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# EQUITY ISSUES AND OFFERING DILUTION

Paul ASQUITH and David W. MULLINS, Jr.*

*Harvard University, Soldiers Field, Boston, MA 02163, USA*

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This study investigates the effect on stock prices of seasoned equity offerings. The results demonstrate that the announcement of equity offerings reduces stock prices significantly. For industrial issues, regression results indicate that announcement day price reduction is significantly and negatively related to the size of the equity offering. The results appear not to be explained by changes in capital structure associated with the equity offerings. The findings are consistent both with the hypothesis that equity issues are viewed by investors as negative signals and with the hypothesis that there is a downward sloping demand for a firm's shares.

## 1. Introduction and issues

This paper investigates the effect of equity issues on stock prices. An enduring anomaly in financial economics is the reliance of firms on internally generated funds as their chief source of equity financing and their corresponding reluctance to issue common stock [Donaldson (1961), Lintner (1960), Sametz (1964)]. This behavior is less anomalous to financial practitioners. Financial executives, investment bankers and many regulators argue that selling equity causes a firm's stock price to fall. Their view, labelled the price-pressure hypothesis by Scholes (1972), contends that an increase in the supply of shares causes a decline in a firm's stock price because the demand curve for shares is downward sloping. The implication is that each firm's shares are unique, and close substitutes do not exist. In addition, some proponents of this hypothesis argue that the price reduction is short-lived and that a post-offering increase in stock prices or 'sweetener' is necessary to market additional shares.

In contrast, the theoretical literature in finance assumes that the demand curve for a firm's shares is essentially horizontal. The prices of securities are determined solely by the risk and expected return associated with a security's future cash flows. Close substitutes for a firm's shares, e.g., securities with

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similar risk and return characteristics, are either directly available in the capital markets or they can be constructed through combinations of existing securities. Moreover, efficient capital markets rule out new issue price effects not based on changes in a security's expected cash flows. Thus with close substitutes, efficient capital markets and fixed investment policies, the price of any firm's shares should be independent of the number of shares the firm, or any shareholder, chooses to sell. This view of equity financing is also not without challenge. There are also theoretical arguments, other than a downward sloping demand curve, for predicting a stock price decrease with equity issues. Chief among these are the effect of new equity issues on corporate capital structures and the role of stock issues as informative signals.

With tax advantages from debt financing, a new equity issue may reduce a firm's stock price if it reduces the firm's debt ratio [see Modigliani and Miller (1963), DeAngelo and Masulis (1980), Masulis (1980a, b, 1983)]. In addition, an unanticipated reduction in financial leverage will make debt less risky resulting in a transfer of wealth from shareholders to bondholders [Galai and Masulis (1976)]. Finally, a firm's choice of capital structure may convey management's expectations about the firm's prospects [Ross (1977)]. Higher debt ratios are binding constraints on the firm and thus signal positive management expectations concerning future cash flows. In contrast, issuing new equity is a negative signal and may reduce a firm's stock price.

Others have theorized that equity issues serve as signals which communicate managers' superior information independent of capital structure considerations. In a world of asymmetric information managers and insiders have superior information compared to investors, and management's decision to issue equity conveys information about a firm's 'intrinsic' value. A stock price reduction is produced by rational investors hedging against the risk that, in selling stock, managers are using their superior information to benefit existing shareholders at the expense of new shareholders. A more benign interpretation is that the information available to managers is not favorable enough to preclude selling stock, and thus the decision to issue equity is a negative signal. Leland and Pyle (1977) hypothesize that, *ceteris paribus*, large equity issues by entrepreneurs to outside investors are a negative signal. In Miller and Rock's (1982) model of dividend policy, equity issues are equivalent to negative dividends and convey negative information concerning the firm's future earnings. In the Myers and Majluf (1983) model, when managers have superior information, issuing equity always reduces a firm's stock price.[1]

Several empirical studies investigate the price effects associated with the sale of seasoned equity. These studies examine both secondary distributions by shareholders and primary distributions by corporations. A secondary offering

[1] The latter two papers model the interaction of investment and financing, and in both managers may forego profitable investment projects because of the negative information impact of equity financing.

involves the sale of stock from a group of current shareholders. That is, the number of shares outstanding remains the same and the firm receives no proceeds from the sale. A primary offering consists of new shares issued by the firm which receives the proceeds.

Studies of secondary offerings include Scholes (1972), Kraus and Stoll (1972) and Dann, Mayers and Raab (1977). The samples employed in these studies consist primarily of unregistered block trades.[2] Scholes and Kraus and Stoll find evidence of a permanent price reduction (of approximately 2%) with block trades. In addition, Kraus and Stoll find a small, temporary intra-day price decline which is substantially reversed by the end of the day. They attribute the decline to a price-pressure or distribution effect. Dann, Mayers and Raab investigate this intra-day price decline and conclude that abnormal trading profits are possible (before transaction costs) if investors react within 15 minutes of the news of a block trade.

Despite this permanent price decline, Scholes concludes that the demand curve for firms' shares is essentially horizontal. This conclusion is based on the finding that the price reduction is not associated with the size of the distribution (as a percentage of the firm's total shares) and he argues that the decline is due to a discrete information effect.[3] Kraus and Stoll find that price declines are significantly related to the value of the distribution, but they can not determine whether this relationship was due to price-pressure or information.

Studies of unregistered secondary distributions provide only limited insight into the effect of large stock distributions by firms and investors. First, unregistered block trades are small compared with registered secondaries and primary issues.[4] Moreover, the conflicting findings concerning a size effect leave this important issue unresolved.

A number of studies have focused on primary issues of seasoned equity [Smith (1977), Logue and Jarrow (1978), Marsh (1979), Hess and Frost (1982)].[5] These studies generally find a small price reduction in the period

[2] Block trades are not registered with the SEC. Registration is often used for very large secondary sales and is required if sellers have a control relationship with the firm. Registration statements include a prospectus, and the seller must wait for SEC approval before the sale. Unregistered block trades are announced on the day of the sale, and thus unlike registered offerings, the announcement date and sale date coincide.

[3] The price-pressure hypothesis is also rejected because of an assumption that price-pressure should be a temporary phenomenon. The failure of stock prices to recover within several weeks after the issue date leads him to conclude that the price reduction reflects a permanent revaluation of the firm's shares.

[4] Unregistered block trades represented 79% of Scholes' sample. The median size (percentage of total shares of firm) of his sample was 1%. The mean was 2%, but 70% of his sample distributions were less than 2% of the firm's outstanding shares. The sample of registered secondary distributions used in this study averages about 5% of the outstanding shares while the sample of primary industrial distributions averages more than 12%.

[5] The study by Smith included rights issues as well as general cash offers and Marsh's study focused exclusively on rights issues. We do not explore the differences in these alternative methods of issuing equity.

surrounding the equity issue. Marsh and Hess and Frost test and reject the hypothesis that the price decline is associated with the size of the issue. These two studies, however, focus on the issue date rather than the date that the offering is announced. This is because they are testing for a price-pressure effect on the issue date. These papers do not examine the possibility that a price decline would be anticipated by investors at the announcement date.

A recent unpublished study, Korwar (1983), does focus on the announcement day price effect of primary issues of seasoned equity.[6] Korwar's study of 424 equity issues finds a price decline of approximately 2.5% on announcement day. This study does not investigate the relationship between the size of the issue and the magnitude of the price reduction since it views equity issues from a capital structure perspective.[7]

Despite the literature reviewed above, the nature and magnitude of the impact of equity offerings on stock prices are unresolved issues. None of the previous studies employs a comprehensive sample of large primary and secondary offerings to examine the announcement day price effect and its relation to issue size.

The announcement day price effect predicted by the various theories can be grouped into three categories:

*No price effect* – consistent with the close substitutes – efficient markets hypotheses.

*Negative price effect* – consistent with (1) a downward sloping demand for firms' shares leading to a permanent price reduction, (2) capital structure hypotheses based upon redistribution of firm value among classes of security holders, tax effects, and/or leverage-related information effects, (3) information effects associated with the sale of equity by informed sellers, both firms and investors, and (4) large transaction costs associated with equity issues.

*Positive price effect* – consistent with (1) a favorable information effect associated with investment, and (2) a value enhancing reduction in financial leverage due, for example, to a reduction in the expected costs of financial distress and/or agency costs.

The first priority is to determine which of the predictions listed above is consistent with the data. A second priority is to investigate whether the size of the issue influences the price effect. A significant relation between issue size and the magnitude of the price effect would be expected in the latter two groups of hypotheses. For leverage-related hypotheses the size of the issue is

[6]Several other unpublished papers have recently utilized announcement day price effects to investigate equity distribution. Mikkelson and Partch (1984) examine large block trades in secondary distributions and Hess and Bhagat (1983) examine new equity issues by utilities.

