STOCK PRICE EFFECTS AND COSTS OF SECONDARY DISTRIBUTIONS

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This study does not support the view that a large number of shares can be sold at the prevailing market price and at a small cost. A significant stock price decrease is observed at the initial announcement of secondary distributions. The price declines are greater for offerings by officers and directors and for larger offerings, but are significant for all types of sellers and for large and small offerings. There is no significant price decline at the offering when secondaries are announced in advance. Underwriting and other selling costs are substantial and are positively related to relative offering size.

1. Introduction

An unresolved issue is whether a large block of common stock can be sold at the prevailing market price and at a small cost. News of an offering can be associated with a decrease in share price if (1) the sale causes the market to revise downward its assessment of the firm's prospects or (2) demand for the firm's shares is not perfectly elastic. In addition, there can be substantial costs associated with the selling effort that reduce the net proceeds of the sale.

This paper investigates the stock price effects and costs associated with large block sales of common stock in the form of secondary distributions. We focus on secondary distributions because they are offerings of substantial size and are not associated with a change in the firm's assets or capital structure. Thus, the price effects and costs of the sale of shares can be measured in the absence of confounding changes in assets or capital structure.

This study is closely related to Scholes' (1972) investigation of secondary distributions. Our study differs from Scholes' in that we examine returns around the earliest announcement date as well as around the offering date. We

investigate registered and non-registered offerings separately, since offerings registered with the Securities and Exchange Commission (SEC) are disclosed in advance of the offering and non-registered secondaries are not. We also document the selling costs of secondary distributions, including (1) the under-writing spread, (2) other expenses incurred by the seller, and (3) the difference between the offering price and the closing market price on the day of the sale.

Our results do not support the view that a shareholder can sell a large number of shares within a short period of time at approximately the prevailing market price and at a small cost. We find that secondary offerings are associated with a significant decrease in share price. The average two-day abnormal stock return at the earliest public disclosure of the offerings is -1.96% for non-registered secondaries and -2.87% for registered secondaries. We find no statistically significant abnormal stock return at the actual offering date for registered distributions. Further, the selling costs of secondaries are substantial. The average total selling costs of non-registered secondaries are 5% of the pre-announcement value of the shares offered for sale. Sellers of registered secondaries incur total costs of 6.7%. These costs, in addition to the price decline at the initial announcement, indicate that secondary distributions have a large negative effect on the wealth of the selling shareholders.[1]

We investigate whether the stock price response to the announcement of the offering depends on the characteristics of the selling shareholder(s) and/or the size of the offering. Our analysis provides evidence on Scholes' hypothesis that the market infers unfavorable information about the firm from the secondary offering. We examine the relation between the magnitude of the stock price change at the announcement of registered offerings and various characteristics of the offerings disclosed in the prospectuses. Like Scholes, we find that the category of selling shareholder is related to the stock price response. The stock price response is not related to the seller's pre- or post-offering ownership stake nor to the dollar value of the offering. Among the categories of sellers, the average price decrease is largest for secondaries by officers and directors, sellers most likely perceived to hold inside information about the firm. However, we also find a statistically significant negative price response for *all* categories of sellers. The pervasiveness of this result suggests that the characteristics of the selling shareholders that we examine cannot explain completely the price response to secondary offerings, and suggests that the *event* of a sale is a source of the market's perception of unfavorable information.

Scholes also examines whether at the offering date there is a temporary decrease in share price, which he calls a price pressure effect, that depends on the size of the offering. He finds no relation between the price change on the

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[1] Ryngaert (1983) finds similar price effects and underwriting costs for a sample of registered secondaries that predates our sample of secondary offerings.

offering date and offering size.[2] Our analysis differs in that we distinguish, as do Kraus and Stoll (1972), between a permanent stock price effect at the announcement of the offering that is due to less than perfectly elastic demand (a supply effect) and a temporary price effect at the offering that reflects compensation for costs incurred by buyers of a secondary (a liquidity cost effect).

We test for a supply effect by examining the relation between the initial announcement price effect and the relative size of the offering. We find that the price response to the initial disclosure of secondaries is related to the size of offering, measured relative to the total number of shares outstanding, even when we control for certain characteristics of the selling stockholder. This evidence could be interpreted as consistent with less than perfectly elastic demand for a firm's shares. However, because the variables we use to characterize the sellers may not capture fully the market's perception of unfavorable information, the evidence is also consistent with the interpretation that size is a proxy for unfavorable information. We also examine whether the relation between the price effect and relative offering size depends on characteristics that we conjecture are determinants of the elasticity of demand. These tests provide no support for a supply effect. Thus, we cannot conclude that we have uncovered evidence of a supply effect.

We investigate a liquidity cost effect by looking for evidence of a price recovery after the offering date, and by examining whether underwriting and other costs of secondaries depend on the selling effort required to find buyers of a large quantity of shares. No evidence is found of a price recovery immediately following the offering date of secondaries. However, the underwriting spread for both registered and non-registered secondaries is related positively to the size of the offering, measured relative to either total shares outstanding or average daily trading volume. Since larger distributions presumably require greater selling effort, this evidence supports the notion that underwriting spreads are in part compensation for the selling effort associated with secondary offerings. As Kraus and Stoll (1972) suggest, compensation for liquidity costs of a secondary offering appears to be in the form of underwriting compensation rather than a price recovery following the offering date.

