Are PIPEs a Bet on Growth Options?*

Katrina Ellis
Finance Discipline
Faculty of Economics and Business
University of Sydney
Sydney, NSW 2006
Australia

Garry Twite†
School of Finance, Actuarial Studies &
Applied Statistics
College of Business and Economics
Australian National University
Canberra, ACT 0200
Australia
garry.twite@anu.edu.au

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† Corresponding author: School of Finance, Actuarial Studies and Applied Statistics, Australian National University, Canberra ACT 0200, Australia. Email: garry.twite@anu.edu.au; phone: 61 (2) 6125-9190; fax: 61 (2) 6125-0087.

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Abstract

In this paper we explore the possibility that the presence of uncertain growth opportunities contribute to the use of PIPE financing. We conjecture that the existence of information asymmetry induces the firm to undertake a private placement and that the characteristics of the firm's investment opportunity set influences the choice to issue common stock PIPEs. In particular, common stock PIPE issuers have not yet achieved measurable milestones in their operations, facing high uncertainty about future cash flows. We find that in the presence of high information asymmetry, firms choosing to issue common stock PIPEs rather than SEOs are smaller research and development intensive firms, investing heavily but with negative cash flow. Consistent with PIPE issuers being at an earlier stage of development and facing high payoff uncertainty; the likelihood of undertaking a PIPE issue decreases with sales, profitability and capital expenditure, and increases with patents. Further, they exhibit a relatively low likelihood of default and positive returns prior to the issue. Finally, consistent with the existence of profitable growth opportunities, we find that the return distribution of common stock PIPEs have large positive extreme values.

Keywords: private placements, private equity, PIPE securities, R&D
JEL Classifications: G23, G32

1. Introduction

Most publicly-traded companies have operations that produce cash flows that can be utilized to fund the ongoing operations and growth investments of a company. However, when these cash flows are insufficient to fund all investments, companies turn to external sources of financing and select the source of financing that best suits their investment needs and provides capital at the lowest cost. PIPE (private investment in public equity) financing is one such form of external financing that is available to firms,[1] albeit a form of financing that it is suggested represents last resort equity financing (Chen, Dai and Schatzberg, 2010) and in the past has earned a "toxic" reputation.[2]

Existing literature on the choice of security type and issuance method has to a large part focused on the role played by information asymmetry in determining both firm preferences for external financing and the incentive for investors to become informed. For example, Myers and Majluf (1984) find that asymmetric information results in external financing choices exhibiting a pecking order, with less informationally sensitive securities such as debt and convertibles being chosen first by firms with asymmetric information. While Chemmanur and Fulghieri (1999) show that the likelihood that a firm will choose a private over a public placement increases with higher levels of information asymmetry, arguing that private investors have higher incentives to produce costly information than dispersed public investors. Gomes and Phillips (2006) also argue firms that access private sources of financing rather than public sources of financing do so

[1] As identified by Chaplinsky and Haushalter (2006) PIPEs differ from private placement on several dimensions, in particular, private placements usually include restricted stock, whereas PIPE issues can be publicly traded. See Wruck and Wu (2005) for a discussion of private placements.

[2] For example, Huemer (2004) asserts that while PIPEs has legitimate applications it has also witnessed its share of abuse and controversy, with the most controversy being generated by "death-spiral" or "toxic" convertible bonds that have a resetting conversion price, granting more stock to the PIPE investor as the stock price declines. These bonds becoming popular in the wake of the telecoms and internet bust, "as rapidly sinking companies grasped at straws to keep themselves afloat".

because they face higher information asymmetry, examining the choice of funding between public and private debt, equity or convertibles, they find that firms choosing private equity over public are smaller, have more research and development expense, and have worse operating performance prior to the offering.

In this paper, we explore the possibility that firm size, performance and the presence of highly uncertain growth options contribute to the use of common stock PIPE financing. SEO issuers that exist within the same industries as the PIPE issuers have different characteristics that enable them to access public equity rather than relying on private equity. Why? We argue that the characteristics of PIPE firms are such that they face more severe information asymmetry. SEO issuers have reached tangible, measurable operations whereas PIPE issuers have not achieved standard operating milestones (e.g., sales, profits, positive operating cash flow). We demonstrate that PIPE issuers face high uncertainty about the future prospects of the firm, as these companies are at a stage where it is still unknown whether a market exists for a product or whether a product can be successfully manufactured. Here private investors have higher incentives to produce costly information than dispersed public investors. By contrast, for SEO issuers some of the uncertainty about investment opportunities has been resolved allowing disperse public investors to verify the quality of the investment.

Prior evidence on PIPE issuers provides some insight into the characteristics of these issuers. There is consistent evidence that PIPE issuers are poor performers. Hertzel, Lemmon, Linck and Rees (2002) show for a sample of PIPEs during 1989 to 1996 that return on assets, and operating cash flows are below industry averages, and remain poor even after PIPE investments, while expenditure on capital and research and development

is higher than industry averages both before and after the funding. Consistent with this focus on research and development, Chou, Gombola and Liu (2009) find that poor operating performance clusters in high growth firms. Chen, Dai and Schatzberg (2010) find that firms that subsequently issue PIPEs have greater information asymmetry and weaker operating performance than SEO issuers.

Rather than interpreting the poor operating performance of PIPE issuers as evidence of these being distressed firms, we argue in the life cycle of a firm, firms with strong performance are in the expansion and mature growth stages whereas firms with weak performance are at the early stages (pre-expansion) or late stages (decline). Thus, we seek to differentiate PIPEs poor performance from distress-related poor performance. We conjecture that common stock PIPEs are investments in firms with large growth opportunities that are highly uncertain and have not yet come to fruition. The growth options exist because the firms are investing heavily in research and development that provides investment opportunities that have a low probability of a high-payoff outcome. These firms not only have high information asymmetry characteristic of research and development firms, but this is exacerbated by high uncertainty about the likelihood and scale of future payoffs. In effect, common stock PIPEs can be viewed as a follow-on round of venture capital for companies that went public too early in their development.[3]

To examine our hypothesis we focus on a sample of research and development intensive firms. In particular, we compare the firm characteristics of common stock PIPE issuers versus SEO issuers for a sample of external equity issues over the period 1991 to 2007 in "high" research and development industries - computers, biotechnology,

[3] Hertzel, Huson and Parrino (2009) find evidence consistent with the staging of issues in the public equity market similar to that observed in the venture capital market.

electronics, healthcare products, internet, mining, oil & gas, pharmaceuticals, software and telecommunications. The information asymmetry generated by research and development activity is idiosyncratic to the firm, implying that investors can derive little or no information about the firm's performance and value from observing comparable firms. This allows us to focus on the impact of firm characteristics that drive cross-sectional differences in both firm performance and uncertainty with regard to future operating performance on the choice of financing, PIPE versus SEO.[4]

Our results have implications for our understanding of the PIPE and SEO markets, supporting our conjecture that common stock PIPEs are investments in firms with large growth opportunities that are highly uncertain and have not yet come to fruition, as a consequence, these firms exhibit both extreme levels of information asymmetry and uncertainty about the firm's future payoffs.

