The Decline in the Cost of Private Placements[*]

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Abstract

This study documents and examines a decrease in the price discounts associated with private investments in public equity (PIPE) issues. PIPE discounts decreased from an average of 16.4 percent during the 1995 to 2000 period to an average of 9.8 percent during the 2001 to 2007 period. This decrease reflects changes in the characteristics of the public firms that are accessing the PIPE markets as well as changes in the pricing of issue characteristics. In addition, part of the decrease is attributable to contracting practices that caused PIPE discounts in recent years to better reflect market conditions on the day that the securities were issued.

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1. Introduction

There have been substantial changes in the equity markets since the mid-1980s. The fraction of equity in the 1,000 largest U.S. firms that is held by institutional investors increased from 46.6% in 1987 to 76.4% in 2007. Institutional investors became increasingly active in the private equity markets as total annual commitments to corporate buyout (venture capital) funds rose from $14.7 billion ($3.1 billion) in 1987 to $223.8 billion ($32.2 billion) in 2007. In addition to these well known trends, there has been, more recently, a noteworthy increase in the use of private placements by public firms. The dollar volume of private investment in public equity (PIPE) issues increased from less than $1 billion in 1995 to $92.0 billion in 2007. Since 2006 more common equity capital has been raised by public firms through PIPE issues than through seasoned equity offerings (SEOs).[1] In this paper we examine how the pricing of PIPE issues has changed as the level of activity in this market has increased and the implications for the theory of how PIPE issues are priced.

Like seasoned equity offerings, PIPE issues are typically sold at a discount to the price at which the public shares are trading. However, the discounts at which PIPEs are sold tend to be considerably larger than those for SEOs. Smith (1977) was the first to show that SEOs are priced on average at a statistically significant discount to contemporaneous secondary market prices. His findings have been confirmed in numerous subsequent studies.[2] Wruck (1989), Hertzel and

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[1] The figures on institutional ownership are from the Conference Board and include defined benefit pension funds, defined contribution retirement plans, investment companies, mutual funds, hedge funds, insurance companies, banks, foundations and endowments. The figures on private equity commitments are from The Private Equity Analyst, and the figures for PIPE issues are from Sagient Research Inc.

[2] See, for example, Smith (1986), Loderer, Sheehan, and Kadlec (1991), and Altinkiliç and Hansen (2003) for discussions of this evidence.

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Smith (1993), and Hertzel, Lemmon, Linck, and Rees (2002) report that PIPEs are also discounted relative to market prices, but that the discounts tend to be much larger for PIPEs than for SEOs. For example, Corwin (2003) finds that the average discount for his sample of SEOs equals 2.2 percent. Liu and Malatesta (2006) report an average discount of 3.4 percent. For the sample of PIPEs analyzed by Hertzel and Smith (1993), though, the average discount is 20.1 percent and Hertzel Lemmon, Linck, and Rees (2002) report an average discount equal to 16.5 percent. Hence, average price discounts for PIPEs have been as large as nine times those for SEOs.

While PIPE discounts averaged well over 15 percent in the 1980s and 1990s, they have been considerably lower in recent years. In the sample of PIPE issues that we examine, the average discount was 16.4 percent from 1995 through 2000, but only 9.8 percent from 2001 through 2007. This decline in average PIPE discounts raises questions about the conclusions from previous studies of these discounts, which have characterized the discounts as compensation for monitoring services (Wruck, 1989) and the cost of price discovery (Hertzel and Smith, 1993). The lower discounts in recent years might reflect lower costs of price discovery or fundamental changes in the attributes of the firms that are using the PIPE markets that result in, for example, lower benefits from monitoring by PIPE investors. However, it might also reflect changes in the characteristics of the firms that are using the PIPE market or the pricing of other issue characteristics, or changes in the PIPE contracting process itself.

We find evidence that there have been changes in both the fundamental characteristics of PIPE issuers and that the pricing of firm, deal, and market characteristics has changed over time. The characteristics of the PIPE issuers after 2000 have warranted lower discounts. For example, the firms that sold equity in the PIPE market after 2000 had, on average, less volatile share prices and were less likely to have poor operating performance prior to the issue than firms that issued

PIPEs prior to 2001. However, these changes do not explain the entire decrease in PIPE price discounts. Changes in the pricing of issue characteristics also account for a significant reduction in discounts.

We also find evidence that, on average, PIPEs were priced several days prior to the issue date in the 1995 through 2000 period and that issue prices were set closer to the issue date after 2000. This is important because, on average, stock prices of firms issuing PIPEs increased in the days leading up to the issue dates and because increases after the issue price is set increase the observed discount. The evidence that prices are set in advance of the issue is similar to that reported in Lowry and Schwert (2004) for IPOs. The evidence of a change in when the price is set suggests that the pricing of private placements more fully reflected public information in the latter period. The average difference in the time at which the issue price is set explains about one third of the decrease in PIPE discounts from before 2001 to after 2000.

The paper is organized as follows. Section 2 discusses the pricing of private placement issues. Section 3 describes the data and Section 4 the empirical evidence. Section 5 concludes.

2. Private placement issue prices

The pricing of PIPE issues is influenced by many of the same factors that influence the pricing of IPOs and seasoned equity offerings (SEOs). Consequently, the literatures on the pricing of IPOs, SEOs, and PIPEs have tended to focus on the same microeconomic explanations for why primary equity sales typically involve discounts. This focus dates back to the early literature in all three areas, including Rock (1986) and Beatty and Ritter (1986) on IPOs, Mikkelson and Partch (1985) and Loderer, Sheehan, and Kadlec (1991) on SEOs, and Wruck (1989) and Hertzel and Smith (1993) on PIPEs. Microeconomic explanations examined in the literatures include moral hazard considerations, uncertainty and asymmetric information, price

pressure, pre-offer price movement and manipulative trading, and transaction costs savings, among others (Wruck, 1989 and Corwin, 2003).

SEOs and PIPEs are similar in that they both tend to be sold at a discount. However, as discussed in the introduction, the magnitudes of the discounts at which they sell differ considerably. In addition to selling at different discounts, SEOs and PIPEs are perceived differently by the market. Wruck (1989), and Hertzel and Smith (1993) report that stock price reactions to PIPEs announcements are, on average, significantly positive. This contrasts sharply with the well-known result that stock prices tend to fall, on average, when SEOs are announced.[3]

2.1. Moral Hazard, Uncertainty and Asymmetric Information, and PIPE Issue Pricing

The extant literature on the impact of microeconomic factors on the pricing of PIPEs has focused on two general theoretical hypotheses. One of these stresses moral hazard and conflicts of interest arising between firm managers and stockholders. Wruck (1989) points out that PIPE issues tend to concentrate stock ownership and to create blockholders. She argues that a PIPE issue that creates a blockholder will increase firm value if the blockholder uses his or her influence to improve the allocation of corporate resources, or to promote a value-increasing takeover. Conversely, an issue that serves to entrench incumbent management will result in greater shirking and perquisite consumption by managers and therefore will decrease firm value.

Hertzel and Smith (1993) acknowledge that PIPE issues might affect managerial monitoring. They emphasize, however, the role that PIPE issues can play in resolving informational asymmetries. Their model extends the analysis of Myers and Majluf (1984). They assume that, at some cost, a private investor can observe the intrinsic value of an informationally

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[3] See, for example, Altinkiliç and Hansen (2003) who report statistically significant average announcement period abnormal returns of -2.2 percent for a sample of SEOs occurring in the U.S. from 1990 through 1997. The sample of 3,243 SEOs analyzed by Liu and Malatesta (2006) spans the period from 1990 through 2002. They find an average announcement period abnormal return of -3.2 percent.

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problematic firm. Private placement discounts compensate the investor for the cost of becoming informed and the PIPE transaction itself signals to public investors that the selling firm is undervalued. Hence, the firm's stock price increases when news about the PIPE becomes public.