The next section discusses secondary distributions. Section 3 describes the samples of secondary offerings and presents our empirical methods. Section 4

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[2] Related evidence is provided by several other studies. Kraus and Stoll (1972) study daily and intraday stock returns at the time of large block trades. They find price changes that are related to the size of the block. Hess and Frost (1982) examine share price behavior at the issuance date of primary stock offerings by public utility companies, and fail to uncover any evidence of a price effect related to offering size. Asquith and Mullins (1983) examine share price behavior at the announcement of primary and secondary offerings of common stock. They find some evidence that the stock price effects are related to the size of the offering, but their tests do not control for the asset structure or capital structure effects of primary offerings nor for the characteristics of the selling shareholder in secondary offerings.

provides evidence on average stock returns, and examines potential explana-
tions of the stock price effects. Evidence on underwriting compensation and
other costs is presented in section 5. A summary and conclusions are presented
in section 6.

2. Secondary distributions of common stock

The secondary distributions examined in this study are sales of outstanding
securities that take place off the exchange, usually after the close of trading,
and generally at a price less than or equal to that day's closing price on the
exchange. Secondary offerings require the approval of the exchange(s) on
which the securities are listed. According to Rule 393 of the New York Stock
Exchange, for example, approval of a secondary is based on the judgment of
exchange officials that the block of securities cannot be absorbed in the normal
course of trading.

The seller of a secondary distribution may be required to register the offering
with the SEC. The Securities Act of 1933 requires the registration of a public
offering of a firm's outstanding securities, if the seller has a control relationship
with the firm.[3] Registration involves filing a prospectus in advance of the
actual offering that contains information about the selling shareholder, the
securities being sold, the terms of the offering and the selling arrangements. A
report of the proposed secondary offering usually appears in *The Wall Street
Journal* on the day following the filing of the prospectus.

The first public disclosure of non-registered secondary distributions is typi-
cally on the news tape of the exchange or on a news service wire shortly before
the distribution becomes effective. The initial announcement may occur before
or after the close of trading on the offering date. The tape reveals the identity
of the firm whose shares are being sold, the number of shares offered, the
dealer discount and whether the seller is reserving the right to stabilize share
price. Although the seller's identity is reported to the exchange in the appli-
cation for permission to offer a secondary, the identity of the seller in a
non-registered offering typically is not reported by the exchange, or disclosed
to buyers by the selling agents. Potentially important differences between
registered and non-registered secondary offerings are (1) the length of time
between the initial public disclosure and the beginning of the offering and (2)
the information about the offering that is publicly disclosed by the time of the
offering. Because of these fundamental differences, we analyze registered and
non-registered offerings separately.

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[3] Federal regulation states that ' the term 'control' means the possession, direct or indirect, of the
power to direct or cause the direction of the management and policies of a person, whether
through the ownership of voting securities, by contract, or otherwise'. (See 17 CFR 230.40J at
paragraph 3342.)

3. Description of samples and empirical methods

3.1. Selection criteria

Initially, all underwritten secondary distributions of common stock that occurred between 1972 and 1981 are identified in the semi-annual issues of the *Investment Dealers' Digest* containing the Corporate Financing Directory. Nearly 2000 secondary distributions were reported during this ten-year period.

The final samples satisfy the following selection criteria: (1) secondary offerings are not made in combination with primary offerings of securities; (2) the shares are listed on either the New York Stock Exchange (NYSE) or the American Stock Exchange (ASE) at the time of the offering; (3) no other news about the company was reported in *The Wall Street Journal* on the date of the initial announcement; and (4) certain data requirements are met. For registered secondaries, the data requirements include obtaining an offering prospectus and identifying the date of first public disclosure. For the non-registered sample we require that there not be any material inconsistencies between the number of shares offered or the offering date as reported by the *Investment Dealers' Digest* and the *SEC Statistical Bulletin*. Finally, two non-registered offerings that were announced in *The Wall Street Journal* prior to the offering are eliminated.

These selection criteria determine final samples of 146 registered offerings and 321 non-registered offerings. Table 1 reports the total number of offerings

Table 1

Total number of secondary distributions of common stock at the four stages of sample formation (1972–1981).

Sample	Registered offerings	Non-registered offerings
(1) Initial sample of all underwritten secondary and combination offerings	1464	516
(2) Secondary offerings	390	516
(3) Secondary offerings for NYSE/ASE firms	183	360
(4) Final sample of secondary offerings	146[a]	321[b]

[a] Registered offerings are excluded from the final sample if (1) other potentially important news about the company was reported in *The Wall Street Journal* on the announcement date (13 offerings), (2) an offering prospectus could not be obtained (20 offerings), or (3) neither an announcement in *The Wall Street Journal* nor the filing date with the SEC could be identified (4 offerings).

[b] Non-registered offerings are excluded from the final sample if (1) other potentially important news about the firm was reported in *The Wall Street Journal* on the announcement date (20 offerings), (2) there were any material inconsistencies between data reported in the *Investment Dealers' Digest* and the *SEC Statistical Bulletin* (17 offerings), or (3) the offering was announced in *The Wall Street Journal* before the sale (2 offerings).

Table 2

Number of registered and non-registered secondary distributions of common stock by year.

