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# Adverse selection and the rights offer paradox*

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We develop an analytical framework to explain firm's choice of equity flotation method and the near disappearance of rights offers by U.S. exchange-listed firms. The choice between uninsured rights, rights with standby underwriting, and firm-commitment underwriting depends on information asymmetries, shareholder characteristics, and direct flotation costs. Underwriter certification and current-shareholder takeup are viewed as substitute mechanisms for minimizing wealth transfers between shareholders and outside investors. Uninsured rights create adverse-selection effects when shareholder takeup is low. Implications for stock-price behavior around issue announcements, shareholder subscription precommitments, and relative issue frequencies are supported by large-sample evidence.

## 1. Introduction

Seasoned common stock is typically sold through one of three flotation methods: uninsured rights (short-lived warrants issued to current shareholders

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on a pro rata basis), rights with standby underwriting (the underwriter commits to purchase all unsubscribed shares), or firm-commitment underwritten offers (the entire issue is sold directly to the underwriter). Stevenson (1957) reports that, over the 1933–1955 period, approximately half of all U.S. common stock offers with over $1 million in proceeds used a rights or standby method. By the 1960s, however, firm-commitment offers dominated in the U.S. In fact, over the 1963–1981 period, less than 5% of all seasoned stock offers by New York Stock Exchange (NYSE)- and American Stock Exchange (Amex)-listed industrial companies used rights, with the virtual disappearance of these issuers by 1981. The recent preference for firm-commitment offers extends to debt issues; Eckbo (1986) reports less than 5% of corporate debt issues sold between 1964 and 1981 used a rights offer method. The rarity of rights issues in the U.S. contrasts with the situation in Canada, where in recent years almost half of all equity issues have been sold through rights offers,[1] and in Europe and the Pacific Basin, where the majority of equity issues are sold through rights, though a trend toward a greater use of underwritten offers is evident in a number of countries.[2]

As highlighted by Smith (1977), the preference for firm commitments in the U.S. represents a major puzzle. Hansen (1988) observes a similar puzzle in the diminished use of standby rights offers. The puzzle arises in part from Smith's finding that the average rights offer involves substantially lower direct flotation costs than the average underwritten offer (standby or firm-commitment). Further, since the value of the right increases with the subscription price discount, it appears that the rights issuer can guarantee the offer's success by adjusting the subscription price. Smith raises the possibility that observed flotation-method choices reflect an agency problem. For example, managers may receive personal benefits from underwriters selected to handle the equity issue. Second, there may be pressure from the boardroom: Herman (1981) finds that 21% of the 200 largest nonfinancial and 27% of the 100 largest industrial companies have one or more investment bankers on their board of directors. The resulting conflict of interest may lead to excessive use of underwriting. Third, whereas a rights offer is unlikely to change the distribution of voting rights substantially, a sale to the public through an underwriter can increase shareholder dispersion, thereby reducing shareholder monitoring of managers and thus enhancing potential manager welfare.

A possible alternative explanation for the demise of the rights offer is that other important shareholder-borne costs of this method have been ignored or underestimated. Examples of such costs are capital gains taxes [Smith (1977)],

[1] Source: *Toronto Stock Exchange Monthly Review*, various issues.

[2] For international evidence on equity issues, see Marsh (1979) (U.K.), Loderer and Zimmerman (1988) (Switzerland), MacCulloch and Emanuel (1990) (New Zealand), Hietala and Löyttyniemi (1991) (Finland), Eckbo and Verma (1992) (Canada), Bøhren, Eckbo, and Michaelsen (1992) (Norway), Dehnert (1991) (Australia), and Kato and Schallheim (1991) (Japan).

transaction costs of selling rights in the secondary market [Hansen (1988)], and wealth transfers due to antidilution clauses, which are a standard feature in convertible securities and warrants. Since these costs are likely to vary substantially across issue types, a comparative analysis of the costs of rights and underwritten offers requires a multivariate framework. Hansen and Pinkerton (1982) make a similar point and argue that the apparent cost advantage of uninsured rights reflects a selection bias driven by differences in ownership structure across issuers. As we discuss below, however, there is currently insufficient evidence to suggest that any of these alternative explanations can resolve the rights offer paradox.

Our initial evidence, using multivariate regressions designed to control for possible selection biases in Smith's univariate cost comparisons, strongly reconfirms the rights offer paradox. We then examine firms' flotation method choices when equity issue markets are characterized by adverse selection. We draw on the basic mechanism in the Myers and Majluf (1984) model, in which adverse-selection effects are examined for firms selling shares directly to unaffiliated investors (a direct issue). To explicitly recognize more complex flotation methods, we allow for shareholder participation in the issue sale, and we give underwriters an informational role to play. We believe these extensions are necessary to provide a meaningful discussion of managerial choices between uninsured rights, rights with standby underwriting, and firm-commitment underwritten offers.[3]

Although shareholder participation and underwriter quality certification substantially complicate the basic Myers and Majluf analysis, our analysis produces several testable implications. In this analysis, the issuer selects the flotation method that maximizes net issue benefits to the firm's current shareholders, subject to an exogenous constraint on the expected portion of the issue that can be sold directly to shareholders. In equilibrium, the net issue benefit depends on the expected current shareholder takeup, as well as on the choice of flotation method.

This framework delivers a wide range of empirical predictions about the observable characteristics of equity offers as a function of issue characteristics, such as the issuer's ownership structure and the degree of information asymmetry between the issuer and the capital market, the relative frequency of rights issues, the role of rights subscription precommitments, and the announcement and preannouncement stock-return patterns of equity issuers across flotation methods. We present several new empirical findings that are consistent with these prediction and that help explain:

[3]The use of other flotation methods, such as direct offers and best-efforts underwritten offers (where the underwriter distributes the shares without bearing any risk of offer failure), can also be understood within this framework.

(1) why industrial firms tend to switch to underwritten offers as growth increases the dispersion of share ownership, and why exchange-listed companies, which are among the largest U.S. firms, almost never use rights;
(2) why the decline in the use of rights offers coincides with the adoption of dividend reinvestment plans;
(3) why rights issues are used more in foreign jurisdictions (including Canada and most countries in Europe and the Pacific Basin) characterized by smaller and relatively closely held firms;
(4) why public utilities use rights more often than industrial issuers;
(5) why uninsured rights offers are typically accompanied by large shareholder subscription precommitments while no such precommitments are observed in standbys;
(6) why uninsured rights offers are associated with an insignificant average announcement-period abnormal stock return;
(7) why standby rights offers have a negative average announcement-period abnormal return that is significantly smaller than the announcement effect of firm commitment offers;
(8) why firm commitments, and to a lesser extent standbys, are typically announced following significant stock-price runups, while there is no evidence of stock-price runups prior to uninsured rights offers; and
(9) why preemptive rights charter amendments, which increase the probability of firm-commitment offers, cause negative market reactions.

The paper is organized as follows. Section 2 shows the relative decline in rights offers, using our substantially expanded sample of 1,057 firm-commitment offers and 192 (virtually the entire population) domestic uninsured rights and standby rights offers by NYSE- and Amex-listed industrial and utility firms between 1963 and the introduction of shelf registration in 1982. This section also demonstrates that the decline in rights offers coincides with widespread adoption of dividend reinvestment plans, which may be viewed as a substitute means of raising capital from current shareholders.

Using a multivariate regression framework, section 3 reconfirms the rights offer paradox in terms of the different direct flotation costs across uninsured rights, standbys, and firm-commitment offers. Section 4 discusses the paradox in light of several potential costs of using rights not reflected in the earlier analysis. These include costs associated with adverse selection in issue markets, which become the basis for a theoretical framework for explaining the flotation method choice summarized in section 5. The major empirical implications of this adverse-selection framework, including evidence on offer frequencies, rights subscription precommitments, and abnormal stock-price behavior around offer announcement dates, are examined in section 6. Section 7 concludes the paper.

## 2. Disappearing rights offers

To place the rights offer paradox in perspective, we start our investigation of the equity offer decision by documenting the frequencies of alternative seasoned equity flotation choices by publicly traded U.S. firms.

### 2.1. Sample selection

The primary offers of seasoned common stock in our sample are identified from company announcements in the *Wall Street Journal Index*, the *Investment Dealer's Digest*, and *Moody's Industrials* and *Utilities Manuals* over the period 1963–1981. Our observation period ends just before the 1982 adoption of shelf registration, which Bhagat, Marr, and Thompson (1985) show has reduced underwriter compensation. Uninsured rights and standby offers are identified from the 'Rights Distributed' section of *Moody's Dividend Record* as well as the previously cited sources. Firm-commitment offers before 1981 are obtained primarily from the Masulis and Korwar (1986) database, and 1981 offers are selected from the *Wall Street Journal Index*, the *Dow Jones News Retrieval Service*, and the SEC *Registered Offerings Statistics* (ROS) tape.

The final sample satisfies the following five criteria: (1) The common stock is listed on either the NYSE or the Amex at the offer announcement date; (2) the date of the initial public announcement is found in the *Wall Street Journal Index*, the *Predicast's F&S Index of Corporations and Industries*, or the *Dow Jones News Retrieval Service*; (3) no simultaneous offers of debt, preferred stock, or warrants are announced; (4) combination primary/secondary stock offers, cancelled or postponed offers, and non-U.S. issues are excluded; and (5) information in the offer prospectus or the *Investment Dealer's Digest's Corporate Financing Directory* permits classification of the rights offers into issues involving and not involving standby underwritten agreements.

Table 1 gives a yearly breakdown of the 1,249 equity offers (1,057 firm commitments, 135 standby rights, and 57 uninsured rights) in our sample, classified by whether the issuing firm is a regulated utility or an industrial company. Also, approximately half of the industrial offers are by NYSE-listed firms and the other half by Amex-listed companies. Almost all the utilities are NYSE-listed, reflecting their typically large size. 62% of the offers (whether firm commitments or rights) are by public utilities. The frequency of offers is decidedly dominated by the firm-commitment methods, as observed earlier by Smith. After 1976, rights offers by industrial firms almost disappear.

Table 2 lists the mean and median percentage increase in the number of shares outstanding, the gross proceeds, and the value of an issuing firm's total assets, separated into industrial and utility issues. Data sources for these offer characteristics include *Moody's Daily Stock Price Guide* and *Handbook of Common Stocks*, *Standard & Poor's Manuals*, *Investment Dealer's Digest's Corporate*

Table 1

Annual distribution of the number of seasoned common-stock offer announcements by NYSE- and Amex-listed industrial firms ('Ind') and regulated utilities ('Utl'), classified by flotation method, 1963–1981.[a]

| Year of issue announcement | Total offers | Firm-commitment underwritten offers | | | Rights offers | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Total rights | Standby rights | | Uninsured rights | |
| | | Total | Ind | Utl | | Ind | Utl | Ind | Utl |
| 1963 | 12 | 2 | 1 | 1 | 10 | 3 | 3 | 1 | 3 |
| 1964 | 17 | 8 | 4 | 4 | 9 | 3 | 3 | 1 | 2 |
| 1965 | 20 | 5 | 5 | 0 | 15 | 4 | 5 | 2 | 4 |
| 1966 | 27 | 12 | 7 | 5 | 15 | 8 | 4 | 2 | 1 |
| 1967 | 26 | 12 | 9 | 3 | 14 | 4 | 5 | 4 | 1 |
| 1968 | 44 | 26 | 20 | 6 | 18 | 4 | 5 | 7 | 2 |
| 1969 | 42 | 24 | 13 | 11 | 18 | 7 | 8 | 2 | 1 |
| 1970 | 49 | 36 | 18 | 18 | 13 | 2 | 8 | 2 | 1 |
| 1971 | 84 | 65 | 40 | 25 | 19 | 2 | 13 | 2 | 2 |
| 1972 | 81 | 68 | 27 | 41 | 13 | 1 | 10 | 1 | 1 |
| 1973 | 58 | 50 | 10 | 40 | 8 | 1 | 5 | 1 | 1 |
| 1974 | 53 | 47 | 5 | 42 | 6 | 0 | 3 | 1 | 2 |
| 1975 | 89 | 79 | 19 | 60 | 10 | 1 | 8 | 0 | 1 |
| 1976 | 93 | 88 | 29 | 59 | 5 | 1 | 3 | 0 | 1 |
| 1977 | 65 | 62 | 2 | 60 | 3 | 0 | 3 | 0 | 0 |
| 1978 | 90 | 86 | 23 | 63 | 4 | 2 | 1 | 0 | 1 |
| 1979 | 85 | 81 | 20 | 61 | 4 | 0 | 2 | 1 | 1 |
| 1980 | 162 | 157 | 86 | 71 | 5 | 0 | 2 | 1 | 2 |
| 1981 | 152 | 149 | 63 | 86 | 3 | 0 | 1 | 1 | 1 |
| All | 1,249 | 1,057 | 401 | 656 | 192 | 43 | 92 | 29 | 28 |