[7]Korwar does analyze the magnitude of the change in leverage produced by the equity issue.

related to the magnitude of the change in capital structure. For information-related hypotheses, the size of the issue should be a measure of the size of the informative signal. Consistent with Scholes' (1972) argument, the lack of relationship between the price effect and issue size is consistent with a horizontal demand curve for the firm's shares even if there is a non-zero average price effect due either to the release of a discrete quantum of information or to fixed transaction costs.

Distinguishing among the many hypotheses within any of the three categories is difficult, but some discrimination is possible. For example, secondary issues do not result in changes in corporate capital structure and their comparison with primary issues provides a testable capital structure hypothesis.[8] Differences in results for industrial firms and public utilities, and evidence on the timing of equity issues also provide insight into the factors responsible for price effects. Finally, examination of post-announcement day stock returns should reveal any failures in semi-strong capital market efficiency such as temporary price-pressure around the issue date.

This paper examines the announcement day and issue day price effects of both primary and registered secondary issues of seasoned equity. The results demonstrate that equity issues reduce stock prices. For industrial issues, regression results indicate that the announcement day price reduction is significantly related to the size of the equity offering. Although the percentage reduction in equity value is small, the loss in firm value on announcement day is a substantial fraction of the proceeds of the stock issue. These results may explain why firms are reluctant to issue new equity.

The results presented in this paper confirm Taggart (1977) and Marsh's (1979) finding that primary stock issues are more likely to occur after a rise in stock prices. However, the decision to issue equity appears to be related more to the performance of a firm's stock price relative to the market than to the performance of the market as a whole. Regression results for industrial issues indicate that the announcement day price reduction is inversely related to stock price performance in the year prior to the announcement. This finding provides an explanation for why firms tend to issue equity after a rise in stock prices. These results are also consistent with the suggestion by Myers and Majluf that the price reduction associated with equity issues varies through time and that firms respond by issuing equity when price reductions are relatively small.

The findings also indicate that primary stock offerings for public utilities are accompanied by price reductions. The price effects for utilities are smaller than those observed for industrial issues, and there is no relation between the timing of utility issues and stock price performance. One possible explanation is that

[8] This assumes a homogeneous motivation for primary and secondary issue announcement day price effects. It is possible that the price effects for primary and secondary offerings are similar but the result of different explanations.

differences in the announcement day price effects for industrial issues and utilities are due to a larger information content associated with industrial offerings.

Finally, the roughly similar price effects observed for primary issues by corporations and registered secondary distributions suggest that the price reduction is not related solely to tax effects or leverage-related information associated with a change in capital structure. The results are generally consistent with the hypothesis that equity sales by firms and knowledgeable investors are viewed by the market as unfavorable signals about a firm's current performance and future prospects. The results are also consistent with the price-pressure hypothesis that there is a downward sloping demand for a firm's shares.

## 2. Data

This study analyzes 531 registered common stock offerings by utilities and industrial firms. These common stock offerings were chosen by examining *Moody's Industrial Manual* and *Moody's Public Utility Manual*. Industrial stock offerings were obtained by examining the common stock histories of each firm rated by Moody's or included in the full coverage or comprehensive coverage sections of the *Moody's Industrial Manual*. Stock offerings by these firms are included in the sample used here if they met the following requirements:

(1) The stock offering took place between January 1963 and December 1981.
(2) The firm was listed on the ASE or NYSE at the time of the stock offering. Therefore, there are no initial offerings.
(3) The offering was public, underwritten, and registered with the SEC.
(4) The offering was for common stock only. No joint offerings of common stock and any other financing instrument are included.
(5) Firms with more than one class of voting common stock are excluded from the sample.
(6) The offering announcement was reported in the *Wall Street Journal*.

These requirements assure data availability on the CRSP daily stock return file and a sample of common stock offerings uncontaminated by simultaneous offerings of other financial instruments or by merger bids.[9] The sample also covers a long time period and includes only listed, well established firms to avoid initial offerings and small, thinly traded stocks. There are 266 common stock offerings by industrial firms in the sample.

[9] This does not eliminate all other sources of information. Almost all equity announcements simultaneously release other information by stating the purpose that the funds will be used for. This statement is often very general, e.g., used for general corporate purposes, to increase working capital, to pay off short-term debt, for general investment purposes, etc. Tests of differences in market reaction between these uses showed none and the results are not reported here.

Utility stock offerings were obtained by first examining the common stock histories of any utility both rated by Moody's and included in the full coverage section of *Moody's Public Utility Manual.* To be included in the sample of utility common stock offerings these offerings also had to meet the six requirements listed above. There are 265 utility common stock offerings in the sample used here.

The sample of common stock issues collected from Moody's was checked in the *Wall Street Journal Index* and the *Wall Street Journal* to make sure the offerings were for common stock only. In addition, several other data items were collected for each offering. First, the type of each offering (primary, secondary, or combination) was determined. A primary offering is for new shares of common stock which are added to the number of shares outstanding. A secondary offering is for the sale of securities owned by a present stockholder, and it does not change the number outstanding. A combination offering combines a primary and secondary offering. Where available, the type of offering was taken from the *Moody's Manuals* and in other instances from the *Wall Street Journal* article, the offering prospectus, or the firm's 10K report. The size of each offering, both announced and actual, was collected in a similar manner. The number of shares of stock currently outstanding for the

Table 1

Announcement dates by year for industrial and utility common stock offerings.

| | Type of offering | | | | |
|---|---|---|---|---|---|
| Year | All | Industrial primary | Secondary | Combination | Utility primary[a] |
| 1963 | 1 | 0 | 1 | 0 | 1 |
| 1964 | 1 | 0 | 0 | 1 | 2 |
| 1965 | 5 | 1 | 3 | 1 | 0 |
| 1966 | 5 | 2 | 3 | 0 | 1 |
| 1967 | 4 | 1 | 1 | 2 | 0 |
| 1968 | 6 | 3 | 0 | 3 | 2 |
| 1969 | 19 | 3 | 12 | 4 | 4 |
| 1970 | 16 | 9 | 2 | 5 | 6 |
| 1971 | 29 | 8 | 8 | 13 | 7 |
| 1972 | 36 | 6 | 24 | 6 | 14 |
| 1973 | 11 | 4 | 7 | 0 | 20 |
| 1974 | 7 | 3 | 3 | 1 | 13 |
| 1975 | 20 | 12 | 6 | 2 | 25 |
| 1976 | 23 | 13 | 7 | 3 | 24 |
| 1977 | 5 | 1 | 2 | 2 | 30 |
| 1978 | 12 | 6 | 4 | 2 | 31 |
| 1979 | 8 | 7 | 0 | 1 | 33 |
| 1980 | 39 | 32 | 1 | 6 | 35 |
| 1981 | 19 | 17 | 1 | 1 | 16 |
| Total | 266 | 128 | 85 | 53 | 264 |

[a] Only one utility stock offering in the sample was not a primary offering. There was one secondary offering in 1967.

firm was obtained from several sources including the *Wall Street Journal* article if it gave that information, the offering prospectus when it could be obtained, or the firm's 10K report.

In addition to this offering data, the percentage of the firm's stock owned by insiders and information about the firm's capital structure were obtained for as many firms as possible. Insider ownership percentages were collected from the *Value Line Investment Survey*, debt ratios were obtained from *Compustat*, and Moody ratings of senior and subordinated debt were collected from the *Moody's Industrial Manual* and *Moody's Public Utility Manual*. Finally, for the time period surrounding each stock offering in the sample, the performance of the value weighted market return and the S&P Index of 500 Stocks were also collected from the CRSP index files.

In summary, the sample used in this paper contains 531 common stock offerings over the period 1963–1981. The sample includes 266 industrial offerings and within this classification there are 128 primary offerings, 85 secondary offerings and 53 combination offerings. The sample also includes 265 utility stock offerings during this period; all are primary offerings except for one secondary offering. The distribution of offerings by year and type are given in table 1.

## 3. Methodology

The stock market's reaction to equity offering announcements is measured using daily excess stock returns. These excess stock returns are estimated from the daily stock returns file provided by the Center for Research in Security Prices (CRSP). The daily excess return for any security is estimated by

$$XR_{it} = R_{it} - \mathrm{E}(\tilde{R}_{it}), \tag{1}$$

where

$t$ = day measured relative to the event,
$XR_{it}$ = excess return to security $i$ for day $t$,
$R_{it}$ = return on security $i$ during day $t$,
$\mathrm{E}(\tilde{R}_{it})$ = expected rate of return on security $i$ for day $t$.