Year	Registered offerings	Non-registered offerings
1972	60	71
1973	16	84
1974	7	27
1975	11	25
1976	17	21
1977	8	23
1978	12	21
1979	3	15
1980	8	15
1981	4	19
1972–81	146	321

remaining at the four stages of sample formation. More than 1000 registered offerings are excluded because they were made in combination with a primary offering of securities, usually common stock. Table 2 reports the distribution of offerings in the final samples by calendar year. Approximately one-half of the distributions in the final samples occurred in 1972 or 1973.[4]

3.2. Characteristics of the samples

Selected descriptive statistics for the samples of registered and non-registered offerings are presented in table 3. The first four rows present statistics on the absolute size of the offering. In terms of both the number of shares offered and the dollar value of the shares offered, the registered offerings are considerably larger than the non-registered offerings. Relative measures of the size of offering presented in rows 5 and 6 indicate that on average the number of shares offered in registered distributions represents 8.1% of the total number of shares outstanding and in non-registered distributions represents 2.7% of total shares outstanding.[5] Rows 7 and 8 indicate that the number of shares offered is substantial relative to average daily trading volume measured over the six months preceding the month of the first public disclosure of the offering. The average ratio of shares offered to average daily trading volume is

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[4] Secondary distributions were used frequently in the latter part of our sample period. However, they were very often accompanied by a primary offering of shares and thus are excluded.

[5] Scholes' sample consists of 73 registered offerings and 272 non-registered offerings made in the period from July 1961 through December 1965. The average ratio of shares offered divided by shares outstanding is 2.2% for his sample of 345 secondaries. For our two samples combined, the average ratio is 4.4%. The average dollar value of secondaries is $4.7 million for Scholes' sample and is $12.3 million for our two samples combined.

Table 3

Selected summary statistics for 146 registered and 321 non-registered secondary distributions of common stock (1972–1981).[a]

Descriptive measure	Mean	Median	Standard deviation	Minimum	Maximum
Number of shares offered (000)					
(1) Registered offerings	828	462	1492	70	13357
(2) Non-registered offerings	152	117	130	13	1124
Value of shares offered (000)[b]					
(3) Registered offerings	$31593	$14000	$50448	$691	$296000
(4) Non-registered offerings	$3486	$2276	$3624	$125	$21694
Shares offered / shares outstanding					
(5) Registered offerings	0.081	0.053	0.077	0.001	0.473
(6) Non-registered offerings	0.027	0.023	0.019	0.001	0.098
Shares offered / average daily trading volume					
(7) Registered offerings	96.5	60.79	104.0	3.1	811.5
(8) Non-registered offerings	29.7	19.91	28.8	1.0	190.9
Shares offered / shares held by institutional investors					
(9) Registered offerings	5.69	0.632	27.0	0.001	300.0
(10) Non-registered offerings	1.62	0.186	16.9	0.001	295.3

[a] For the registered secondaries, summary statistics are calculated using data collected from the offering prospectuses and from the *Security Owner's Stock Guide*. Summary statistics for the non-registered offerings are calculated using data from the *Security Owner's Stock Guide*, the *Investment Dealers' Digest* and the *SEC Statistical Bulletin*.

[b] Dollar value is calculated using the offer price.

96.5 for registered distributions, more than three times the average ratio of 29.7 for non-registered distributions. In addition, as indicated in rows 9 and 10, the average size of registered offerings is also greater when the size of the offering is measured relative to the number of shares held by institutional investors in the month prior to the first public disclosure of the offering.

When information on the selling shareholders is available, an offering is classified into one of the categories of selling stockholders listed in table 4. For registered distributions, the offering prospectus is examined to identify the selling stockholder. When there are two or more sellers of different types, the secondary is classified according to the type of stockholder selling the largest number of shares in the distribution. An exception to this classification rule is that a secondary is placed in the directors and officers category if any of the sellers is a director or an officer.[6] The identity of the selling stockholder in

[6] In the sample of 146 registered secondaries, there are 89 offerings by a single seller, and 57 offerings by more than one type of sharcholder. Of the 36 offerings by multiple sellers involving officers and directors, there are 18 cases where officers and directors sold more shares than the other selling shareholders.

Table 4

Distribution by category of the principal selling stockholder(s) of 146 registered and 321 non-registered secondary distributions of common stock (1972–1981) (proportions in parentheses).

Category of principal selling stockholder(s)	Number of registered offerings[a]	Number of non-registered offerings[b]
(1) Directors(s) or officer(s)	53(0.37)	6(0.03)
(2) Individual(s)	25(0.17)	8(0.04)
(3) Corporation	20(0.14)	11(0.05)
(4) Investment company, bank or insurance company	10(0.07)	155(0.71)
(5) Trust, estate, foundation, university or government	38(0.25)	16(0.07)
(6) Various[c]	0	22(0.10)
(7) No information	0	103(0.00)[d]
Total sample	146(1.0)	321(1.0)

[a] Source: Offering prospectus.
[b] Source: *SEC Statistical Bulletin.*
[c] This term is used by the SEC; its precise meaning is unclear.
[d] The offerings with no information on the type of selling stockholder are excluded from the calculation of sample proportions. The sample proportions are based on a sample of 218 offerings.

non-registered secondaries is not publicly disclosed at the time of the sale. However, the *SEC Statistical Bulletin* classifies completed offerings by type of selling stockholder. These classifications were reported only through 1976, so it is not possible to classify the selling stockholder for non-registered secondary distributions after 1976.