[a]Primary offers of seasoned common stock are identified from company announcements in the *Wall Street Journal Index*, the *Investment Dealer's Digest*, and *Moody's Industrials* and *Utilities Manuals*. Rights offers are identified from the 'Rights Distributed' section of *Moody's Dividend Record* as well as previously cited sources. The sample satisfies the following criteria: (1) The common stock is listed on either the NYSE or the Amex; (2) the initial public announcement of the offer appears in the *Wall Street Journal* or *Predicast's F&S Index of Corporations and Industries* or the *Dow Jones News Retrieval Service*; (3) no simultaneous offers of debt, preferred stock, or warrants are announced; (4) combination primary/secondary stock offerings, cancelled or postponed offers, and non-U.S. issues are excluded; and (5) information in the offer prospectus or the *Investment Dealer's Digest's Corporate Financing Directory* permits a classification of the rights offers into those issues involving and not involving standby underwritten agreements.

*Financing Directory*, *Wall Street Journal Index*, and offer prospectuses. In the uninsured rights category, industrial issuers tend to be small, whereas utility issuers tend to be large. Further, uninsured rights issues tend to have the largest proportionate increase in shares outstanding, whether the issuer is an industrial firm or a public utility. For all three offer categories, the average offer size, as a percentage of preannouncement common-stock market value, is larger for industrials than for utilities.

Table 2

Mean (median) values of offer characteristics for the total sample of 1,249 seasoned common-stock offers by NYSE- and Amex-listed firms classified by the type of firm and flotation method, 1963–1981.[a]

| Offering characteristic | Firm commitments | | Standby rights | | Uninsured rights | |
|---|---|---|---|---|---|---|
| | Ind | Utl | Ind | Utl | Ind | Utl |
| Number of observations | 401 | 656 | 43 | 92 | 29 | 28 |
| Shares issued, old plus new shares (%) | 13.0 (11.1) | 9.9 (9.3) | 15.4 (12.5) | 8.3 (9.1) | 24.2 (20.1) | 10.0 (9.1) |
| Amount offered ($ millions) | 33.3 (19.8) | 50.6 (37.3) | 60.4 (21.6) | 48.3 (31.5) | 15.1 (8.6) | 169.7 (108.6) |
| Amount offered, market value of equity (%) | 16.5 (12.5) | 11.2 (10.3) | 20.2 (14.3) | 9.2 (10.0) | 34.7 (25.2) | 11.3 (10.0) |
| Market value of equity ($ millions) | 389.6 (149.2) | 732.9 (391.0) | 960.5 (133.2) | 547.0 (371.8) | 51.2 (26.7) | 1962.5 (977.0) |
| Firm total assets ($ millions) | 855.2 (148.0) | 2437.2 (1254.0) | 1083.3 (157.3) | 1698.4 (988.2) | 133.4 (69.1) | 3846.2 (1441.2) |

[a]'Ind' denotes industrial issuer and 'Utl' denotes public utility. Data sources for the offer characteristics include *Moody's Daily Stock Price Guide* and *Handbook of Common Stocks*, *Standard & Poor's Manuals*, *Investment Dealer's Digest*, *Corporate Financing Directory*, the *Wall Street Journal Index*, and offer prospectuses.

### 2.2. *Impact of dividend reinvestment plans on rights offers*

Dividend reinvestment plans (DRIPs) allow shareholders to elect to receive shares of common stock in lieu of cash dividends. In these plans the firms generally absorb commissions and other expenses associated with the purchase of stock. Shares sold through DRIPs must be purchased in the secondary market or, if the DRIP is registered with the SEC, the firm can issue new shares. When new shares are issued through DRIPs, it is common to offer a discount from the stock's market price (typically 3–5% in the latter part of our sample period) and to allow shareholders to purchase additional shares in excess of their dividends up to some maximum dollar amount on the ex-dividend date.[4]

Since DRIPs offer shareholders the right to buy shares with their dividends (typically quarterly), and in many cases the right to buy additional shares for cash, they are similar to a periodic rights offer. When firms need new equity capital, they can sell new shares through the DRIPs, which have relatively predictable subscription levels. The alternative of reducing dividend payouts appears to be unattractive to most firms, given the observed inflexibility in corporate dividend policies [see, for example, Lintner (1956), Kalay (1980), and DeAngelo, DeAngelo, and Skinner (1991)]. When additional equity capital is

[4]See Scholes and Wolfson (1989) for a further description of DRIPs.

not needed, the firm can make the plan less attractive by decreasing the price discount, or it can fund the DRIP with shares bought in the secondary market.

Before a 1968 revision in SEC regulations, only regulated investment companies were able to offer DRIPs in the U.S. Although DRIPs became popular within a short period, not until 1973 did firms begin to sell new shares through these plans. New-share DRIP adoptions were relatively frequent for our sample of common-stock issuers. Using DRIP filing dates obtained from the SEC ROS tape, we show the pattern of new-share DRIP adoptions for our sample in table 3. The population of stock issuers for this table is given by the 419 firms underlying table 1 that made one or more firm-commitment offers, and the 54 firms that made rights or standby offers, over the 1970–1981 period. Further, the table is restricted to new-share DRIP adoptions involving a minimum of 10,000 new shares, and it excludes closed-end investment company issuers.

Insofar as DRIPs are similar to rights offer, one would expect rights issuers to adopt DRIPs more often than firm-commitment issuers. This prediction is supported by the first two columns in table 3, as 54% of the rights issuers

Table 3

The number and proportion of NYSE- and Amex-listed seasoned common-stock issuers adopting dividend reinvestment plans (DRIPs) over the 1973–1981 period, and the number of stock issues following DRIP adoption, classified by flotation method.[a]

| | Number of stock issuers registering DRIPs | | Stock offers by issuers with DRIPs | | Stock offers by issuers without DRIPs | |
|---|---|---|---|---|---|---|
| Offer year | Firm commitments | Rights/ standbys | Firm commitments | Rights/ standbys | Firm commitments | Rights standbys |
| 1973 | 6 | 4 | 3 | 2 | 54 | 9 |
| 1974 | 5 | 5 | 4 | 1 | 40 | 4 |
| 1975 | 13 | 7 | 5 | 5 | 72 | 5 |
| 1976 | 18 | 2 | 18 | 1 | 73 | 3 |
| 1977 | 15 | 12 | 32 | 3 | 29 | 3 |
| 1978 | 18 | 3 | 35 | 1 | 50 | 3 |
| 1979 | 10 | 2 | 40 | 2 | 40 | 3 |
| 1980 | 15 | 2 | 57 | 1 | 101 | 4 |
| 1981 | 15 | 2 | 67 | 1 | 83 | 3 |
| Total | 115 | 29 | 261 | 17 | 542 | 37 |
| Proportion (%) | 28 | 54 | 94 | 6 | 94 | 6 |

[a]The population of stock issuers in this table is given by the 419 firms underlying table 1 that made one or more firm-commitment offers and the 54 firms that made rights or standby offers over the 1970–1981 period. Further, the table requires the DRIP to be funded with new shares where the SEC registration involved at least 10,000 common shares; it excludes regulated investment company issuers; and it assumes that AT&T's DRIP date does not apply to its separately incorporated subsidiaries. Before a 1968 revision in SEC regulations, only regulated investment companies were able to offer DRIPs. Further, according to the SEC Registered Offerings Statistics tape, firms did not begin to sell shares through DRIPs until 1973.

register DRIPs, whereas only 28% of the firm-commitment issuers do the same over the 1973–1981 period. The latter columns of table 3 present the annual number of rights or standbys and firm-commitment stock offers conditional on whether the issuer has previously adopted a DRIP. For the total sample period, the proportion of rights and standby offers is 6%, regardless of the DRIP adoption decision. But after 1977, the year with the largest number of DRIP adoptions, the proportion of rights and standbys falls to 2% for issuers with DRIPs while it remains at 5% for issuers without DRIPs.

Although the above evidence indicates that the growth trend in DRIPs can partially explain the disappearance of rights and standby offers, the combined growth of rights and standby offers plus firms adopting DRIPs over the 1970s remain limited. Thus this evidence leaves largely unexplained why firm commitments continue to be the predominant flotation method when they appear to be more costly than selling shares directly to existing shareholders, as shown below.

## 3. Direct flotation costs: Are rights cheaper?

At the core of the rights offer paradox is Smith's (1977) finding that the direct costs of uninsured rights offers are substantially lower than the cost of underwriting. To investigate this issue, we start by extending Smith's 1971–1976 flotation cost evidence to our longer sample period. We present a more detailed picture of the average cost differences across uninsured rights, standbys, and firm-commitment offers by taking into account cross-sectional differences in a set of issue characteristics that can confound univariate cost comparisons. For example, it is possible that observed flotation costs of uninsured rights are particularly low because this method is selected when stock return variance is low, when shareholder concentration is high, or, as suggested by Hansen and Pinkerton (1982), when a large blockholder is willing to guarantee subscription. Any of these issue characteristics can reduce direct flotation cost regardless of the chosen flotation method.

### *3.1. Issue underpricing*

The total cost of a firm-commitment underwritten offer includes issue underpricing, if any,[5] in addition to underwriter fees. Although it is well established in studies by Ibbotson (1975), Ritter (1984, 1991), and others that initial public offerings of stock are underpriced, the evidence for seasoned equity offer discounts is somewhat contradictory. For example, Smith documents significant discounts averaging 0.5% below the closing price the day before the offer day in his sample of 328 common-stock offers over the years 1971–1975. Bhagat and

[5] Parsons and Raviv (1985) presents a model which implies underpricing of seasoned equity offers.

Table 4

Secondary-market prices around the offer day as a percentage of offer prices for firm-commitment seasoned common-stock offers by NYSE- and Amex-listed firms, 1963–1981.[a]

| | Offer day − 1 | | | | Offer day | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Median | % EO | % GT | Mean | Median | % EO | % GT |
| | | | | I. Industrial issues ($N = 401$) | | | | |
| Open | 0.00649 | 0.00382 | 13.4 | 32.4 | 0.00127 | 0.00000 | 56.9 | 19.3 |
| High | 0.01801 | 0.01296 | 11.0 | 1.4 | 0.00929 | 0.00490 | 26.6 | 9.0 |
| Low | −0.00510 | −0.00349 | 32.8 | 52.4 | 0.00787 | 0.00000 | 50.7 | 41.4 |
| Close | 0.00444 | 0.00000 | 62.1 | 3.1 | −0.00113 | 0.00000 | 34.8 | 26.2 |
| | | | | II. Utility issues ($N = 656$) | | | | |
| Open | −0.00414 | −0.00619 | 20.5 | 58.2 | −0.00253 | 0.00000 | 48.7 | 42.4 |
| High | 0.00327 | 0.00000 | 36.5 | 22.9 | 0.00322 | 0.00000 | 36.8 | 17.9 |
| Low | −0.01108 | −0.01061 | 11.6 | 85.3 | −0.00502 | −0.00455 | 43.4 | 54.4 |
| Close | −0.00305 | 0.00000 | 50.9 | 42.8 | −0.00061 | 0.00000 | 43.2 | 33.2 |

[a]The mean and median values are of the return $(p_t - p)/p$, where $p_t$ is the secondary-market price as of event time $t$ in relation to the first day of the offer (day 0), and $p$ is the offer price. Thus, positive values indicate offer price discounts and negative values indicate premiums. '%EQ' and '%GT' are the percent of the cases where $p = p_t$ and $p > p_t$. Closing prices are from the CRSP file (entire sample period), while the open, high, and low prices are from the Cornell University Price–Volume file (1970–1981).

