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The effects of equity issues on ownership structure and stock liquidity: A comparison of rights and public offerings

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Abstract

I find that proportionate bid-ask spreads increase after rights offerings of common stock, but decrease after public underwritten offerings. These changes are correlated with changes in the issuing firm's ownership structure. Public offerings cause greater dispersion in share ownership while rights offerings lead to more concentrated ownership. I argue that increased spreads represent a significant cost to issuing firms' shareholders, making rights offerings costlier than public underwritten offerings for actively traded firms.

Key words: Seasoned equity offerings; Rights offerings; Ownership structure; Bid-ask spread; Liquidity

JEL classification: G32

1. Introduction

Fewer than 10% of U.S. firms issue seasoned equity directly to current shareholders through rights offerings, despite evidence that the direct flotation

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costs are lower than those of public underwritten offerings. Smith (1977) and Eckbo and Masulis (1992) show that the direct flotation costs of public underwritten offerings are over 6% of issue proceeds, but are only 4% for standby rights offerings and 2% for pure rights offerings. This suggests that rights offerings are costlier in other ways.

I show that rights offerings impose a significant indirect cost on issuers by reducing the liquidity of the issuer's stock. In contrast, public offerings improve liquidity. For a sample of NASDAQ rights issues from 1973 to 1986, percentage bid-ask spreads, on average, increase from 11.31% before the ex-rights date to 13.05% after. For a sample of public underwritten offerings matched by firm size, percentage spreads decrease from 7.19% before the offering date to 5.58% after. Both changes are statistically significant.

Increased spreads impose an indirect cost on issuers through their effect on firm value. Amihud and Mendelson (1986) argue that stocks with larger spreads have higher required rates of return and lower value because investors require compensation for higher expected trading costs. Since trading costs are incurred repetitively, even a small change can substantially affect firm value. Therefore, firms have an incentive to increase the liquidity of the financial claims they issue.¹

I find that the changes in spreads are correlated with changes in the concentration of share ownership around the issuance of equity. Rights and public offerings have opposite effects on the issuing firm's ownership structure. Share ownership becomes more concentrated following rights issues, but more diffuse after public offerings. I examine three different measures of ownership concentration: large blockholdings, insider holdings, and changes in the number of shareholders. Regardless of the measure used, spreads increase when the issuer's ownership becomes more concentrated and decrease when ownership becomes more diffuse.

Concentrated ownership increases spreads because it reduces trading activity and increases dealers' potential losses from trading against informed investors. Further, as Holmstrom and Tirole (1993) argue, concentrated ownership reduces the extent to which stock market participants monitor the firm, reducing the amount of information available about the firm and increasing spreads. These arguments are borne out in previous empirical work by Demsetz (1968) and Benston and Hagerman (1974), who show that spreads are negatively correlated with the number of shareholders, and by Chiang and Venkatesh (1988), who find a positive relation between spreads and insider ownership.

¹For example, Barclay and Smith (1988) argue that increases in spreads following open-market repurchases may explain why firms prefer cash dividends to repurchases, despite the latter's tax advantages. Recent papers by Singh, Zaman, and Krishnamurti (1994) and Miller and McConnell (1995) do not find evidence of such increases, however.

Consistent with the notion that ownership concentration affects trading activity, I find that trading volume increases significantly following public issues, but not after rights issues. There is also a difference in the stock price effects of the two issue methods. In contrast to public issues, there is a significant price decline around the ex-rights date of rights issues because issuers typically set the subscription price well below the market price. The observed changes in spreads are related to these concurrent changes in price and volume following the two types of offerings.

My evidence sheds light on why firms typically prefer public underwritten offerings to rights offerings of seasoned equity. I establish that liquidity changes around stock offerings can influence the firm's choice of issue method. My findings also explain the evidence in this and previous studies that rights offerings are used more often by firms with concentrated ownership. Such firms are less concerned about increased trading costs because their investors tend to have longer investment horizons. In contrast, larger firms with more dispersed ownership are not as likely to employ rights offerings because their stocks trade more frequently and reduced liquidity has a greater effect on share value.