Table 4 presents the distributions of registered and non-registered offerings by category of the principal selling stockholder. The distributions appear to reflect the SEC's registration requirements. For example, 37% of the registered offerings are sales by directors or officers, while only 3% of the non-registered offerings are classified into this category. On the other hand, only 7% of the registered secondaries represent sales by insurance companies, banks or investment companies, but 71% of the non-registered offerings are sales by this category of stockholder. The relatively greater proportion of corporations and individuals offering registered rather than non-registered distributions suggests that these sellers tend to have a control relationship with the firm, as defined by federal regulation. The low proportion of registered offerings by insurance companies, banks and investment companies suggests that selling stockholders who are not required to register generally do not view registration as beneficial to their selling effort.[7]

[7] The definition of control (footnote 3 above) leaves considerable ambiguity as to the type of seller actually required to register a secondary offering. It does not appear possible to identify precisely secondaries that are registered voluntarily.

3.3. Estimation of daily prediction errors

Daily prediction errors, or excess returns, are estimated around the date of the first public disclosure of the sale [the announcement date (AD)], as well as around the date the offering begins [the distribution date (DD)]. For 124 of the 146 registered secondaries, the announcement date is the date of announcement in *The Wall Street Journal*. For the remaining 22 cases, the announcement date is defined as the trading day following the date of registration with the SEC.[8] For non-registered secondaries, the announcement date is also the distribution date, since there are no announcements in advance of the offerings. Thus, for these distributions prediction errors are examined around a single date. The prediction error for the common stock of firm j on day t is defined as

$$PE_{jt} = R_{jt} - \left(\hat{\alpha}_j + \hat{\beta}_j R_{mt} \right),$$ (1)

where R_{jt} is the continuously compounded rate of return for the common stock of firm j on day t, and R_{mt} is the continuously compounded rate of return for the CRSP equally weighted index on day t. The coefficients $\hat{\alpha}_j$ and $\hat{\beta}_j$ are ordinary least squares estimates of firm j's market model parameters. The estimation period includes the 140 days that end 61 days before the announcement date of the secondary and the 140 days that begin 61 days after the distribution date, a total of 280 trading days.

Prediction errors are calculated for each day in the event period that begins 60 trading days before the announcement date and ends 60 trading days after the distribution date. The event period is 121 trading days for all non-registered offerings but differs for the registered offerings, varying from 123 to 247 days.

The average prediction error on event day t for a sample of N secondary distributions is

$$APE_t = \frac{1}{N} \sum_{j=1}^{N} PE_{jt}.$$ (2)

A test of statistical significance is conducted to determine whether the average standardized prediction error equals zero. Each standardized prediction error (SPE_{jt}) is defined as

$$SPE_{jt} = PE_{jt} / S_{jt},$$ (3)

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[8] These 22 observations include 15 not reported in *The Wall Street Journal* and seven where the registration date preceded the earliest published report by more than one trading day.

where

$$
S_{jt} = \left[V_j^2 \left\{ 1 + \frac{1}{ED} + \frac{\left(R_{m_t} - \bar{R}_m \right)^2}{\sum\limits_{t=1}^{ED} \left(R_{mt} - \bar{R}_m \right)^2} \right\} \right]^{1/2}
\tag{4}
$$

In (4), V_j^2 is the residual variance of firm j's market model regression, ED is the number of days in the period used to estimate the market model, R_{mt} is the market return on day t, and $\bar{R}_m$ is the mean market return in the estimation period. The average standardized prediction error is

$$
ASPE_t = \frac{1}{N} \sum_{j=1}^{N} SPE_{jt}.
\tag{5}
$$

The individual daily prediction errors are assumed to be distributed normal, so each SPE_{jt} is distributed Student t with variance equal to $ED/(ED-2)$. Under the Central Limit Theorem, $ASPE_t$ is distributed normal with a variance equal to $[ED/(ED-2)(N)]$, assuming that the individual prediction errors are cross-sectionally independent. Since ED is large, $ED/(ED-2)$ is very close to one and the variance of $ASPE_t$ approximately equals $1/N$. For each day, the following Z-statistic is computed:

$$
Z = \sqrt{N} \left(ASPE_t \right),
\tag{6}
$$

which has a unit normal distribution under the hypothesis that the mean standardized prediction error equals zero.[9]

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[9]Our choice of statistical test is based on the simulation results presented by Brown and Warner (1984). For samples of 50 securities, Brown and Warner find that the mean excess return is distributed very close to normal, which supports our application of the Central Limit Theorem. In addition, when events are not clustered in calendar time, Brown and Warner find that the assumption of cross-sectional independence in estimating the variance of mean excess returns results in test statistics that are well-specified under the null hypothesis and are more powerful than procedures that do not assume cross-sectional independence. This supports our procedure of standardizing daily prediction errors before aggregating cross-sectionally. This method gives greater weight to the prediction errors that are measured more precisely (lower standard error of prediction errors) and presumably eliminates heteroscedasticity among prediction errors of different firms.