Frost (1986) find significant premiums for utility issuers, while Loderer, Sheenan, and Kadlec (1991) find no statistically significant premiums or discounts. To clarify the evidence, we present several estimates of issue discounts for our sample of industrial firms and public utilities, taking into account whether offers are made at the exchange open or after the exchange close.

Table 4 presents estimates of the offer-price discounts $(p_t - p)/p$, where $p_t$ is the secondary market price at the open, high, low or close at time $t$ and $p$ is the public offering price. Closing prices are from the Center for Research in Security Prices (CRSP) file (covering the entire sample period), and the open, high, and low prices are from the Cornell University Price–Volume file (1970–1981). The discounts are computed for firm-commitment offers in relation to the day before the offer day, with negative values indicating premiums. Estimates based on offer-day prices are also shown, but these prices can be affected by underwriter price stabilization efforts. Secondary-market prices are also affected by a migration of purchase orders from the secondary market, where the buyer incurs commission costs, to the primary market, where purchases from the underwriter are commission-free.[6] As shown in Lease, Masulis, and Page (1991), this

[6]Using the information in Philips and Smith (1980), a conservative estimate of the one-way transaction cost, including both commission and the bid–ask spread, is 0.5%.

migration causes the observed transaction prices $p_t$ in the secondary market to shift toward the bid side of the bid–ask spread while the primary offer is ongoing, thereby downward-biasing these secondary-market prices.

Equity offers typically start in the morning before the opening of the exchange, or in the late afternoon after the exchange closing. Thus for morning offers, day 0 coincides with the offer prospectus date. For late afternoon offers, however, day 0 is defined as the following trading day. The offer is made after the exchange closing in approximately 20% of our cases. This information is based on a comparison of the prospectus date with the date of the last sales price listed in the prospectus. The last sales prices is the stock's closing price on the date specified in the prospectus, so when this date coincides with the prospectus date, the offer is made after closing. For 1980–1981 offers we also rely on the Dow Jones news service, which reports the time of the day the offer commencement is announced.

Panel I of table 4 indicates that the offer price of the typical industrial issue in our sample is set at an average discount of 0.44% (median 0.00%) from the closing price on day $-1$. The columns denoted '%EQ' and '%GT' show the percentages of the sample in which $p = p_t$ and $p > p_t$. In a majority of the cases (62.1%), the offer is set equal to the prior day's closing price. Only 3.1% of the offers are priced above this closing price and 1.4% exceed the daily high. Panel II shows that the average utility offer is priced at a small premium over the prior day's close, a result found by Bhagat and Frost (1986) as well. The average value of $(p_t - p)/p$ in our utility sample is $-0.31\%$ (median 0.00%). Of the total sample of utility offers, 50.9% are priced at the prior day's close, while in 42.8% of the cases the offer price exceeds this closing price.

The estimates in table 4 provide little basis for arguing that firm-commitment offers of seasoned equity are systematically priced below the corresponding transaction price in the secondary market. This result contrasts sharply with the evidence for rights offers, where significant discounts are the norm. In our sample of uninsured rights (not shown in table 4), the average subscription-price discount from the closing price the day before the rights subscription period begins is 8.3% for industrial issuers and 12.7% for utility issuers; the medians are 14.3% and 9.2%. In the standby rights category, the corresponding average discounts are 20.4% for industrials and 8.3% for utilities and the medians are 19.5% and 7.8%. As reported below, the average subscription rate in either rights offer category is close to 100%. Consequently, current shareholders capture the value of these subscription discounts, either by subscribing to the offer or by selling the rights. In sum, issue underpricing is not a relevant component of flotation costs in any of the three flotation methods studied here.

Table 5

Mean (median) underwriter compensation and other flotation expenses for 1,170 seasoned common-stock offers by NYSE- and Amex-listed firms, classified by type of firm and flotation method, 1963–1981.[a]

| | Firm commitments | | Standby rights | | Uninsured rights | |
|---|---|---|---|---|---|---|
| Flotation costs | Ind | Utl | Ind | Utl | Ind | Utl |
| Number of observations | 351 | 639 | 42 | 89 | 26 | 23 |
| Underwriter compensation ($ millions) | 1.47 (1.03) | 1.78 (1.32) | 1.20 (0.47) | 0.56 (0.34) | – | – |
| Other expenses ($ millions) | 0.16 (0.15) | 0.14 (0.12) | 0.36 (0.19) | 0.38 (0.29) | 0.11 (0.09) | 0.45 (0.19) |
| Total costs ($ millions) | 1.72 (1.28) | 1.92 (1.45) | 1.59 (0.68) | 0.94 (0.72) | 0.11 (0.09) | 0.45 (0.19) |
| Total costs/ gross proceeds (%) | 6.09 (5.53) | 4.23 (3.82) | 4.03 (3.32) | 2.44 (2.07) | 1.82 (0.94) | 0.51 (0.22) |
| Total costs/ market value common (%) | 1.05 (0.68) | 0.49 (0.41) | 0.93 (0.57) | 0.22 (0.18) | 0.80 (0.30) | 0.05 (0.02) |

[a]'Ind' denotes industrial issuer and 'Utl' denotes public utility. Data sources are the SEC Registered Offerings Statistics data tape and issue prospectuses. The cost of the offer-price discount in firm-commitment offers is not included, nor is the value of any 'Green Shoe' options. In the standby rights category, the underwriter's compensation is computed using the actual takeup fee based on subscription information shown in table 7.

### *3.2. Direct flotation costs and the impact of issue characteristics*

Table 5 lists the mean and median values of underwriter fees and other direct expenses across the three flotation methods and two issuer types.[7] As Smith concludes for the 1971–1976 period, an uninsured rights offer is on average the cheapest flotation method. The average cost of these offers ('other' expenses only) is 1.8% of the offering's gross proceeds for industrial issues and 0.5% for utility issues. This contrasts with firm-commitment contracts where the sum of underwriter compensation and other direct expenses averages 6.1% of gross proceeds for industrial issues and 4.2% for utility issues, with underwriter fees accounting for approximately 90% of total costs.

[7]'Other' direct expenses include fees for legal and accounting services, trustees' fees, listing fees, printing and engraving expenses, SEC registration fees, Federal Revenue Stamps, and state taxes. Our primary data sources are the ROS tape and offer prospectuses. These data exclude the value of any 'Green Shoe' (overallotment) option in the underwriter contract. A Green Shoe option grants the underwriting syndicate the right to purchase a certain percentage (usually up to 10%) of the issue as additional shares at the offer price. This option makes it less costly for the underwriter to overallot the new issue to potential customers before the offer date, a common selling practice. Hansen, Fuller, and Janjigian (1987) estimate the value of the average overallotment option for seasoned common-stock offers, using the Black and Scholes (1973) option pricing model. They report the average value to be approximately 1% of gross proceeds, independent of offer size as well as other components of total flotation costs.

Table 6

OLS parameter estimates in cross-sectional regressions of percentage flotation costs for 1,104 seasoned common-stock offers by NYSE- and Amex-listed firms against issue characteristics and flotation method, 1963–1981 ($t$-statistics in parentheses).[a]

Model: $FC = \alpha_0 + \alpha_1 PRO + \alpha_2 PRO^2 + \alpha_3 \triangle SHR + \alpha_4 SCON + \alpha_5 ST + \alpha_6 D1 + \alpha_7 D2$

| $\alpha_0$ | $\alpha_1$ | $\alpha_2$ | $\alpha_3$ | $\alpha_4$ | $\alpha_5$ | $\alpha_6$ | $\alpha_7$ | $\bar{R}^2$ | $F$-value |
|---|---|---|---|---|---|---|---|---|---|
| | | | | I. Industrial issues ($N = 402$)[b] | | | | | |
| 0.29 | − 0.05 | 0.002 | 0.01 | − 0.004 | 0.50 | 0.05 | 0.02 | 0.74 | 160.0 |
| (7.58) | (− 6.22) | (4.75) | (3.07) | (− 5.11) | (6.29) | (14.42) | (9.71) | | |
| | | | | II. Utility issues ($N = 702$)[c] | | | | | |
| 0.55 | − 0.10 | 0.005 | − 0.02 | − 0.003 | 0.81 | 0.03 | 0.000 | 0.38 | 60.0 |
| (11.24) | (− 10.33) | (9.56) | (− 1.09) | (− 3.36) | (4.68) | (8.37) | (0.02) | | |

[a]Variable definitions: $FC$ = direct flotation costs (the sum of underwriter fees and other expenses in table 5) as a percentage of gross proceeds. $PRO$ = natural log of gross proceeds of offer. $PRO^2$ = square ($PRO$). $SCON$ = natural log of share value at the offering divided by number of shareholders (based on offer price). $ST$ = standard deviation of issuer's daily stock return over 450 trading days starting 60 days before the *Wall Street Journal* offer announcement. $\triangle SHR$ = percentage change in shares outstanding due to the offer (new shares divided by old plus new shares). $D1$ = indicator variable of offering method (standby or firm-commitment offer = 1). $D2$ = 2nd indicator variable of offering method (firm-commitment underwritten offer = 1).

[b]The total sample of 402 comprises 337 firm commitments, 40 standbys, and 25 uninsured rights offers.

[c]The total sample of 702 comprises 597 firm commitments, 83 standbys, and 22 uninsured rights offers.

In standby underwritten agreements, the fee paid to the underwriter typically has two components: a fixed commitment fee and a takeup fee on all unsubscribed shares resold by the underwriter after the rights offer expires. Since the ROS file records underwriter compensation in standbys either at its minimum level, which assumes no takeup by the underwriter, or at the maximum level, which assumes a 100% issue takeup, we use subscription information (discussed below) to compute the actual underwriter takeup. As shown in table 5, the mean ratio of direct flotation expense to gross proceeds in standbys is 4.0% for industrial issuers and 2.4% for public utilities, which is similar to the evidence presented by Hansen (1988).

Although several earlier studies have identified issue characteristics that are correlated with direct flotation costs such as those shown in table 5,[8] the literature does not systematically compare the costs of uninsured rights, standby rights, and firm-commitment offers in a multivariate regression framework. Table 6 shows the coefficient estimates in such a cross-sectional model. The

[8]Examples of such studies are Smith (1977), Hansen and Pinkerton (1982), Smith and Dhatt (1984), Bhagat, Marr, and Thompson (1985), Bhagat and Frost (1986), Booth and Smith (1986), Ritter (1987), and Hansen (1988).

dependent variable is direct flotation cost as a percentage of offer proceeds, and the explanatory variables include offer size, percentage change in shares outstanding, issuer's regulatory status, stock risk, shareholder concentration, and binary variables for the flotation method.

Overall, the model explains 74% of the cross-sectional variability in percentage flotation costs for the sample of industrial issues and 38% for the utility issues sample, with significant $F$-values of 160.0 and 60.0. Since 90% of the rights offers take place before 1976 we reestimate the model with post-1975 equity offers excluded and for each flotation method separately. The resulting parameter estimates and significance levels are almost identical to those reported for the pooled regressions in table 6. Further, with one exception, parameter estimates are typically insensitive to whether the issuer is an industrial firm or a public utility. In sum, these issue characteristics appear to represent fundamental determinants of flotation costs.