Previous explanations in the literature for the rights offering anomaly include Hansen and Pinkerton's (1982) selection bias argument, Hansen's (1988) shareholder selling costs hypothesis, and the adverse selection model of Eckbo and Masulis (1992). Hansen and Pinkerton (1982) argue that only firms with concentrated share ownership enjoy the direct flotation cost advantage of nonunderwritten rights offerings because as the number of potential buyers in an issue declines, so do direct costs such as printing expenses, transfer fees, and marketing costs. Eckbo and Masulis (1992), however, find that the flotation cost differential persists after controlling for the issuer's ownership structure. They argue that rights offerings are costly because the lack of underwriter certification increases adverse selection costs implied by the Myers and Majluf (1984) model, which predicts that prices will respond unfavorably to announcements of equity issues because the market assumes that managers have incentives to issue stock that they believe is overvalued. The presence of underwriters can reduce the information disparity between issuing firm's managers and outside investors. Eckbo and Masulis argue that a potential substitute for underwriter certification is the expected take-up by existing shareholders. The expected take-up is higher in firms with concentrated ownership and, therefore, these firms are more likely to issue nonunderwritten rights. Firms with diffuse ownership prefer underwritten public offerings.

My findings on liquidity consequences of equity offerings complement explanations provided previously in the literature for the reluctance of firms to issue rights. As opposed to previous studies that focus on the *levels* of ownership concentration, I focus on the *changes* in ownership that equity issues cause in issuing firms, and how they affect the liquidity of the firm's stock. Section 2 describes the data and the sample selection process. Section 3 presents my

findings on changes in spreads, and Section 4 documents changes in ownership structure. Section 5 concludes.

2. Sample description

The sample of rights offerings consists of 85 seasoned issues on NASDAQ from 1973 to 1986. I identify issues from Moody's *Annual Dividend Records* and the Registered Offerings and Securities (ROS) tape compiled by the Securities and Exchange Commission. According to the *Directory of Corporate Financing*, all but three issues are nonunderwritten (pure) rights offerings. I also use Moody's to identify the ex-rights date, the subscription price, and the basis for each issue. Ex-rights dates are not available in Moody's for twenty of these issues, so I use record dates instead. For issues for which both ex-rights dates and record dates are available, the difference between these two dates is only a day or two and is rarely more than a week. I include firms in the sample only if they have bid-ask price data available on the Center for Research in Security Prices (CRSP) files.

The sample of public underwritten offerings is also identified from the ROS tape, which provides the offering date and issue price for each offering. I exclude secondary and combination offerings and offerings without price data on CRSP. I then rank firms from this set by market capitalization within each year. The firm with the market capitalization closest to that of a firm with a rights issue in that year is chosen as its matching firm.

I obtain data on bid and ask prices, daily closing prices, and returns from the CRSP NASDAQ Daily and Monthly Master File. CRSP reports trading volume data beginning in late 1982. Daily data on volume for the years 1973–1982 come from several volumes of the *NASDAQ Daily Stock Price Records*. I obtain other financial information about issuing firms from either COMPUSTAT Merged Expanded Annual Industrial with OTC file, the ROS tape, or Moody's *Manuals*. Finally, share ownership data are from proxy statements and 10-K reports.

Firms issuing rights on NASDAQ are typically very small firms – the average market value for the sample of 85 issues is only \$35.71 million (median \$13.38 million). The average capitalization for the matched 85 public offerings is \$39.07 million (median \$13.78 million). The average issue sizes are 52% of market value for rights offerings and 36% for public underwritten offerings (the median is 28% for both categories).

3. Changes in bid-ask spreads

The transaction costs of trading a security include the bid-ask spread, brokerage commissions, and potential price concessions incurred by the trader

in exchange for immediate order execution. Since the bid–ask spread represents a significant proportion of transaction costs for most investors, it has been used as a measure of a stock's liquidity in several studies, including Amihud and Mendelson (1986), Copeland (1979), and Demsetz (1968). In addition, empirical studies by Loeb (1983) and Lee, Mucklow, and Ready (1993) find that alternative measures of liquidity are highly correlated with spreads. I therefore examine changes in proportionate bid–ask spreads around rights and public equity offerings in order to obtain a measure of the liquidity effects of the two issue methods. Proportionate spreads are calculated as the difference between the ask and bid prices divided by the bid–ask midpoint.

For the rights offerings sample, I calculate changes in spreads using a period of 200 days surrounding the ex-rights day. For each firm, I compare the average daily spread for days -100 to -1 with the average daily spread for days 0 to 99 , where day 0 is the ex-rights day. Since the distribution of spread changes is not normal, I measure the log-ratio of the average daily spread after the ex-rights day to the average daily spread before. This distribution of log-changes is approximately normal. I use the same procedure for public underwritten offerings, with day 0 being the offering date of the issue. I also calculated changes excluding ten days around the ex-rights date, i.e., from -100 to -6 and $+5$ to $+99$, and for longer windows (up to 400 days); the results are essentially unchanged.