4. Evidence on stock price effects

4.1. Average prediction errors

Table 5 presents summary statistics of daily prediction errors for 21 trading days centered around the date of the earliest public disclosure of registered and non-registered secondaries. Column 1 designates the trading day, where day 0 is the announcement date. Columns 2 and 4 present the average daily prediction errors, and columns 3 and 5 present the proportion of negative prediction errors for each day.

Table 5

Daily average prediction errors and proportions of negative prediction errors for 21 trading days around the date of the earliest public disclosure of 146 registered and 321 non-registered secondary distributions of common stock (1972–1981).

Trading day (1)	Registered distributions		Non-registered distributions	
	Average prediction error[b] (2)	Proportion negative[c] (3)	Average prediction error[b] (4)	Proportion negative[c] (5)
−10	−0.31%[d]	0.59[d]	−0.09%	0.53
−9	0.39[e]	0.49	0.11	0.49
−8	0.21	0.47	0.05	0.53
−7	0.08	0.49	−0.05	0.50
−6	0.09	0.51	0.07	0.48
−5	−0.25	0.58	−0.22[d]	0.56[d]
−4	−0.17	0.58	−0.21[e]	0.55
−3	−0.07	0.53	−0.18	0.53
−2	−0.23	0.55	0.10	0.50
−1	−1.31[e]	0.71[e]	−0.40[e]	0.58[e]
0[a]	−1.56[e]	0.72[e]	−0.40[e]	0.61[e]
1	0.09	0.49	−1.56[e]	0.73[e]
2	0.33[d]	0.49	−0.73[e]	0.62[e]
3	0.38[d]	0.47	−0.41[e]	0.58[e]
4	0.37[e]	0.41[d]	−0.46[e]	0.57[e]
5	0.19	0.48	−0.15	0.59
6	−0.20	0.56	−0.15[e]	0.57[d]
7	0.01	0.49	0.01	0.52
8	0.19	0.52	−0.15	0.55
9	0.05	0.48	0.09	0.50
10	0.02	0.53	−0.13	0.50

[a] Day 0 is the announcement date for registered secondaries and is the distribution date for non-registered secondaries.

[b] The null hypothesis for each day is that the average standardized prediction error equals zero.

[c] The null hypothesis for each day is that the proportion of negative prediction errors equals 0.50. The test statistic is the Wilcoxon signed-ranks statistic described by Daniel (1978).

[d] Significant at the 0.05 level.

[e] Significant at the 0.01 level.

The average prediction errors in column 2 and the proportion of negative prediction errors in column 3 indicate a pronounced negative change in the value of common stock at the announcement of registered secondaries. The average two-day prediction error for the day preceding the announcement date (day -1) and the announcement date (day 0) is -2.87%. The average prediction errors on days -1 and 0 are both significant at the 0.01 level and 83% of the two-day prediction errors are negative.[10]

The disclosure of non-registered secondaries also has a negative effect on stock price. The average two-day prediction error for the distribution date (day 0) and the day following the distribution date (day 1) is -1.96%. Both average prediction errors in this two-day period are significant at the 0.01 level. Days 0 and 1 comprise the two-day period of interest for non-registered distributions, since these offerings typically are disclosed and begin after the close of trading on the distribution day. It is not surprising, therefore, that the largest negative average prediction error is observed on day 1. For this day, the average prediction error is -1.56%, and 73% of the prediction errors are negative. Buyers of non-registered secondaries on average appear to earn negative returns, since the average percentage discount of the offer price from the closing price on day 0 is only 0.2%, as reported below in table 11.

The average prediction errors observed on days 2, 3 and 4 for non-registered secondaries are troublesome. Each of these three average prediction errors is less than -0.40% and is significant at the 0.01 level. This suggests market inefficiency. An alternative explanation of the negative and significant returns on days 2 through 4 is that in some cases the offering date reported in the *Investment Dealers' Digest* and in the *SEC Statistical Bulletin* precedes the true offering date. However, we have no reason to suspect that the reported offering dates are incorrect. In addition, for the three subsamples of offerings with a standardized prediction error less than -1.5 on day 2, 3 or 4, respectively, the average standardized prediction errors on day 1 are negative and significant at the 0.01 level. This finding is consistent with an explanation based on incorrect dates only if news of the offering is leaked in advance. Finally, the negative returns on days 2, 3 and 4 do not appear to be related to the actual distribution of shares, since approximately 90% of the non-registered secondaries are completed by the end of day 1. Therefore, we do not have a satisfactory explanation at this time for the significant negative average prediction errors following day 1.

Table 6 presents the average prediction errors for the eleven trading days centered around the distribution date of registered secondaries. Eight of the eleven average prediction errors are negative, but no single average prediction

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[10] Test statistics are not adjusted to account for a possible increase in variance of returns around the announcement date. However, if every firm's variance of daily returns increases by the same proportion, the standard error of returns must increase by more than four times to change the inference that the day -1 and day 0 average prediction errors are significant at the 0.05 level.

Table 6

Daily average prediction errors and proportions of negative prediction errors for 11 trading days around the distribution date of 146 registered secondary distributions of common stock (1972–1981).

Trading day (1)	Average prediction error[b] (2)	Proportion negative[c] (3)
− 5	− 0.14%	0.56
4	0.07	0.46
− 3	0.29	0.48
− 2	− 0.08	0.55
− 1	− 0.30	0.60
0[a]	− 0.12	0.57
1	− 0.12	0.53
2	0.10	0.47
3	− 0.21	0.48
4	− 0.31	0.57
5	− 0.03	0.45

[a] Day 0 is the distribution date of the secondary offering.