While there were twice as many PIPEs than SEOs during the 1991 to 2007 period, they were considerably smaller, with the average amount raised in a PIPE being only 15.2% of the amount raised in the average SEO. Also, the dominant PIPE structure is a common stock PIPE, accounting for 62.1% of all issues and 59.0% of the capital raised, with the structured PIPEs accounting for only 18.9%% of all issues and 12.1% of the capital raised. In support of our conjecture that common stock PIPE issuers are not distressed firms, but firms at the start of their growth phase, we find the return on common stock PIPE issuers is positive during the 12 months prior to the issue and

[4] The choice between PIPE and SEO issue reflects alternative paths that result in issue of publically tradable securities. In a typical PIPE issue, the company relies on an exemption from SEC registration requirements to issue investors common stock or securities convertible into common stock for cash. The company then registers the resale of the common stock issued in the private placement, or issued upon conversion of the convertible securities issued in the private placement, with the SEC. However, because the company registers the resale of the PIPE shares, investors are free to sell them into the market as soon as the SEC declares the resale registration statement effective.

compared to the population of all intensive research and development industries, the likelihood of default is extremely low with a positive trend in asset growth.

Both PIPE issuers and SEO issuers are investing heavily in growth opportunities and have negative cash flow, relying heavily on outside financing during the year prior to the equity issue. We find that the likelihood of undertaking a common stock PIPE issue decreases with sales, profitability and capital expenditure, but increases with the greater the proportion of firm assets represented by patents.

Finally, consistent with the conjecture that common stock PIPEs are investments in firms with large highly uncertain growth opportunities, we find that the return distribution of common stock PIPEs have large positive extreme values. In contrast to the pervasive poor performance found by Chaplinsky and Haulthauser (2010) and Brophy, Ouimer and Sialm (2009), we do not find that PIPE investments always underperform.

The remainder of the paper is organized as follows. Section 2 discusses the influence of information asymmetry, payoff uncertainty and growth options on the choice to issue PIPEs versus SEOs. Section 3 describes the data. Section 4 presents the empirical results, and Section 5 concludes.

2. PIPEs and firm characteristics

This section discusses how firm characteristics influence the choice of firms seeking external equity financing, in particular, PIPEs. Specifically, we consider the role played by payoff uncertainty and growth options. We conjecture that the existence of information asymmetry induces the firm to undertake a private placement, issuing securities to private parties who may be better informed or who may more efficiently

produce information, thus mitigating informational problems. Second, the characteristics of the firm's investment opportunity set influences the choice of issuance mechanism. In particular, the higher the uncertainties about the scale and likelihood of future cash flows and the more profitable growth options, the more likely the firm is to undertake a PIPE issue.

We argue that firms choosing to issue PIPEs rather than SEOs are smaller research and development intensive firms with identified growth opportunities, but at an earlier stage of development facing high payoff uncertainty and severe information asymmetry.

2.1 PIPE issuance, information asymmetry, payoff uncertainty and growth options

All corporate investments create information asymmetries, managers can continually observe changes in investment productivity on an individual asset basis whereas outsiders obtain only highly aggregated information on investment performance at discrete points of time. However, because of its uniqueness, the extent of information asymmetry associated with research and development is larger than that associated with tangible assets. Research and development differs from other capital expenditures (e.g., property, plant, and equipment expenditure) along several important dimensions related to the level of information asymmetry. First, many research and development projects are unique to the firm, whereas other capital expenditures share common characteristics across firms within an industry. Consequently, investors can derive little or no information about the firm's performance and value from observing other firms. Second, while "real" assets can be traded in markets, where prices convey information about asset profitability and

values, the market for research and development (including patents) is non-existent or illiquid. Existing empirical evidence is consistent with higher information asymmetry being associated with research and development activities. For example, Barth, Kasznik, and McNichols (1998) find that analyst coverage is significantly larger for research and development intensive firms. While, Aboody and Lev (2000) find that research and development is a major contributor to information asymmetry and gains from insider trading.

Finally, the outcome of research and development expenditure is the acquisition of real assets. Information with regard to the likely success of research and development is idiosyncratic, particularly in the early stage of research and development activity. The more uncertain the firm is with regard to the likely success of research and development activities and the timing of subsequent real asset acquisition, the higher the uncertainty faced by both insiders and outsiders, irrespective of the level of information asymmetry.

We argue that the characteristics of common stock PIPE firms are such that they face severe information asymmetry, hypothesizing a life cycle argument to explain the difference in funding choice between PIPEs and SEOs in intensive research and development industries. In the life cycle, firms proceed from concepts through to startup, then rapid growth, followed by expansion, mature growth and perhaps eventually decline. Our first hypothesis is that SEO issuers have reached tangible, measurable operations whereas PIPE issuers have not achieved standard operating milestones (e.g., sales, profits, positive operating cash flow).

For SEO issuers, these firms are in the expansion phase where some of the uncertainty about research ventures has been resolved and is apparent to both insiders and

outsiders and so public investors have sufficient information to provide funding to the firm. By contrast, PIPE issuers are at the rapid growth phase in the life cycle where the process of moving from concept to expansion is still uncertain. The growth options exist because the firms are investing heavily in research and development that provides investment opportunities that have a low probability of a high-payoff outcome. For these companies the insiders will likely face as much uncertainty about the future prospects of the firm as outsiders do, as these companies are at a stage where it is still unknown whether a market exists for a product or whether a product can be successfully manufactured. Here private investors have higher incentives to produce costly information than dispersed public investors.

As further support for the argument that PIPE issuers are high-growth potential firms we expect to find that PIPE issuers have higher growth opportunities than SEO issuers, evidence by higher research and development expenditure and more patents.

PIPEs can be viewed as a follow-on round of venture capital for companies that went public too early in their development. The payoffs to PIPE companies are similar to the payoffs to venture-financed private firms: in a venture capital portfolio most firms will fail, but the portfolio will provide high returns due to one or two firms that are five-baggers or ten-baggers (i.e., provide returns of 500% or 1000%). From the perspective of the investor a PIPE is a highly risky investment, but a rational investor recognizing the possibility of positive payoff arising from the existence of growth opportunities would provide capital to this firm if the security was fairly priced to compensate for the high-risk. Hence, we hypothesize that the future returns to PIPEs will have wider variance than SEOs with fat tails in positive payoffs.

According to a Sagient Research report in 2004 (Financial Engineering News, 2004), the PIPE market has become more popular since the tech bubble burst in a manner consistent with our conjecture: the insatiable appetite of public investors for high-growth tech companies during the late 1990s that resulted in many of these types of companies rushing to IPO completely vanished after the market correction in 2001-2002 and cash-strapped public companies turned to PIPE financing as a way to fund their growth. Hence, we expect that the mix of common stock PIPE investors will reflect their similarity to venture-financed private firms. We hypothesize that common stock PIPE investors will be composed of a greater proportion of venture capitalists and equity funds and less hedge funds than structured PIPEs.