Table 1 presents evidence that spread changes are strikingly different for the two issue methods. The average percentage spread increases significantly around rights issues, from 11.31% before the ex-rights date to 13.05% after (p -value = 0.007), with 61% of the firms experiencing increases in spreads. The mean log-ratio of spread changes for these firms is also significantly positive.² As a further check, I perform the nonparametric binomial test which yields a z -statistic of 2.06.³ In contrast, public underwritten offerings are followed by significant declines in percentage spreads. Percentage spreads in the pre-issue period are, on average, 7.19%, but fall to 5.58% in the post-issue period (p -value = 0.002). The mean log-change is significant as well. Sixty-seven percent of the firms experience decreases in spreads. In a recent working paper, Loderer and Sheehan (1993) observe similar changes in spreads for a sample of all underwritten public offerings on NASDAQ from 1980 to 1986.

²The t -statistic is obtained from a paired difference t -test and is calculated as $(\text{averagespread}_{\text{post}} - \text{spread}_{\text{pre}}) / \text{SE}$, where $(\text{spread}_{\text{post}} - \text{spread}_{\text{pre}})$ refers to either the change or the log-change in spread, as the case may be, for firm i , and SE is the standard deviation of the matched changes in spreads divided by the square root of the number of sample observations.

³Binomial $z = 2\sqrt{N}(p - 0.5)$, N is the total number of firms and p is the proportion experiencing increases in spreads. It tests whether p is significantly greater than 0.5, assuming cross-sectional independence among observations, which is a reasonable assumption in this case, since the issues are not clustered in calendar time.

Table 1

Changes in bid-ask spreads around ex-rights date offering date: Rights issues and public underwritten issues on NASDAQ from 1973 to 1986

The sample consists of 85 rights issues and a matched sample of 85 public underwritten offerings on NASDAQ from 1973 to 1986. Public issues are matched with rights issues by year of issue and issuer's market capitalization. Proportionate bid-ask spread is calculated as the difference between the ask and bid prices divided by the bid-ask midpoint. Absolute spread is the difference between the ask and bid prices. Pre-issue spread is the average daily spread calculated over the period -100 to -1 relative to the ex-rights (offering) date for rights (public) offerings. Post-issue spread is the average daily spread calculated over the period 0 to 99 , where day 0 is the ex-rights (offering) date for rights (public) offerings.

	Number of firms	Mean pre-issue spread (s_1) (median)	Mean post-issue spread (s_2) (median)	Avg. change in spread ($s_2 - s_1$)	t^a	% > 0	Binomial z	Mean $\log(s_2/s_1)$	t^b
<i>Rights issues</i>									
Proportionate spread	85	0.1131 (0.1076)	0.1305 (0.1243)	0.0173	2.76***	61.0	2.06**	0.105	2.63***
Absolute spread	85	0.5764 (0.5752)	0.5479 (0.5311)	-0.0285	-1.52	24.7	-4.66***	-0.117	-2.97***

Matched public underwritten issues

Proportionate spread	85	0.0719 (0.0701)	0.0558 (0.0520)	- 0.0161	- 3.25***	32.9	- 3.15***	- 0.181	- 3.71***
Absolute spread	85	0.5787 (0.5750)	0.4392 (0.4165)	- 0.1394	- 4.41***	17.7	- 5.97***	- 0.248	- 5.59***

Rights vs. public issues^a

Change in proportionate spread

4.54***

Change in absolute spread

2.21**

^aPaired difference *t*-test, $t = \text{average}(\text{spread}_{\text{public}} - \text{spread}_{\text{rights}}) / \text{SE}$, where $(\text{spread}_{\text{public}} - \text{spread}_{\text{rights}})$ refers to either the change or log-change in spread, as the case may be, for firm *i*, and SE is the standard deviation of the matched changes in spreads divided by the square root of the number of sample observations.

^bA difference-in-means *t*-test is conducted to compare the average change in spreads between the rights issues and public issues samples. The *t*-statistic is computed as: $(\mu_r - \mu_p) / \sqrt{SD_r^2/N_r + SD_p^2/N_p}$, where μ is the average log-change in spread, *SD* is the sample standard deviation, and *N* is the number of observations. The subscripts *r* and *p* refer to rights issues and public issues, respectively.