[b] The null hypothesis tested for each day is that the average standardized prediction error equals zero. None of the average standardized prediction errors is significant at the 0.05 level.

[c] The null hypothesis for each day is that the proportion of negative prediction errors equals 0.50. The test statistic is the Wilcoxon signed-ranks statistic described by Daniel (1978). None of the test statistics is significant at the 0.05 level. The lowest *p*-value is 0.127 on day 0.

error is significant at the 0.05 level. Only the average prediction error on day − 1 is significant at the 0.10 level. In addition, for each day the signed-ranks test statistic is insignificant at the 0.10 level. On the distribution date, the average prediction error is only − 0.12% and 57% of the prediction errors are negative. Thus, there is no evidence of statistically significant changes in share price on the day of or immediately following the distribution date of registered offerings.

The average prediction errors for several intervals of trading days around the announcement date and the distribution date are reported in table 7. For registered offerings, the average prediction error for the eleven days surrounding the announcement date is − 2.23%, and is significant at the 0.01 level. The average prediction error in the interval from six trading days after the announcement date to six days before the distribution date, a period that is of different length for each registered secondary, is only − 1.02%, and is not statistically significant at the 0.10 level. The average prediction error is − 0.85% for the eleven days centered around the distribution date for these offerings, and is also not significant at the 0.10 level. Thus, the sum of the average prediction errors for registered secondaries from five trading days before the announcement date to five trading days after the distribution date is − 4.10%.

Table 7

Average prediction errors for several intervals around the announcement date (AD) and the distribution date (DD) of 146 registered and 321 non-registered secondary distributions of common stock (1972–1981).

Interval of trading days (1)	Registered distributions		Non-registered distributions	
	Average interval prediction error[a] (2)	Z-value[b] (3)	Average interval prediction error[a] (4)	Z-value[b] (5)
AD − 49, AD − 39	0.12%	0.26	− 0.38%	− 1.23
AD − 38, AD − 28	0.42	0.66	− 0.21	− 0.83
AD − 27, AD − 17	1.14	2.09	− 0.48	− 1.75
AD − 16, AD − 6	− 0.17	− 0.44	− 0.42	− 1.27
AD − 5, AD + 5	− 2.23	− 3.70	− 4.62	− 11.62
AD + 6, DD − 6[c]	− 1.02	− 0.55	[d]	
DD − 5, DD + 5	− 0.85	− 1.29	[e]	
DD + 6, DD + 16	0.78	2.29	− 0.54	− 0.94
DD + 17, DD + 27	0.35	1.28	0.43	0.95
DD + 28, DD + 38	0.46	0.90	0.02	0.08
DD + 39, DD + 49	0.05	0.19	− 0.07	− 0.11

[a] The average interval prediction error ($AIPE$) equals the sum of the daily average prediction errors (APE) in the specified interval of days.

$$AIPE_{D_1, D_2} = \sum_{t=D_1}^{D_2} APE_t,$$

where D_1 and D_2 are the first and last days in the interval of interest.

[b] The null hypothesis for each interval is that the average cumulative standardized prediction error equals zero. The Z-values reported above do not change materially when calculated as the average prediction error divided by an estimate of the standard deviation adjusted for first-, second- and third-order autocorrelation in the prediction errors.

[c] Only 119 registered secondaries are represented in this interval because in 27 cases the announcement date and distribution date are less than 11 days apart.

[d] This interval contains zero days.

[e] The distribution date is the date of earliest public disclosure (AD).

During the comparable eleven-day period for non-registered secondaries, the average prediction error is −4.62%.[11]

Significant negative stock price effects are confined primarily to intervals that contain the announcement date. No negative average prediction error that is significant at the 0.05 level is observed for any interval that precedes the announcement date or follows the distribution date for registered secondaries.

[11] If we combine our samples of registered and non-registered secondaries, as Scholes does, the average prediction error on the offering date is −0.31% and the average prediction error for the eleven days surrounding the offering date is −3.43%. Scholes reports an average return of −0.55% on the offering date and −1.69% for the eleven days around the offering date for his sample of secondaries.

For non-registered secondaries, the average prediction errors for the eleven-day periods that immediately precede and follow the eleven-day interval around the announcement date are not significant at the 0.10 level.

Significant positive returns are observed in the period following the distribution of shares in registered secondaries. The cumulative average prediction error over days 6 through 16 is 0.78%, and the cumulative average prediction error for the interval from days 6 through 49 is 1.64%. Both are significant at the 0.01 level. However, since these positive returns do not begin until six days after the sale, it seems unlikely that they are associated with a price recovery that is related to a decrease in price around the announcement and distribution dates. There is no evidence of a price recovery for the non-registered secondaries. The cumulative average prediction error is -0.54% over days 6 through 16 and is -0.20% for the interval from day 6 through 49.[12]

In summary, we find a significant negative stock price response to the earliest public disclosure of both registered and non-registered secondary distributions. The small negative price change observed at the distribution date of registered secondaries is not significantly different from zero. Thus, the significant price impact of secondaries occurs in response to news of the offerings, rather than at the time of the actual sale of shares. In the remainder of this section we present evidence that is relevant to possible explanations of the stock price effects.