The moral hazard and asymmetric information hypotheses are complementary and both might be useful in explaining aspects of PIPEs. Wruck (1989) finds a significant, nonlinear relation between PIPE announcement period cumulative abnormal stock returns (CARs) and changes in stock ownership concentration. This result tends to support the moral hazard hypothesis. Hertzel and Smith (1993) report that placement discounts and abnormal returns are both significantly related to proxies for informational opacity and to the costs of assessing firm value. They are unable, however, to confirm Wruck's (1989) findings. In their sample, PIPE announcement period CARs are essentially unrelated to changes in ownership concentration. Wu (2004) compares PIPE issues and SEOs by high-technology firms and examines several proxies for informational asymmetry. In her sample these asymmetries tend to be higher on average for the private placement firms than for the firms making SEOs and in most cases the difference is statistically significant. She also finds that changes in the ownership fractions of pension funds and venture capital funds for private placement firms are insignificantly different from those for public offer firms, on average. These results support the asymmetric information hypothesis, but raise some doubt about the relations between PIPEs, matters of moral hazard, and monitoring of managerial behavior.

2.2. Firm and Issue Characteristics and PIPE Issue Pricing

As noted above, the existing literature proposes several microeconomic factors that affect the value added by a PIPE transaction. Under the moral hazard theory examined by Wruck (1989), value changes flow from changes in ownership structure that alter the quality of firm

monitoring. A transaction that creates an outside blockholder, for example, would improve monitoring and this would tend to augment firm value.

Under the information asymmetry theory examined by Hertzel and Smith (1993), value changes arise, in part, because the participation of the private placement investor reveals that the firm's stock was previously undervalued in the public market. This hypothesis is most relevant to firms with highly asymmetric information and in cases where the investors have special expertise in assessing the values of such firms. Small firms are likely to be problematic in this sense and large corporate investors in the same or related industries would be well-positioned to assess their values.

Transaction value-added is also likely to depend on a firm's financial condition. Firms in financial distress tend to be informationally opaque and therefore subject to high degrees of informational asymmetry. Moreover, in these cases the infusion of additional equity capital would itself reduce the probability of eventual bankruptcy and mitigate expected financial distress costs.

2.3. Macroeconomic Factors and PIPE Issue Pricing

While the evidence suggests that microeconomic factors help to explain PIPE pricing, much remains unexplained. It is plausible that prices in the market for private placements also depend upon public market conditions. The idea that market conditions influence financing decisions has been studied extensively, with detailed evidence of such influence being reported at least as far back as 1953 (Hickman, 1953). Bayless and Chaplinsky (1996) suggest that lower levels of asymmetric information during certain periods reduce the cost of public equity sales and thereby increase the volume of such financings. Lerner, Shane, and Tsai (2003) find that equity financing cycles affect the likelihood that small biotechnology firms use alliances to fund

research and development expenditures. When public market financing volume is low, small firms are more likely to use alliances and tend to cede more control rights to larger corporate partners. This latter evidence is consistent with the notion that public market conditions influence the choice between public and private sources of capital and the bargaining power of issuing firms. With regard to direct private investment, Gompers, Kovner, Lerner, and Scharfstein (2005) report evidence that venture capitalists increase the level of their investments most when public market signals are positive. These authors find that market signals reflecting industry attractiveness, such as the industry Tobin's Q and the frequency of initial public offerings (IPOs) by firms in the industry, are related to venture capital investment activity, especially among the most experienced venture capital firms. Gompers et al. (2005) conclude that the volatility of market fundamentals has an important effect on the volatility of the level of venture capital investment activity.

If periods of low public-market financing volume increase the bargaining power of investors as in Lerner et al. (2003), we expect PIPE discounts to be larger at such times. However, periods of low financing activity could result from a scarcity of attractive projects in which to invest capital rather than from a scarcity of capital. In this situation the issuer has bargaining power and we would expect lower discounts.

3. Data

We begin with a sample of 3,874 PIPE transactions that closed between January 1, 1995 and December 31, 2007. This initial sample includes all PIPE issues involving common equity sales that are included in the Sagient Research Systems database during this period. Following Hertzel et al. (2002), we exclude transactions where the stock price is less than $2 (938 issues). We also exclude 1,451 observations where the transaction is not the issuer's first transaction in

the database. We do this because the typical second placement occurs only eight months after the first placement. Hence, the extent of information asymmetries associated with first and subsequent placements are likely to differ and so, too, would their effects on transaction characteristics. This leaves a sample of 1,485 initial PIPE issues involving shares trading at a price of $2 or more. Three hundred fifty-seven of these 1,485 observations are lost because the issuing firms are not included in the Standard and Poor's Compustat or Center for Research in Security Prices (CRSP) databases (328 observations) or because the gross proceeds reported in the Sagient Database differ from the product of the reported offer price and the number of shares issued by more than 2 percent of that product (29 observations). We therefore end up with a final sample of 1,128 initial PIPE issues at 1,128 distinct firms.

We obtain data on firm characteristics around the time of each private placement from the Compustat and CRSP databases. Data from Compustat are used to compute the ratio of property, plant and equipment to book assets (*PPE/assets*), the ratio of the market value of assets to the book value of assets (*MVA/assets*) as of the end of the fiscal year ending immediately preceding the placement, and the ratio of operating income in the year of the transaction to assets at the beginning of the year (OROA).[4] We also create an indicator variable that equals one if OROA is negative during both of the two fiscal years immediately preceding the private placement and zero otherwise. This indicator, which we use to identify firms that are likely to be financially distressed, is designated *distress*.[5]

Data from CRSP are used to estimate a market model regression over trading days -300 to -51, relative to the issue date for each sample firm, using the CRSP equally-weighted index. These market model regressions are then used to compute a residual value each day over the -

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[4] Market value of assets, MVA, is estimated as the book value of assets less the book equity plus the market value of equity.

[5] This definition is consistent with those used in Hertzel and Smith (1993) and Wu (2004). In both of these papers firms with negative earnings in the two years prior to placement are considered to be financially distressed.

300 to -51 day period, for each firm, by subtracting the observed stock return from the return predicted by the firm's market model regression. Finally, the standard deviation of the daily residual values is computed for each firm. We designate this standard deviation as *residual standard deviation*. We also compute the equity market capitalization of each sample firm as of 10 days after the issue using data from CRSP.

Transaction characteristics are largely provided by Sagient, but are supplemented with additional information that we are able to obtain from reviews of the financial press and the SEC Edgar database. Sagient reports a number of characteristics for each PIPE, including the selling company name and industry, identities and number of the investors, number of shares sold, transaction price, closing date, filing date if the issue was subsequently registered with the SEC, whether a placement agent was used by the firm, and the exchange on which the shares trade.

The Thompson Financial Disclosure database, which contains information from proxy statements and 10K reports filed by each firm with the Securities Exchange Commission (SEC), is used to obtain information on the ownership and identity of blockholders at the sample firms. These data are used, in conjunction with the investor identity data from Sagient, to identify corporate investors who are blockholders.

We acquire information on whether insiders participate in each of the 1,128 placements by searching the SEC *Records on Trading of Securities by Corporate Insiders, 7/11/1978 - 3/12/2001*, which is available on the National Archives web site at http://aad.archives.gov/aad/, and by directly searching the SEC Edgar database for Form 4 (Statement of Changes in Beneficial Ownership) filings. We consider an insider to have participated in the placement if the transaction date involving the insider is within two trading days of the closing date of the PIPE transaction listed in the Sagient database and if the transaction price equals the per share purchase price reported by Sagient.

We use several measures to capture macroeconomic factors that might influence PIPE price discounts. Following Gompers et al. (2005), we use monthly data on the number of IPOs as a measure of perceived investment opportunities.[6] We measure credit market conditions using data from the Federal Reserve web site.[7] The yield on 10-year Treasury bonds is obtained to reflect the availability of capital, to the extent that Treasury rates are higher in tight credit markets. The Federal Reserve senior loan officer survey is used to measure the net fraction of loan officers tightening credit terms. Lown, Morgan, and Rohatgi (2000) report that the spread between commercial and industrial loans is highly correlated with the degree of credit tightening reflected in the senior loan officer survey. Finally, we obtain the total monthly volume, in dollars, and number of issues of private placements of non-equity securities. These measures are used as proxies for the level of activity in the market for private funds and are obtained from Sagient Research Systems database.