***Significance at the 1% level, two-tailed test.

**Significance at the 5% level, two-tailed test.

I find that the effect of public offerings on issuing firms' spreads is significantly more favorable than that of rights offerings (p -value = 0.0001).⁴ In addition, the decline in absolute spreads (difference between ask and bid) is significantly greater following public offerings than after rights offerings (p -value = 0.03), although both offerings lead to lower absolute spreads. The average decline in absolute spreads around rights offerings is -0.0285 , which is not statistically significant, although the log-change is significant. For public offerings, the average decrease in absolute spreads is -0.1394 and is statistically significant, with spreads declining for over 82% of the issuers.

A close examination of the behavior of absolute spreads is important, especially in the case of rights issues, to rule out the effects of price discreteness. For the rights to have value, the subscription price must be set below the current market price of the shares. Thus, the stock price falls on the ex-rights date to the weighted average of the subscription price and the market price just before the ex-rights date. The average split factor for the rights issues sample is 13.8%.⁵ NASDAQ dealers are required to quote spreads in multiples of $\$1/8$ if the bid is greater than $\$10$ and multiples of $\$1/64$ if the bid is $\$10$ or less. This discreteness in price movements can cause proportionate spreads to go up when prices fall, especially when the absolute spread hits the lower bound set by the minimum tick. This is a bigger concern for firms with lower-priced stocks, which tend to characterize the rights issues sample. However, for almost all firms issuing rights, absolute spreads before the issue are sufficiently greater than the minimum tick to allow for decreases commensurate with a split factor of 50% or more. Also, spread changes for a subsample of firms with small pre-issue absolute spreads ($\leq \frac{1}{4}$ th) are similar to those for firms with larger pre-issue absolute spreads ($> \frac{1}{4}$ th), suggesting that the results are not driven by the stickiness of smaller spreads in the sample.

4. Changes in ownership structure and spreads

Equity offerings can affect bid-ask spreads by inducing changes in the issuing firm's ownership structure. Table 2 shows changes in share ownership at the time of equity offerings. Rights offerings lead to a more concentrated ownership

⁴A difference-in-means t -test is used. The t -statistic is computed as: $(\mu_r - \mu_p) / \sqrt{SD_r^2/N_r + SD_p^2/N_p}$, where μ is the average log-change in spread for the relevant sample, SD is the sample standard deviation, N is the number of observations. The subscripts r and p refer to rights issues and public issues, respectively.

⁵If P_r is the rights-on price (price before the offering), P_s is the subscription price, and N is the number of rights required to purchase one new share in the offering, then the expected ex-rights price is $E(P_e) = (NP_r + P_s)/(N + 1)$, and the split factor, F , equals $P_r/E(P_e)$. The value of each right is $\max[0, P_r - E(P_e)]$.

Table 2

Changes in share ownership around equity issues

The sample consists of rights issues and a matched sample of public underwritten issues made on NASDAQ from 1973 to 1986. Public issues are matched with rights issues by year of issue and issuer's market capitalization. Beneficial and insider ownership data are available for 51 equity issues (26 rights issues and 25 public issues). Data on number of shareholders are available for 57 equity issues (28 rights issues and 29 public issues). Beneficial ownership refers to total holdings by shareholders owning 5% or more of the firm's equity. Insider ownership refers to total holdings by directors and senior management. Pre-issue ownership refers to ownership reported in the last proxy statement or 10K before the rights or public issue. Post-issue ownership refers to ownership reported in the first proxy statement or 10K following the expiration of the issue.

Average changes in ownership around rights offerings and public underwritten offerings

	Beneficial ownership	Insider ownership	Number of shareholders
<i>Rights offerings</i>			
Pre-issue ownership	36.49	23.54	3443
Post-issue ownership	40.41	26.93	3558
Change in ownership	3.92	3.28	0.03 ^a
<i>t</i>	1.40	1.31	1.19
<i>p</i> -value	0.18	0.20	0.24
<i>Matched public underwritten offerings</i>			
Pre-issue ownership	26.42	28.42	3633
Post-issue ownership	14.15	18.28	4322
Change in ownership	-12.27	-10.14	0.24
<i>t</i>	-4.42	-5.41	4.30
<i>p</i> -value	< 0.01	< 0.01	< 0.01
<i>Rights versus public offerings^b</i>			
<i>t</i>	4.20	4.08	-3.42
<i>p</i> -value	< 0.01	< 0.01	< 0.01

^aProportionate change in number of shareholders. Similar results are obtained using raw changes.