4.2. Potential determinants of the announcement date price effects

We examine two potential explanations of the stock price effects of secondary distributions. The first is the notion that the decrease in share price reflects the market's belief that the seller has unfavorable information about the firm, or at a minimum that the seller has no favorable information. The second explanation is that the decrease in share price is due to a supply effect, i.e., movement along a downward sloping transaction, or excess, demand curve for a firm's shares.[13]

Price effect due to unfavorable information. Several characteristics of a seller or of a secondary distribution are potential determinants of the market's percep-

[12] Scholes reports an average prediction error of -0.8% for registered secondaries and of -1.4% for non-registered secondaries over the fourteen days that follow the offering date. He argues that given a commission of approximately 1%, an investor is essentially indifferent between buying shares in a secondary offering and paying no commission or buying the shares several days after the offering and paying a commission. Our results do not support this statement. Over the sixteen days following the offering date, the average prediction error for registered secondaries is 0.2% and for nonregistered secondaries is -3.9%.

[13] The concept of a transaction, or excess, demand curve is presented in Hirshleifer (1980). A transaction demand curve relates share price and the quantity of shares demanded by investors in excess of shares already owned.

tion that the seller possesses unfavorable information about the firm. First, the market's perception may depend on the seller's relation to the firm. For example, Scholes (1972) suggests that an individual involved in a firm's decision-making, such as an officer or director, is viewed more likely to possess inside information than other shareholders. Therefore, we test the following proposition:

> The relative decrease in stock price at the initial announcement is greater for offerings by officers or directors than for offerings by other types of sellers.

This proposition is tested using the classification of registered offerings described in section 3.2.

Second, the market's perception that the seller holds unfavorable information may depend on the seller's proportional ownership of the firm's shares. The seller's incentive and ability to be informed about the firm's prospects is greater, the larger the ownership stake. For example, the holder of a sufficiently large block of shares who can exercise some influence over the firm's activities is likely to be informed about the firm through direct communication with management. A second proposition we test is:

> The relative decrease in stock price at the initial announcement is greater, the larger is the proportion of the firm's shares held by the seller prior to the offering.

Third, investors' view of whether the seller holds unfavorable information may depend on the seller's proportional ownership of the firm's shares following the secondary offering. The smaller is the seller's post-offering ownership stake, the smaller is any decrease in the selling stockholder's wealth due to unfavorable information that is divulged after the offering. Therefore, the market is more likely to perceive that the seller possesses unfavorable information if the seller retains none or only a small proportion of the firm's shares after the offering. We test the following proposition:

> The relative decrease in stock price at the initial announcement is greater, the smaller is the seller's post-offering ownership stake of the firm's shares.

To test the two propositions concerning the seller's ownership in the firm, the number of shares held and the number of shares offered by the principal seller were collected from the offering prospectus of each registered secondary.

Fourth, dollar value of the secondary offering may also be a determinant of the market's perception that the seller holds unfavorable inside information. Controlling for other possible determinants, the larger is the dollar value of the offering, the greater is the incentive of the seller to be informed about the firm's prospects and to act on unfavorable inside information. A fourth

proposition is:

> The relative decrease in stock price at the initial announcement is greater, the larger is the dollar value of the offering.

The number of shares offered and the offer price are collected from the prospectus of each registered secondary.

Supply effect on share price due to less than perfectly elastic demand.   If a firm's shares do not have sufficiently close substitutes, so that demand is less than perfectly elastic, a potential price effect of a secondary offering is due to movement along a downward sloping excess demand curve. This effect reflects neither the transactions costs of selling shares nor a change in the market's assessment of the firm's earnings prospects. Instead, a supply effect represents a change in equilibrium price due to the characteristics of demand for a firm's shares, and implies that the marginal market valuation of the last share offered is below the current market price. This corresponds to what Kraus and Stoll (1972) call a 'distribution effect due to different investor preferences for a given security'.

A supply effect implies that the price response to a secondary depends on the size of the offering and on the elasticity of demand for the firm's shares. In addition, in an efficient market a supply effect occurs at the initial announcement, since a supply effect represents a change in equilibrium price. Therefore, we test the following proposition:

> The relative decrease in stock price at the initial announcement is greater, the larger is the number of shares offered relative to the number of shares outstanding.

A difficulty with testing this proposition is that a negative relation between the price response and the size of the offering is also consistent with the unfavorable information hypothesis, since offering size can be a proxy for unfavorable information. However, a supply effect suggests that the elasticity of demand as well as the size of the offering affect the price response. We attempt to distinguish a supply effect from an unfavorable information effect by investigating whether the relation between the price response and offering size depends on factors we conjecture are related to demand elasticity.

4.3. Cross-sectional tests of the propositions

Table 8 reports the estimates of the coefficients of weighted least squares regressions of the two-day announcement period prediction error for registered secondaries on (1) an index variable that equals one if the seller is classified as

Table 8

Estimated coefficients for weighted least squares regressions of the two-day announcement period prediction errors on proxies for the market's assessment of unfavorable information and for relative offering size for 146 registered secondary distributions of common stock (1972–1981) (t-statistics are in parentheses).[a]

| | | Independent variables[b] | | | | | |
	Const. (1)	TYPE (2)	STAKE (3)	KEEP (4)	ln(DVAL) (5)	SIZE1 (6)	F-stat.[c]
(1)	0.012 (0.56)	−0.016 (−2.27)	0.076 (0.55)	−0.083 (−0.59)	−0.002 (−1.14)	−0.144 (−0.56)	14.43 (6,140)
(2)	0.004 (0.20)	−0.016 (−2.47)	−0.045 (−1.10)	0.029 (0.57)	−0.002 (−0.83)		15.56 (5,141)
(3)	0.013 (0.62)	−0.019 (−3.21)			−0.003 (−1.22)	−0.076 (−1.94)	21.81 (4,142)

[a] The dependent and independent variables are divided by the standard error of the two-day prediction error.