Interpreting the model estimates, the intercept is positive and significant, suggesting a fixed component to flotation expenses. The natural log of the issue's gross proceeds ($PRO$) is negative and significant, indicating economies of scale associated with share issuance. $PRO^2$ exhibits a significantly positive coefficient, indicating that the flotation cost function is decreasing and convex in the gross proceeds of the offer. The percentage change in shares ($\Delta SHR$) is positive and statistically significant for industrial issues and positive but insignificant for utility issues. As discussed below, this result is consistent with the hypothesis that larger percentage changes in shares subject shareholders to greater costs of adverse selection.

The log of equity capitalization per shareholder ($SCON$) is significantly negative, indicating that shareholder concentration lowers flotation costs. Since firms with concentrated ownership tend to obtain subscription precommitments, it is natural to suspect that it is precisely these precommitments that lower flotation costs. But while not shown in table 6, adding an intercept dummy variable for subscription precommitments does not produce a significant parameter estimate. Thus the impact of ownership concentration on flotation costs is apparently capturing more than a simple proxy for subscription precommitments.[9]

The standard deviation of the issuer's daily stock return ($ST$) is positive and statistically significant. Greater stock risk is expected to positively affect flotation costs for several reasons. For example, greater stock risk increases

[9]Hansen and Pinkerton (1982) use a nonlinear flotation cost function that includes ownership concentration to estimate the hypothetical flotation cost of a rights offer for a sample of firms that choose the firm-commitment method, and conclude that rights offers would have entailed higher costs. Their $t$-statistics are conditional on the functional form used to generate the flotation cost structure, however, and are therefore difficult to assess. Also, Smith and Dhatt (1984) argue that the Hansen–Pinkerton shareholder concentration parameter is biased, and that correction for this bias leaves rights offers as the cheapest flotation method.

underwriting risk and therefore the underwriter fee. Also, given that a rights offer requires a minimum 14-day subscription period, $ST$ can be viewed as a proxy for the risk of offer failure due to random changes in stock price over the rights subscription period (where failure involves higher costs of alternative sources of capital). The greater the expected failure costs, the greater the issuer's distributional/selling effort which in turn translate into higher 'other' expenses.

The indicator variables $D1$ and $D2$ adjust for the flotation method. $D1$ separates underwritten offers (standbys and firm commitments) from nonunderwritten offers (uninsured rights), and $D2$ separates firm commitments from all rights offers. The positive and statistically significant impact of both $D1$ and $D2$ for industrial issuers suggests that the choice of an underwritten offer increases the flotation costs, and that the choice of a firm-commitment offer increases these costs further. For utilities, the $D1$ parameter is significant and positive, indicating again that underwritten offers are more costly. The $D2$ parameter is insignificant, however, indicating that firm-commitment and standby fees in utility offers are close in size when the other explanatory variables in the regression model are controlled for.

The coefficient estimates on $D1$ and $D2$ are interesting. For industrial issuers, $\alpha_6$ is 0.05 and $\alpha_7$ is 0.02. In other words, controlling for the issue characteristics, direct flotation cost as a percentage of gross proceeds increases by 5% when going from uninsured rights to underwritten offers. Further, the average cost is 7% higher for firm commitments than for uninsured rights offers. Thus, the average cost differences implied by the cross-sectional regression are somewhat larger than the ones emerging from the univariate analysis in table 5. A similar picture emerges for utility issues. From this evidence, of the three flotation methods for selling common stock, a rights offer appears to be the cheapest.

## 4. Additional costs of rights: Hypotheses and evidence

The results above reconfirm the rights issue paradox. That is, even after issue characteristics are controlled for, rights have lower direct flotation costs than standbys, which in turn have lower costs than firm commitments. Yet the firm-commitment flotation method is dominant and rights are, if anything, dying out. Further, the observed substitution of DRIPs for rights offers is insufficient to explain why underwritten offers continue to predominate. As discussed in the introduction, unless these observed flotation method choices are a manifestation of an agency problem, there must be some as yet unidentified direct costs of rights or opportunity costs that make rights offers less attractive to value-maximizing managers. Examples of such costs are given below, some of which have been suggested by earlier research in this area.

(1) *Capital gains taxes.* In a rights offer, shareholders who do not wish to purchase shares of the issue must sell their rights (or subscribe and sell the shares) to avoid losing the value of the subscription-price discount. As Smith notes, these sales are subject to capital gains taxes, which increase with the subscription-price discount, discouraging large discounts. The potential capital gains tax liability is also particularly onerous if the firm's stock price has risen substantially in recent periods. Smith estimates, however, that the relative tax disadvantage of uninsured rights, in a worst-case scenario, is at most 2% of offering proceeds, and he concludes that capital gains taxes alone cannot explain the rights offer paradox.

(2) *Stock liquidity and transaction costs of reselling rights.* Current shareholders resell their rights on organized exchanges, which entails dealer spreads and brokerage fees. Shareholders avoid these costs when the firm employs an underwriter to sell its new shares. Moreover, Hansen (1988) argues that underwriters are able to effectively lower the compensation for portfolio rebalancing costs that outside investors demand when purchasing the shares. Both arguments imply that rights offers carry a transaction-cost disadvantage for shareholders uninterested in subscribing to the issue. Our empirical analysis (section 6, below) fails to reveal the temporary price decline predicted by Hansen's selling-cost hypothesis. Kothare (1991), however, presents evidence that rights offers reduce stock liquidity and increase bid–ask spreads over the rights period, and Lease, Masulis, and Page (1992) find that bid–ask spreads narrow after firm commitments. Although this evidence indicates that rights offers have a transaction-cost disadvantage, the bid–ask spread effects are small in relation to the flotation-cost difference between uninsured rights and firm-commitment offers documented above.

(3) *Short-selling activity and the risk of rights offer failure.* The issuer is effectively reducing the cost of hedging short-sale positions in its stock when it makes a rights offer, especially for stocks with low equity capitalization that lack publicly traded options. When the rights offer expires, if the market price is above the subscription price, the investor subscribes to the rights and uses them to close out the short position. If the stock price falls, the investor lets the rights expire unexercised and buys shares on the secondary market to close out the short position at a profit. This hedged short selling is profitable as long as the stock price exceeds the subscription price by more than the transaction costs incurred.[10]

As additional short positions are opened between the announcement of the rights offer terms and the offer expiration, the resulting sell orders tend to depress the stock price within the bid–ask spread, thereby reducing the

[10] Given the short life of the right, the transaction costs of purchasing the rights will be low.

attractiveness of exercising the rights for most stockholders. This creates additional uncertainty for issuers about the ultimate rights offer subscription level, which can cause the issuer to extend the offer, increasing flotation costs and creating continued downward pressure on stock price for the extended life of the offer.

It follows from this argument that, all else being equal, firms with greater stock-price uncertainty have less incentive to issue rights because of the right's greater value, which increases the attractiveness of this hedged short-selling strategy. Similarly, firms needing to sell relatively large amounts of new shares would tend to avoid uninsured rights, because the value of the warrant issue increases with the number of rights per share outstanding. Although the risk of rights offer failure is almost certainly an important factor in the flotation method choice, empirical tests of this hypothesis require more detailed information on short-selling activity than is currently available.

(4) *Antidilution clauses and wealth transfers to convertible-security holders.* If a firm has convertible securities or warrants outstanding with antidilution clauses in place, issuing rights at discounts can trigger automatic reductions in conversion rates as discussed in Kaplan (1965) and Myhal (1990). These antidilution clauses are likely to result in improved positions for these convertible securities, shifting wealth from the common-stock holders to the convertible-security holders. Firms with convertible securities outstanding have an added incentive to avoid issuing rights at deep discounts. According to *Moody's Industrial* and *Utilities Manuals*, the total number of industrial convertible securities (stocks and bonds) outstanding was 611 in 1960, 1,303 in 1970, and 1,191 in 1975. Further, industrial firms are much more likely than utilities to issue convertible securities. These trends are consistent with the observed reduction in rights offer frequencies over the 1960s and 1970s and the reduced use of rights offers by industrial firms.

(5) *Adverse-selection costs of uninsured rights.* In the remainder of this paper, we outline an adverse-selection models for firms' flotation method choice in equity markets where underwriters offer imperfect certification services. The model implies that an uninsured rights offer is a relatively costly flotation method when current shareholder participation in the new issue is low. Our empirical evidence appears to give substantial support to the central empirical implications of this analysis.

## 5. A model for the flotation method choice under adverse selection

In the framework of Myers and Majluf (1984), a firm faces a profitable investment opportunity that requires a commonly known level of new equity

capital. The firm's decision to issue and invest depends on the value of the project, $b$, the cost or benefit of selling under- or overpriced stock, $c$, and direct flotation costs, $f$. The value $c$ is equal to the difference between the intrinsic value of the shares sold to outsiders and the shares' market value conditional on the issue decision. Managers, who are assumed to maximize the intrinsic (full information) value of the firm's shares, elect to issue and invest if and only if the net issue benefit is nonnegative, that is, when $b - (c + f) \geq 0$. Myers and Majluf further assume that current shareholders do not participate in the issue, and they rule out an informational role for underwriters. Thus the real-world equivalent to the flotation method implicit in the Myers–Majluf model is a direct issue to outside investors (possibly distributed by a simple best-effort agreement with an investment bank), with no alternative flotation methods available. Consequently, for certain parameter values, a decision to issue signals a truncation of the upper tail of the distribution of share intrinsic values, causing rational market participants to lower the secondary-market price of an issuer's stock.

In the following, we expand the flotation method opportunity set by allowing shareholder participation in the issue and by assuming that underwriters play a certification role. As discussed, alternative flotation methods now imply different equilibrium values of $c$ as well as different direct flotation costs $f$. Although $f$ is observed to be highest for firm-commitment offers and lowest for uninsured rights, the value of $c$ depends on the level of current-shareholder participation in the issue and the average quality of the firms in the pool selecting a particular flotation method.

### 5.1. *Model assumptions*

Let $k \in [0, 1]$ denote the proportion of the equity rights issue that is purchased and held by current shareholders (shareholder takeup level). Assume that:

(A.1) The firm faces a profitable but short-lived investment opportunity requiring equity investment. Management's objective is to maximize the intrinsic value of the firm, and managers know more than the market about the intrinsic value of the firm's assets in place. Managers select the flotation method that maximizes the net issue benefit $b - (c + f)$ given the expected current shareholder takeup and recognizing that the equilibrium value of $c$ itself depends on both the value of $k$ and the flotation method choice.

(A.2) The value of $k$ is determined by factors largely beyond managerial control, such as personal consumption and wealth constraints, diversification benefits and portfolio rebalancing costs, benefits from maintaining a shareholder's current voting and dividend rights, and individual tax brackets. Thus, managers treat $k$ as an exogenous factor.

(A.3) Managers have better information than the market about $k$. Information about $k$ is revealed to the market through the announcement of subscription precommitments, through the volume of rights traded in the secondary market during a rights offer (where a high volume indicates a low $k$), and through the announcement of actual subscription levels at the end of the rights offer period. Thus, low-$k$ issuers cannot falsely signal a high $k$ value, while high-$k$ issuers can conceal their information on $k$ by not selecting a rights offer.

(A.4) Underwriter certification narrows, but does not eliminate, the information asymmetry between the firm and the market. That is, some residual uncertainty about the true value of the issue remains even after the underwriter's investigation of the issuer (noisy quality certification).[11] If the underwriter's investigation indicates that the issue is overpriced, the firm is given the choice of lowering the offer price or withdrawing the issue.[12]

Under these assumptions, the equilibrium value of $c$ depends on the market's estimate of $k$, conditional on the information in the offer announcement. At one extreme, if the market is convinced that current shareholders will purchase and hold the entire equity issue ($k = 1$), there is no potential for wealth transfers between current and new shareholders, no adverse selection, and, consequently, $c = 0$. In this case, the decision to issue reduces to assessing whether or not $b \geq f$. If it is, the issuer selects uninsured rights (whether the firm is over- or undervalued), since this is the flotation method that minimizes direct flotation costs.