^bThe *t*-test determines whether changes in ownership are significantly different around rights offerings relative to public offerings. The *t*-statistic is computed as: $(\mu_r - \mu_p) / \sqrt{SD_r/N_r + SD_p/N_p}$, where μ is the average change in the relevant ownership variable, *SD* is the sample standard deviation, and *N* is the number of observations. The subscripts *r* and *p* refer to rights issues and public issues respectively.

structure while public issues result in a more diffuse share ownership. Since shares are sold originally to existing shareholders of the firm in a rights issue, a rights issue is not likely to achieve as great a dispersion of ownership as a public offering, for which the marketing and distribution efforts of underwriters are available. Ownership can even become more concentrated after a rights issue if either management or large block shareholders take up additional allotments in undersubscribed issues.

I calculate three measures of ownership concentration: insider holdings (shares owned by the CEO, chairperson, directors, and other senior officers of the company), beneficial or block ownership (ownership of shareholders holding 5% or more of the firm's equity), and the number of shareholders. On average, insiders own 28.42% of the total equity prior to a public offering, but decrease their holdings to 18.28% after the issue. Large blockholdings decrease from 26.42% to 14.15%. Also, the number of shareholders increases from 3,634 to 4,322. All changes are significant at the 1% level. In contrast, insider holdings constitute 23.54% of the firm's equity before a rights issue but increase to 26.93% subsequent to the issue, and blockholders increase their holdings, on average, from 36.49% before the issue to 40.41% after the issue, although neither increase is statistically significant. In addition, there is no significant change in the number of shareholders. These effects of rights offerings on ownership concentration are significantly different at the 1% level from the effects of public offerings.

Changes in ownership structure can affect spreads in several ways. First, increased ownership concentration reduces both the magnitude of trading volume and the continuity of order flow, not only because there are fewer shareholders but because large blockholders and insiders are not likely to trade very often. Conversely, in firms with a dispersed shareholder base, trades occur more frequently, leading to greater depth and lower spreads. Second, more concentrated ownership increases dealers' losses from trading against informed traders. When firms are closely held, the probability that the dealer will face an informed investor (and possibly, an insider) in any given trade rises. Dealers are likely to increase their spreads to cover their expected losses to such investors. In contrast, firms with diffuse shareholders will have lower spreads because of lower adverse selection costs. Finally, Holmstrom and Tirole (1993), in an extension of Kyle's (1985) model, suggest that changes in ownership structure affect the monitoring of the firm's activities by stock market participants. They argue that as the fraction of the firm's shares held by insiders increases, outside investors find that the value of being informed is reduced because there are fewer liquidity traders in such stocks. In the absence of liquidity trades, informed traders find it more difficult to disguise their information and trade beneficially on it. Since there is less external monitoring, dealers are faced with a higher level of information asymmetry and are likely to increase spreads. Conversely, widely held stocks will have lower spreads because they will be followed more closely and more information will be generated about them in the market.

The preceding discussion predicts a positive relation between changes in ownership concentration and changes in proportionate spreads around equity issues. The correlations between spread changes and changes in various ownership measures confirm these predictions. Changes in spreads are positively correlated with changes in insider holdings ($\rho = 0.33$, p -value = 0.02) and changes in beneficial ownership ($\rho = 0.28$, p -value = 0.05), and negatively

Table 3

The influence of ownership changes on spreads of issuing firms

The sample consists of rights issues and a matched sample of public underwritten issues on NASDAQ from 1973 to 1986. Public issues are matched with rights issues by year of issue and issuer's market capitalization. Beneficial and insider ownership data are available for 51 equity issues (26 rights issues and 25 public issues). Data on number of shareholders are available for 57 equity issues (28 rights issues and 29 public issues). Insider ownership refers to total holdings by directors and senior management. Beneficial ownership refers to total holdings by shareholders owning 5% or more of the firm's equity. Change in ownership is calculated as the difference between the ownership reported in the last proxy statement or 10K before the issue and the ownership reported in the first proxy statement or 10K following the expiration of the issue. The change in spread for each issuing firm is calculated as the log of the ratio of the average proportionate spread during the post-issue period (days 0 to 99) to the average proportionate spread in the pre-issue period (days – 100 to – 1); day 0 is the ex-rights date for rights offerings and the offering date for public offerings.