4. Results

4.1. Descriptive Statistics

Figure 1 illustrates the substantial changes in the volume and value of PIPE issues, as well as changes in the average price discount, that took place from 1995 through 2007. The evidence is for only the 1,128 initial PIPE issues in our sample, but the plots are qualitatively similar for the 1,485 initial issues that we identified before screening for missing CRSP and Compustat data and for possible errors in the Sagient data.

Figure 1a shows that the annual number of PIPE issues increased sharply from 43 in 1998 to 175 in 2000 and then declined gradually before flattening out at approximately 60 issues per year in 2005, 2006, and 2007 (62, 63, and 61 issues, respectively). Figure 1b shows that the

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[6] Jay Ritter makes these IPO data available on his web site at http://bear.cba.ufl.edu/ritter/ipodata.htm.
[7] See http://research.stlouisfed.org/fred2/.

average proceeds raised through PIPE issues remained relatively flat from 1995 to 2005 and then increased 167 percent in the following two years, from $36 million in 2005 to $96 million in 2007. Finally, Figure 1c shows that the average price discount was above 15 percent from 1995 though 1999, fell by approximately 50 percent from 1999 to 2002, and then ranged between 6.2 and 9.3 percent after 2002.

Table 1 presents descriptive statistics for firm (Panel A) and issue characteristics (Panel B) in our sample. Statistics are presented for the entire sample period and for sub-samples partitioned by whether the issue was completed prior to 2001 or after 2000. Our sample consists of relatively small public firms that have a mean (median) equity market capitalization of $430.59 ($135.27) million. These firms also have relatively few fixed assets, with mean (median) PPE representing only 33.7 (23.0) percent of total book assets. By comparison, the corresponding mean ratio of PPE to book assets is greater than 50 percent for all Compustat firms over the sample period. The ratios of the market value of assets to the book value of assets for issuers are large, with a mean (median) value of 3.79 (2.26). Many of these firms have exhibited poor operating performance immediately prior to the placement. Over half of the issuers have had two years of negative OROA immediately prior to the placement (the *distress* indicator equals one). The large proportion of distressed firms is consistent with evidence reported by Chaplinsky and Haushalter (2006).

Panel B of Table 1 reports statistics for characteristics of the private placements. The mean (median) amount raised is $33.92 ($11.91) million and the mean (median) issue represents 13.23 (9.67) percent of the post-issuance market capitalization of the firm.

As noted by Wruck (1989), PIPEs also tend to concentrate ownership. More than half of the PIPE issues are purchased by only one or two investors. The mean (median) number of investors that participate in one of the PIPEs in our sample is 7.32 (2.00). To further characterize

investor concentration we construct a Herfindahl-type index for each private placement equal to the sum of the squared fractions of the placement purchased by each of the participating investors. This index is logically bounded between zero and one. In our sample it has a mean (median) value of 0.62 (0.63). Finally, in 10.73 percent of the issues in our sample, another corporation participates as an investor and ends up holding more than five percent of the issuer's shares after the transaction.

The remaining statistics in Panel B indicate that management participated as a buyer in only 10.5 percent of the placements, placement agents are used in 51.4 percent of the transactions, and trading of privately placed shares tends initially to be restricted in most cases. To determine whether trading of shares was initially restricted, we examined form S-3 registration statements obtained from the SEC Edgar database for each firm for a period of six months following the placement date. One week after the placement, 84.2 percent of our sample remain unregistered (15.8 percent are registered). However, though we do not report this in Table 1, we find that the percentage of unregistered issues three months after the placement is 55.8 percent (44.2 percent are registered). The high frequency of registrations within the first three months suggests that PIPES are more liquid than is commonly assumed. Our discussions with industry participants reveal that registration rights are a common feature in private placement agreements.

Table 1 also presents summary statistics for firm and issue characteristics associated with issues completed from January 1, 1995 through December 31, 2000 (Pre-2001) and from January 1, 2001 through December 31, 2007. We can see from these statistics that the changes in many of the reported firm and issue characteristics are both economically and statistically significant. Panel A shows that after 2000 the issuing firms were larger, had lower *MVA/asset* ratios, had lower residual standard deviations of returns, and were less likely to have had negative operating

performance in the previous two years. During the latter part of our sample period the typical PIPE issuer was a larger, more economically stable firm.

The decline in price discounts over our sample period occurred at the same time that the average (median) dollar value of issue proceeds increased from $25.40 ($8.50) million to $39.90 ($15.00) million, the median number of investors decreased from 3.0 to 2.0, placement agent use increased from 45.6 percent to 55.5 percent of issues, and the percentage of issues that were registered within seven days of the transaction more than doubled. The percentage of unregistered issues declined from 91.6 percent to 79.0 percent, indicating that the percentage of registered issues increased from 8.4 percent to 21.0 percent. These differences point to a fundamental change in the PIPE market after 2000.

From Table 1 we know that the changes in PIPE price discounts over our sample period were accompanied by changes in the characteristics of PIPE issuers and in the characteristics of PIPE issues. This naturally raises the question as to what extent the changes in PIPE issuer and issue characteristics explain the change in PIPE discounts. Table 2 presents some univariate evidence on this question. In Panel A, each of the sub-period samples are split into quintiles based on issuer *equity market capitalization*, issuer *MVA/assets*, issuer *residual standard deviation*, the dollar value of proceeds raised in the issue, the proceeds raised in the issue as a fraction of the firm's equity market capitalization, and *investor concentration* (as measured by the Herfindahl index).[8] The evidence in this panel indicates that PIPE price discounts are larger for smaller firms, firms with larger *MVA/assets* ratios, firms with larger residual return standard deviations, issues where smaller dollar amounts are raised, issues in which the capital raised represents a larger fraction of total equity market capitalization, and issues in which more investors participate (those with a lower concentration). These patterns are observed in both sub-

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[8] The fourth and fifth quintiles for the investor concentration variable collapse into one group because there are 439 observations with a Herfindahl index value of 1.

periods. The data indicate that there was a decrease in PIPE price discounts from before 2001 to after 2000 in all partitions for all of these firm and issue characteristics. Finally, the p-values reported in square brackets suggest that the pricing of the *equity market capitalization* and *residual standard deviation* firm attributes may have changed.

Panel B of Table 2 partitions the period into sub-samples based on whether the issuing firm had negative OROA in the two years preceding the issue (*distress*), whether a corporate blockholder bought shares in the issue, whether an insider purchased shares in the issue, and whether the shares were registered within seven days of the issue. The evidence in this panel indicates that price discounts are larger for firms that have been performing poorly and for issues where no corporate blockholder participates, insiders do not participate, and which are not immediately registered. Also, the p-values reported in the square brackets suggest that the pricing of the *corporate blockholder* issue attribute may have changed.

The evidence in Table 2 suggests that price discounts are negatively related to firm size and recent operating performance and positively related to *MVA/assets* and stock return residual variation. These relations are all consistent with evidence reported elsewhere.[9] These characteristics can be interpreted as measures of informational opacity. For example, greater idiosyncratic volatility in stock prices might be expected to result, at least in part, from opacity. To the extent that there is a relation between PIPE price discounts and opacity, our evidence is consistent with the arguments of Hertzel and Smith (1993) that PIPE issues can play a role in resolving informational asymmetries.

The positive relation between discounts and the relative amount of capital raised is consistent with the findings of Hertzel and Smith (1993), among others. Larger issues increase

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[9] See, for example, Hertzel and Smith (1993) and Wruck and Wu (2005).

opacity, and thereby discounts, if the firm's new projects are harder to value than are its existing assets.

The interpretation of the negative relation between price discounts and investor concentration, a relation which is also reported by Hertzel and Smith (1993) and Wruck and Wu (2005), is unclear. If the number of investors increases with the size of the issue (measured as a fraction of equity market capitalization) then this relation might reflect the necessity of offering a larger price discount to attract more capital. On the other hand, low investor concentrations might be characteristic of issues made by informationally problematic firms. This latter interpretation could apply if investors are unwilling to take large positions in such issues and they must therefore be sold to multiple investors.

The evidence that price discounts are smaller when a corporate blockholder purchases shares is consistent with the conclusion drawn by Wruck and Wu (2005) that relational investors tend to invest in higher quality firms. If high quality firms are in a better bargaining position than low quality firms, we would expect to observe smaller discounts associated with private placements by the high quality firms.