$\mathrm{E}(\tilde{R}_{it})$ is estimated by grouping annually all securities listed on the NYSE and the AMEX into ten equal control portfolios ranked according to their Scholes and Williams (1977) beta estimates. Each security is therefore assigned to one of ten portfolios. The observed return to the control portfolio to which security $i$ is assigned is then used as the estimate of $\mathrm{E}(\tilde{R}_{it})$. The CRSP daily returns file provides the observed returns for each security $R_{it}$. The excess return for each security, $XR_{it}$, is then calculated as the difference between the actual return to a security and the return to its control portfolio.

Average excess returns for each relative day are calculated by

$$XR_t = \frac{1}{N}\sum_{i=1}^{N} XR_{it}, \tag{2}$$

where $N$ is the number of securities with excess returns during day $t$. The cumulative excess returns for each security $i$, $CER_i$, are formed by summing average excess returns over event time as follows:

$$CER_{i,K,L} = \sum_{t=K}^{L} XR_{it}, \tag{3}$$

where the $CER_{i,K,L}$ is for the period from $t$ = day $K$ until $t$ = day $L$.

Average cumulative excess returns over the event time from day $K$ until day $L$ are calculated by

$$CER_{K,L} = \frac{1}{N}\sum_{i=1}^{N} CER_{i,K,L}. \tag{4}$$

In particular, a two-day average excess return is generated for each equity offering announcement examined. A two-day excess return is necessary to capture the effect of an announcement due to its timing relative to the market's trading hours. Day $t = 0$ is the day the news of an announcement is published in the *Wall Street Journal*. In most cases, the news is announced on the previous day, $t = -1$, and reported the next day. If an equity offering is announced before the market closes, then the market's response to the news actually predates the publication by one day. If the news is announced after the market closes, the market will respond the next day and the reaction is indeed on day 0. Thus in reality there is a two-day announcement 'day', $t = -1$ and $t = 0$. This two-day return for firm $i$ is $CER_{i,-1,0}$ where

$$CER_{i,-1,0} = XR_{i,-1} + XR_{i,0}, \tag{5}$$

and $XR_{i,-1}$ is the excess return to security $i$ on the day prior to a published announcement in the *Wall Street Journal*, and $XR_{i,0}$ is the excess return to security $i$ on the day an announcement is published in the *Wall Street Journal*.

Finally $t$-statistics are calculated for $CER_{K,L}$ by

$$t(CER_{K,L}) = CER_{K,L}/S(CER_{K,L}), \tag{6}$$

where

$$S(CER_{K,L}) = \text{standard deviation of } CER_{K,L}$$

$$= (T \operatorname{var}(XR_t))^{1/2} \quad \text{with} \quad T = K - L + 1.$$

The var($XR_t$) is estimated over the period from 68 days before the announcement day until 21 days before the announcement day.[10] If $K = L$, $t(CER_{K,L})$ is equivalent to the $t$-statistic for $XR_K$.

## 4. Results

### 4.1. Industrial offerings

#### 4.1.1. Announcement day effects

For industrial offerings the average excess returns surrounding the announcement day are reported in table 2. Consistent with no information leakage before the announcement and semi-strong market efficiency, the excess returns for the total sample and all three subsamples are concentrated in the two-day announcement period. The average two-day announcement period excess return for the total sample is $-2.7\%$ with a $t$-statistic of $-14.8$. The average two-day excess return is $-3.0\%$ for primary offerings, $-2.0\%$ for secondary offerings and $-3.2\%$ for combination offerings. All three average excess returns are statistically significant. These average announcement period returns are not the result of a few outliers. Tables 3 and 4 illustrate that more than 80 of the industrial equity issues exhibit negative excess returns.

While price reductions on the order of 2% to 3% may appear small, tables 3 and 4 provide additional insight into the magnitude of the price effect. For each of the subsamples, tables 3 and 4 present distributions of the average reduction in aggregate equity value on announcement day as a percentage of the proceeds of the equity issue.

For primary issues we define the ratio of the change in the equity value of the firm to the proceeds of the issue as 'offering dilution'. A ratio of 0% means that on announcement day the equity value of the firm does not change. A ratio of $-100\%$ means that on announcement day, the equity value falls by an amount equal to the new equity raised in the issue. That is, with a $-100\%$ ratio, after the proceeds are received on issue date, equity value will be exactly equal to the pre-announcement equity value. This is 100% 'dilution' since the same common stock value is now divided by a larger number of shares, and the reduction in stock price is exactly proportional to the increase in shares

[10] This period was chosen because estimating the var($XR_t$) over the event period may result in a higher or lower estimate than non-event periods. That is, the event may change var($XR_t$) from that usually observed. The $t$-statistics were also run with $S(CER_{K,L}) = (T \text{ var}(XR_t) + 2(T-1) \times \text{cov}(XR_t, XR_{t+1}))^{1/2}$. The covariance term adjusts for possible first-order autocorrelation between the excess returns due to non-synchronous trading. The covariance term was found to be approximately equal to zero for all tests (out to five significant figures), and thus only $t$-statistics from the first method are reported.

Table 2

Average excess returns (*XRET*) and cumulative excess returns (*CER*) from 10 days before until 10 days after the announcement day of industrial equity offerings by type of offering in the period 1963–1981.

| | Type of offering | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | All | | Primary | | Secondary | | Combination | |
| Day | *XRET* | *CER* | *XRET* | *CER* | *XRET* | *CER* | *XRET* | *CER* |
| | (%) | | (%) | | (%) | | (%) | |
| −10 | −0.1 | −0.1 | −0.0 | 0.0 | 0.2 | 0.2 | −0.6 | −0.6 |
| −9 | 0.0 | −0.1 | −0.1 | −0.1 | −0.1 | 0.3 | 0.1 | −0.5 |
| −8 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.4 | 0.2 | 0.3 |
| −7 | 0.1 | 0.1 | 0.3 | 0.3 | 0.0 | 0.4 | −0.4 | −0.7 |
| −6 | −0.3 | −0.2 | −0.3 | 0.0 | −0.3 | 0.1 | −0.5 | −1.2 |
| −5 | −0.0 | −0.2 | −0.4 | −0.4 | 0.3 | 0.4 | 0.4 | −0.8 |
| −4 | 0.0 | −0.2 | −0.0 | −0.4 | 0.0 | 0.4 | 0.1 | −0.7 |
| −3 | 0.1 | −0.1 | −0.2 | −0.6 | 0.5 | 0.9 | 0.1 | −0.6 |
| −2 | −0.4 | −0.5 | −0.3 | −0.9 | −0.1 | 0.8 | −1.1 | −1.7 |
| −1 | −1.8 | −2.3 | −2.3 | −3.3 | −1.0 | −0.2 | −1.8 | −3.5 |
| AD[a] | −0.9 | −3.2 | −0.7 | −3.9 | −1.0 | −1.2 | −1.4 | −5.9 |
| +1 | −0.0 | −3.2 | −0.1 | −4.0 | −0.0 | −1.2 | 0.0 | −5.9 |
| +2 | 0.1 | −3.1 | 0.0 | −4.0 | −0.0 | −1.2 | 0.2 | −5.7 |
| +3 | 0.2 | −2.9 | 0.3 | −3.7 | 0.2 | −1.0 | 0.1 | −5.6 |
| +4 | 0.2 | −2.7 | 0.1 | −3.6 | 0.3 | −0.7 | −0.1 | −5.7 |
| +5 | 0.0 | −2.7 | 0.1 | −3.5 | 0.1 | −0.6 | −0.4 | −6.1 |
| +6 | 0.0 | −2.7 | −0.1 | −3.6 | 0.3 | −0.3 | 0.1 | −6.0 |
| +7 | 0.3 | −2.4 | 0.1 | −3.5 | 0.2 | −0.1 | 1.2 | −4.8 |
| +8 | 0.0 | −2.4 | −0.1 | −3.6 | 0.0 | −0.1 | 0.2 | −4.6 |
| +9 | 0.1 | −2.3 | −0.1 | −3.7 | 0.1 | 0.0 | 0.6 | −4.0 |
| +10 | 0.0 | −2.3 | 0.2 | −3.5 | 0.0 | 0.0 | −0.3 | −4.3 |
| Two-day announcement return | −2.7 | | −3.0 | | −2.0 | | −3.2 | |
| *t*-statistic | 14.8 | | 12.5 | | 9.1 | | 5.9 | |
| *N* | 266 | | 128 | | 85 | | 53 | |

[a]AD = announcement day.

outstanding.[11] Offering dilution between 0 and −100% will leave post-issue equity value greater than pre-announcement equity value and will result in a stock price reduction which is less than proportional to the increase in shares.

Table 3 illustrates that primary stock issues (and the primary portion of combination issues) are highly dilutive in the sense defined above. On average the loss in firm value on announcement day is 31% of the funds raised in

[11]From the shareholders' viewpoint, the effect of 100% dilution for a primary offering is equivalent to the firm's donating newly issued shares and receiving nothing in return.