Ordinary least squares regressions of spread changes on ownership changes

Independent variable	Coefficient estimate	t-statistic (p-value)	R ²	F
Change in inside ownership	0.0129	2.35 (0.02)	0.10	5.54
Change in beneficial ownership	0.0092	1.98 (0.05)	0.08	3.91
Change in number of shareholders	– 0.49	– 2.34 (0.02)	0.09	5.47

correlated with changes in the number of shareholders ($\rho = -0.3$, p -value = 0.02). A separate correlation analysis for each issue method yields similar results. Table 3 reports the results of ordinary least squares regressions of changes in proportionate spreads on changes in ownership. The coefficients on insider holdings and beneficial holdings are significantly positive, the coefficient on the number of shareholders is significantly negative. These results suggest that increases in ownership concentration lead to higher spreads, and dispersion of ownership reduces spreads among issuing firms.

4.1. Changes in trading characteristics and spreads

In this section, I further investigate the underlying causes for the changes in spreads around equity issues. Market microstructure theory suggests that spreads must cover three costs borne by dealers: inventory holding costs, order processing costs, and adverse selection costs arising from trades with unidentified investors possessing superior information.⁶ Consistent with the theory, Benston and Hagerman (1974) and Stoll (1978) show that proportionate spreads are

⁶This research includes studies by Tinic (1972), Bagehot (1974), Stoll (1978), Amihud and Mendelson (1980), Ho and Stoll (1981), Copeland and Galai (1983), and Glosten and Milgrom (1985).

negatively related to trading volume and price and positively related to the risk of the security.

Table 4 examines whether trading characteristics such as volume, price, and volatility change after equity issues. I find significant declines in price around both types of equity issues, and a significant increase in volume around public offerings. Moreover, the increase in volume around public offerings is significantly greater than that following rights issues, and rights offerings are associated with a significantly larger price decline than public offerings. The average decline in prices from

Table 4

Changes in trading characteristics of issuing firms' stocks around ex-rights date/offering date: Rights issues versus public underwritten issues on NASDAQ from 1973 to 1986

The sample consists of 85 rights issues and a matched sample of 85 public underwritten offerings on NASDAQ from 1973 to 1986. Public issues are matched with rights issues by year of issue and issuer's market capitalization. Changes in price and volatility are calculated for all 85 firms in each sample. Volume data are available for only 79 rights issues and 84 public issues. Daily dollar volume is the number of shares traded multiplied by the CRSP closing price. Volatility is measured as the standard deviation of daily returns in the relevant period. Log-change = $\log(\text{average value of the variable in the post-issue period}/\text{average value of the variable in the pre-issue period})$. The pre-issue period is defined as days -100 to -1 , and the post-issue period refers to days 0 to 99 , where day 0 is the ex-rights (offering) date for rights (public) offerings.

	Changes in price	Changes in dollar volume	Changes in volatility
<i>Rights issues</i>			
Mean log-change	-0.22	0.03	0.01
<i>t</i>	-6.16	0.34	0.29
<i>p</i> -value	< 0.01	0.74	0.77
Percentage of firms with increases	22.35	53.16	49.41
Binomial <i>z</i>	-5.09	0.56	-0.10
<i>Matched public underwritten issues</i>			
Mean log-change	-0.07	0.83	0.03
<i>t</i>	-1.87	8.10	0.86
<i>p</i> -value	0.06	< 0.01	0.39
Percentage of firms with increases	43.53	84.52	47.06
Binomial <i>z</i>	-1.19	6.33	-0.54
<i>Difference-in-means test*</i>			
<i>t</i>	-3.05	-5.53	-0.32
<i>p</i> -value	< 0.01	< 0.01	0.75

*The *t*-test determines whether the mean log-changes between rights issues and public issues are significantly different. The *t*-statistic is computed as: $(\mu_r - \mu_p) / \sqrt{SD_r^2/N_r + SD_p^2/N_p}$, where μ is the average change in the relevant variable, *SD* is the sample standard deviation, and *N* is the number of observations. The subscripts *r* and *p* refer to rights issues and public issues, respectively.

the pre-issue period to the post-issue period is 9% for rights offerings, as opposed to 5% for public offerings.

As mentioned earlier, the price decline following rights issues, which is similar to the price decline seen after a stock split, occurs because the subscription price is lower than the market price. The split effect has no wealth implications for the firm's shareholders as long they either exercise or sell their rights. While there is no economic rationale for the phenomenon, it is interesting to note that stock splits are also followed by increases in bid-ask spreads. Copeland (1979) and Conroy, Harris, and Benet (1990) show that proportionate spreads increase significantly when firms split their stock, although the splits they examine are much larger than the effective split in a rights issue.

There is no significant difference between the two types of issues in terms of volatility changes (measured as the standard deviation of daily returns). For both samples, volatility changes are insignificant. Black (1986) and Amihud and Mendelson (1987) show that the spread itself affects measured volatility. I therefore calculate changes in volatility adjusted for the spread effect, with the net change in volatility given by the observed change in volatility less half the change in squared spreads. The results are similar to those for unadjusted volatility.