If $k$ is less than one, however, some undervalued firms find it too costly to issue, because of the dilution of current shareholder claims caused by selling shares at prices below intrinsic value. Consequently, the pool of issuing firms shows adverse selection to a degree that, all else being equal, is inversely related to $k$. Reducing $k$ is here analogous to lowering the amount of financial slack in the Myers and Majluf model, or to increasing the size of the issue offered to outside investors, as in Krasker (1986), where equity offers of varying size are allowed. Thus firms facing $k < 1$ trade off the adverse-selection cost of an

[11] Quality certification can take place only if underwriters on average suffer penalties from selling mispriced stocks to the public. Examples of such costs are loss of reputation [e.g., Booth and Smith (1986), Beatty and Ritter (1986), Titman and Trueman (1986), and Smith (1986)], direct costs of lawsuits from disgruntled clients purchasing overpriced issues [Tinic (1988) and Blackwell, Marr, and Spivey (1990)], and loss of business from issuing firms if the underwriter systematically underprices the issues [Ritter (1986)].

[12] In practice, issue withdrawal is likely to be infrequent, since a profitable investment opportunity will be lost, which is consistent with the evidence in Mikkelson and Partch (1988). Also, if the certification process described above works well, the offer price can be set close to the stock's secondary-market price at the close of the day before the offer day, which is consistent with the evidence on offer-price discounts presented in table 4.

uninsured rights issue and the net certification benefit of an underwritten (standby or firm-commitment) offer.

### 5.2. *The flotation method choice when* $k < 1$

(1) *Undervalued firms.* High-$k$ issuers select uninsured rights and inform the market of the high $k$ value with subscription precommitments.[13] These issuers realize a double benefit: the value of any underpricing is captured by current shareholders (the value of $c$ is close to zero), and the direct flotation cost $f$ is lowest for uninsured rights. In other words, for these firms, shareholder takeup is a cheap substitute for an underwriter guarantee.

Adverse-selection effects, and thus the value of $c$, increase as $k$ falls, since highly undervalued firms are now more likely not to issue. Moreover, the underwriter certification option exacerbates the negative market reaction to nonunderwritten offers by low-$k$ issuers. Thus, for some critical value $k_s < 1$, an undervalued firm finds excessive the $c$ implied by an uninsured rights offer. This firm will opt for an underwritten issue if the sum of the expected certification benefit (in terms of reducing $c$) and the net project value exceeds the underwriter fee. All else being equal, the greater the undervaluation of the firm's shares, the less likely this condition is to be met, and the more likely the firm is not to issue.

If the firm decides to issue using the underwritten method, the value of $k$ also helps the firm decide on the form of the underwriter contract. Let $k_f < k_s$ denote the firm's critical $k$ value for switching from a standby to a firm-commitment contract. Over the range $k_f < k < k_s$, the standby underwriting method economizes on the fact that current shareholders are expected to purchase a nonnegligible portion of the issue, which lowers both the standby fee and the takeup fee charged by the underwriter. As $k$ falls, however, the total standby underwriting fee necessarily approaches the firm-commitment fee. Thus, if $k$ falls in the range $0 < k < k_f$, the issuer prefers a firm-commitment underwritten offer to a standby offer to save the additional issuer-borne rights distribution costs implied by the standby method.

(2) *Overvalued firms.* If the value of $k$ is high, the overvalued issuer can select the uninsured rights method, informing the market of the high $k$ value. Alternatively, the firm can conceal the $k$ value and select a firm-commitment contract in a calculated attempt to pool with undervalued low-$k$ issuers to exploit the imperfect certification process. By assumption, if detected as overvalued, the firm either sells stock at the lower 'certified' price or withdraws the issue, thus

[13] In practice, subscription precommitments by large blockholders are likely to influence the subscription decisions of small, relatively uninformed shareholders. Moreover, subscription precommitments are also useful when assessing the likely underwriter risk in a standby offer and can help lower the standby fee. While not analyzed here, these additional benefits further underscore our contention that subscription precommitments play a strategic role in the firm's issuance decision.

foregoing the profitable investment project. The incentive for the overvalued firm to risk the underwriter certification process depends on the probability of detection, the size of the underwriter fee, the average quality of the firms in the pool selecting firm-commitment offers, and the value of the investment project.

For lower values of $k$, rights are precluded because of the resulting large equilibrium value of $c$, and the overvalued issuer selects the firm-commitment method, again in a calculated attempt to exploit the noisy certification process.

(3) *Market inferences.* The market cannot distinguish between overvalued and undervalued issuers but understands the above issue strategies and incentives. Thus, the market infers the following:

(i) The pool of *uninsured rights offers* will exhibit (i) high $k$ values (verified by subscription precommitments and/or by low rights trading volume) and (ii) low adverse selection, since a greater proportion of relatively undervalued firms decides to issue (using uninsured rights) when $k$ is high.

(ii) The pool of *standby rights offers* will exhibit (i) lower $k$ values and (ii) greater adverse selection than uninsured rights, since a greater proportion of highly undervalued firms (with similar $k$ values) now prefers not to issue.

(iii) The pool of *firm-commitment underwritten offers* will exhibit (i) the lowest $k$ values and (ii) the greatest degree of adverse selection, since (a) some overvalued firms try to get by the underwriter regardless of the true value of $k$, (b) high-$k$ undervalued firms use rights or standbys, and (c) low-$k$ undervalued firms are more likely not to issue.

Also, in practice, the underwriter may well have a greater incentive to sell overpriced than under priced stock, given the value of future debt and equity underwriting business with the issuing firm and the difficulty of verifying after the fact whether the issue was overpriced. This incentive further increases the adverse selection in the pool of firms selecting underwritten offers in comparison with the pool of rights offers.

As discussed next, this equilibrium analysis has implications for the observed market reaction to equity issue announcements, as well as for the values of certain issue characteristics, across flotation methods.

### 5.3. *Implications for stock-price behavior around issue announcements*

The model implies that the market reaction to an equity issue announcement is a function of both $k$ and the flotation method:

(H.1) The average value of $k$ in the pool of uninsured rights offers is close to one and, consequently, the average market reaction to uninsured rights offers is close to zero.[14]

(H.2) The average market reaction to a standby offer is less negative than the average market reaction to a firm-commitment offer of equivalent dollar size.

H.2 follows because the average quality of firms in the pool selecting standbys is no less than the average quality of firms selecting firm commitments, and because issuers selecting standbys have higher $k$ values. Taken together, H.1 and H.2 imply that the average market reaction to rights offers should be less negative than the average reaction to firm-commitment underwritten offers.

(H.3) High-$k$ issuers, which tend to have fairly or undervalued stock, on average show smaller preannouncement stock-price runups than low-$k$ issuers. Given the hypothesized correspondence between $k$ values and the flotation method choice, this in turn implies that rights and standby offers have smaller preannouncement runups than firm-commitment offers, with no runup for uninsured rights.

H.3 extends the argument of Lucas and McDonald (1990) to include the effect of differential $k$ values across issuers and flotation methods. Lucas and McDonald assume that (i) firms are correctly priced on average but may be temporarily mispriced and (ii) delaying the equity issue lowers the net present value $b$ and is therefore costly. In this situation, temporarily underpriced firms have an incentive to postpone the issue until the stock price is higher, which implies that the average preannouncement price path of these issuing firms will slope upward. On the other hand, temporarily overpriced firms will issue immediately as investment opportunities arise. If the arrival of investment projects is uncorrelated with the firm's price history, the average preannouncement price path of temporarily overvalued firms will be flat. As a result, the average preannouncement price path of all issuing firms will slope upward. The effect of $k$ in this analysis is to reduce the incentive of undervalued firms to postpone the issue, since current shareholders capture part of the underpricing. At the extreme, when $k = 1$, the firm issues rights immediately regardless of its current underpricing. Thus in a sample of rights issuers where the average value of $k$ is known to be large, the analysis predicts that there should be little or no stock-price runup on average before the issue announcement.

[14]This assertion assumes that issuers are not constrained in their choice of flotation methods. If issuers are precluded from using firm commitments, as appears to be true in some nations, the rights and standby offers should show greater adverse-selection effects and thus receive more negative market reactions.

(H.4) Since there is less adverse-selection risk associated with a public utility issue than with an industrial issue, utilities are more likely to select rights, and the adverse market reaction to a public sale of equity should be relatively smaller for public utilities than for other issuers for the same flotation method. Across flotation methods, however, utilities should also show relatively higher adverse-selection effects for firm commitments.

Utility issues have less adverse-selection risk because the investment and financing of utilities are highly regulated, and because public knowledge of the regulatory policy lowers the probability that a utility announcing a stock offer is attempting to take advantage of favorable market conditions.[15]

(H.5) The market reacts negatively to preemptive rights charter amendments.

As managers receive private information that the value of $k$ in future equity issues will be low, they propose preemptive rights charter amendments to prepare for the firm-commitment flotation method. The charter amendment proposal signals management information on $k$, causing the market to capitalize the higher future expected costs of raising capital. Interestingly, this explanation is also consistent with the fact that shareholders almost uniformly see it in their own interests to vote in favor of such manager-sponsored proposals to amend the charter.

H.5 is consistent with the evidence in Bhagat (1983) and in Eckbo and Masulis (1986). The remaining hypotheses, H.1–H.4, as well as several predictions about subscription precommitments and the timing and frequency of rights issues, are examined below.

## 6. Empirical analysis

### *6.1. Subscription precommitments and actual shareholder takeup*

Our adverse-selection model implies that the degree of shareholder takeup (the value of $k$) plays a strategic role in the issuer's flotation method choice. Since the issuer is better informed than the market about $k$ at the time of the offer announcement, high-$k$ issuers selecting rights have an incentive to credibly communicate their information on $k$ to the market by means of subscription precommitments. Such precommitments help attenuate the negative market

[15] For example, stock offers often require state utility commission approval or SEC approval for utility holding companies. In other instances, a utility offer is mandated if a rate increase is to be approved. It also appears that regulatory commissions sometimes pressure utilities to make equity offers, which further lowers the anticipated adverse-selection effect.

reaction to the issue announcement, and reduce the expected cost of offer failure in an uninsured rights offer. Given the hypothesized relationship between the value of $k$ and the flotation method choice, we therefore expect both actual shareholder takeup and subscription precommitments to be larger for uninsured rights than for standby rights offers.

Table 7, which shows the mean and median values of shareholder subscription precommitments and actual subscription rates for rights and standbys, supports this prediction. The total subscription precommitment consists of two components, one referring to the pro rata allocation of the rights distributed and the other covering overallotment guarantees. The latter represent precommitments to exercise rights beyond one's own pro-rata allocation should other shareholders not fully exercise theirs. In the uninsured rights category, industrial issuers receive total precommitments averaging 48% (median 23%) of the number of shares offered, and the precommitment is 66% (median 87%) for the average utility issue. Thus at the time of the offer announcement, the risk of offering failure is particularly low for public utility issuers. As shown in the last column, actual subscription rates in uninsured rights offers average 99% for industrial issuers and 93% for public utilities.

Table 7

The mean (median) percentage of the share issue precommitted to be subscribed, the percentage of the issue guaranteed to be subscribed in overallotment, and the percentage of the issue subscribed, for rights offers of seasoned common stock by NYSE- and Amex-listed firms, classified by issuer type, 1963–1981.[a]

| Issuer | Subscription precommitment in percentage of shares issued | | Percentage of issue subscribed |
|---|---|---|---|
| | Pro-rata allotment | Overallotment[b] | |
| | I. Uninsured rights | | |
| Industrial | 27.1 | 21.2 | 98.7 |
| | (23.0) | (0.0) | (100.0) |
| Utility | 62.7 | 3.4 | 92.7 |
| | (87.0) | (0.0) | (99.0) |
| | II. Standby rights[c] | | |
| Industrial | 2.7 | 0.0 | 98.7 |
| | (0.0) | (0.0) | (99.0) |
| Utility | 0.0 | 0.0 | 92.0 |
| | (0.0) | (0.0) | (93.0) |

[a]Data source: Offering prospectuses. The actual subscription rates include subscriptions by investors who have purchased rights in the secondary market during the offer period.