Table 3

The announcement day offering dilution for industrial equity offerings, defined as the reduction in the value of the equity of a firm as a percentage of the planned value of a primary equity offering.

| | Type of offering | | | |
|---|---|---|---|---|
| | 121 primary | | 45 combination | |
| Dilution (%) | *N* | Cumulative (%) | *N* | Cumulative (%) |
| $80 < \leq 100$ | 1 | 0.8 | 2 | 4.4 |
| $60 < \leq 80$ | 0 | 0.8 | 0 | 4.4 |
| $40 < \leq 60$ | 2 | 2.5 | 0 | 4.4 |
| $30 < \leq 40$ | 0 | 2.5 | 0 | 4.4 |
| $20 < \leq 30$ | 3 | 5.0 | 0 | 4.4 |
| $10 < < 20$ | 7 | 10.7 | 1 | 6.7 |
| $0 < \leq 10$ | 9 | 18.2 | 4 | 15.6 |
| $-10 < \leq 0$ | 20 | 34.7 | 3 | 22.2 |
| $-20 < \leq -10$ | 9 | 42.1 | 7 | 37.8 |
| $-30 < \leq -20$ | 11 | 51.2 | 3 | 44.4 |
| $-40 < \leq -30$ | 25 | 71.9 | 4 | 53.3 |
| $-50 < \leq -40$ | 6 | 76.9 | 5 | 64.4 |
| $-60 < \leq -50$ | 5 | 81.0 | 5 | 75.6 |
| $-70 < \leq -60$ | 6 | 86.0 | 0 | 75.6 |
| $-80 < \leq -70$ | 4 | 89.3 | 1 | 77.8 |
| $-100 < \leq -80$ | 6 | 94.2 | 3 | 84.4 |
| $-120 < \leq -100$ | 4 | 97.5 | 3 | 91.1 |
| $-140 < \leq -120$ | 1 | 98.3 | 0 | 91.1 |
| $-160 < \leq -140$ | 1 | 99.2 | 0 | 91.1 |
| $-200 < \leq -160$ | 0 | 99.2 | 1 | 93.3 |
| $\leq -200$ | 1 | 100.0 | 3 | 100.0 |
| Average dilution | −31.0% | | −53.2% | |
| Median dilution | −28.0% | | −35.6% | |

primary offerings. For example, to raise $100 million dollars in new equity, existing shareholders, on average, gave up $31 million in current market value. The median dilution is −28.0%. Almost 25% of the primary issues produce offering dilution greater than 50%, and 6% of the primary issues result in dilution greater than 100%. For the offerings with greater than 100% dilution, after the proceeds of the equity issue are received, equity value is actually lower than the equity value before the issue is announced. These results imply that a substantial portion of the proceeds of an equity issue, in effect, comes out of the pockets of old shareholders.

Table 4 reports the aggregate announcement day loss in equity value as a percentage of the proceeds of registered secondary issues and combination issues. An offering dilution ratio of −100% for secondary issues means that on announcement day the equity value falls by an amount equal to the amount being sold. This is identical to a −100% offering dilution for primary issues except that in a secondary distribution the firm does not receive the proceeds

Table 4

The announcement day offering dilution for industrial equity offerings, defined as the reduction in the value of the equity of a firm as a percentage of the planned value of a secondary equity offering.

| | Type of offering | | | |
|---|---|---|---|---|
| | 82 secondary | | 51 combination | |
| Dilution (%) | *N* | Cumulative (%) | *N* | Cumulative (%) |
| $200 < \leq 300$ | 3 | 3.7 | 0 | 0.0 |
| $150 < \leq 200$ | 0 | 3.7 | 0 | 0.0 |
| $100 < \leq 150$ | 3 | 7.3 | 0 | 0.0 |
| $60 < \leq 100$ | 4 | 12.2 | 0 | 0.0 |
| $30 < \leq 60$ | 1 | 13.4 | 2 | 3.9 |
| $20 < < 30$ | 2 | 15.9 | 0 | 3.9 |
| $10 < \leq 20$ | 1 | 17.1 | 1 | 5.9 |
| $0 < \leq 10$ | 3 | 20.7 | 5 | 15.7 |
| $-10 < \leq 0$ | 3 | 24.4 | 7 | 29.4 |
| $-20 < \leq -10$ | 8 | 34.1 | 7 | 43.1 |
| $-30 < \leq -20$ | 6 | 41.5 | 8 | 58.8 |
| $-40 < \leq -30$ | 4 | 46.3 | 9 | 76.5 |
| $-50 < \leq -40$ | 4 | 51.2 | 5 | 86.3 |
| $-60 < \leq -50$ | 2 | 53.7 | 0 | 86.3 |
| $-80 < \leq -60$ | 5 | 59.8 | 4 | 94.1 |
| $-100 < \leq -80$ | 9 | 70.7 | 0 | 94.1 |
| $-150 < \leq -100$ | 9 | 81.7 | 1 | 96.1 |
| $-200 < \leq -150$ | 3 | 85.4 | 2 | 100.0 |
| $-300 < \leq -200$ | 5 | 91.5 | 0 | 100.0 |
| $-400 < \leq -300$ | 2 | 93.9 | 0 | 100.0 |
| $-500 < \leq -400$ | 2 | 96.3 | 0 | 100.0 |
| $-600 < \leq -500$ | 2 | 98.8 | 0 | 100.0 |
| $-700 < \leq -600$ | 0 | 98.8 | 0 | 100.0 |
| $-800 < \leq -700$ | 1 | 100.0 | 0 | 100.0 |
| Average dilution | | −77.6% | | −31.1% |
| Median dilution | | −43.4% | | −25.0% |

of the sale. The reduction in equity value associated with the announcement of a secondary is, on average, a large fraction of the size of the issue. The average reduction in firm value is 78% of the proceeds of the sale, the median is −43.4%, and in almost 30% of the secondary issues, firm value fell by more than the proceeds of the sale.[12] The larger reductions observed for secondary distributions compared with primary offerings suggest that secondary issues may be viewed as relatively more pessimistic signals.

[12] It should be noted that secondary issues are substantially smaller (as a percentage of firm value) than primary issues. The ratio of the proceeds of the issue to the pre-announcement aggregate equity value is 12.5% for primary issues, 5.2% for secondaries and 16.5% for combination issues, on average.

In interpreting these results an important issue is whether the price reductions associated with equity issues harm existing shareholders. If the price reductions are caused by negative signals, wouldn't the negative information eventually be released anyway?

Despite this argument, in most signalling models price reductions associated with equity issues are detrimental to shareholders. First, for shareholders who are consuming a portion of their wealth through time, postponing the release of negative information is beneficial [see Greenwald, Stiglitz and Weiss (1984)]. Secondly, correctly priced 'good' firms which must issue equity to fund a positive net present value project incur the price reduction because they cannot convincingly distinguish themselves from 'bad' firms issuing equity to taken advantage of overvaluation. Even though they will later be recognized as good firms, the harm has been done by selling equity at a low price to the detriment of 'old' shareholders and the benefit of 'new' shareholders. This is a classic adverse selection problem which harms existing shareholders both when 'good' firms issue equity and when they forego positive net present value projects rather than incur the equity issue price reduction [see Miller and Rock (1982) and Myers and Majluf (1984)]. Finally, and perhaps most importantly, Myers and Majluf contend that the detrimental impact on 'good' firms can be avoided or minimized. Their reasoning is that the magnitude of the adverse selection problem varies through time. In time periods when the equity issue price reduction is small, firms can sell shares and invest in financial slack (cash reserves or unutilized debt capacity) thereby obviating the need to suffer a larger reduction later when funds are needed to finance worthwhile projects.

### *4.1.2. Firm and stock market performance*

The findings reported in tables 5 and 6 explore the timing of equity sales. Table 5 focuses on the performance of sample firms' stock returns adjusted for the performance of the stock market as a whole. For all three subsamples, positive average cumulative excess returns are observed in the two years preceding the announcement of the issue. The average *CER*'s for the period from two years until ten days preceding the issue are 40.4% for primary issues, 21.4% for secondaries and 41.8% for combinations.[13] For all three subsamples the average cumulative excess returns in the two years following the equity issue are at first slightly positive then negative. Thus, firms and secondary issuers sell stock following a period in which the stock outperforms the market.

[13] These average *CER*'s have *t*-statistics of 8.73, 4.90 and 5.62, respectively. The *t*-statistics were calculated using the technique mentioned above in footnote 9 where the var($XR_t$) is estimated over the period from 490 days before the announcement day until 21 days before the announcement day. Although this means the variance of ($XR_t$) is estimated over the same period as the *CER*, there is no reason to believe this period has a greater or lower variance than any other estimating period that could have been chosen.