To examine whether changes in spreads are related to these changes in trading characteristics, I report correlations in Table 5. Changes in proportionate spreads are negatively and significantly correlated with changes in trading volume and price. The correlation of spread changes with trading volume changes is -0.65 , and the correlation with price changes is -0.49 . However, it is difficult to empirically disentangle the effects of the changes in trading characteristics on spreads from the effects of changes in ownership on spreads because changes in trading characteristics and ownership are not independent. In particular, increased ownership concentration increases spreads because, among other factors, it reduces trading volume, which is the most important empirical determinant of spreads. Table 6 shows the correlation of ownership changes with changes in volume and other trading characteristics. As expected, volume changes are significantly correlated with ownership changes, while there is no significant relation between ownership changes and other determinants of spreads. In addition to its effect on volume, an increase in ownership concentration increases spreads because it increases dealers' potential losses from trading against informed traders, and decreases the level of information and monitoring in the market. These effects of ownership structure are difficult to quantify and test empirically, and are not included in my analysis.

4.2. Liquidity and the choice of financing method

A rights offerings is not the costlier method for *all* issuers, particularly for those with a highly concentrated ownership structure. Amihud and Mendelson (1986) show that a mere 1% increase in proportionate spread is associated with a 0.21%

Table 5

Relation between changes in spreads, price, volume, and volatility around equity issues

The correlation analysis is performed on the combined sample of 85 rights issues and 85 matched public underwritten issues on NASDAQ from 1973 to 1986. Public issues are matched with rights issues by year of issue and issuer's market capitalization. Volume data are available for only 79 rights issues and 84 public issues.

Variable definitions:

ALPSPREAD = log-change in average proportionate spreads.

ALPRICE = log-change in average daily closing price.

ALVOLUME = log-change in average dollar volume.

ALSTDDEV = log-change in standard deviation of daily returns.

where the log-change for each issuing firm is calculated as the log of the ratio of the average value of the given variable during the post-issue period (days 0 to 99) to its average value in the pre-issue period (days –100 to –1); day 0 is the ex-rights (offering) date for rights (public) offerings.

Partial correlations				
	<i>ALPSPREAD</i>	<i>ALPRICE</i>	<i>ALVOLUME</i>	<i>ALSTDDEV</i>
<i>ALPSPREAD</i>	1.00			
	0.00*			
<i>ALPRICE</i>	–0.49	1.00		
	< 0.01	0.00		
<i>ALVOLUME</i>	–0.65	0.54	1.00	
	< 0.01	< 0.01	0.00	
<i>ALSTDDEV</i>	0.03	–0.16	0.21	1.00
	0.69	0.03	< 0.01	0.00

*Significance level of the correlation coefficient.

increase in monthly risk-adjusted excess return. These numbers imply a potential decline in firm value of nearly 10% around rights offerings and a potential increase of about 16% following public offerings.⁷ However, the effect of higher trading costs on a stock's value depends on the frequency with which these costs have to be incurred. Therefore, for a given increase in spreads, firms whose

⁷The following example is based on Amihud and Mendelson (1988). Suppose the average sample stock generates a perpetual cash flow of \$1.00 per month and has a required net return of 1% per month. Then the total required monthly return prior to a rights issue is 3.38% (2.38% is the spread-related compensation for the mean spread of 11.31%). This translates to a pre-issue price of \$29.63 (\$1/0.03375) which will fall to \$26.73 following the issue, implying a decrease in firm value of 9.79%. Similarly, the decrease in spreads for the public offerings sample implies an increase in firm value of 15.59%. These are, of course, upper bounds on firm value changes since the example assumes that the spread changes are permanent and that the incremental required rate of return for a given change in spreads is the same at all levels of spreads.

Table 6

Ownership changes and changes in trading characteristics around equity issues

The sample consists of rights issues and a matched sample of public underwritten issues on NASDAQ from 1973 to 1986. Public issues are matched with rights issues by year of issue and issuer's market capitalization. Beneficial and insider ownership data are available for 51 equity issues (26 rights issues and 25 public issues). Data on number of shareholders are available for 57 equity issues (28 rights issues and 29 public issues). Insider ownership refers to total holdings by directors and senior management. Beneficial ownership refers to total holdings by shareholders owning 5% or more of the firm's equity. Change in ownership is calculated as the difference between the ownership reported in the last proxy statement or 10K prior to the issue and the ownership reported in the first proxy statement or 10K following the expiration of the issue. Changes in trading characteristics are defined as the log of the ratio of the average value of the given variable during the post-issue period (days 0 to 99) to its average value in the pre-issue period (days -100 to -1). day 0 is the ex-rights date for rights offerings and the offering date for public offerings.