Prior evidence on PIPE issuers provides some insight into the characteristics of these issuers. There is some consistent evidence that PIPE issuers are poor performers: Hertzel, Lemmon, Linck and Rees (2002) show for a sample of PIPEs during 1989 to 1996 that return on assets, and operating cash flows are below industry averages, and remain poor even after PIPE investments, while expenditure on capital and research and development is higher than industry averages both before and after the funding. Similar results are report by Chen, Dai and Schatzberg (2010) for the period 1996 to 2006. Consistent with this focus on research and development, Chou, Gombola and Liu (2009) find that poor operating performance clusters in high growth firms.

In addition, existing literature has suggested that PIPEs are a way for hedge funds to gouge wealth out of firms that are on the brink of bankruptcy. They claim that firms in financial distress turn to the PIPE market to provide the needed financing, however, instead of continuing, the firms decline. Hillion and Vermaelen (2004) focus on a set of

reset convertible PIPEs which allow the conversion price to be reset if the stock price falls, but not if the price rises above the original stock price. They argue that these are poorly-contracted securities as the security design encourages investors to simultaneously short-sell the stock and push down the stock price resulting in a so-called "death spiral". Consistent with this suggestion, Chaplinsky and Haushalter (2010) provide evidence that investors in these price protected pipes earn positive abnormal returns while regular stock holders suffer from negative abnormal returns, while Brophy, Ouimer and Sialm (2009) show that hedge funds are the main investors in these securities. We argue that price protected PIPES are different from common stock PIPES and the issuers have markedly different features.

Rather than interpreting the poor operating performance of PIPE issuers as evidence of these being distressed firms, we argue that firms being at an early stage of their life cycle can explain the poor performance of common stock PIPEs. This leads to the conjecture that structured PIPEs are distressed issuers, distinct from common stock PIPEs.

3. Data

We collected a sample of PIPE issuers during 1991 to 2007 from Sagient Research who maintain the Placement Tracker database and a sample of SEO issuers during the same time frame from Thomson Financial's SDC database.[5] Table 1 provides the frequency and proceeds of PIPEs over this time frame. There were twice as many PIPEs than SEOs (15,863 versus 8,314) though the average amount raised via PIPEs is only $17.2 million compared to $113.4 million raised in the average SEO. In addition, PIPEs are

[5] We are currently in the process of extending the sample to cover the period 1991 to 2011.

categorized into traditional and structured PIPEs. Traditional PIPEs are defined to include common stock, with or without warrants or fixed-price convertible debt, again with or without warrants. Over these seventeen years more than $273 billion was raised via PIPE financing, with the dominant structure being a traditional PIPE (either common stock or fixed convertible debt). Traditional PIPEs account for 81.1% of the issues and 87.8% of the capital raised. Finally, common stock PIPE issues are the dominant traditional PIPE issue, accounting for 76% of the issues and 67% of the capital raised. Thus, the PIPE market has changed significantly from the samples examined in prior research (Chaplinsky and Haushalter, 2010; Brophy, Ouimer and Sialm, 2009). We focus on the sample of common stock PIPE issues, comprising 9854 issues raising an average of $16.3 million per issue.

[Table 1 about here]

In order to examine our hypothesis about payoff uncertainty and growth options, we first have to determine the industries that use common stock PIPE financing. Sagient Research provides an industry classification for all PIPE issuers and using 2-digit SIC codes from Compustat, the firms are dispersed over 32 2-digit SIC codes. Table 2 shows the top ten industries (ranked on number of PIPE issues) during 1991 to 2007. These industries account for 76% of all the common stock PIPEs, and 58% of dollar volume of common stock PIPEs. Thus, PIPEs are highly concentrated in these industries that represent intensive research and development industries, as the industry median research and development expense is higher than the overall median Compustat firm. Hence, we

restrict our sample to those PIPEs in the Computers, Biotechnology, Electronics, Healthcare Products, Internet, Mining, Oil & Gas, Pharmaceuticals, Software and Telecommunications industries as identified by Sagient Research.

[Table 2 about here]

Although the focus of our sample (namely, the ten intensive research and development industries) covers the majority of PIPEs, it is important to note that in restricting our sample we are missing some of the larger PIPEs. The large PIPEs that we are ignoring tend to be PIPEs issued by Utilities (5.1% of dollar volume), REITs (3.8%), or Pipelines (3.8%). These industries are capital intensive with high levels fixed assets, and do not fit with the rationale that we are providing for common stock PIPE issuance, but would be an interesting area to study separately.

We make use of annual analyst earnings forecasts from IBES to proxy for information asymmetry. Lang and Lundholm (1996) show that both analyst forecast accuracy and dispersion decrease when firms make more informative earnings disclosures, where improved disclosure reduces information asymmetry. We incorporate three earnings forecast variables, analyst following (*Number*), analyst forecast error measured as median forecast less actual earnings normalized by share price (*Error*) and the dispersion of analyst forecasts measured as the standard deviation of earnings forecasts normalized by share price (*Dispersion*). In addition, the idiosyncratic volatility of the stock, has also been used in the literature recently as a measure of information

asymmetry[6], (*Volatility)*, measured as the standard deviation of the residuals from a Carhart 4-factor model estimated for the 60 months prior to the PIPE issuance and SEO dates, respectively. We require that each firm have at least 30 months of returns. From the initial sample of 7480 pipes, there are 4339 that have at least 30 months of returns during the 60 months prior to the PIPE issuance date. While for the initial sample of matching SEOs, there are 4526 that have at least 30 months of returns during the 60 months prior to the SEO date.

We include variables to proxy for growth opportunities and uncertainty regarding future payoffs. We proxy growth opportunities using research and development expenditure to total assets (*RD*), one, three and five year growth in research and development expenditure, (*RD Growth*) and patents estimated as intangible assets less goodwill over total assets (*Patents/Assets*). We argue that future payoff uncertainty is higher when firm investment activity is at an earlier stage, reflected in lower operating performance and investment in fixed assets. Hence, we proxy future payoffs uncertainty using sales (*Sales*), one, three and five year sales growth (*Sales Growth*), sales over total assets (*Turnover*), cash flow from operations over total assets (*CFOps*), cash flow from investment over total assets (*CFInv*) and capital expenditures less proceeds from sale of PP&E over total asset (*Capex*).

Drawing from the existing literature we include firm characteristics to control for firm external financing demands, in particular, cash plus marketable securities over total assets (*Cash*), total long term debt over total assets (*Leverage*), operating income after depreciation over total assets (*EBIT*) and cash flow from financing over total assets (*CFFin*). For companies with negative cash flows from operations we estimate cash over

[6] See Boehme, Danielsen, and Sorescu (2006) for references.

cash flow from operations (*Burn*) and gross proceeds over cash flow from operations (*Time*) both expressed in years.