[b]This represents precommitments to exercise rights beyond one's own pro-rata allocation should other shareholders not fully exercise theirs.

[c]The difference between 100 and the 'percentage of issue subscribed' represents the underwriter's takeup. In the last column, 80% of the standbys have a takeup of 10% or less.

For standby rights offers, although actual subscription rates are high, the average size of precommitments is lower than for uninsured rights: 2.7% for industrials and 0% for utility issuers. From the table, the underwriter takeup averages 8.0% for utility issues and 1.3% for industrial issues, suggesting that the adverse-selection risk borne by the standby underwriter is relatively low.[16] In fact, the underwriter takeup rate implied by table 7 understates the true rate because the underwriters typically purchase and exercise rights during the offer period. Although information on the underwriter's secondary-market purchases is unavailable for industrial standbys, Singh (1992) documents that underwriters in utility standbys typically purchase and exercise approximately 16% of the rights, leaving an average shareholder takeup of 76%.[17] In sum, the evidence indicates that both the level of subscription precommitments and the value of $k$ on average are lower for standbys than for uninsured rights. According to our model, these standby issuers realize that their $k$ values are too low to select uninsured rights but high enough to select standby underwriting over firm-commitment offers.

According to our model setup, without subscription precommitments, the market infers the value of $k$ through other means, such as the trading volume in the rights during the offer period, and otherwise observable shareholder characteristics (e.g., ownership dispersion) that help form expectations about $k$. If these information sources yield relatively imprecise estimates of $k$, our model implicitly assumes that the costs to the issuer of misrepresenting the value of $k$ are prohibitive. Specifically, in light of the low subscription precommitments in the standby category evident in table 7, the model implicitly assumes that the standby underwriter refrains from overstating the value of $k$ when marketing the shares. A recent court case in the U.K., where rights offers are the rule rather than the exception, is of interest in this respect. In this case, the standby underwriter for the £837 million equity issue by Blue Arrow in September 1987 (the largest issue ever in the U.K.) was convicted of overstating the actual subscription level the morning after the rights offer expired (the *Times*, international edition, February 15, 1992). The actual subscription rate was 38%. The underwriter, however, apparently viewed 50% as the minimum needed to successfully market the remaining shares to its clients, and so proceeded to anonymously purchase rights to 11% of the issue, and announced that the offer had been a 'success'. The prosecution spent £35 million to prove that $k$ had been overstated, and the underwriter lost the case.

[16] 80% of the standby issues in the sample have an underwriter takeup of 10% or less. Comparable subscription rates are reported by Hansen, Pinkerton, and Ma (1986) in a sample of 60 utility standby offers that took place between 1969 and 1979.

[17] Singh's data suggest that we underestimate the takeup fee component of the total cost of a utility standby offer in section 3 above. Correcting for this bias does not alter our earlier conclusion that firm-commitment offers are more expensive than standby rights offers.

### 6.2. Stock-price behavior around issue announcements

#### 6.2.1. Procedure for estimating abnormal stock returns

Table 8 presents estimates of the average abnormal stock returns, classified by issuer type and flotation method, in relation to the following dates: issue announcement ($a$), offer start ($b$), and offer expiration ($e$). Abnormal returns for all event windows are estimated simultaneously using the regression model

$$r_{jt} = \alpha_j + \beta_j r_{mt} + \sum_{n=1}^{6} \gamma_{jn} d_{nt} + \varepsilon_{jt}, \tag{1}$$

where $r_{jt}$ and $r_{mt}$ denote the continuously compounded daily rates of return to firm $j$ and the value-weighted market portfolio of all NYSE- and Amex-listed stocks. The six dummy variables $d_{nt}$ each take on a value of one over the intervals corresponding to each of the six columns in table 8, and zero otherwise.[18]

The estimation uses 450 daily stock returns from the CRSP tape, starting on day $a - 60$. We use a postoffer-dominated estimation period to minimize the possible bias in the market-model parameters caused by long periods of preannouncement abnormal stock-price runups reported in the literature. Missing return observations are dealt with as follows: If a return observation in the estimation period following the event period is missing, the next return observation is also excluded (since on the CRSP tape, this is a multiple-day return). If there is a missing return in any of the five event periods, however, the following available return is not excluded, since we want $\gamma_{jn}$ to capture the total abnormal return over the event period. Missing observations in the event period are rare in our sample, and for the critical event periods 2 (the two-day announcement period) and 4 (the offer day) there are none.

The issuing firm's total abnormal stock return over event period $n$ is $\omega_{jn}\gamma_j$, where $\omega_{jn}$ is the number of days in the event period. Since firm-commitment offers have no formal offer expiration day $e$, we define $e = b + 20$ for this offer category, which is in fact comparable to the length of a typical rights offer.[19] For

[18] We also repeated all regressions using a 'Monday factor' in eq. (1), defined as $\beta'_j r_{mt} d_{mt}$, where $d_{mt}$ is a dummy variable which takes a value of one if period $t$ is a Monday and a value of zero otherwise. This procedure addresses the concern that the estimated value of the abnormal return parameter for stock offers that take place on Mondays tend to reflect the abnormal Monday behavior of the market index. Inclusion of this additional factor in the market model does not alter the conclusions of this paper, and we therefore report results based on the standard form of the market model only.

[19] In the firm-commitment sample, the average number of trading days between the issue announcement and the beginning of the offer period is 26 for the industrial offers and 33 for the public utility offers. For standbys, the average number of trading days from $a$ to $b$ is 31 for industrial and 38 for utility offers, and $e - b$ (the length of the subscription period) averages 12 days for industrial standbys and 13 for utility standbys. Finally, the average number of trading days from $a$ to $b$ in pure rights offers is 40 for industrial and 45 for utility offers, and $e - b$ averages 14 days for industrials and 21 for utilities.

each event period $n$, table 8 also reports the percentage of the sample with negative abnormal return, as well as the test statistic

$$z_n = (1/\sqrt{N}) \sum_{j=1}^{N} (\hat{\gamma}_{jn}/\hat{\sigma}_{\hat{\gamma}jn}), \tag{2}$$

where the 'hat' denotes ordinary-least-squares (OLS) estimate and $\hat{\sigma}_{\hat{\gamma}jn}$ is the estimated standard error of $\hat{\gamma}_{jn}$. Under the null hypothesis of zero abnormal return, $z_n$ is approximately standard normal for large sample size $N$.

### 6.2.2. *Announcement-period abnormal returns and direct flotation costs*

The second column in table 8 shows the average two-day announcement-period abnormal return, which reflects the capitalized value of the flotation costs and the market's reassessment of the stock's adverse-selection potential. As is well documented in the literature, announcements of firm-commitment offers are met with significantly negative average abnormal returns.[20] The two-day announcement-period average abnormal return is a highly significant $-3.34\%$ for the 389 industrial offers and $-0.80\%$ for the 646 public utility offers.

In the standby category, the two-day announcement-period abnormal return is a statistically significant $-1.03\%$ ($z$-value of $-2.04$) for industrial issuers and $-0.53\%$ ($z$-value of $-2.28$) for utility issuers. In other words, the average market reaction to standbys is only weakly significant, and for industrial issuers, approximately one-third of the average reaction to firm-commitment offers. The average announcement-induced market reaction is weakest for uninsured rights, $-1.39\%$ ($z$-value $-1.56$) for industrial issues and $0.23\%$ ($z$-value 1.00) for utility issues. A standard $t$-test for differences in sample means rejects at a 1% level the hypothesis that the average market reaction to firm-commitment and rights offers is the same. Further, the average market reaction is significantly less negative when the issuer is a public utility rather than an industrial company, which is consistent with the hypothesized smaller adverse-selection effects in regulated utilities.

The results in table 8 substantially expand our empirical knowledge of the valuation effects of rights offers. Smith (1977) reports zero announcement-month abnormal performance in his sample of rights issues from the 1971–1975 period. His analysis does not distinguish between pure rights and standbys or

[20] See Asquith and Mullins (1986), Masulis and Korwar (1986), Kalay and Shimrat (1987), Barclay and Litzenberger (1988), and Choe, Masulis, and Nanda (1992). Mikkelson and Partch (1986) and Officer and Smith (1986) document a positive average market reaction to announcements of the cancellation or postponement of equity issues.

Table 8

Percent average abnormal stock returns relative to the issue announcement ($a$), offer start ($b$), and offer expiration ($e$) dates for 1,216 seasoned common-stock offers by NYSE- and Amex-listed firms classified by issuer type and flotation method, 1963–1981.

$$\text{Regression model:}\quad \tilde{r}_{jt} = \alpha_j + \beta_j \tilde{r}_{mt} + \sum_{n=1}^{6} \gamma_{jn} d_{nt} + \tilde{\varepsilon}_{jt}$$

where $\tilde{r}_{jt}$ and $\tilde{r}_{mt}$ denote the continuously compounded daily rates of return to firm $j$ and the value-weighted market portfolio; the six dummy variables $d_{nt}$ each take on a value of one over the intervals corresponding to each of the six columns in the table, and zero otherwise. The issuing firm's abnormal return over event period $n$ is $\omega_{jn}\gamma_{jn}$, where $\omega_{jn}$ is the number of days in the event period (z-value, and percent negative in parentheses).[a]

| | Event period | | | | | |
|---|---|---|---|---|---|---|
| Issuer type | $a-60$ through $a-2$ | $a-1$ through $a$ | $a+1$ through $b-1$ | $b$ | $b+1$ through $e-1$ | $e$ |
| | | | I. Firm commitments[b] | | | |
| Industrials ($N = 389$) | 12.05 (11.89, 24.7) | − 3.34 (− 21.48, 82.5) | 0.97 (1.18, 47.6) | − 0.21 (− 1.75, 55.5) | 0.91 (1.69, 44.2) | − |
| Utilities ($N = 646$) | 0.77 (2.29, 48.9) | − 0.80 (− 11.57, 66.9) | − 0.80 (− 2.09, 55.6) | 0.19 (4.53, 41.2) | − 0.08 (− 0.19, 50.5) | − |

| | | | | | | |
|---|---|---|---|---|---|---|
| **II. Standby rights[c]** | | | | | | |
| Industrials ($N = 41$) | 4.57 (1.97, 43.9) | − 1.03 ( − 2.04, 56.1) | − 0.87 ( − 0.45, 53.7) | − 1.10 ( − 5.08, 70.7) | − 1.03 ( − 0.58, 58.5) | 0.51 (2.09, 41.5) |
| Utilities ($N = 87$) | 0.11 (0.03, 49.4) | − 0.53 ( − 2.28, 63.2) | − 2.73 ( − 3.37, 74.7) | − 0.67 ( − 6.06, 70.1) | − 0.55 ( − 0.83, 58.5) | 0.07 (0.72, 43.7) |
| **III. Uninsured rights[d]** | | | | | | |
| Industrials ($N = 26$) | − 2.38 ( − 0.42, 53.8) | − 1.39 ( − 1.56, 69.2) | − 6.88 ( − 1.32, 65.4) | − 1.33 ( − 1.94, 57.7) | − 3.55 ( − 2.63, 69.2) | 0.81 (1.54, 42.3) |
| Utilities ($N = 27$) | 3.11 (2.15, 40.7) | 0.23 (1.00, 51.9) | − 1.87 ( − 1.18, 55.6) | − 0.34 ( − 1.72, 59.3) | − 3.23 ( − 3.12, 77.8) | 0.27 (0.97, 44.4) |

[a]The estimation uses 450 daily stock returns from the CRSP tape, starting on day $a - 60$. For event period $n$, $z_n = (1/\sqrt{N})\sum_{j=1}^{N}(\hat{\gamma}_{jn}/\hat{\sigma}_{\gamma jn})$, where the 'hat' denotes OLS estimate and $\hat{\sigma}_{\gamma jn}$ is the estimated standard deviation of $\hat{\gamma}_{jn}$. Under the null hypothesis of zero abnormal return, $z_n$ is approximately standard normal for large $N$.