Our evidence indicates that insiders are more likely to participate when discounts are relatively small. This evidence differs from that reported by Hertzel and Smith (1993), who find no relation between the discount and insider participation. It also differs from the findings in Wu (2004). She reports that managerial participation is associated with significantly larger discounts. The evidence in Table 2 is inconsistent with managerial self-dealing. In our sample, managers do not appear to participate only when they can deal themselves large discounts. The evidence on insider participation in Table 2 might indicate that managers invest in higher quality issues or that investors require a smaller discount when managers invest alongside of them.

Finally, the evidence that discounts tend to be smaller when the issue is registered within seven days is consistent with the idea that investors require smaller discounts when the shares are expected to be more marketable. Hertzel and Smith (1993) also observe this relation.

4.2. Multivariate Evidence

Overall, the evidence in Table 2 indicates that price discounts vary predictably with firm and issue characteristics. However, as the discussion suggests, interpretation of some of this univariate evidence is unclear. In order to better understand the determinants of PIPE price discounts we next obtain multivariate evidence.

Table 3 presents coefficient estimates from regression models that predict the price discount measured relative to the stock price one day after the issue date. The models in Table 3 include the variables presented in Table 1, with the exception of *equity market capitalization* and *number of investors*. *Equity market capitalization* is excluded because there is a multicollenearity problem when it is included in a model with *proceeds as a fraction of equity market capitalization*. *Number of investors* is excluded because *investor concentration*, an alternative measure of the number of investors, is included. The independent variables that are included in the models in Table 3 also represent firm and issue characteristics that have been examined in previous studies of private placement discounts.

The model in the first column of Table 3 is estimated using all observations for which sufficient data are available. The coefficient estimates for firm characteristics in this model indicate that PIPE price discounts are positively related to the ratio of *MVA/assets* and the standard deviation of residual returns and are larger for firms that have had negative operating performance during the two years preceding the issue. Furthermore, when we include *equity market capitalization* in the model, while excluding *proceeds as a fraction of market*

capitalization, we find that price discounts are negatively related to *equity market capitalization*. These relations are all consistent with the univariate evidence in Table 2.

The coefficient estimates for issue characteristics indicate that price discounts are smaller for larger issues, when measured in dollars, where investor concentration is greater, and where insiders purchase shares in the issue. These relations are consistent with those in Table 2. However, the coefficient estimates in the first model in Table 3 for *proceeds as a fraction of equity market capitalization*, the participation of a corporate blockholder in the issue, and whether the issue is registered within seven days are statistically insignificant despite the suggestion in Table 2 that these variables are related to the price discount.

The second and third columns in Table 3 present coefficient estimates for models estimated using observations for the pre-2001 and post-2000 periods. We estimate these models to obtain evidence on whether the pricing of firm and issue characteristics has changed. The results indicate that the signs of the coefficient estimates for all of the firm characteristics are the same in both sub-periods and that they are statistically indistinguishable.[10] The results for the issues characteristics are generally the same. However, the signs of the coefficient estimates for the corporate blockholder and registration indicators are different in the two sub-periods. Furthermore, the coefficient estimates for both the corporate blockholder and registration indicators are both significantly different from zero in the earlier sub-period, but insignificantly different from zero in the later sub-period. The presence of corporate blockholders and immediate registration were associated with lower discounts in the earlier period, but not in the

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[10] The tests for the equality of the coefficients across the sub-periods are based on a single regression using all of the observations over the entire sample period. That regression model includes the explanatory variables shown in Table 3 and, in addition, the products of those variables with a binary variable that takes the value of one for post-2000 observations, and zero for the pre-2001 observations. The table reports the p-values for t-tests on the estimated coefficients on these interaction terms. The t-statistics are calculated using heteroskedasticity-consistent estimates of the coefficient standard errors.

later period. This evidence suggests that there may have been a change in the pricing of these issue attributes over time.

While the models in Table 3 report coefficient estimates for variables that have been examined in previously published research on PIPE price discounts, recent evidence from Huson, Malatesta, and Parrino (2007) suggests that capital market conditions affect both PIPE issue volume and price discounts. A study of the pricing of PIPE issues should therefore also consider the possible effects of capital market conditions.

Table 4 reports coefficient estimates for regression models that relate capital market conditions to the level of PIPE issue activity. Models 1 and 2 are ordinary least squares (OLS) regression models in which the dependent variable equals natural log of the total capital raised through PIPE issues in a month and Models 2 and 3 are Poisson regression models in which the dependent variable is the number of PIPE issues in a month. All models are estimated using data from the 156 months from January 1995 through December 2007.

The explanatory variables in these models include measures of both equity and credit market conditions. *EW market return* is the return on the equally-weighted CRSP index in the prior month. *Net percent of loan officers tightening credit terms* equals the number of loan officers, from the Federal Reserve senior loan officer survey of 60 domestic and 24 foreign officers, who indicate that they are tightening credit terms, minus the number of officers who do not indicate they are tightening terms, divided by the total number of officers surveyed. *Number of non-common stock private issues* is the number of non-common stock issues that were privately placed during the month. *Number of IPO issues* is the number of IPO issues during the month. *10 Year Treasury rate* is the yield on 10 year Treasury bonds measured at the beginning of the month.

The evidence in Table 4 indicates that the level of PIPE market activity is related to capital market conditions. The coefficient estimates in Model 2, which includes year dummy variables to control for time trends, reveal that there is a negative relation between the *net percent of loan officers tightening credit terms* and the dollar volume of PIPE issues. This suggests that the aggregate value of PIPE issues is greater in periods when credit conditions are tighter. In addition, there is a positive relation between the *number of IPO issues* and the amount of equity raised through PIPE issues. Finally, the adjusted R-squared in Model 1 indicates that the capital market variables explain 17.9 percent of the variation in the monthly dollar volume of PIPE issues.

The coefficient estimates in Model 4 of Table 4 suggest that the number of PIPE issues in a particular month is positively related to recent market returns, the *number of non-common stock private issues*, the *number of IPO issues*, and the *10-year Treasury rate*. These relations indicate that the number of PIPE issues is greater when recent equity market returns are higher, public firms are also privately placing more non-equity issues, the IPO market is more active, and credit markets are more expensive.

In Table 5 we present coefficient estimates from models like those in Table 3, but which also include the explanatory variables for capital market characteristics that are included in the models in Table 4. The coefficient estimates for firm and issue characteristics in the model in the first column, which is estimated using data from the total sample period, are generally similar to the corresponding coefficients in the first column of Table 3. The only notable differences are that the coefficient estimates for *MVA/assets* and *distress* are not statistically significant in Table 5, although the signs of those coefficient estimates are unchanged.

Focusing on the market characteristic variables in the first column of Table 5, we see evidence that PIPE price discounts are positively related to recent market performance and the

10-year Treasury rate and are negatively related to the *net percent of loan officers tightening credit terms*. The coefficient of 0.5170 for *EW market return [-30, -1]* indicates that less than 50 percent of the change in the general level of stock market prices leading up to PIPE issues is reflected in PIPE issue prices. Since the average value of *EW market return [-30, -1]* in our sample is 4.79% percent, this means that the over two percentage points of the average price discount is attributable to recent equity market returns. It follows that the prices set for private placement issues are sticky in the sense that they do not change as much as stock market prices in general leading up to the private placement dates. This is consistent with the idea that the placement price is set at some point in advance of closing and is not changed to reflect recent changes in the stock market. It is also consistent with evidence reported in Lowry and Schwert (2004) that IPO prices do not fully reflect public information that becomes available between the time that the offer price range is set and the offering date.

The positive relation between the *10 year Treasury rate* and the PIPE price discount indicates that issuing firms discount their shares more heavily when interest rates are high. If Treasury bond rates reflect, at least in part, tightness in the credit markets, this evidence supports the view that private placement discounts are larger when debt capital is relatively scarce. Similarly, the negative coefficient estimate on the *net percent of credit officers tightening credit terms* variable suggests that PIPE price discounts are smaller when credit officers are tightening credit terms. Since credit tightening (loosening) is a move away from relatively abundant (scarce) capital, discounts are lower when credit officers are tightening credit terms than when they are loosening those terms.