4. Results

4.1 PIPEs as another round of venture financing

Gomes and Phillips (2006) argue, firms that access private sources of financing rather than public sources of financing do so because they have higher information asymmetry. Consistent with this, we argue that PIPE issuers and SEO issuers in the same research and development intensive industry face the same growth opportunities, but the SEO issuers face less information asymmetry and lower uncertainty with regards to future payoffs, because their operations have achieved milestones that allow the public market to verify the quality of the investments. By contrast, the PIPE issuers are at an earlier stage of growth, and have yet to achieve these milestones.

In Table 3 we match PIPE issuers in the ten intensive research and development industries that have data on CRSP and Compustat (2928 PIPEs) to SEO issuers in the same two-digit SIC code, same year of issuance and closest in size measured by total assets. The table summarizes the characteristics of the firms, presenting the mean and median of each firm characteristic variable.

[Table 3 about here]

It is clear from Table 3 that we are focusing on small-cap companies (the average of total assets is $112 million), and on all dimensions of operations the PIPE issuers are not as robust as their SEO counterparts. Interestingly, PIPEs and SEOs undertake similar levels of research and development expenditure. Thus, both PIPE and SEO issuers in these high-growth industries are investing heavily in growth opportunities, with PIPE issuers holding a greater proportion of assets in patents, as a measure of growth opportunities.

PIPE firms face higher information asymmetry than SEO firms, with higher idiosyncratic volatility. Further, both earnings forecast error and dispersion are higher for PIPEs than SEOs, while the number of analysts following the stock is lower.

Both PIPE and SEO issuers are cash flow negative. This is in contrast to Gomes and Phillips (2006) who examine all public equity issuances and find that SEO issuers are on average profitable. Thus, our focus on intensive research and development industries demonstrates that the SEOs in these particular industries are not yet profitable, and investors in these SEOs are also investing in growth opportunities. Both PIPE and SEO firms have relied heavily on outside financing during the year prior to the PIPE, with cash flow from financing representing 57% of assets for PIPEs and 37% of assets for SEOs.

SEO firms are burning through less cash: for those with negative cash flow from operations (86% of PIPEs, 66% of SEOs) PIPE firms have a median of only 1.1 years of cash remaining prior to the PIPE issue compared to 1.5 years remaining for the cash flow-negative SEOs. In addition, as more money is raised in an SEO, the time gained via the financing is only 1.2 years (median) for PIPE issuers compared to 10.8 years for SEO issuers.

Although the SEO firms are cash flow negative, they are generating more sales, more cash flows from operations and higher sales growth than their PIPE counterparts, which suggest that common stock PIPE issuers are at an earlier stage of development, facing high uncertainty about future cash flows.

In addition to examining the univariate differences in firm characteristics, we use a logistic regression modeling the choice of PIPE or SEO issuance as a function of firm characteristics that reflect growth opportunities and payoff uncertainty, controlling for both firm characteristics that reflect external financing demand and information asymmetry. We distinguish between two measures of information asymmetry, namely, analyst following and the idiosyncratic volatility of the stock.

Consistent with our hypothesis the results in Table 4 show that firms which are less profitability, have less sales, less cash, less investment in property, plant and equipment, more investment in patents, lower price-to-book and are facing more severe information asymmetry (measured as analyst following or idiosyncratic volatility) are more likely to issue a PIPE than SEO.

However, there is a negative relationship between research and development expense and choosing a PIPE that is not supportive of our conjecture.

[Table 4 about here]

Overall, SEO firms in the same high-growth industries as PIPE firms are cash flow negative and investing heavily in research and development similar to PIPE firms, suggesting that investors are looking for growth options to create value. Both firms are

raising external cash because they cannot sustain their operations via internal financing, however the large differences are that the SEO firms have reached more milestones than PIPE firms. For PIPE issuers sales and investment in property, plant and equipment is lower, but the investment in patents is higher. This suggests that PIPE issuers are at an earlier stage in their life cycle with identified investment opportunities, facing higher uncertainty about future payoffs.

In addition to comparing common stock PIPE issuers to a matched sample of SEO issuers, we compare firm characteristics for a sub-sample of PIPE issuers who subsequent undertake an SEO. Specifically, we compare the firm's characteristics at the time of the SEO issue with those at the time of both the first and last PIPE issue prior to the firm's SEO issue.

[Table 5 about here]

It is clear from Table 5 that at the time of the subsequent SEO, PIPE issuers are more developed and hence have less uncertainty about their future operating performance. While they continue to generate negative cash flows, at the time of the subsequent SEO, PIPE issuers are more profitable, burning less cash, higher cash flows from operations, investing more in property, plant and equipment and have higher sales.

Finally, reflecting the conjectured similarity between common stock PIPE investors and venture-financed private firms we consider the mix of investor types in common stock PIPE compared to structured PIPEs. Table 6 presents the mean proportional dollar contribution (investment amount/gross proceeds) of each investor

type as identified by Sagient Research, namely, bank, broker, corporation, hedge fund, insurance, mutual fund, pension fund, private equity, trusts and venture capital firm.[7]

[Table 6 about here]

Consistent with expectations we find common stock PIPE investors are composed of a greater proportion of private equity funds and less hedge funds than structured PIPEs. However, there is no difference in the contribution of venture capital firms. In addition, we find that the proportion of funds contributed by corporations, insurance firms, mutual funds, pension funds and trusts to common stock PIPE issues is greater than that for structured PIPEs.

4.2 Are PIPE issuers distressed firms?

The existing literature[8] suggests that the poor operating performance of PIPE issuers could indicate financial distress, as low sales and negative cash flow from operations could signal that these firms are in decline. In Table 7 we examine returns during the twelve months prior to PIPE issuance. We measure returns both as buy-and-hold abnormal returns and as the intercept from one, three- and four-factor models. The buy-and-hold abnormal returns (BHAR) are calculated using daily returns for both 252 days and 20 days prior to the offering:

[7] Saigent also includes an unknown category, comprising PIPE issues where they are unable to classify the investor. We made use of Hedgeco.net to classify these unknown investors. However, we excluded PIPEs issues where we are unable to classify the investor using either Saigent or Hedgeco.net .

[8] See Hertzel, Lemmon, Linck and Rees (2002); Chaplinsky and Haulthauser (2006) and Brophy, Ouimer and Sialm (2009).

$$BHAR_i = \prod_{t=-252}^{-1}(1+ret_{it}) - \prod_{t=-252}^{-1}(1+vwretd_t) \quad (1)$$

where *vwretd* is the value-weighted market return from CRSP.

[Table 7 about here]

In Table 7, Panel B we construct portfolios each month for the PIPE issuers. Firms are included in the portfolio for months -12 to -1 relative to the issuance date. We use the monthly factors from Ken French and estimate CAPM, Fama-French 3-factor and Carhart 4-factor models of returns.

Both the 252-day and 20-day buy-and-hold abnormal returns are significantly positive for the sample of common stock PIPE issuers. The results from the calendar-time portfolios support the buy-and-hold returns results: common stock PIPEs have significant positive alphas prior to issuance. Thus, PIPE issuers do not appear to be stocks that are underperforming, rather these firms are raising external financing after positive returns. Albiet, the 252-day buy-and-hold abnormal returns and portfolio alphas are stronger for the SEO firms.