[b]Since firm-commitment offers have no formal offer expiration day, we use $e = b + 20$ in this offer category, which is comparable to the length of a typical rights offer (see below). The average number of trading days between the issue announcement and the beginning of the offer period is 26 for the industrial offers and 33 for the public utility offers.

[c]The average number of trading days from $a$ to $b$ is 31 for industrial standbys and 38 for utility standbys, and $e - b$ (i.e., the length of the subscription period) averages 12 days for industrial standbys and 13 days for utility standbys.

[d]The average number of trading days from $a$ to $b$ is 40 for industrial offers and 45 for utility offers, and $e - b$ averages 14 days for industrials and 21 days for utilities.

between industrial and utility issuers, distinctions that the results in table 8 indicate are important. White and Lusztig (1980), who use daily security returns over the period 1962–1972, report evidence that the average market reaction to rights offer announcements is negative. Their study also does not separate the two categories of rights offers or issuer types. For standby rights offers, Hansen (1988) presents results that are comparable to ours. He estimates the average two-day announcement-period abnormal return to be − 2.61% for industrial issues and − 1.21% for utility issues, both with $t$-values greater than − 5. These estimates are significantly larger than the corresponding marginally significant estimates of − 1.03% and − 0.53% reported in table 8. Although it is not clear why Hansen's estimates exceed ours, we suspect the discrepancy reflects a combination of our larger sample (his 22 industrial standbys are from the period 1965–1971 only) and different estimation procedures.[21]

Since the offer announcement causes the market to capitalize expected flotation costs, it is useful to add realized flotation costs as a percentage of preannouncement equity capitalization back into the estimated abnormal stock return. This adjusted abnormal return provides a measure of the extent to which the market reaction to an offer announcement reflects the effect of information asymmetries not influencing direct flotation costs. Looking at the mean values, the adjusted abnormal return is − 2.29% for industrial firm-commitment offers, up from − 3.34%. Thus, over and above flotation costs, the offer announcement conveys negative information that causes the market to lower the share price by approximately 2%. For public utility firm-commitment offers the average adjusted abnormal return is − 0.31%, up from the unadjusted average of − 0.80% in table 8. For standbys, the average adjusted abnormal return is − 0.10% for industrials (up from − 1.03%) and − 0.31% for utilities (up from − 0.53%). Finally, for pure rights, the average adjusted abnormal return is − 0.59% for industrials (up from − 1.39%) and 0.28% for utilities (up from 0.23%). In sum, the market reactions to rights and standby offers appear to be economically negligible after the effect of direct flotation costs is adjusted for.

### *6.2.3. Adjusted announcement-period abnormal returns and offer characteristics*

The statistical significance of the differences between the adjusted abnormal returns discussed above is indicated by the pooled cross-sectional regression

[21] Eckbo (1986) shows that the average market reaction to convertible debt issues is significantly negative when the issue is underwritten and indistinguishable from zero in rights offers. Moreover, for straight debt issues the average market reaction is indistinguishable from zero regardless of the flotation method. This evidence is also consistent with our main hypothesis, since the hybrid debt–equity nature of convertible debt leads one to expect greater adverse-selection effects for convertible than for straight debt.

shown in table 9.[22] One can interpret this as a constrained regression in which the explanatory variable flotation costs is required to take on a parameter value of minus one. As in section 3, we use indicator variables, $D1$ and $D2$, to test the proposition that the conditional mean value of the dependent variable differs systematically across flotation methods, as predicted by our theoretical framework.

The cross-sectional regression yields an $R^2$ of 8% for industrial issues and 9% for utility issues, with marginally significant $F$-values of 4.6 and 8.3. Interpreting the individual regression coefficients, the issuing firm's abnormal stock return over the 59 days before the issue announcement ($RUN$) shows a significantly negative coefficient for both industrial and utility issues. The standard error of the firm's stock return ($ST$) has a statistically significant negative coefficient in the public utility sample but, surprisingly, appears to have no explanatory power in the sample of industrial issuers.[23] Since this variable is a significant determinant of flotation costs (table 6), the estimated value of $\delta_2$ indicates that firm risk has an additional impact on the market reaction to utility issues but not to industrial issues.[24] Moreover, the leverage change variable $\Delta(D/E)$ is insignificant for both industrial and utility issuers. The offer-induced change in leverage is approximated by

$$\Delta(D/E) = \frac{\Delta D}{E} - \frac{D}{E}\left(\frac{\Delta E}{E}\right) = -\left(s + \frac{D}{E}\right)\left(\frac{\Delta E}{E}\right), \tag{3}$$

where $s$ is the percentage of the equity proceeds used to repurchase the firm's debt as indicated in the offer prospectus or the *Wall Street Journal Index*, $\Delta E$ is the increase in equity, and the corresponding decrease in the firm's debt is $\Delta D = -s\Delta E$. The insignificance of $\Delta(D/E)$ fails to support the proposition that the negative market reaction to seasoned equity issues is a function of the leverage reduction implied by the issue, which runs counter to a number of current capital-structure theories.

Turning to the indicator variable $AUT$ for prior stock authorization (which is included as a proxy for the market's ex ante assessment of the probability of an

[22] The regression is estimated using weighted least squares. Eckbo, Maksimovic, and Williams (1990) show that, for discrete nonrepetitive voluntary events, OLS or GLS are inconsistent. Reestimation of our statistical model using the Eckbo, Maksimovic, and Williams estimator, however, yields conclusions qualitatively similar to those in table 9.

[23] This result differs from Dierkens (1991), who uses preannouncement returns to generate standard errors. The market preannouncement runup in the firm-commitment sample induces a bias in her standard error estimate.

[24] Inclusion of a corresponding market risk variable, i.e., the standard deviation of the market return over the estimation period of $ST$, does not alter the results. Thus the negative value of $\delta_2$ for utility issuers reflects firm-specific risk. The market-risk variable showed an insignificant coefficient and was dropped.

Table 9

OLS estimates of coefficients in linear cross-sectional regressions of the percentage two-day announcement-period abnormal stock return plus flotation costs on firm and issue characteristics for 1,139 seasoned common-stock offers by NYSE- and Amex-listed firms, 1963–1981 ($t$-values in parentheses).[a]

Model: $AR + FC = \delta_0 + \delta_1 \ln A + \delta_2 ST + \delta_3 RUN + \delta_4 AUT + \delta_5 SCON + \delta_6 \triangle(D/E) + \delta_7 D1 + \delta_8 D2$

| $\delta_0$ | $\delta_1$ | $\delta_2$ | $\delta_3$ | $\delta_4$ | $\delta_5$ | $\delta_6$ | $\delta_7$ | $\delta_8$ | $\bar{R}^2$ | $F$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | I. Industrial issues ($N = 402$)[b] | | | | | | |
| − 0.01 | − 0.28 | 3.39 | − 3.94 | 1.27 | 0.08 | 0.01 | 0.94 | − 1.88 | 0.08 | 4.6 |
| ( − 0.01) | ( − 1.90) | (0.12) | ( − 3.50) | (2.03) | (0.40) | (0.35) | (0.88) | ( − 2.68) | | |
| | | | | II. Utility issues ($N = 737$)[c] | | | | | | |
| 3.91 | − 0.20 | − 66.60 | − 3.53 | − 0.51 | − 0.39 | − 0.09 | − 1.05 | − 0.04 | 0.09 | 8.3 |
| (5.24) | ( − 3.05) | ( − 3.23) | ( − 4.19) | ( − 2.48) | ( − 3.39) | ( − 0.60) | ( − 2.13) | ( − 0.17) | | |

[a]The dependent variable is the sum of the two-day announcement-period abnormal stock return and the direct flotation costs from table 6. The explanatory variables are: $\ln A$ = natural log of firm total assets, $RUN$ = cumulative abnormal stock return over the period day − 60 through day − 2 relative to the offer announcement day, $AUT$ = indicator variable that takes a value of one if the firm had sought and obtained additional common-stock authorizations in the year preceding the offering announcement, and zero otherwise, $\triangle(D/E)$ = implied change in issuer's debt/equity ratio [see eq. (3) in the text]. The variables $ST$, $SCON$, $D1$, and $D2$ are defined as in table 6.

[b]The 402 issues comprise of 334 firm commitments, 42 standbys, and 26 uninsured rights offers.

[c]The 737 issues comprise of 630 firm commitments, 86 standbys, and 21 uninsured rights offers.

equity issue), we find it has a significantly positive coefficient for industrial issues, as expected. Surprisingly, the same coefficient is negative for utility issues, where the probability of an issue is more directly related to investment activity (as opposed to market timing). The share-concentration variable *SCON* exhibits an insignificant coefficient in the sample of industrial issues and, perhaps surprisingly, a significantly negative coefficient in the sample of utility issues. The log of equity capitalization ($\ln A$) receives a significantly negative coefficient, indicating a potential size effect in abnormal returns. Since firm size and issue size are positively correlated, we also include the log of offer proceeds and the percentage change in the number of shares outstanding as explanatory variables. Neither shows a significant coefficient in any of the regressions, and their inclusion does not eliminate the negative impact of $\ln A$. Thus the negative value of $\delta_1$ does not appear to be capturing the offer size per se.

The estimated coefficients $\delta_7$ and $\delta_8$ for the indicator variables *D1* and *D2* are particularly interesting. For industrial issues, $\delta_8$ is significant with a value of $-1.9$. Thus the market reaction to firm-commitment offers, adjusted for flotation costs and firm-specific variables, is significantly more negative than the market reaction to rights issues. The value of $\delta_7$ is indistinguishable from zero, which suggests that for industrial issues, the market reacts primarily to whether the flotation method is a firm-commitment underwriting. For utility issues, $\delta_7$ is significant with a value of $-1.1$, whereas $\delta_8$ is indistinguishable from zero. Thus, in this issuer category, the market reacts primarily to whether or not the flotation method is an underwritten offer, which is consistent with our observation that average flotation costs of standby and firm-commitment offers are very similar for utility issuers. Overall, this evidence indicates that, as predicted, the market reaction net of flotation costs is most negative for underwritten offerings and least negative for uninsured rights, whether the issuer is an industrial firm or a regulated utility.

### *6.2.4. Pre- and postannouncement abnormal stock-price behavior*

Returning to table 8, the first column shows the average abnormal stock-price runup over the three months before the announcement date. Firm-commitment offers (which under our hypothesis have the largest adverse-selection potential) are typically announced following significant abnormal stock-price increases, on average gaining 12.05% for industrial issuers ($z$-value of 11.89). This is consistent with empirical studies of firm-commitment offers by Korajczyk, Lucas, and McDonald (1990), Lucas and McDonald (1990), and Choe, Masulis, and Nanda (1992).

In contrast, there is evidence of a much smaller prior stock-price runup in standbys (4.57% for industrials, with a $z$-value of 1.97) and virtually no runup before industrial uninsured rights offers ($-2.38\%$, $z$-value of $-0.42$), which is

consistent with our model. Also, the apparent market timing in the firm-commitment sample appears unique to industrial issuers, with utilities showing few or no significant gains, which is also consistent with our adverse-selection argument.