Table 5

Cumulative excess returns from 490 days before until 480 days after the announcement of industrial equity offerings in the period 1963–1981.

| | Type of offering | | | |
|---|---|---|---|---|
| Day | All % $N = 189$[a] | Primary (%) $N = 80$ | Secondary (%) $N = 73$ | Combination (%) $N = 33$ |
| −480 | 0.5 | 0.9 | 0.1 | 0.7 |
| −440 | 3.1 | 3.8 | 2.6 | 2.4 |
| −400 | 5.1 | 5.8 | 3.0 | 8.4 |
| −360 | 7.4 | 9.0 | 3.8 | 10.8 |
| −320 | 10.4 | 13.1 | 4.8 | 16.9 |
| −280 | 10.5 | 12.2 | 5.3 | 18.2 |
| −240 | 13.7 | 16.5 | 7.5 | 21.1 |
| −200 | 16.5 | 18.7 | 11.1 | 23.8 |
| −160 | 19.2 | 21.7 | 11.8 | 29.8 |
| −120 | 24.4 | 28.5 | 15.3 | 35.4 |
| −100 | 25.7 | 30.0 | 16.9 | 36.2 |
| −80 | 27.8 | 33.5 | 17.5 | 37.8 |
| −60 | 30.4 | 36.0 | 20.0 | 41.1 |
| −40 | 31.0 | 37.7 | 20.3 | 41.7 |
| −30 | 31.2 | 37.6 | 19.7 | 42.0 |
| −20 | 32.5 | 39.5 | 20.2 | 43.5 |
| −10 | 33.0 | 40.4 | 21.4 | 41.8 |
| AD[b] | 29.7 | 35.5 | 20.2 | 37.8 |
| +10 | 30.6 | 36.2 | 21.2 | 38.9 |
| +20 | 30.5 | 35.6 | 20.8 | 40.5 |
| +30 | 30.9 | 37.9 | 20.2 | 38.5 |
| +40 | 30.8 | 37.1 | 21.1 | 38.1 |
| +60 | 32.3 | 39.4 | 22.5 | 38.0 |
| +80 | 32.4 | 39.0 | 23.0 | 38.0 |
| +100 | 33.2 | 39.6 | 23.9 | 38.9 |
| +120 | 33.0 | 40.0 | 22.8 | 39.7 |
| +160 | 33.8 | 42.6 | 22.4 | 38.6 |
| +200 | 33.2 | 41.1 | 23.0 | 37.5 |
| +240 | 31.8 | 41.7 | 20.0 | 35.3 |
| +280 | 29.1 | 38.9 | 16.8 | 33.8 |
| +320 | 37.2 | 37.0 | 15.3 | 31.7 |
| +360 | 27.1 | 36.0 | 14.0 | 35.3 |
| +400 | 26.3 | 35.7 | 12.9 | 33.0 |
| +440 | 25.6 | 34.7 | 13.4 | 30.9 |
| +480 | 23.3 | 32.4 | 10.1 | 32.1 |

[a]There are less than 266 firms in the sample because not all firms had usable stock returns for the entire four-year period.
[b]AD = announcement day.

Subsequent to the issue, superior performance ceases and average or below average performance is observed.

Table 6 provides insight into the timing of equity issues relative to the general level of stock prices, and these results are easily interpreted. For all three subsamples, market returns are positive in the two years preceding the

Table 6

Cumulative average value weighted market returns from 490 days before until 480 days after the announcement of industrial equity offerings in the period 1963–1981.

| | Type of offering | | | |
|---|---|---|---|---|
| Day | All (%) $N = 189$[a] | Primary (%) $N = 80$ | Secondary (%) $N = 76$ | Combination (%) $N = 33$ |
| −480 | −0.0 | −0.4 | 0.0 | 0.6 |
| −440 | −0.5 | −1.0 | −0.3 | 0.5 |
| −400 | −0.4 | −1.6 | 1.0 | −0.9 |
| −360 | 0.7 | −0.4 | 3.4 | −2.6 |
| −320 | 1.3 | −0.4 | 4.3 | −1.5 |
| −280 | 2.6 | 0.4 | 6.6 | −1.3 |
| −240 | 4.1 | 1.2 | 9.0 | 0.0 |
| −200 | 4.5 | 2.2 | 8.7 | 0.6 |
| −160 | 5.6 | 2.9 | 10.1 | 2.0 |
| −120 | 6.6 | 2.9 | 11.8 | 3.3 |
| −100 | 7.4 | 4.3 | 11.8 | 4.8 |
| −80 | 8.7 | 6.0 | 12.1 | 7.6 |
| −60 | 9.9 | 7.1 | 13.4 | 8.9 |
| −40 | 12.0 | 9.4 | 15.0 | 11.3 |
| −30 | 13.0 | 10.8 | 15.5 | 12.6 |
| −20 | 13.5 | 11.6 | 15.6 | 14.1 |
| −10 | 14.3 | 12.3 | 16.3 | 14.3 |
| AD[b] | 14.6 | 12.7 | 16.8 | 14.2 |
| +10 | 14.9 | 13.1 | 17.1 | 13.9 |
| +20 | 15.3 | 13.2 | 17.6 | 14.9 |
| +30 | 15.3 | 13.3 | 17.3 | 15.3 |
| +40 | 15.0 | 13.2 | 16.9 | 15.2 |
| +60 | 15.4 | 13.5 | 17.5 | 15.0 |
| +80 | 15.4 | 13.5 | 17.5 | 14.9 |
| +100 | 16.0 | 14.8 | 17.5 | 15.5 |
| +120 | 16.3 | 15.1 | 17.7 | 16.0 |
| +160 | 16.7 | 17.0 | 16.0 | 17.8 |
| +200 | 18.9 | 19.6 | 17.2 | 20.9 |
| +240 | 20.0 | 21.4 | 17.8 | 21.6 |
| +280 | 21.4 | 23.0 | 18.5 | 24.1 |
| +320 | 22.0 | 24.4 | 18.0 | 25.2 |
| +360 | 23.0 | 25.3 | 19.2 | 25.6 |
| +400 | 23.9 | 26.1 | 20.2 | 26.9 |
| +440 | 23.5 | 26.0 | 19.7 | 26.1 |
| +480 | 23.4 | 26.5 | 19.8 | 24.1 |

[a] There are less than 266 firms in the sample because not all firms had usable stock returns for the entire four-year period.
[b] AD = announcement day.

announcement of the issue. Despite the fact that equity is sold following an increase in the general level of stock prices, the results in table 6 reveal no ability by sellers to time the market. The general level of stock prices continues to rise in the two years following the equity issue. Therefore, the results in tables 5 and 6 show pre-announcement market-adjusted returns exceeding

Table 7

Estimated coefficients and $t$-statistics (in parentheses) from regressing the two-day excess returns for the announcement of an industrial equity offering on the size of the offering[a] and the previous eleven-month[b] cumulative excess return.

| Two-day excess return = $\alpha + \beta_1$(size) + $\beta_2$(eleven-month $CER$) | | | |
|---|---|---|---|
| Offerings | $\alpha$ | $\beta_1$ | $\beta_2$ |
| All | −0.02217 | −0.07721 | +0.01466 |
| | (−6.01) | (−2.95) | (2.05) |
| | $N = 251$, $R^2 = 0.043$, $F = 5.51$, Significance of $F$-statistic = 0.005 | | |
| Primary | −0.02516 | −0.08675 | +0.02807 |
| | (−3.80) | (1.93) | (2.21) |
| | $N = 121$, $R^2 = 0.057$, $F = 3.55$, Significance of $F$-statistic = 0.032 | | |
| Secondary | −0.01410 | −0.21380 | +0.01740 |
| | (−2.30) | (−1.80) | (1.23) |
| | $N = 78$, $R^2 = 0.058$, $F = 2.29$, Significance of $F$-statistic = 0.108 | | |
| Combination | −0.0347 | +0.00011 | +0.00610 |
| | (−2.74) | (0.00) | (0.50) |
| | $N = 48$, $R^2 = 0.006$, $F = 0.13$, Significance of $F$-statistic = 0.881 | | |

[a]The size of the offering is measured as the planned proceeds of the offering divided by the pre-announcement value of the firm's equity.
[b]The eleven months ending one month before the announcement of the offering.

post-announcement market-adjusted returns and no timing pattern for the general level of stock prices centered on the announcement data.[14]

### 4.1.3. *Issue size and price effects*

The regression results presented in table 7 provide additional insight into the price effects from equity issues for industrial firms. For all subsamples the two-day announcement period excess returns are regressed against a measure of the size of the issue (the planned proceeds of the offering divided by the pre-announcement value of the firm's equity) and against the cumulative excess return for the eleven months prior to the month of the announcement.[15]

Regressions for the total sample of industrial issues indicate that the announcement day excess return is inversely related to the size of equity issue

[14]See Merton and Hendrikson (1982) for a more sophisticated approach to estimating these two timing components.