In addition, we examine the default likelihood for PIPE issuers. If the poor operating performance is a sign of financial distress, then these firms should have higher likelihood of default than SEO issuers and other firms in the same industry. We follow the methodology of Vassalou and Xing (2004) and Bharath and Shumway (2008) and calculate a default probability by valuing the firm's equity as a call option on the firm's assets via the Black-Scholes formula. The implied probability of default is given by:

$$\pi = \mathrm{N}\left(-\left(\frac{\ln(V/F) + (\mu_v - 0.5\sigma_v^2)T}{\sigma_v\sqrt{T}} \right) \right) \quad (2)$$

Where V is the value of the firm's assets which follows a stochastic process with drift μ_v and volatility σ_v. F is the face value of debt, and we set T=1, thus the implied probability represents the likelihood of default over a one year timeframe.

In Table 8, Panel A the mean default probability for common stock PIPE issuers is 7.02%, this is higher than SEO issuers (1.85%) but lower than the mean default probability of 11.83% for all 6511 firms in the high-tech industries. In addition, both PIPE and SEO issuers have positive asset drift on average compared to a negative average drift for the industry. Thus, although the PIPE issuers have weak operational performance, these firms do not have a high likelihood of default, and assets are growing rather than declining.

[Table 8 about here]

To further demonstrate that common stock PIPE issuers are not likely to be firms on the brink of bankruptcy, we examine the characteristics of the firms in the highest default-likelihood quartile for the intensive research and development industry. In Table 9 we show that the characteristics of these 1736 firms are starkly different from the common stock PIPE issuers. The distressed firms are larger, more levered, with less spending on research and development and capital expenditures than the PIPE issuers.

Both groups have negative cash flow from operations on average, but the asset values have negative drift for the distressed firms indicating that these are firms in decline in contrast to the PIPE issuers with positive drift and significantly lower likelihood of default.

[Table 9 about here]

In summary, although common stock PIPE issuers have worse operating performance than SEO issuers, this does not appear to be a sign of distress as PIPEs are issued following positive abnormal returns and the default probabilities are low relative to the industry average.

4.3 Future returns and growth options

The investment in research and development is rational: these firms may not show current cash flows and sales, but there is a small probability that future sales and cash flows will be positive (and large).

As we expect the payoffs to these growth opportunities to be highly non-normal, we do not expect mean returns to be particularly informative. Instead we will examine the distribution of future returns and we expect that the PIPEs will have more widely dispersed returns (with a fat right tail) than SEO returns.

We examine abnormal returns from the Carhart 4-factor model. Rather than constructing portfolios of PIPE firms, we conduct firm-specific regressions and then examine the distribution of the firm-specific alphas. This will result in more noise than

examining portfolio alphas, but as our interest is in the dispersion rather than mean, firm-specific alphas allow us to measure this.

In Table 10 we examine the returns distributions for our sample of common stock PIPEs and the matching SEOs. In contrast to the pervasive poor performance found by Chaplinsky and Haulthauser (2010) and Brophy, Ouimer and Sialm (2009), we do not find PIPE investments underperform. The mean for our sample of common stock PIPEs is positive, but cannot be distinguished from the mean return for the matching SEOs.

[Table 10 about here]

Consistent with the conjecture that common stock PIPEs are investments in firms with large highly uncertain growth opportunities, we find that our sample of common stock PIPEs have more dispersed long-run returns than SEOs, with large positive extreme values.

4.4 Research and development intensive firms, information asymmetry and PIPE issues

In this section we examine the extent to which the measurement of information asymmetry and our sample selection procedure drives our results.

We again presents the logistic regression modeling the choice of PIPE or SEO but distinguish between two alternative measures of information asymmetry, namely, analyst forecast error and the dispersion of analyst forecasts.

[Table 11 about here]

Consistent with previous results, Table 11 shows that firms are less profitability, have less sales, less cash, less investment property, plant and equipment, more investment in patents and lower price-to-book ratio. However, the results with respect to the alternative measures of information asymmetry are mixed. There is a negative relationship between the dispersion of analyst forecast and choosing a PIPE that is not supportive of our conjecture.

Finally, we also examine the choice of PIPE or SEO issuance for the full sample of PIPE issues. We distinguish PIPE issues by research and development intensive firms, using an intensive research and development/common stock PIPE dummy variable that takes a value of one for firms in the 10 industries we previously identified as intensive research and development industries and undertakes a common stock PIPE issue and zero otherwise. Overall, the results are substantially unchanged.

5. Conclusion

Common stock PIPE issues are risky bets on low probability positive outcomes. They are clustered in firms with high research and development expenditures, facing severe information asymmetry and high cash flow uncertainty. Investors are looking for indicators of growth options (research and development expenditure and patents) and measures of the verifiability of future payoffs (current sales, current cash flow from operations and capital expenditure). Firms are issuing common stock PIPE financing because they have not yet achieved the level of operations reveal their potential success

to public investors, whereas firms that have achieved these levels issue SEOs. Common stock PIPE issuers are not high-distress firms; having stock price run-ups prior to issuance, and low likelihood of default.

Finally, common stock PIPEs are investments in firms with large highly uncertain growth opportunities, having more dispersed long-run returns than SEOs, with large positive extreme values.

In contrast to prior research, we find that common stock PIPEs are a useful source of financing for firms facing extreme information asymmetry with highly uncertain future payoffs, and do not appear to underperform in the long run.

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Table 1
Issue Frequency and Proceeds

This table presents the frequency and proceeds of PIPEs (private investment in public equity) and SEOs (secondary equity offerings) over the period 1991 to 2007. PIPEs are categorized into traditional and structured PIPEs. Traditional PIPEs are defined to include common stock, with or without warrants or fixed-price convertible debt, again with or without warrants. Structured PIPEs incorporate price reset.