It is worth noting that when we add the market characteristic variables to the price discount model, the adjusted R-squared increases from 0.135 in Table 3 to 0.206 in Table 4. Capital market conditions add substantially to the explanatory power of the model. Huson,

Malatesta, and Parrino (2007) discuss the relation between market characteristics and the price discount in more detail.

The second and third columns in Table 5 present the price discount model estimates for the pre-2001 and post-2000 sub-periods. The evidence for the firm and issue characteristics in these models is qualitatively similar to that in the corresponding models in Table 3. Focusing on the capital market condition variables, we see that the coefficient estimates for *EW market return [-30, -1]* are positive and significantly different from zero in both sub-periods. Furthermore, the magnitudes of these estimates are significantly different from each other in both statistical and economic terms. The p-value for the test that these coefficients are equal is 0.000. The coefficient estimates for *EW market return [-30, -1]* indicate that during the pre-2001 period the discounts contained 93.42 percent of the market return during the 30 days preceding PIPE issues. In contrast, during the latter period, the discounts contained only 21.06 percent of the recent market return. PIPE prices in the latter period better reflected recent market conditions than in the earlier period. This evidence suggests that PIPE prices in the earlier period tended to be set further in advance of the issue date than they were in the latter period. In other words, there appears to have been a change in the contracting process.

The evidence to this point suggests that the characteristics of the firms that sold equity in PIPE issues changed from the pre-2001 period to the post-2000 period and that the characteristics of PIPE issues themselves also changed (Table 1). We have also seen evidence that there were changes in the pricing of firm and issue characteristics from the pre-2001 period to the post-2000 period (Tables 2, 3, and 5). Finally, in Table 5 we see evidence that there has been a significant change in the relation between prior market performance and PIPE price discounts. Collectively, this evidence suggests that the decline in price discounts over our sample period is attributable to changes in the characteristics of the firms that have been accessing the

PIPE market, changes in the pricing of firm and issue characteristics, and changes in the nature PIPE contracting process. We next provide more direct evidence on the importance of these changes.

Table 6 provides direct evidence on the changes in the characteristics of the firms that have been accessing the PIPE market and changes in the pricing of firm and issue characteristics. The top row in Table 6 presents mean and median values of the observed price discounts in the two sample sub-periods for the 757 PIPE issues that were used to estimate the regression models in Table 3.[11] These values, which are significantly different in the two sub-periods, provide a basis for comparison with the predicted values in Panels A and B.

In Panel A of Table 6 we use the sub-period models from Table 3 (those presented in the second and third columns of Table 3) to predict the price discount for each of the 757 PIPE issues used to estimate those models. We then compute mean and median values for these predicted values within partitions based on the sample period. The top row in Panel A presents mean and median values of the discounts predicted by the model in the second column of Table 3 for the observations in the pre-2001 and post-2000 periods, respectively. The second row in Panel A presents corresponding statistics for predictions based on the model in the third column of Table 3.

The test statistics in Panel A provide direct evidence that there were changes in both the characteristics of the firms accessing the PIPE markets and in the pricing of firm and issue characteristics. The statistically different mean and median values across columns indicates that the characteristics of firms and issue characteristics have changed over time. Holding the

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[11] The models in Table 5 were estimated using 755 of these observations. There are two fewer observations in Table 5 because the lagged 10-year Treasury bond rate was not available for the two PIPE issues in December 2007 at the time that the data used in this study were collected.

prediction models constant, the predicted price discounts are significantly lower in the post-2000 period than in the pre-2001 period.

The statistically significant differences in predicted values between the rows in Panel A of Table 6 provide direct evidence that the pricing of firm and issue characteristics changed over the two periods. Holding firm and issue characteristics constant, the predicted price discounts are lower using the model that is estimated using observations from the post-2000 period.

The evidence in Panel B of Table 6 is similar to that in Panel A, but the level of significance of the comparisons between rows is lower. In fact, only the differences for the post-2000 observations are statistically significant. This decline in the level of significance is attributable to the addition of capital market characteristics to the prediction models. Specifically, the change in the sensitivity of the price discounts to stock market performance immediately preceding the issue accounts for most of the decline.

We provide additional evidence on the relation between PIPE price discounts and stock returns preceding the PIPE issues in Table 7. Recall that in Table 5 we reported evidence on the relation between the return on a market index during the 30 days leading up to PIPE issues, *EW Mkt. Return [-30, -1]*, and PIPE price discounts. While the positive relation in Table 5 suggests that PIPE issues tend to be priced prior to the issue date, this evidence is indirect. In Table 7, we report more direct evidence of the relation between prior stock returns and PIPE price discounts by considering the relation between the returns on the stocks of our sample firms during the 10-day period leading up to the PIPE closing dates and the discounts received by the private placement investors.

The first column in Table 7 presents coefficient estimates for an ordinary least squares regression model that is estimated using all observations in our sample. The dependent variable is the price discount and the explanatory variables are the daily returns in the sample firms'

shares during each of the ten days leading up to the issue closing date. In the first column we see that more than 9 percent of the cross sectional variation in discounts is explained by the firms' own return in the pre-closing period. In fact, issuing-firm stock returns as far back as day -9 are positively and significantly related to the price discount. This evidence is consistent with PIPE prices being set prior to closing. Using average daily returns, for all observations, for each of the ten days immediately preceding the PIPE issue with the coefficient estimates in the first column of Table 7 reveals that 1.3 percentage points of the average discount are attributable to PIPE prices incompletely impounding publicly available stock price information.

The second and third columns in Table 7 provide evidence on the incorporation of public information in each of the two sub-periods in our sample. During the pre-2001 period, 12.8 percent of the cross-sectional variation in discounts is explained by the sample firms' own stock returns. Discounts are positively and significantly related to own-firm returns on days -1 through -6 and on day -9. On average, the discounts contain more than one-half of the day -1 and -2 stock returns. Using average daily returns for each of the ten days immediately preceding the PIPE issues, for the observations in the pre-2001 period only, and with the coefficient estimates for that period from the second column of Table 7, reveals that 2.68 percentage points of the average discount are attributable to the failure of PIPE prices to reflect public stock price information. This represents 16.34 percent of the average discount during the pre-2001 period, which was 16.41 percent. (see Table 1).

The third column of Table 7 shows that own-firm returns account for only 4.2 percent of the cross-sectional variation in discounts during the post-2000 period. The only significant relations between the discount and the sample firms' own stock returns are observed for days -1, -5, and -9. Using average daily returns for each of the ten days immediately preceding the PIPE issue, for the observations in the post-2000 period only, and with the coefficient estimates for

that period from the third column of Table 7, we calculate that 0.51 percentage points of the average discount are attributable to PIPE prices not fully reflecting public stock price information. This represents just 5.23 percent of the average discount of 9.76 percent reported in Table 1 for the post-2000 period.

Part of the difference between the sub-periods in the magnitude of the discounts predicted using stock returns in the ten days prior to the PIPE issue is attributable to significantly higher average returns on days -1, -8, and -9 (1.55 percent vs. 0.41 percent, 1.13 percent vs. 0.28 percent, and 1.40 percent vs. 0.34 percent, for the pre-2001 and post-2000 periods, respectively). However, there is also a significant difference in how fully the sample firm stock returns were incorporated into PIPE issue prices across the two sub-periods. The impact of the day -1 stock return for sample firms in the pre-2001 period is three times larger than it is in the post-2000 period (0.649 vs. 0.204). Similar differences are observed for the returns on days -2 and -3. During the pre-2001 period, 51.0 percent and 28.9 percent of the returns on days -2 and -3, respectively, were not incorporated into the issue price. In contrast, during the post-2000 period, on average, the returns on days -2 and -3 were unrelated to the discount. The 2.17 percentage point decrease (2.68 percent minus 0.51 percent) in the average discounts related to better incorporation of public stock price information in the post-2000 period accounts for approximately 1/3 of the observed reduction in discounts (16.41 percent – 9.76 percent).

5. Conclusion

We document an economically significant decrease in PIPE price discounts during the 1995 to 2007 period. This decrease has implications for the importance of theories that have been proposed in the finance literature to explain these discounts. While we find that changes in the types of firms that are accessing the PIPE market and changes in the contracting process (specifically, the time at which issue prices are set) explain part of the decline, changes in the

pricing of firm and issue attributes also contribute to it. Taken together, our findings advance our understanding of price discounts. While microeconomic theories concerning monitoring benefits and the cost of price discovery might explain some portion of observed discounts, the level of the discounts is influenced by many other factors. Furthermore, the importance of the effects proposed by these theories might be changing over time.