	Correlation analysis		
	Change in volume	Change in price	Change in volatility
Change in insider ownership	– 0.35 0.02*	0.06 0.68	– 0.07 0.66
Change in beneficial ownership	– 0.19 0.19	– 0.05 0.76	0.00 0.98
Change in number of shareholders	0.42 0.00	0.26 0.05	0.20 0.14

*Significance level of the correlation coefficient.

investors have longer holding periods will not suffer as large a decline in value. As an approximate measure of the holding periods of investors in the two sets of firms, I measure the inverse of turnover, with turnover defined as the ratio of the annual dollar volume to the market value of the firm's equity. Because interdealer trading can cause reported volume on NASDAQ stocks to be overstated by as much as 50% (Atkins and Dyl, 1993), I halve the volume in the calculation of turnover to correct for a downward bias in the measurement of the average holding period. For the sample of public underwritten offerings, the average investor's holding period is 2.8 years based on this measure, whereas it is significantly greater at 4.8 years for the rights offerings sample. This suggests that firms which choose rights offerings have longer-term investors whose losses due to higher spreads are, therefore, not as great as those of the average investor in firms using public underwritten offerings.

Firms with long-term investors are typically those that have several large blockholders or are closely held. Barclay and Holderness (1989) show that large blocks, once formed, are generally not broken up for long periods of time. In

closely held family concerns, family members are likely to hold their shares for a long period of time to avoid diluting their control rights. Such firms are more likely to issue rights because they incur not only lower liquidity costs but also lower flotation and adverse selection costs than firms with more dispersed ownership. For larger firms with dispersed ownership whose stocks tend to trade more frequently, the costs of reduced liquidity are significantly greater as are the flotation costs and adverse selection effects of a rights offering.

The evidence on ownership structures of issuing firms is consistent with the notion that rights are mostly issued by firms with concentrated ownership. Hansen and Pinkerton (1982) document that the average block ownership is around 61% of the total equity for a sample of 54 rights offerings occurring from 1971 to 1979. Kothare (1992) shows that large block shareholders account for 36% of the firm's outstanding shares in 148 NYSE and AMEX firms issuing rights from 1971 to 1986, but they hold only half that amount in firms employing public underwritten offerings. The findings in this paper provide further evidence of this pattern. Large block ownership constitutes 36.49% of the equity of firms issuing rights, but only 26.42% for the matched sample of public offerings.

5. Conclusion

The equity financing paradox refers to the lower direct costs of rights offerings versus public underwritten offerings. In this study, I examine a previously unidentified indirect cost, namely, reduced stock liquidity experienced by firms issuing rights. I find that rights offerings are associated with a statistically significant increase in proportionate bid-ask spreads, while public underwritten offerings are followed by a significant decrease in proportionate bid-ask spreads. I attribute this difference in the behavior of spreads to the different effects of the two methods on the issuing firm's ownership structure. Rights offerings increase the firm's ownership concentration, but ownership becomes more diffuse after public underwritten offerings.

These findings help explain why many firms prefer public underwritten offerings, particularly larger firms with more diffuse ownership structures and frequently traded stocks. For large firms, the decrease in firm value due to reduced liquidity is significantly greater than for firms with relatively illiquid stocks, whose shareholders are mostly long-term investors. Also, firms with dispersed shareholders may find it more cost-effective to hire underwriters, whereas firms with concentrated ownership can significantly reduce direct flotation costs as well as the information asymmetry prevalent in equity financing by obtaining guarantees from their large blockholders and management.

I do not address why some firms choose to have more concentrated ownership than others, when liquidity can be increased through a more diffuse ownership. According to Bhidé (1993), U.S. public policy promotes passive,

diffuse shareholdings and the resulting increase in liquidity over more active, concentrated ownership. Presumably, the benefits of increased liquidity must be traded off against the benefits of concentrated ownership. Several studies in corporate finance have discussed the positive effects of large blockholders and insider ownership on firm value, such as reduced agency problems (Jensen and Meckling, 1976) and the benefits of monitoring by blockholders (Grossman and Hart, 1980; Shleifer and Vishny, 1984). The optimal balance between liquidity and ownership concentration is an important issue for future research.

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