Panel A						
Year	N	Average Proceeds ($M)	Total Proceeds ($M)	N	Average Proceeds ($M)	Total Proceeds ($M)
	PIPE			SEO		
1991	41	7.88	323	457	65.02	29,713
1992	113	17.13	1,936	490	64.65	31,679
1993	152	12.70	1,931	704	63.81	44,924
1994	155	8.69	1,347	441	63.23	27,883
1995	323	16.11	5,203	588	84.35	49,599
1996	658	17.78	11,696	711	95.83	68,135
1997	673	11.57	7,784	673	98.13	66,045
1998	595	9.12	5,425	526	158.38	83,310
1999	967	14.19	13,722	397	181.29	71,972
2000	1521	14.59	22,188	366	141.62	51,833
2001	1469	12.77	18,752	381	132.40	50,445
2002	1494	14.28	21,328	367	127.53	46,803
2003	1801	22.88	41,198	459	130.41	59,860
2004	1404	10.30	14,462	531	127.53	67,720
2005	1498	12.48	18,696	414	138.80	57,464
2006	1612	16.40	26,431	439	161.03	70,693
2007	1386	43.66	60,508	370	174.97	64,738
1991 - 2007	15863	17.22	273,140	8314	113.40	942,815

Panel B						
	Traditional PIPE			Structured PIPE		
1991	31	8.17	253	10	6.96	70
1992	50	25.42	1,271	63	10.56	665
1993	67	15.09	1,011	85	10.82	920
1994	77	11.64	896	78	5.78	451
1995	232	20.15	4,675	91	5.80	528
1996	403	24.85	10,016	255	6.59	1,680
1997	421	15.21	6,405	252	5.47	1,379
1998	383	11.35	4,348	212	5.08	1,077
1999	810	15.63	12,660	157	6.76	1,062
2000	1211	16.47	19,950	310	7.22	2,238
2001	1196	14.86	17,772	273	3.59	980
2002	1294	15.87	20,535	200	3.97	793
2003	1655	24.12	39,911	146	8.82	1,288
2004	1227	11.52	14,130	177	1.88	332
2005	1227	14.45	17,733	271	3.55	963
2006	1373	18.39	25,251	239	4.94	1,180
2007	1209	35.66	43,116	177	98.26	17,392
1991 - 2007	12866	18.65	239,934	2996	11.01	32,998

Table 1 (continued)

Panel C						
Year	N	Average Proceeds ($M)	Total Proceeds ($M)	N	Average Proceeds ($M)	Total Proceeds ($M)
	Traditional PIPEs					
	Common Stock PIPE			Convertible Debt PIPE		
1991	22	3.24	71	9	20.23	182
1992	38	20.00	760	12	42.61	511
1993	42	11.48	482	25	21.15	529
1994	54	9.34	504	23	17.05	392
1995	153	11.46	1,753	79	36.99	2,922
1996	269	18.28	4,919	134	38.04	5,097
1997	274	14.50	3,974	147	16.54	2,431
1998	285	8.72	2,484	98	19.02	1,864
1999	616	13.45	8,283	194	22.56	4,377
2000	927	14.02	12,998	284	24.48	6,952
2001	876	13.86	12,140	320	17.60	5,631
2002	976	13.91	13,572	318	21.90	6,963
2003	1306	17.51	22,866	349	48.84	17,045
2004	960	10.57	10,150	267	14.91	3,981
2005	951	12.45	11,835	276	21.37	5,898
2006	1124	17.83	20,044	249	20.91	5,207
2007	981	35.11	34,446	228	38.03	8,670
1991 - 2007	9854	16.36	161,282	3012	26.11	78,651

Table 2
PIPE Issuance by Industry

This table presents the frequency and proceeds of common stock PIPEs issued by the top nine industries (ranked on number of PIPEs) during the period 1991 to 2007. Industry classification is as defined by Sagient Research.

Industry	Number of PIPEs	Percent of Total	Total Proceeds ($M)	Percent of Total
Mining	2401	24.37%	18,423	11.42%
Oil & Gas	1094	11.10%	18,754	11.63%
Pharmaceuticals	834	8.46%	14,037	8.70%
Biotechnology	690	7.00%	10,888	6.75%
Internet	585	5.94%	6,898	4.28%
Healthcare Products	544	5.52%	6,877	4.26%
Telecommunications	417	4.23%	7,655	4.75%
Software	377	3.83%	5,130	3.18%
Computers	324	3.29%	2,732	1.69%
Electronics	214	2.17%	1,998	1.24%
Top Industries as a group	7480	75.91%	93,394	57.91%
Other Industries	2374	24.09%	67,889	42.09%
Total	9854		161,282	

Table 3
PIPEs versus SEOs

The table matches each common stock PIPE to an SEO, matching on year, industry (2-digit SIC code), and closest in size measured by assets. The table summarizes the characteristics of the firms, presenting the mean and median of each variable. We test for the differences in means between PIPEs and SEOs using a *t*-test and difference in medians is tested via a Wilcoxon test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively. Variables are defined as follows:
Assets (in millions), Sales (in millions), Turnover = Sales / Assets, Cash = Cash plus marketable securities / Assets, Leverage = Total Long Term Debt / Assets, CFOps = Cash Flow from Operations / Assets, CFInv = Cash Flow from Investments / Assets, CFFin = Cash Flow from Financing / Assets, RD = Research and Development Expense / Assets, EBIT = Operating Income after Depreciation / Assets, Burn = Cash / Cash Flow from Operations (only for companies with negative CFOps) (years), Time = Gross Proceeds / Cash Flow from Operations (only for companies with negative CFOps) (years), Capex = Capital Expenditures / Asset, RD Growth =((RD(t+k) – RD(t))/RD(t))^1/k – 1, k = 1,3,5, Sales Growth = ((Sales (t+k) – Sales (t)) / Sales(t))^(1/k) – 1, k = 1,3,5, Patents = Intangibles less goodwill / Assets, Price/Book = Market Value of Equity at fiscal year end/Book value of equity, Price/Book+ = exclude all with negative book value of equity, Proceeds = millions from offering, Proceeds/Book = offering proceeds/book value of equity, Number = analyst following, Error = (median forecast - actual earnings)/share price, Dispersion = standard deviation of earnings forecasts/share price, Volatility = the standard deviation of the residuals from a Carhart 4-factor model estimated for the 60 months prior to the PIPE issuance and SEO dates.

Firm characteristics	PIPE			SEO		
	N	Mean	Median	N	Mean	Median
Assets	2928	112.08***	21.99***	2928	218.97	32.23
Sales	2922	57.76***	5.99***	2926	120.58	15.41
Turnover	2922	62.79%	28.98%***	2926	67.88%	41.71%
Cash	2928	42.61%**	39.98%*	2928	44.29%	41.72%
Leverage	2925	24.58%	0.70%***	2927	11.48%	0.94%
CFops	2909	-60.56%***	-27.83%***	2923	-28.20%	-12.95%
CFinv	2909	-2.42%***	-4.62%***	2923	-6.79%	-5.42%
CFfin	2909	57.40%***	27.96%***	2923	36.69%	22.96%
RD	2315	44.76%	26.82%	2288	41.91%	25.05%
EBIT	2922	-80.68%***	-37.81%***	2926	-38.11%	-22.84%
Capex	2903	7.03%	3.19%***	2915	6.70%	3.21%
Burn	2429	7.78*	1.07***	1963	3.86	1.54
Time	2429	12.34	1.16***	1937	81.82	10.82
1 yr RD growth	2098	52.09%	12.92%***	2069	51.08%	24.48%
3 yr RD growth	1694	20.06%*	12.26%***	1635	22.50%	18.47%
5 yr RD growth	1264	14.50%**	10.41%***	1172	17.44%	18.56%
1 yr sales growth	2360	781.53%	11.05%***	2658	286.09%	30.22%
3 yr sales growth	1967	34.69%	9.08%***	2013	35.50%	23.21%
5 yr sales growth	1517	14.30%***	7.58%***	1526	19.82%	15.90%
Patents	2586	3.85%***	0.01%***	2536	2.43%	0.00%
Price/Book	2718	-7.02***	3.64***	2682	13.99	5.36
Price/Book +	2415	10.51***	4.21***	2422	21.41	6.06
Proceeds	2928	18.65***	7.50***	2885	125.24	84.70
Proceeds/Assets	2928	228.60%***	35.07%***	2885	815.06%	221.04%
Number	1047	2.85***	2.00***	2323	3.74	3.00
Error	973	-8.06%	-1.94%	2232	-4.32%	-4.29%
Dispersion	630	15.08%	6.00%***	1874	13.90%	4.00%
Volatility	1783	25.27%***	23.06%***	2033	21.68%	20.54%