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Figure 1

Number of PIPE issues, average PIPE issue value, and average price discount by year

Transaction characteristics are from a sample of 1,128 private placements of equity by public firms over the period from January 1995 through December 2007.

a. Number of PIPE issues by year
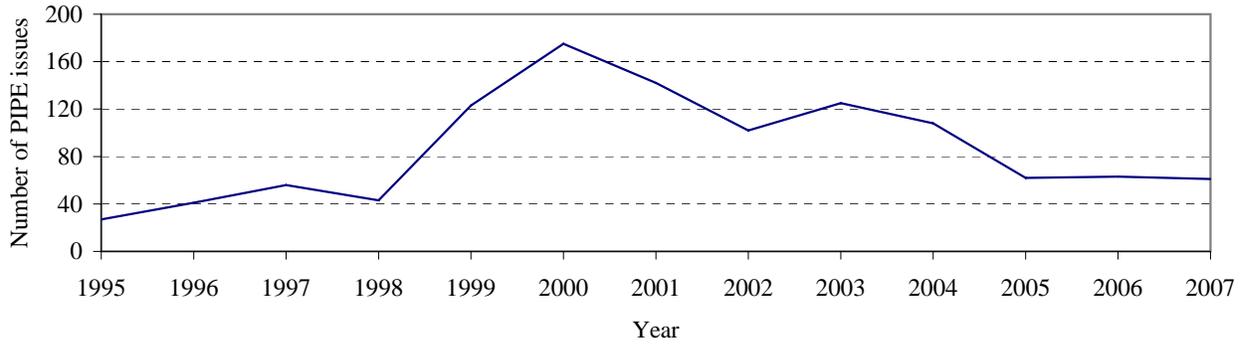
b. Average PIPE issue value by year
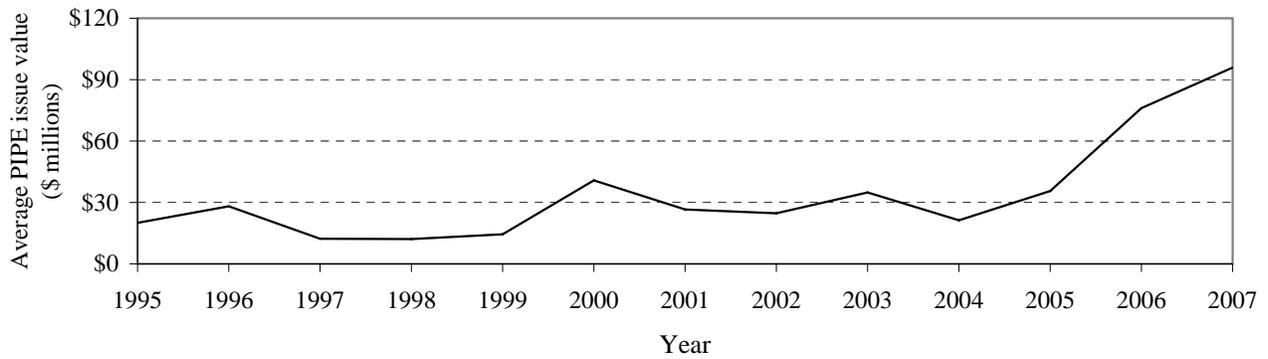

c. Average price discount by year
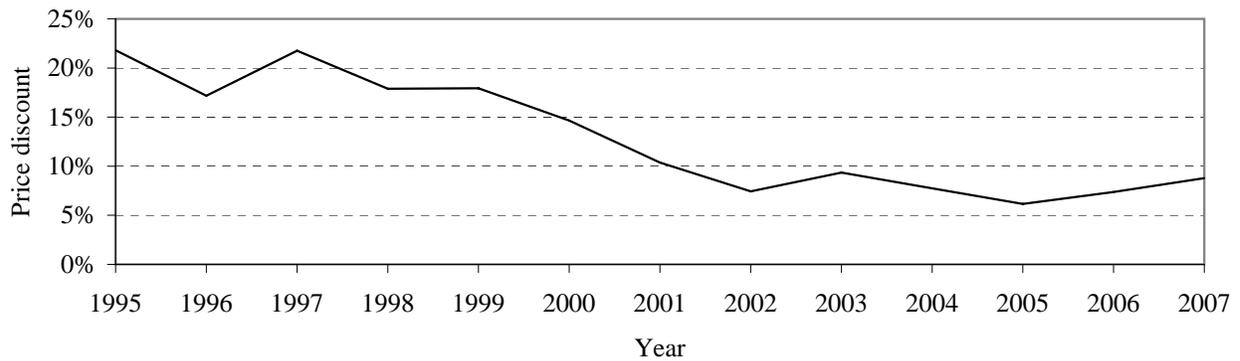
Table 1

Firm and issue characteristics

Firm and issue characteristics for 1,128 private equity issues by public firms (PIPE issues) over the period from January 1995 through December 2007. *Equity market capitalization* is computed as of 10 days after the issue. *PPE/assets* is the ratio of property, plant and, equipment to the book value of total assets at the end of the year before the issue. *MVA/assets* is the ratio of the book value of assets less the book value of equity plus the market value of equity divided by the book value of assets at the end of the year before the issue. *Residual standard deviation* is the standard deviation of the residuals from a market model regression that is estimated over trading days -300 to -51, relative to the issue date, using the CRSP equally-weighted index. *Distress* is an indicator that equals one if EBIT/assets is negative in each of the two years before the issue. *Price discount* is the discount to the investors measured relative to the closing price of the issuers stock on the day after the issue. *Issue proceeds* is the product of the number of shares issued times the offer price. *Proceeds as a fraction of equity market capitalization* is the value of the issued shares as a fraction of the total firm equity market capitalization as of 10 days after the issue. *Investor concentration* is a Herfindahl index (sum of the squared fractions) computed from the fractions of the total issue purchased by each of the investors. *Corporate blockholder* is an indicator that equals one if a corporation purchases shares and owns five percent or more of the equity after the issue. *Insider participation* is an indicator variable that equals one if an insider purchased shares in the offering. *Placement agent* is an indicator that equals one if the issuer used a placement agent. *Not immediately registered* is an indicator variable that equals one if the shares sold in the offering were not registered within one week of the closing date.

	Total Sample			Pre-2001 Issues			Post-2000 Issues			p-value from Tests that Means and Medians Are Equal	
	N	Mean	Median	N	Mean	Median	N	Mean	Median	Mean	Median
Panel A: Firm characteristics											
Equity market capitalization ($ millions)	1,126	$430.59	$135.27	465	$377.50	$94.61	661	$467.93	$162.09	0.301	0.001
PPE/assets	927	33.7%	23.0%	416	33.7%	24.1%	511	33.6%	22.7%	0.957	0.411
MVA/assets	994	3.79	2.26	434	4.93	3.37	560	2.91	1.67	0.001	0.001
Residual standard deviation	1,037	5.20%	4.81%	413	6.46%	5.84%	624	4.36%	4.17%	0.001	0.001
Distress	953	50.8%		402	65.2%		551	40.3%		0.001	0.001
Panel B: Issue characteristics											
Price discount	1,035	12.36%	11.11%	405	16.41%	15.51%	630	9.76%	8.51%	0.001	0.001
Issue proceeds ($ millions)	1,128	$33.92	$11.91	465	$25.40	$8.50	663	$39.90	$15.00	0.027	0.001
Proceeds as a fraction of equity market capitalization	1,126	13.23%	9.67%	465	13.66%	8.85%	661	12.93%	10.28%	0.551	0.034
Number of investors	1,126	7.32	2.00	465	7.98	3.00	661	6.86	2.00	0.066	0.007
Investor concentration	1,128	0.62	0.63	465	0.58	0.50	663	0.65	0.84	0.005	0.001
Corporate blockholder	1,128	10.73%		465	12.04%		663	9.80%		0.232	0.232
Insider participation	1,128	10.5%		465	10.3%		663	10.6%		0.899	0.899
Placement agent	1,128	51.4%		465	45.6%		663	55.5%		0.001	0.001
Not immediately registered	1,128	84.2%		465	91.6%		663	79.0%		0.001	0.001

Table 2

Changes in price discounts over time by firm and issue characteristics

Data are for a sample of 1,128 private equity issues by public firms (PIPE issues) over the period from January 1995 through December 2007. Variables are defined in Table 1. The price discount statistics are median values within each partition.