Except for utility firm-commitment offers, table 8 also shows evidence of negative average abnormal returns after the announcement day, in particular over the first day of the offer (column four). As discussed in section 4, this may be caused by short-selling designed to take advantage of (and perhaps affect) the offering price, or by the necessity to compensate investors for transaction costs of absorbing the new issue. The negative abnormal returns may also reflect the fact that the primary market, where there are no purchaser-borne fees, draws buyers away from the secondary market, increasing the likelihood that our secondary-market closing prices are at the low end of the bid–ask spread, as documented by Lease, Masulis, and Page (1991).[25]

These arguments all have in common that the hypothesized price decline is temporary. Hansen (1988) concludes that the price decline is indeed temporary for his sample of standby offers. He finds a significantly negative correlation between the abnormal return over the 20 trading days before the start of the offer period and the 20-day abnormal return following the offer expiration day. As shown in an earlier version of this paper, however, when replicating Hansen's test strategy, we fail to reproduce the significant correlation. This discrepancy probably reflects our larger sample and different estimation methodology. For example, instead of Hansen's 20-day preoffer event period, we use the exact time from the announcement to the offer (column 3 in table 8), which is arguably a superior measure under Hansen's hypothesis. Regardless, tests for price reversal of the type described above lack power, since both the timing and duration of the hypothesized price dip are likely to vary substantially across firms. Intraday transactions data, as well as information on bid–ask spreads and short-selling activity, would increase our power to test hypotheses predicting temporary price effects in the postannouncement period, but this exceeds the bounds of the current study.

### *6.2.5. The information content of subscription-price discounts*

The rights offer paradox hinges in part on the apparent reluctance of managers to issue rights with a deep subscription-price discount [Smith (1977)]. In principle, the deeper the discount, the more valuable the right, and the more likely the issue will be fully subscribed. As discussed earlier, a reluctance to offer a deep discount possibly reflects capital-gains-tax considerations or the cost of compensating convertible-security holders under antidilution clauses. Alternatively, as in Heinkel and Schwartz (1986), a deep discount conveys negative

[25] See also Barclay and Litzenberger (1988) and Loderer and Sheenan (1991).

Table 10

OLS estimates of coefficients in linear cross-sectional regressions with the offering-day abnormal stock return as the dependent variable and the offering discount and other issue and issuer characteristics as explanatory variables for 1,212 issues of seasoned common stock by NYSE- and Amex-listed firms, 1963–1981 ($t$-values in parentheses).[a]

Model: $AR = \theta_0 + \theta_1 DISC + \theta_2 \ln A + \theta_3 ST + \theta_4 SCON + \theta_5 D1 + \theta_6 D2$

| $\theta_0$ | $\theta_1$ | $\theta_2$ | $\theta_3$ | $\theta_4$ | $\theta_5$ | $\theta_6$ | $\bar{R}^2$ | $F$ |
|---|---|---|---|---|---|---|---|---|
| I. Industrial issues ($N = 451$)[b] | | | | | | | | |
| − 1.06 | − 0.73 | − 0.01 | − 31.64 | − 0.01 | 0.59 | 1.16 | 0.05 | 3.6 |
| ( − 1.25) | ( − 0.65) | ( − 0.08) | ( − 1.99) | ( − 0.12) | (0.93) | (2.40) | | |
| II. Utility issues ($N = 761$)[c] | | | | | | | | |
| 0.56 | 1.01 | − 0.03 | − 17.11 | − 0.09 | − 0.55 | 0.79 | 0.07 | 9.2 |
| (1.34) | (0.88) | ( − 0.79) | ( − 1.55) | ( − 1.58) | ( − 2.20) | (4.94) | | |

[a]The dependent variable is the offering-day abnormal stock return $DISC = (P_0 - P_{-1})/P_{-1}$, where $P_0$ is the offering price and $P_{-1}$ is the stock's closing price on the day before the offering day. The explanatory variables $\ln A$, $ST$, $SCON$, $D1$, and $D2$ are as defined in table 9.

[b]The total sample of 451 comprises 379 firm commitments, 43 standbys, and 27 uninsured rights offers.

[c]The total sample of 761 comprises 646 firm commitments, 88 standbys, and 23 uninsured rights.

information to outside investors about the true value of the issue. In their model, offer failure is costly, and a rights issuer who privately expects the stock price to fall over the rights offer period prefers to self-insure by selecting a relatively low offer price in relation to the current market price. As a result, market participants infer the issuer's private information from the size of the offer-price discount. Thus, Heinkel and Schwartz predict that greater discounts will cause larger downward adjustments in the stock's secondary-market price.[26]

Table 10 presents the results of pooled cross-sectional regressions with the offer-day abnormal stock return as dependent variable and the offer-price discount as one of the explanatory variables. The discount is computed as $DISC = (p - p_{-1})/p_{-1}$, where $p$ is the offer price and $p_{-1}$ is the stock's closing price on the trading day before the offer day. News of the discount typically reaches the market on the offer day, so the dependent variable in this regression captures the information effect of the discount.[27]

[26]Heinkel and Schwartz also model the issuer's choice between uninsured rights, standby rights, and firm-commitment underwritten offers. They assume, however, that direct flotation costs are higher for standbys than for firm commitments, which is contradicted by the flotation cost evidence presented earlier. Further, their model implies that the most undervalued firms choose standby offers, which appears inconsistent with our evidence on the relative market reactions to equity announcements across flotation methods (table 8). This evidence does not, however, invalidate the Heinkel and Schwartz prediction about the information content of the rights offer discount that we test below.

[27]Since the offer discounts may be affected by the order-flow asymmetries discussed earlier in this section, the coefficient estimate for the offer discount in table 10 may be understated. Also, since our

The offer-price discount enters with an insignificant coefficient whether the issuer is an industrial firm or a public utility. While not reported in table 10, *DISC* also receives an insignificant coefficient when the regression is run separately for uninsured and standby rights offers. Moreover, since subscription precommitments in uninsured rights offers tend to reduce the signaling effect of the discount (since the risk of offer failure is low), the regression is reestimated with a precommitment indicator variable. This specification also fails to produce a significant coefficient for *DISC*. In sum, we find no support for the proposition that a relatively deep discount signals negative information to the market about the true value of the issuer.

### *6.3. Determinants of k and the frequency of rights offers*

If the value of $k$ decreases as the firm's equity capitalization and ownership dispersion increase, we expect the frequency of rights offers to be highest for relatively small, closely held firms. This is consistent with the evidence on industrial issuers in tables 1 and 2 above, and with the fact that smaller, private companies (not included in our sample) use the rights method more frequently than publicly traded firms. On the other hand, table 2 indicates that the average utility rights issuer, which according to table 7 has a high $k$ value, is relatively large. Thus although some large firms have concentrated ownership [Demsetz and Lehn (1985)], firm size is probably not the only factor determining $k$.

Our analysis also suggests that, for a given value of $k$, the greater the information asymmetry between the issuer and the market, the greater the marginal benefit of quality certification, and the greater the probability that the issuer will employ an underwriter. Issuers with a relatively transparent production technology, or a high level of mandated disclosure, are more likely to use rights. Thus regulated utilities, with their higher level of public information, are more likely to select rights issues.[28] This prediction is supported by the relatively high frequency of rights issues among utility issuers shown earlier in table 1. Further, the conjecture that information asymmetries play a relatively minor role in the flotation method decision of these firms helps explain why utility issuers selecting rights, which according to table 7 have high $k$ values, also tend to be relatively large.

Finally, since firms switching from rights to firm-commitment offers must first eliminate corporate charter provisions granting shareholders preemptive rights

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sample excludes canceled offerings, the average offer-day abnormal return reflects a slight survivorship bias. But given the low number of offer cancellations (less than 20) found during our sample selection or in Mikkelson and Partch (1988), we doubt that this selection bias is empirically important.

[28] If the information asymmetry between the issuer and the market is sufficiently low, there is little to certify, and the cost of the underwriting guarantee will exceed the benefit even if $k$ is low. In these cases the issuer will choose a direct offer or a best-effort contract. Although these flotation methods are not part of our empirical analysis, it is interesting that certain public utilities, where regulatory policy reduces information asymmetries, appear to the most frequent users of direct offers.

to purchase new equity issues, our adverse-selection framework also has implications for the timing of preemptive rights charter amendments. Specifically, as the value of $k$ falls over time (perhaps because firm size grows with time), managers find it optimal to switch to firm-commitment offers and therefore propose preemptive rights charter amendments. According to the sample of preemptive rights charter amendments in Bhagat (1983), there was a surge in such amendments in the early 1970s, just preceding the sharp reduction in rights issues shown in our table 1. Because equity issues by exchange-listed industrial firms are relatively infrequent, the clustering of the charter amendments in the late 1960s and early 1970s may reflect a positive cross-sectional correlation in the demand for equity capital by these firms.

## 7. Conclusions

This paper begins by reconfirming the rights offer paradox highlighted by Smith (1977) in his study of seasoned equity offers. With a sample of more than 1,000 firm-commitment offers and nearly 200 rights offers made over the 1962–1981 period, we show that average direct flotation costs of uninsured rights are significantly lower than the costs of rights with standby underwriting, which in turn are significantly cheaper than firm-commitment offers. This conclusion is further strengthened by our multivariate analysis, in which flotation costs are shown to be determined by several issue-specific characteristics regardless of the flotation method chosen. Yet U.S. firms overwhelmingly prefer the firm-commitment method when issuing seasoned common stock, with industrial rights issues becoming relatively rare after 1975 and virtually disappearing by 1981.

We show that the reduction in rights issues coincides with these same firms adopting dividend reinvestment plans, which allow shareholders to receive shares of common stock in lieu of cash dividends. Given the apparent reluctance of managers to cut dividend levels, dividend reinvestment plans are similar to a periodic rights offer. Thus, a narrow focus on rights issues tends to understate actual shareholder participation in new equity issues in the period after 1975. Nevertheless, the combined growth of rights and dividend reinvestment plans is relatively limited, leaving unexplained why underwritten equity offers continue to be the predominant flotation method.

The revealed preference for underwritten offers possibly reflects as yet unidentified managerial benefits of underwritten offers (an agency-cost hypothesis) or indirect costs that cause value-maximizing managers to avoid rights. Examples of these indirect costs are capital gains taxes [Smith (1977)], shareholder-borne costs of reselling rights [Hansen (1988)], wealth transfers to convertible-security holders under antidilution clauses, and risk of offer failure resulting from the increased short-selling activity encouraged by the rights offer. Although all of these costs may play a role in resolving the paradox, the existing evidence does not indicate that any one of them is the dominant explanation.

By placing the flotation method choice in an adverse-selection framework, we identify a possible tradeoff between rights and underwritten offers that has not previously been recognized in the literature. We view current-shareholder subscription in rights offers and underwriter certification in firm commitments as substitute mechanisms for minimizing wealth transfers between current shareholders and outside investors. From the outside investors' point of view, a rights issue to which current shareholders elect not to subscribe is informationally equivalent to a direct sale of stock to the public. Given the availability of underwriter quality certification services, such a direct stock issue causes the market to infer that the stock is overvalued, resulting in relatively large adverse-selection costs of the type analyzed in Myers and Majluf (1984). Adverse-selection costs are reduced in direct proportion to the degree of current-shareholder participation in the issue or, alternatively, by the relatively costly services of an underwriter. Conditional on the expected current-shareholder takeup, we show how under- and overvalued issuers of stock choose between uninsured rights, standby rights, and firm-commitment offers, and how the market responds to these choices. In this framework, observed flotation method choices reflect shareholder characteristics, the information asymmetry between the issuer and the market, and direct flotation costs.

Our framework yields a wide range of empirical predictions across equity offers for rights, standbys, and firm commitments that we find are broadly consistent with the evidence. The analysis helps explain why rights issuers tend to have large blockholder subscription precommitments, why average stock returns at equity-offer announcements vary by flotation method, being most negative for firm commitments and least negative for rights offers, and why firms tend to switch to underwritten offers as growth causes substantial dispersion of share ownership. It also suggests a possible explanation for why large exchange-listed U.S. firms have gravitated to the firm-commitment method. Similarly, the analysis offers a possible explanation for the recent shift to firm commitments by large U.K. and Japanese firms that have experienced increased dispersion in share ownership, and why corporations in most other markets, which are typically small and closely held, continue to rely on rights and standbys to sell their stock. The current trends in these other capital markets offer a fertile ground for further analysis of the security issuance process.

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