[15]This variable tests whether the announcement day price effects are related to the recent performance of the firm's stock. The $CER$ is for the period −240 trading days until −20 trading days. Minus 20 days was chosen to eliminate the effect of any leakage of information in the period one month before the announcement of an equity issue.

and positively related to the *CER* in the year preceding the announcement. For the sample of all industrial offerings, both coefficients are significant at the 5% level and the regression is significant at the 1% level. These results imply that, *ceteris paribus*, increasing the size of an equity issue by $100 million dollars, on average, results in an additional reduction of $7.7 million in firm value on announcement day. A one-year pre-announcement *CER* of 50% is associated with an increase in the announcement day excess return of about 3/4%. Conversely, a larger announcement day price reduction is experienced by stocks that have performed poorly prior to the announcement. The regression constant illustrates that the announcement of a sample equity issue, independent of its size or the pre-announcement performance of its stock, is associated with a 2.2% price reduction.

For the subsample of primary industrial issues, the size coefficient is marginally larger than the corresponding coefficient for the total sample and the *CER* coefficient is double the total sample *CER* coefficient. Both coefficients are significant at the 10% level and the regression is significant at the 5% level. In the regression results for the sample of secondary issues, the size coefficient is significant at the 10% level but the *CER* coefficient does meet standard significance criteria.[16]

Although the regression for secondary issues is not significant when both size and *CER* are included, it is significant at the 10% level when only size is considered. In the regressions reported in table 7 the estimated size coefficient for secondary offerings is roughly double the size coefficient in the regressions on primary issues. While this suggests that secondary issues are received by the market as more unfavorable signals compared with primary issues, Chow tests on primary versus secondary regressions and *t*-tests on the differences in the estimated size coefficients for primaries and secondaries both fail to reveal statistically significant differences.

Regression results for combination issues are insignificant. This may be due to the mixing, in combination offers, of different price effects associated with primary and secondary issues. For all samples, regressions of announcement day excess returns against the pre-announcement market return and the level of general stock price indices are insignificant.[17]

The major implication of the regressions in table 7 is that announcement day price reductions are significantly related to the size of equity issues. This

[16]The regression for secondary offerings excludes four outliers where the issue size is three standard deviations larger than the mean size of the secondary sample. The size of these four offerings are 47.5% 28.8%, 18.2% and 17.1%. Two of these secondary offerings (28.8% and 17.1% in size) are for the same firm. These large offerings may contain additional information about control of the firm. Regression results for the complete sample do not differ substantially in either sign or significance from these reported above.

[17]Other explanatory variables also tested but not significant include percentage of inside ownership and identity of the seller. Furthermore, all regressions with size as an explanatory variable were also estimated with the log of size as the explanatory variable, and the results do not differ in nature or significance from those reported.

finding is consistent with the strongly held belief by executives and investment bankers that large equity issues depress stock prices. However, this result does not distinguish between the price-pressure hypothesis and explanations based on asymmetric information since a size effect is consistent with both hypotheses.

The results reported in table 7 together with those presented in table 5 provide insight into the timing of equity issues. Firms tend to issue equity following an increase in stock prices, and after such a pre-announcement stock price increase the announcement day price reduction tends to be smaller. This is consistent with the contention by Myers and Majluf that firms time equity issues to minimize the adverse impact on stock prices.[18]

### *4.1.4. The price-pressure, leverage and signalling hypotheses*

An important issue is whether the negative market reaction to equity offerings is explained by associated changes in financial leverage. To test the importance of capital structure changes as an explanatory variable, additional regression analyses are performed using a measure of the change in sample firms' net debt ratio. Net debt is defined as total debt minus cash and cash equivalents, and the net debt ratio is net debt divided by net debt plus net worth. The change in net debt ratio is calculated as the difference between the ratio after the equity issue minus the average net debt ratio for the five years preceding the announcement of the offering.[19]

To examine the capital structure hypothesis, the two-day announcement period excess returns are regressed against the change in net debt ratio for primary issues, and for a sample including both primary issues and the primary component of combination offerings. The regression results presented in table 8 indicate that the change in leverage coefficient is significant at the 10% level (using a one tail test) for both samples. However, this significance disappears when size is included as an explanatory variable in the regressions.

[18]Myers and Majluf argue that the equity issue price effect will be smaller if uncertainty is less and/or the asymmetry in information between insiders and outsiders is smaller. While the timing evidence cannot be interpreted unambiguously, it is not inconsistent with the Myers and Majluf argument. There are two potential explanations for the finding that the equity issue price effects are smaller following an increase in stock prices. First, an increase in stock prices tends to unleverage the firm's equity and thus reduce its volatility. In the Myers and Majluf analysis, a smaller price reduction is incurred when selling a less risky security, *ceteris paribus*. Secondly, one explanation for an increase in stock prices is that uncertainty has been resolved, thereby reducing the risk of equity and possibly the magnitude of the asymmetry in information. Conversely, an increase in uncertainty would tend to reduce stock prices and result in larger equity issue price reductions. Finally, the finding of a firm-specific (rather than market-wide) timing pattern is consistent with the Myers and Majluf argument.

[19]Subtracting cash from debt adjusts for the negative financial leverage resulting from investments in cash. Also, in all regression analyses the change in leverage defined above (using the five-year average net debt ratio) is superior both in $R^2$ and significance to an alternative measure, the change in net debt ratio from the year preceding the equity issue to the year following it.

Table 8

Estimated coefficients and $t$-statistics (in parentheses) from regressing the two-day excess returns for the announcement of an industrial equity offering on the change in net debt ratio,[a] the size of the offering[b] and the previous eleven-month[c] cumulative excess return.

Two-day excess return = $\alpha + \beta_1$(change on net debt ratio) + $\beta_2$(size) + $\beta_3$(eleven-month $CER$)

| Offerings | $\alpha$ | $\beta_1$ | $\beta_2$ | $\beta_3$ |
|---|---|---|---|---|
| Primary | −0.02749 | 0.02808 | — | — |
| | (−7.31) | (1.41) | | |
| | $N = 96$, $R^2 = 0.021$, $F = 1.98$, Significance of $F$-statistic = 0.163 | | | |
| | −0.01858 | −0.01784 | −0.07819 | — |
| | (−2.64) | (0.82) | (−1.52) | |
| | $N = 90$, $R^2 = 0.048$, $F = 2.17$, Significance of $F$-statistic = 0.120 | | | |
| | −0.02338 | 0.00814 | −0.10553 | 0.03596 |
| | (−3.26) | (0.38) | (−2.05) | (2.36) |
| | $N = 90$, $R^2 = 0.105$, $F = 3.37$, Significance of $F$-statistic = 0.022 | | | |
| Primary plus primary component of combination | −0.02994 | 0.02891 | — | — |
| | (−9.93) | (1.59) | | |
| | $N = 151$, $R^2 = 0.016$, $F = 2.54$, Significance of $F$-statistic = 0.113 | | | |
| | −0.01910 | 0.02212 | −0.08488 | — |
| | (−3.39) | (1.15) | (−1.97) | |
| | $N = 140$, $R^2 = 0.048$, $F = 3.48$, Significance of $F$-statistic = 0.033 | | | |
| | −0.02223 | 0.01949 | −0.08890 | 0.01371 |
| | (−3.70) | (1.01) | (−2.07) | (1.50) |
| | $N = 140$, $R^2 = 0.064$, $F = 3.09$, Significance of $F$-statistic = 0.029 | | | |

[a] Change in net debt ratio is calculated as the ratio after the equity issue minus the average net debt ratio for the five years preceding the announcement of the offering. Net debt is defined as total debt minus cash and cash equivalents, and the net ratio is net debt divided by net debt plus net worth.

[b] The size of the offering is measured as the planned proceeds of the offering divided by the pre-announcement value of the firm's equity.

[c] The eleven months ending one month before the announcement of the offering.

The addition of a third explanatory variable, the $CER$ in the year preceding the announcement, further reduces the size and significance of the coefficient of the change in leverage variable for both samples. Moreover, size and change in net debt ratio are highly collinear with a correlation coefficient of 0.35 for primary offerings and 0.28 for the sample including both primary issues and the primary component of combination offerings.

In an attempt to circumvent the collinearity problem, other leverage related measures are investigated. The deviation of sample firms' pre-announcement capital structure from historical leverage is calculated as the difference between the net debt ratio prior to the announcement and the preceding five year average net debt ratio. This variable is not significant as the sole explanatory variable in a regression, nor is it significant when size and pre-announcement

*CER* are included in a regression. Bond ratings are another proxy for the extent to which a firm's debt ratio is viewed as extreme. When used as a dummy variable in regressions, bond ratings, for both senior and subordinated debt, are not significant either alone or with size and pre-announcement *CER* included in the regression.