	Quintile					p-value from Tests of Medians (Q1 vs. Q5 Within Sub-Period) [Q1 Median - Q5 Median Pre- 2001 vs. Q1 Median-Q5 Median Post-2000]
	1	2	3	4	5	
Panel A: Quintile partitions:						
Equity market capitalization (Q1 is smallest):						
Pre-2001 sub-sample	20.47%	17.07%	13.33%	17.62%	8.75%	(0.001)
Post-2000 sub-sample	12.68%	9.36%	10.71%	6.23%	7.09%	(0.001)
p-values from tests that medians are equal	0.045	0.001	0.176	0.001	0.036	[0.014]
MVA/assets (Q1 is smallest)						
Pre-2001 sub-sample	12.22%	11.60%	15.43%	16.87%	18.18%	(0.015)
Post-2000 sub-sample	7.23%	8.63%	10.30%	7.25%	11.41%	(0.027)
p-values from tests that medians are equal	0.589	0.028	0.004	0.001	0.032	[0.687]
Residual standard deviation (Q1 is smallest):						
Pre-2001 sub-sample	4.92%	14.10%	15.51%	17.50%	20.00%	(0.001)
Post-2000 sub-sample	5.75%	7.20%	10.48%	13.03%	13.49%	(0.001)
p-values from tests that medians are equal	0.852	0.001	0.014	0.014	0.113	[0.021]
Issue proceeds (Q1 is smallest)						
Pre-2001 sub-sample	21.32%	15.95%	15.83%	13.85%	12.44%	(0.047)
Post-2000 sub-sample	11.11%	12.30%	9.82%	7.06%	7.14%	(0.029)
p-values from tests that medians are equal	0.001	0.087	0.023	0.001	0.014	[0.712]
Proceeds as a fraction of equity market capitalization (Q1 is smallest):						
Pre-2001 sub-sample	11.82%	9.23%	19.23%	16.22%	20.00%	(0.001)
Post-2000 sub-sample	5.51%	6.67%	8.62%	11.11%	10.67%	(0.001)
p-values from tests that medians are equal	0.009	0.110	0.001	0.001	0.001	[0.346]
Investor concentration (Q1 is lowest, quintiles 4 and 5 collapse):						
Pre-2001 sub-sample	17.24%	16.24%	18.32%	11.11%		(0.005)
Post-2000 sub-sample	12.10%	10.07%	9.50%	5.06%		(0.001)
p-values from tests that medians are equal	0.003	0.012	0.001	0.001		[0.685]

	No	Yes	p-value from Tests of Medians (No vs. Yes Within Sub-Period) [No Median - Yes Median Pre-2001 vs. No Median-Yes Median Post-2000]
Panel B: Binary partitions:			
Distress:			
Pre-2001 sub-sample	12.57%	17.48%	(0.007)
Post-2000 sub-sample	8.20%	9.29%	(0.332)
p-values from tests that medians are equal	0.009	0.001	[0.113]
Corporate blockholder:			
Pre-2001 sub-sample	16.53%	9.65%	(0.006)
Post-2000 sub-sample	8.62%	6.53%	(0.507)
p-values from tests that medians are equal	0.001	0.358	[0.100]
Insider participation:			
Pre-2001 sub-sample	16.34%	11.11%	(0.006)
Post-2000 sub-sample	8.81%	6.23%	(0.016)
p-values from tests that medians are equal	0.001	0.082	[0.248]
Immediately registered:			
Pre-2001 sub-sample	16.11%	13.59%	(0.246)
Post-2000 sub-sample	10.67%	5.37%	(0.001)
p-values from tests that medians are equal	0.000	0.001	[0.256]

Table 3

Firm characteristics, deal characteristics, and private placement discounts

Ordinary least squares regressions estimated with a sample of 757 private equity issues by public firms over the period from January 1995 through December 2007. Residuals are clustered by year and month. The dependent variable is the discount received by the private placement investors relative to the stock price one day after the issue date. *PPE/assets* is the ratio of property, plant, and equipment to the book value of total assets at the end of the year before the issue. *MVA/assets* is the ratio of the book value of assets less the book value of equity plus the market value of equity divided by the book value of assets at the end of the year before the issue. *Residual standard deviation* is the standard deviation of the residuals from a market model regression that is estimated over trading days -300 to -51, relative to the issue date, using the CRSP equally-weighted index. *Distress* is an indicator that equals one if EBIT/assets is negative in each of the two years before the issue. *Natural log of proceeds* is the natural log of the product of the number of shares issued times the offer price. *Proceeds as a fraction of equity market capitalization* is the value of the issued shares as a fraction of firm market capitalization as of 10 days after the issue. *Investor concentration* is a Herfindahl index (sum of the squared fractions) computed from the fractions of the total issue purchased by each of the investors. *Corporate blockholder* is an indicator that equals one if a corporation purchases shares and owns five percent or more of the equity after the issue. *Insider participation* is an indicator variable that equals one if an insider purchased shares in the offering. *Placement agent used* is an indicator that equals one if the issuer used a placement agent. *Not immediately registered* is an indicator that equals one if the shares sold in the offering were not registered within one week of the closing date. p-values are reported in parentheses.

	Dependent Variable: Price Discount			
	Entire Sample Period	Pre-2001 Period	Post-2000 Period	p-value for Difference Across Periods
Constant	0.4419	0.3778	0.4873	(0.619)
	(0.000)	(0.040)	(0.000)	
Firm characteristics:				
PPE/assets	0.0084	0.0083	0.0065	(0.964)
	(0.649)	(0.816)	(0.747)	
MVA/assets	0.0041	0.0034	0.0025	(0.818)
	(0.047)	(0.266)	(0.277)	
Residual standard deviation	0.5832	0.5327	0.3041	(0.665)
	(0.058)	(0.204)	(0.356)	
Distress	0.0256	0.0370	0.0080	(0.232)
	(0.050)	(0.084)	(0.503)	
Issue characteristics:				
Natural log of proceeds	-0.0204	-0.0171	-0.0212	(0.741)
	(0.001)	(0.104)	(0.004)	
Proceeds as a fraction of equity market capitalization	0.0770	0.1150	0.0361	(0.713)
	(0.490)	(0.496)	(0.788)	
Investor concentration	-0.0888	-0.0806	-0.0976	(0.621)
	(0.000)	(0.007)	(0.000)	
Corporate blockholder	-0.0397	-0.0938	0.0208	(0.039)
	(0.171)	(0.064)	(0.389)	
Insider participation	-0.0448	-0.0676	-0.0310	(0.284)
	(0.011)	(0.018)	(0.118)	
Placement agent used	-0.0073	-0.0053	-0.0019	(0.899)
	(0.562)	(0.821)	(0.880)	
Not immediately registered	0.0234	0.0490	-0.0024	(0.108)
	(0.102)	(0.088)	(0.870)	
R^2	0.135	0.115	0.140	
N	757	344	413	

Table 4

Overall private placement activity and capital market conditions

Ordinary least squares (OLS) and Poisson regressions estimated over the 156 months from January 1995 through December 2007. The dependent variable in the OLS regressions is the natural log of the total dollar value of the capital raised through private equity issues by public firms (PIPE issues) in a particular month. The dependent variable in the Poisson regressions is the number of PIPE issues in a particular month. The PIPE statistics are for a sample of 1,035 issues that were announced between January 1995 and December 2007. The independent variables are measures of capital market conditions and year dummy variables. *EW market return* is the return on the equally-weighted CRSP index in the previous month. *Net percent of loan officers tightening credit terms* equals the number of loan officers, from a survey of 60 domestic and 24 foreign officers, who indicate that they are tightening credit terms, minus the number of officers who do not indicate they are tightening terms, divided by the total number of officers surveyed. *Number of non-common stock private issues* is the number of non-common stock issues that were privately placed during the month. *Number of IPO Issues* is the number of IPO issues during the month. *10 Year Treasury rate* is the yield on 10 year Treasury bonds at the beginning of the month. p-values are reported in parentheses for t-statistics for the OLS regression coefficient estimates and for Chi-Square statistics for the Poisson regressions coefficient estimates.