Table 4
Logistic Regression of Probability of PIPE or SEO

This table presents a logistic regression modeling the choice of PIPE or SEO issuance as a function of firm characteristics. The dependent variable is a dummy taking a value of 1 if the firm undertakes a common stock PIPE issue. Other variables are as defined in Table 3. We test for significance using a *t*-test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively.

Probability of PIPE issue	Coefficient	Std error	Coefficient	Std error
Intercept	0.9348***	0.1412	0.4757***	0.1395
Assets	0.0020***	0.0004	0.0002	0.0002
Turnover	-0.2444***	0.0675	-0.2457***	0.0656
Cash	-0.4787***	0.1763	-1.1246***	0.1658
RD	-0.7992***	0.1414	-0.9463***	0.1463
EBIT	-0.7367***	0.1014	-1.0621***	0.1025
Leverage	0.0791	0.1568	-0.0125	0.1290
Patents	1.3037***	0.4478	1.2710***	0.4243
Capex	-0.7887	0.6808	-1.9592***	0.6433
1 Yr RD Growth	0.0251	0.0256	0.0405	0.0256
1 Yr Sales Growth	-0.0003	0.0005	-0.0003	0.0005
Price/Book	-0.0074***	0.0014	-0.0072***	0.0015
Number	-0.3408***	0.0203		
Volatility			0.7352***	0.2756
Pseudo R-Square	23.70%		11.80%	
Percent Concordant	76.60		66.70	
Likelihood Ratio	695.34		331.50	
N	3541		3541	

Table 5
PIPEs and Subsequent SEOs

The table matches each common stock PIPE to the subsequent SEO. The table summarizes the characteristics of the firms, presenting the mean and median of each variable. Days to SEO is the number of calendar days between the PIPE and SEO issuance dates. Other variables are as defined in Table 3.We test for the differences in means between PIPEs and subsequent SEOs a *t*-test and difference in medians is tested via a Wilcoxon test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively.

Firm characteristics	First PIPE before SEO			Last PIPE before SEO			SEO		
	N	Mean	Median	N	Mean	Median	N	Mean	Median
Assets	257	84.31**	30.73***	257	96.56	37.30***	257	144.87	62.51
Sales	255	41.93	6.20***	257	44.98*	9.76***	257	66.34	16.94
Turnover	255	49.51%	22.89%	257	49.75%	25.93%	257	47.75%	26.34%
Cash	257	49.81%	54.67%	257	49.59%	54.42%	257	50.42%	49.65%
Leverage	256	11.04%*	0.89%	257	13.49%	1.08%	256	12.99%	1.96%
CFops	254	-44.72%	-21.76%	257	-45.07%*	-24.35%**	257	-28.10%	-19.14%
CFinv	254	-5.30%	-5.54%	257	-6.30%	-5.26%	257	-7.69%	-6.33%
CFfin	254	50.07%	27.87%	257	47.68%	28.20%	257	38.90%	27.17%
RD	212	43.98%	30.38%	217	45.21%*	32.77%	221	37.72%	29.16%
EBIT	255	-69.68%*	-33.22%**	257	-67.95%	-34.06%***	257	-36.30%	-27.57%
Capex	255	7.75%	3.74%*	256	7.87%	3.67%*	257	6.44%	3.02%
Burn	207	5.70	1.54	211	4.97	1.44**	190	6.13	1.82
Time	207	14.7	1.71***	211	4.76	1.44***	188	477.98	5.62
1 yr RD growth	176	68.51%	25.53%	196	66.75%	23.25%	211	58.36%	22.81%
3 yr RD growth	119	31.84%	23.34%	150	30.03%	20.79%	187	27.42%	18.51%
5 yr RD growth	69	17.57%	14.14%	103	20.06%	14.77%	136	17.57%	16.51%
1 yr sales growth	195	200.76%	23.42%	217	170.61%	24.20%	234	117.93%	28.38%
3 yr sales growth	139	49.09%	17.99%	170	33.23%	16.50%	211	49.94%	20.15%
5 yr sales growth	87	25.67%	15.39%	118	17.91%	15.39%	153	26.93%	18.65%
Patents	221	2.39%	0.00%**	221	2.23%	0.00%	232	2.70%	0.00%
Price/Book	215	3.16	3.73***	229	4.89	4.22	253	-0.82	5.21
Price/Book +	202	7.08	3.91***	212	8.23	4.64	235	12.23	5.39
Proceeds	257	22.18*	11.01***	257	23.40****	13.49	255	147.25	89.30
Proceeds/Assets	257	311.15%	35.80%***	257	237.49%*	34.13%	255	535.36%	154.15%
Number	127	3.47	2.00**	141	3.32	2.00	208	3.87	3.00
Error	124	-2.05%	1.79%	138	1.15%	1.57%	204	-15.27%	-2.49%
Dispersion	92	14.28%	8.00%**	102	13.05%	7.00%	169	16.38%	5.00%
Volatilty	137	22.41%	20.40%	171	23.61%	21.52%	175	22.31%	21.20%
Days to SEO	257	1234.74	897.00	257	699.52	433.00			

Table 6
Investor Type

The table compares the mix of investor type for Common Stock, Convertible and Structured PIPEs. Investor type are as defined by Sagient Research. The table presenting the mean of the proportion contributed for each investor group defined as investment amount/gross proceeds (*Proportional contribution*). We test for the differences in means between common stock and structured PIPEs using a *t*-test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively.

	Common Stock PIPE	Convertible PIPE	Structured PIPE
Number of issues	9248	3012	858
Investor Type	Proportional contribution		
Bank	0.1184	0.2813	0.1175
Broker	0.0996	0.1646	0.1363
Corporation	0.4283***	0.4548	0.1289
Hedge Fund	0.1029***	0.2070	0.2792
Insurance	0.1356***	0.1284	0.0001
Mutual Fund	0.1145**	0.2575	0.0461
Pension Fund	0.1235***	0.2458	0.0000
Private Equity	0.3122***	0.3792	0.0044
Trust	0.0946**	0.0958	0.0265
Venture Capital Firm	0.1324	0.2224	0.0951

Table 7
Returns prior to PIPE Issuance

This table presents returns during the twelve months prior to PIPE issuance. In Panel A returns are calculated as buy-and-hold abnormal returns using daily returns and the CRSP value-weighted index $BHAR = P_{t=-252}^{t=-1}(1+ret_t) - P_{t=-252}^{t=-1}(1+vwretd_t)$. In Panel B returns are calculated using equally-weighted portfolios monthly returns to common stock PIPEs and SEOs during the 12 months prior to PIPE/SEO issuance. We report alphas calculated excluding duplicate SEOs. We test for the sign of prior return using a *t*-test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively.