The collinearity between change in leverage and issue size makes it difficult to determine which variable is associated with the announcement day price reduction.[20] Furthermore, there are difficulties in associating equity issue price effects with changes in capital structure. First, most equity issues are a relatively small percentage of total capital. Even if the entire proceeds of the issue are used to repay debt, the impact on financial leverage and tax shields are not large relative to the magnitude of the reduction in equity value associated with stock issues. Secondly, changes in leverage induced by equity issues may be ephemeral. Finally, a leverage-related explanation of the price effects of primary equity issues cannot explain the price effects of secondary distributions which do not affect corporate capital structures. As reported above, size is still an important explanatory variable in regressions on secondary distributions, while not surprisingly, all leverage-related variables exhibit no explanatory power in regression analyses of secondary offerings.

Since the price reduction for secondaries cannot be attributed to a change in leverage, is it likely that the similar market reaction to primary issues is caused by the change in leverage? It seems at least as likely that both phenomena are explained by investors' reaction to a negative signal concerning the firm's stock price, the announcement that informed sellers are selling a large block of stock.[21] If issue size is the true explanatory variable and change in leverage only a proxy for size, this provides an alternative explanation for the findings of other empirical tests of capital structure theory [e.g., Masulis (1980a, b,

[20] Korwar's (1983) measure of change in leverage should also be a strong proxy for the size of the equity issue. In his analysis Korwar defines the change in leverage as a hypothetical post-issue debt ratio minus the debt ratio immediately prior to the equity issue. The hypothetical post-issue debt ratio is defined as the pre-issue ratio instantaneously adjusted to reflect the new equity offering. This change in leverage measure should clearly capture the size of the issue. Moreover, Korwar's regressions include both change in leverage and tax shield measures as explanatory variables. Change in leverage and tax shield variables may also be collinear, although Korwar does not report the correlation coefficient for these variables. Finally, Korwar presents several analyses which support an information explanation for the negative market reaction to equity issues. These include analyses of bond price reactions to equity issues and analyses of post-issue earnings performance. These findings are consistent with the interpretation that the size of the equity issue, rather than the change in leverage, is the driving force underlying the market's reaction.

[21] The capital structure view of equity issues is deficient in another respect as well. It does not explain firm's reliance on internal equity funding and their reluctance to issue equity. Even the leverage-related information models [e.g., Ross (1977)] regard external equity and retained earnings as perfect substitutes. In contrast the analyses by Miller and Rock and Myers and Majluf rationalize a reluctance to issue equity. In these papers, it is the source and magnitude of equity financing which is viewed as an informative signal, rather than the change in debt ratio. In both analyses firms may forego profitable investment projects because of the stock price effects of issuing equity.

1983)] which are based on the analysis of the market's reaction to equity transactions (e.g., exchanges and repurchases).[22]

Thus, the findings of a significant announcement day price reduction and a significant size effect for both primary and secondary issues, as well as the regression analyses of leverage variables, argue against a pure capital structure explanation of the effects observed for primary issues. These results suggest instead that the price reductions are due to the information effects predicted by Miller and Rock (1982) and Myers and Majluf (1983). These theoretical analyses predict that price reductions are associated with the source and magnitude of financing rather than with changes in corporate capital structure. Our findings are also consistent with the price-pressure hypothesis. Finally, the reduction in firm value as a percentage of the proceeds appears too large to be explained by issue related transactions costs.

### 4.2. *Public utility offerings*

This study also investigates the effect on stock prices of equity issues by public utilities. The average announcement period excess returns for primary issues by public utilities appear in table 9. The two-day announcement period excess return is only $-0.9\%$, but the associated $t$-statistic is $-7.8$. Two-thirds of the equity issues are associated with negative announcement day returns. The mean dilution for public utilities reported in table 10 is $-12.3\%$, the median is $-8.4\%$ and only 2% of the issues produced dilution greater than $-100\%$.

In contrast to the results for industrial issues, table 11 shows that stock of public utility issuers underperforms the market on a risk-adjusted basis both in the two years preceding the announcement of the issue and in the subsequent two years.[23] This underperformance appears to be steady over the entire four years. Consistent with industrial issues, no ability to time the general level of stock prices can be detected in table 11. Market returns are positive and roughly equal to magnitude in the 240 days preceding and following the announcement of primary issues by public utilities.

The results for primary issues by utilities differ from the findings for industrials in several respects. The percentage price-reduction on announcement day for utility issues, though statistically significant, is much smaller than

[22] Vermaelen (1981) also contends that the capital structure inferences drawn from studies of stock repurchases are inappropriate. Consistent with the reasoning outlined above, he argues that the market's reaction to stock repurchases is explained by their role as an informative signal, rather than their impact on debt ratios. This argument is also supported by Dann's (1981) study of stocks repurchased. Masulis (1983) includes 'information effects' related to changes in firm debt level' as one possible explanation of his results.

[23] The negative *CER* from 490 days before until 20 days before the announcement or utility firm has a $t$-statistic of $-13.16$ which is statistically significant. This is also in contrast to industrial firms where all three subsamples had positive and statistically significant *CER*'s in the two-year period to an equity issue announcement.

Table 9

Average excess returns (*XRET*) and average cumulative excess returns (*CER*) from 10 days before until 10 days after the announcement day of primary equity offerings by utilities in the period 1963–1981.

| Day | *XRET* (%) | *CER* | Day | *XRET* (%) | *CER* |
|---|---|---|---|---|---|
| −10 | 0.0 | 0.0 | +1 | −0.1 | −1.5 |
| −9 | −0.1 | −0.1 | +2 | −0.2 | −1.7 |
| −8 | 0.1 | 0.0 | +3 | −0.0 | −1.7 |
| −7 | −0.0 | 0.0 | +4 | −0.1 | −1.8 |
| −6 | −0.1 | −0.1 | +5 | −0.2 | −2.0 |
| −5 | −0.1 | −0.2 | +6 | −0.1 | −2.1 |
| −4 | −0.1 | −0.3 | +7 | −0.1 | −2.2 |
| −3 | −0.1 | −0.4 | +8 | 0.2 | −2.0 |
| −2 | −0.1 | −0.5 | +9 | −0.1 | −2.1 |
| −1 | −0.6 | −1.1 | +10 | −0.0 | −2.1 |
| AD[a] | −0.3 | −1.4 | | | |
| Two-day announcement return | | −0.9 | | | |
| *t*-statistic | | −7.8 | | | |
| *N* | | 264 | | | |

[a]AD = announcement day.

the reduction associated with industrial issues. The offering dilution (the reduction in firm value as a percentage of the planned proceeds of the sale) is also smaller for utility issues. Also the positive one-year *CER*'s preceding industrial issues are replaced with negative stock market performance preceding utility issues. Finally, although not reported, regressions of announcement day excess returns against the planned size of the issue and the *CER* for the eleven months prior to the announcement are not significant for utilities. This is in contrast to industrial equity issues.

While these results document differences between utility issues and industrial issues, the reason for these differences is not apparent. The smaller reduction in firm value for utilities at announcement suggests that equity issues by utilities are more fully anticipated. This could be due to the disclosure required by regulated firms and/or the fact that many utility issues are motivated by the necessity of making investments to service customer demand while simultaneously maintaining debt ratios within a range mandated by regulation.[24] Such a capital structure process would predict forthcoming equity

[24] However, in the Miller and Rock model a forced equity issue may still be informative because it reveals information concerning a firm's current earnings. Nonetheless, little information would be released if regulation effectively forced disclosure of a utility's earnings. Forced investment and financing could conceivably resolve the information-based conflict motivating the Myers and Majluf model. This would be true if regulation insured that utility managers pursue all profitable investment projects even if they require external equity funding.

Table 10

The announcement day offering dilution for utility equity offerings, defined as the reduction in the value of the equity of a firm as a percentage of the planned value of a primary equity offering.

| Dilution (%) | $N$[a] | Primary offerings, cumulative (%) |
|---|---|---|
| $100 < \leq 150$ | 1 | 0.4 |
| $80 < \leq 100$ | 0 | 0.4 |
| $60 < \leq 80$ | 0 | 0.4 |
| $40 < \leq 60$ | 6 | 2.7 |
| $30 < < 40$ | 3 | 3.9 |
| $20 < \leq 30$ | 6 | 6.2 |
| $10 < \leq 20$ | 18 | 13.1 |
| $0 < \leq 10$ | 50 | 32.4 |
| $-10 < \leq 0$ | 56 | 54.1 |
| $-20 < \leq -10$ | 37 | 68.3 |
| $-30 < \leq -20$ | 32 | 80.7 |
| $-40 < \leq -30$ | 23 | 89.6 |
| $-50 < \leq -40$ | 8 | 92.7 |
| $-60 < \leq -50$ | 7 | 95.4 |
| $-70 < \leq -60$ | 1 | 95.8 |
| $-80 < \leq -70$ | 4 | 97.3 |
| $-100 < \leq -80$ | 2 | 98.1 |
| $-120 < \leq -100$ | 3 | 99.2 |
| $-140 < \leq -120$ | 0 | 99.2 |
| $-150 < \leq -140$ | 0 | 99.2 |
| $-200 < \leq -150$ | 2 | 100.0 |
| $\leq -200$ | 0 | 100.0 |
| Average dilution | | −12.3% |
| Median dilution | | −8.4% |

[a]$N = 259$.

offerings and would also imply that the change in leverage produced by an equity issue is temporary.