	Model			
	1	2	3	4
	OLS Regressions: Dependent Variable is Natural Log of Total Capital Raised Through Private Placements During Month		Poisson Regressions: Dependent Variable is Number of Private Placements During Month	
Intercept	20.3176	22.7971	1.2911	0.9693
	(0.000)	(0.000)	(0.000)	(0.121)
EW Mkt. Return	2.5011	0.9138	3.3753	2.4276
	(0.528)	(0.811)	(0.000)	(0.000)
Net percent of loan officers tightening credit terms	0.0336	-0.0532	0.0108	-0.0058
	(0.003)	(0.040)	(0.000)	(0.163)
Number of non-common stock private issues	0.0657	0.0187	0.0129	0.0096
	(0.000)	(0.501)	(0.000)	(0.027)
Number of IPO issues	0.8714	1.1876	-0.0295	0.1120
	(0.006)	(0.002)	(0.574)	(0.091)
10 year Treasury rate	-0.9000	-0.4541	0.0038	0.2091
	(0.008)	(0.398)	(0.943)	(0.024)
Year dummy variables:	No	Yes	No	Yes
N	156	156	156	156
Adjusted R^2/ PseudoR^2	0.179	0.298	0.125	0.277
Model X^2			132.1	292.35
p-value			0	0

Table 5

Firm characteristics, deal characteristics, market characteristics, and private placement discounts

Ordinary least squares regressions estimated with a sample of 755 private equity issues by public firms over the period from January 1995 through December 2007. Residuals are clustered by year and month. The dependent variable is the discount received by the private placement investors relative to the stock price a day after the issue date. The firm and deal characteristic variables are defined in the caption for Table 3. *EW market return [-30,-1]* is the return on the equally-weighted CRSP index from day -30 through day -1 relative to the private placement issue date. *Net percent of loan officers tightening credit terms* equals the number of loan officers, from a survey of 60 domestic and 24 foreign officers, who indicate that they are tightening credit terms, minus the number of officers who do not indicate they are tightening terms, divided by the total number of officers surveyed. *Number of non-common stock private issues* is the number of non-common stock issues that were privately placed during the month. *Number of IPO Issues* is the number of IPO issues during the month. *10 Year Treasury rate* is the yield on 10 year Treasury bonds at the beginning of the month. p-values are reported in parentheses.

	Dependent Variable: Price Discount			p-value for Difference Across Periods
	Entire Sample Period	Pre-2001 Period	Post-2000 Period	
Constant	0.2766 (0.011)	0.2692 (0.128)	0.4122 (0.003)	(0.515)
Firm characteristics:				
PPE/Assets	-0.0027 (0.880)	-0.0017 (0.959)	-0.0006 (0.973)	(0.977)
MVA/assets	0.0020 (0.350)	0.0003 (0.908)	0.0025 (0.311)	(0.551)
Residual standard deviation	0.5245 (0.093)	0.7430 (0.100)	0.0497 (0.885)	(0.217)
Distress	0.0148 (0.203)	0.0325 (0.103)	0.0055 (0.642)	(0.238)
Issue characteristics:				
Natural log of proceeds	-0.0196 (0.000)	-0.0172 (0.052)	-0.0225 (0.002)	(0.629)
Proceeds as a fraction of equity market capitalization	0.1164 (0.256)	0.1754 (0.232)	0.0530 (0.689)	(0.533)
Investor concentration	-0.0740 (0.000)	-0.0636 (0.021)	-0.0931 (0.000)	(0.365)
Corporate blockholder	-0.0297 (0.285)	-0.0714 (0.139)	0.0203 (0.382)	(0.084)
Insider participation	-0.0379 (0.012)	-0.0492 (0.045)	-0.0228 (0.203)	(0.377)
Placement agent used	0.0006 (0.963)	0.0059 (0.778)	0.0017 (0.891)	(0.862)
Not immediately registered	0.0163 (0.201)	0.0476 (0.097)	-0.0047 (0.741)	(0.099)
Market characteristics:				
EW market return [-30, -1]	0.5170 (0.000)	0.9342 (0.000)	0.2106 (0.007)	(0.000)
Net percent of loan officers tightening credit terms	-0.0007 (0.045)	-0.0012 (0.151)	0.0002 (0.626)	(0.126)
Number of non-common stock private issues	-0.0003 (0.449)	-0.0007 (0.455)	-0.0001 (0.811)	(0.611)
Number of IPO issues	-0.0003 (0.453)	-0.0009 (0.135)	0.0006 (0.600)	(0.261)
10 year Treasury rate	0.0314 (0.003)	0.0203 (0.314)	0.0200 (0.118)	(0.988)
R^2	0.206	0.244	0.160	
N	755	344	411	

Table 6

Changes in attributes and attribute pricing

This table compares predicted price discounts with actual price discounts for a sample of 757 private equity issues by public firms over the period from January 1995 through December 2007. In preparing this table, the regression models in Tables 3 and 5 are first estimated for the pre-2001 sub-sample and the post-2000 sub-sample. Discounts are then predicted for each sub-sample using the parameter estimates from the models in Tables 3 and 5.

	Pre-2001 Sample		Post-2000 Sample		p-values From Tests that Means/Medians are Equal Across Columns	
	Mean	Median	Mean	Median		
Price discount (actual)	17.08%	16.52%	10.52%	9.43%	0.001	0.001
Panel A: Price discounts predicted using firm and issue characteristics (models in Table 3):						
Prediction using pre-2001 parameters	17.08%	18.27%	12.98%	13.79%	0.001	0.003
Prediction using post-2000 parameters	13.13%	13.50%	10.52%	11.33%	0.001	0.001
p-values from tests that means and medians are equal across rows	0.001	0.001	0.001	0.001		
Panel B: Price discounts predicted using firm, issue, and market characteristics (models in Table 5):						
Prediction using pre-2001 parameters	17.08%	18.12%	12.21%	12.45%	0.001	0.001
Prediction using post-2000 parameters	17.40%	17.76%	10.52%	11.20%	0.001	0.001
p-values from tests that means and medians are equal across rows	0.746	0.145	0.010	0.010		

Table 7

Price discounts and previous stock returns

Ordinary least squares regressions estimated with a sample of 1,024 private equity issues by public firms over the period from January 1995 through December 2007. The dependent variable is the price discount, measured using the stock price on day +1. The independent variables are the daily stock returns for days -1 to -10, relative to the issue date.

	Dependent Variable: Price Discount			p-value for Difference Across Periods
	Entire Sample Period	Pre-2001 Period	Post-2000 Period	
Intercept	0.110	0.138	0.091	(0.000)
	(0.000)	(0.000)	(0.000)	
Return on day -1	0.484	0.649	0.204	(0.009)
	(0.000)	(0.000)	(0.029)	
Return on day -2	0.356	0.510	0.158	(0.039)
	(0.000)	(0.000)	(0.196)	
Return on day -3	0.109	0.289	0.022	(0.074)
	(0.181)	(0.036)	(0.706)	
Return on day -4	0.260	0.266	0.143	(0.525)
	(0.012)	(0.075)	(0.249)	
Return on day -5	0.178	0.235	0.223	(0.935)
	(0.041)	(0.051)	(0.012)	
Return on day -6	0.074	0.390	0.005	(0.020)
	(0.265)	(0.017)	(0.870)	
Return on day -7	0.160	0.130	0.240	(0.507)
	(0.015)	(0.200)	(0.069)	
Return on day -8	0.173	0.155	0.191	(0.817)
	(0.043)	(0.123)	(0.120)	
Return on day -9	0.229	0.237	0.204	(0.756)
	(0.000)	(0.000)	(0.018)	
Return on day -10	-0.020	0.023	-0.007	(0.853)
	(0.799)	(0.876)	(0.920)	
N	1024	403	621	
Adjusted R^2	0.092	0.128	0.042	