Panel A: Buy-and-hold Abnormal Returns

	252 Days Prior to PIPE Date			20 Days Prior to PIPE Date		
Sample	N	Mean BHAR	T statistic	N	Mean BHAR	T statistic
PIPEs	2501	34.39%	8.87***	2501	5.86%	8.40***
SEOs	830	117.43%	11.19***	455	0.77%	0.97

Panel B: Calendar Time portfolios

	CAPM alpha		3-factor alpha		4-factor alpha	
	coeff	t-stat	coeff	t-stat	coeff	t-stat
PIPEs	0.0127	1.65	0.0169	2.57**	0.0215	3.24***
SEOs	0.0483	8.88***	0.0509	13.10***	0.0498	12.34***

Table 8
Default Probabilities

This table presents the default probability and asset drift for PIPE issuers. Using the Merton Model to calculate the likelihood of default, we follow the methodology of Bharath and Shumway (2008) and Vassalou and Xing (2004). We model equity as a call option on the company's assets, and derive the asset volatility and asset drift from 12 months of daily stock returns. The default probability is N(-DD) where DD is the distance to default as per Vassalou and Xing (2004). We use all PIPEs that have compustat data and are in the intensive research and development industries. We calculate default probabilities using 12 months of daily returns prior to the PIPE date. The SEOs are in 2-digit SIC codes that correspond to the intensive research and development industries, we calculate default probabilities using 12 months of daily returns prior to the SEO date. The intensive research and development firms are in the same 2-digit SIC codes as the PIPEs. We calculate the default probability using daily returns each year for years 1991 through 2007 and calculate the average across these seventeen years for each firm.

Panel A: Default Probabilities

	N	Mean	25th Percentile	50th Percentile	75th Percentile
PIPEs	2601	7.02%	0.00%	0.003%	1.53%
SEOs	840	1.85%	0.00%	0.00%	0.0002%
All High R&D Firms	6511	11.83%	0.00%	0.037%	9.08%

Panel B: Asset Drift (growth trend for assets)

	N	Mean	25th Percentile	50th Percentile	75th Percentile
PIPEs	2601	18.40%	-25.3%	12.9%	60.6%
SEOs	840	46.04%	12.9%	34.9%	71.7%
All High R&D Firms	6511	-5.68%	-13.1%	5.3%	23.9%

Table 9
Firm Characteristics of PIPEs versus High-Tech firms with high likelihood of default

This table compares the characteristics of PIPE issuers and firms firms in the highest default-likelihood quartile for the intensive research and development industry. Variables are as defined in Tables 3 and 8. Difference of means is tested via a *t*-test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively.

	PIPEs			High Default Likelihood Firms		
Assets	802	118.16	35.10	1736	3,099.5***	124.19***
Sales	802	67.54	15.29	1735	2,129.6***	102.51***
Turnover	802	64.3%	45.3%	1735	105.2%***	81.6%***
Cash	802	36.7%	32.0%	1736	18.1%***	10.0%***
Leverage	802	15.5%	5.9%	1735	27.6%***	18.0%***
CFops	802	-38.1%	-24.3%	1726	-11.3%***	1.4%***
CFinv	802	-1.7%	-2.9%	1724	-2.4%	-3.2%
CFfin	802	33.1%	18.9%	1725	9.2%***	0.7%***
RD	696	34.7%	23.8%	1068	15.5%***	6.2%***
EBIT	802	-50.2%	-36.7%	1735	-20.4%***	-1.6%***
Burn	663	2.36	0.99	887	6.35 *	1.10
Time	663	1.69	0.74			
Capex	708	4.9%	2.5%	1434	3.9%*	2.5%
Default Prob	802	6.4%	0.0%	1736	32.6%***	20.7%***
Asset Drift	802	19.7%	14.7%	1736	-52.7%***	-23.8%***

Table 10

Returns Distribution – Common Stock PIPEs, Structured PIPEs, and SEOs

This table presents the percentiles of the return distribution for our sample of PIPEs versus PIPEs in less research and development intensive industries, structured PIPEs in our nine industries, and the matching SEOs. Difference in distributions is tested via a Wilcoxon test, the sign of portfolio alphas using a t-test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively.

	Common Stock PIPE	SEO
N	2601	840
Mean	0.0032	0.0013
t value	0.6477	0.3740
p value	0.5172	0.7085
100%	8.1461	1.7653
99%	0.3540	0.1931
95%	0.1596	0.1114
90%	0.1087	0.0705
75%	0.0448	0.0310
50%	-0.0012	-0.0011
25%	-0.0462	-0.0382
10%	-0.0958	-0.0753
5%	-0.1387	-0.1021
1%	-0.2798	-0.1722
0%	-4.4855	-0.3345
Wilcoxon (2-sided p value)		0.001***
portfolio alphas	0.0111	-0.0005
t value	1.47	-0.19
p value	0.1425	0.8505
long short portfolio alphas		-0.0167***
t value		-2.80
p value		0.006

Table 11

Logistic Regression of Probability of PIPE or SEO and Information Asymmetry

This table presents a logistic regression modeling the choice of PIPE or SEO issuance as a function of firm characteristics. The dependent variable is a dummy taking a value of 1 if the firm undertakes a common stock PIPE issue. Other variables are as defined in Table 3. We test for significance using a *t*-test. One, two and three asterisks denote significance at the 10, 5 and 1 percent levels, respectively.

Probability of PIPE issue	Coefficient	Std error	Coefficient	Std error
Intercept	0.6035***	0.1308	0.6695***	0.1329
Assets	0.0002	0.0002	0.0002	0.0002
Turnover	-0.2362***	0.0652	-0.2942***	0.0658
Cash	-1.1343***	0.1656	-0.9528***	0.1685
RD	-0.9228***	0.1458	-0.8414***	0.1450
EBIT	-1.0752***	0.1027	-1.0365***	0.1030
Leverage	-0.0199	0.1317	0.0151	0.1457
Patents	1.2877***	0.4262	1.1604***	0.4267
Capex	-2.0278***	0.6437	-1.8849***	0.6529
1 Yr RD Growth	0.0333	0.0248	0.0358	0.0251
1 Yr Sales Growth	-0.0003	0.0005	-0.0003	0.0005
Price/Book	-0.0071***	0.0015	-0.0076***	0.0016
Error	0.0055	0.0306		
Dispersion			-2.7314***	0.4000
Pseudo R-Square	11.67%		14.50%	
Percent Concordant	66.50		69.80	
Likelihood Ratio	324.35		406.27	
N	3541		3541	