Another potential explanation is that the smaller announcement day effect is due to the fact that public utility industries are composed of relatively homogeneous firms.[25] Many sources of valuable inside information (research and development, the value of natural resources, etc.) are absent for most utilities. Key determinants of the value of utilities include cost structures, production technologies and marketing demographics, that are relatively well known and intensively studied by security analysts. Nonetheless, even if utility equity issues are partially predicted and leverage changes are temporary, the average price reduction associated with utility issues is highly significant.

[25]Consistent with this, advocates of the price-pressure effect might argue that, relative to industrial firms, there are many close substitutes for a given utility's shares, and this may account for the smaller price reduction associated with utility issues.

Table 11

Cumulative excess returns and cumulative average value weighted market returns from 490 days before until 480 days after the announcement of equity offerings by utilities in the period 1963–1981.

| Day | *CER* (%) $N = 211$ | Market return (%) $N = 211$ | Day | *CER* (%) $N = 211$ | Market return (%) $N = 211$ |
|---|---|---|---|---|---|
| −480 | 0.0 | −0.3 | +10 | −20.6 | 12.9 |
| −440 | −1.3 | 0.0 | +20 | −20.7 | 13.3 |
| −400 | −3.0 | 0.5 | +30 | −21.2 | 13.6 |
| −360 | −5.0 | 0.5 | +40 | −21.7 | 14.0 |
| −320 | −6.4 | 2.4 | +60 | −22.7 | 14.4 |
| −280 | −8.9 | 3.3 | +80 | −23.5 | 15.2 |
| −240 | −10.6 | 4.7 | +100 | −24.2 | 16.0 |
| −200 | −12.2 | 6.0 | +120 | −24.9 | 16.6 |
| −160 | −13.8 | 6.9 | +160 | −27.2 | 17.9 |
| −120 | −15.1 | 7.9 | +200 | −28.4 | 19.3 |
| −100 | −15.5 | 8.5 | +240 | −31.3 | 20.7 |
| −80 | −16.1 | 9.5 | +280 | −33.1 | 22.8 |
| −60 | −16.7 | 10.1 | +320 | −35.0 | 24.6 |
| −40 | −17.9 | 10.9 | +360 | 38.0 | 26.1 |
| −30 | −18.3 | 11.2 | +400 | −39.8 | 27.3 |
| −20 | −18.2 | 11.5 | +440 | −41.2 | 28.8 |
| −10 | −18.6 | 11.9 | +480 | −43.1 | 30.3 |
| AD[a] | −20.0 | 12.4 | | | |

[a]AD = announcement day.

### *4.3. Issue day results*

Finally, this study examines the issue day average excess returns for industrial and utility equity issues. The results, although not reported, are consistent with semi-strong capital market efficiency. Market prices at issue data already reflect the effects of the announcement, and no significant temporary price-pressure effects are apparent around the issue data. The results suggest that a permanent reduction in firm value is associated with the announcement of an equity issue, and the subsequent execution of the sale takes place at the discounted stock price.

## 5. Conclusions

The results of this study demonstrate that announcement of common equity offerings reduce stock prices. This finding is pervasive in that over 80% of the sample industrial issues are associated with negative announcement day excess returns. The average announcement day excess return for all industrial issues is −2.7% and is statistically significant. Though this price effect may appear small, the aggregate reduction in industrial firms' equity value as a percentage

of the planned proceeds of a primary issue averages 31%. On average, registered secondary distributions of industrial stocks are accompanied by a reduction in firm value equal to 78% of the proceeds of the sale. This study also documents a timing pattern related to industrial issuers' market-adjusted stock price performance. During the two years prior to the issue, sample industrial firms' stock outperforms the market by an average of 33%. In the two years following the issue, the sample industrial firms on average underperform the market by 6%. No evidence of an ability to time the general level of stock prices is apparent in the data since positive market returns are observed in the two years preceding and following industrial equity issues.

Regression results for industrial issues indicate that the announcement day price reduction is significantly related to both the cumulative abnormal stock price performance during the eleven months prior to the month of the issue and to the size of the issue (as a percentage of total equity value of the firm). Better risk-adjusted stock price performance in the months prior to the issue is associated with smaller price reductions on announcement day. Larger equity issues are associated with larger announcement day price reductions. For secondary industrial issues, the negative effect of issue size is larger than for primary issues. However, for secondary issues no significant association is found between announcement day excess returns and abnormal stock returns in the months prior to the issue.

Primary equity issues by public utilities also are accompanied by negative excess returns on announcement day. Approximately two-thirds of the utility issues are associated with price reductions. The average announcement day excess return for utility issues is $-0.9\%$ and is statistically significant. The average reduction in the sample firms' market value equals 12% of the proceeds of the issue. The results for utility issues reveal no evidence of timing patterns based on the market-adjusted performance of individual stocks or the performance of the market as a whole. In contrast to industrial issues, negative abnormal stock returns of roughly equal magnitude are observed in the year preceding and following public utility issues. Consistent with the results for industrial issues, positive market returns are exhibited in both the year preceding and the year following utility issues. For utility issues there is no relationship between the announcement day market reaction and issue size or the previous performance of the utility's stock. The differences between the results of industrial and utility issues might be explained by a larger information content associated with industrial issues. Finally, no significant excess returns are found in the days surrounding the issue date for industrial stocks and public utilities. This result is consistent with semi-strong capital market efficiency.

The similarity of the price effects for primary issues and registered secondary distributions suggests that the price reduction is not related solely to tax effects

or to leverage-related information effects associated with a change in corporate capital structure. In addition, the reduction in firm value as a percentage of the proceeds of the sale appears too large to be explained by issue-related transactions costs in the case of primary issues where the firm bears those costs. The results are consistent both with the hypothesis that equity sales by corporations and informed investors are interpreted by the market as unfavorable signals about a firm's current performance and future prospects, and with the hypothesis that there is a downward sloping demand for a firm's shares. These hypotheses are not separable using tests presented in the study, and the design of tests to distinguish between these two hypotheses is an important task for future research.

The findings for primary issues also have important implications for corporate financial decisions. For example, the reduction in firm value associated with equity issues represents a substantial 'cost to false signalling' in dividend signalling models of the type developed by Bhattacharaya (1980). The finding of stock price reductions associated with external equity financing rationalizes a reluctance on the part of firms to issue equity. This is consistent both with the theoretical analysis presented by Myers and Majluf (1983) and with the empirical observation that firms rely on internally generated funds as the chief source of equity financing. The timing pattern associated with equity issues is also consistent with the Myers and Majluf argument that firms should time equity issues to minimize the attendant adverse stock price effects. Firms tend to issue equity following a rise in stock prices, and this is when the equity issue price reduction tends to be small. These results have important implications for financing policy. Moreover, the negative market reaction to external equity financing produces an interaction among major financial decisions: investment policy, capital structure policy and dividend policy. The necessity of jointly determining financial policies is suggested by the constraint imposed by the negative market reaction to external equity financing, and this would lead to optimal financial decisions which differ from those predicated on the traditional assumption that a firm can always issue equity at the current stock price.

Finally, the findings for equity issues are related to empirical results for stock repurchases [e.g., Vermaelen (1981) and Dann (1981)] and dividends [e.g., Asquith and Mullins (1983)]. Emerging from these empirical studies of equity cash flows is a theory of the firm based upon superior information possessed by managers vis a vis investors. These empirical studies are consistent with a view of the firm as a 'black box' where unanticipated equity cash flows communicate information to investors. Cash outflows (stock repurchases and increases in dividends) are viewed as positive signals accompanied by increases in stock prices. Conversely, if a firm requires cash inflows from the equity market (through equity issues or a reduction in dividends), this is interpreted as a negative signal resulting in a reduction in the stock price.

While empirical studies have documented that stock prices and unanticipated equity cash flows are postively related, additional research is needed to develop a corresponding theoretical model which is both rigorous and comprehensive.

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