[b] Independent variables are defined as follows: $TYPE$ = index variable equal to one if seller is an officer or director and equal to zero otherwise, $STAKE$ = proportional ownership position of principal seller prior to the offering, $KEEP$ = proportional ownership position of principal seller after the offering, $DVAL$ = dollar value of the offering, and $SIZE1$ = number of shares offered divided by the number of shares outstanding.

[c] The F-statistic tests the hypothesis that all the coefficients (including the intercept) are different from zero. Degrees of freedom are in parentheses under the F-statistic.

an officer or director and equals zero otherwise ($TYPE$), (2) the pre-offering proportional ownership stake of the seller ($STAKE$), (3) the post-offering ownership position of the seller ($KEEP$), (4) the natural logarithm of the dollar value of the offering ($DVAL$) and (5) the number of shares offered divided by shares outstanding ($SIZE1$). The dependent and independent variables are divided by the standard error of the predicted two-day announcement period stock return to adjust for unequal variances of prediction errors across firms. These tests do not include non-registered secondaries, because $TYPE$, $STAKE$ and $KEEP$ are not disclosed in the announcement of these offerings.

Row 1 of table 8 presents the coefficient estimates of a multiple regression on all five independent variables. Only the coefficient on the dummy variable for the type of seller has a t-statistic that is significant at the 0.05 level. Since the variable $SIZE1$ in most cases equals the difference between the variables $STAKE$ and $KEEP$, $SIZE1$ is excluded from the regression reported in row 2.[14] Again, only the coefficient on type of seller ($TYPE$) is significant. When the variables $STAKE$ and $KEEP$ are excluded, the coefficients on relative

[14] $SIZE1$ equals $STAKE$ minus $KEEP$ for the 89 offerings by a single seller.

Table 9

Estimated coefficients for weighted least squares regressions of the two-day announcement period prediction errors on the relative size and the log of dollar value of the offering for registered secondary distributions of common stock (1972–1981) (t-statistics are in parentheses).[a]

Sample of secondaries	Sample size	Independent variables[b]			F-stat.[c]
		Const.	SIZE1	ln(DVAL)	
(1) Registered offerings by sellers other than officers and directors	93	0.021 (0.90)	−0.082 (−1.86)	−0.003 (−1.45)	12.45 (3,90)
(2) Registered offerings by sellers other than officers and directors	93	−0.012 (−2.92)	−0.077 (−1.75)		17.42 (2,91)
(3) Registered offerings by sellers in the trust and estates category	38	0.036 (0.89)	−2.11 (−2.01)	−0.004 (−1.08)	6.12 (3,35)
(4) Registered offerings by sellers in the trusts and estates category	38	−0.077 (−1.12)	−0.166 (−1.73)		8.56 (2,36)

[a] The dependent and independent variables are divided by the standard error of the two-day prediction error.

[b] Independent variables are defined as follows: SIZE1 = number of shares offered divided by the number of shares outstanding, and DVAL = dollar value of the offering.

[c] The F-statistic tests the hypothesis that all the coefficients (including the intercept) are different from zero. Degrees of freedom are in parentheses under the F-statistic.

offering size (SIZE1) and on type of seller (TYPE) are significant at the 0.10 and 0.01 levels, respectively.[15]

The significant coefficient on type of seller (TYPE) is consistent with a price effect due to the market's inference of unfavorable information. However, the statistically insignificant coefficients for the pre-offering ownership position (STAKE), the post-offering ownership position (KEEP) and the dollar value of the offering (DVAL) do not support a price effect due to unfavorable information. The negative coefficient on the relative offering size (SIZE1) can be interpreted in two ways. First, SIZE1 is related to each of the variables STAKE, KEEP and DVAL, and is possibly a proxy for the effects of unfavorable information. The second interpretation is that the coefficient on SIZE1 represents an effect due to less than perfectly elastic demand.

We attempt to distinguish between a supply effect and an unfavorable information effect. First, we estimate the cross-sectional relation between the

[15] Scholes finds no relation between prediction errors and measures of SIZE1 for his combined sample of registered and non-registered secondaries. Scholes' results differ from ours for at least two reasons: (1) the dependent variable in his regression is the single-day prediction error on the offering date, and (2) Scholes does not control for other potential determinants of price effects and estimates simple regressions on SIZE1 and DVAL, respectively.

initial announcement two-day prediction errors and *SIZE1* for subsamples of offerings that are least likely to be associated with a price effect due to unfavorable information. Offerings by officers and directors are excluded from these subsamples, since the evidence in table 8 indicates that sales by officers and directors are associated with a significantly greater price decrease than sales by other types of shareholders. Table 9 shows that for the sample that excludes offerings by officers and directors, the coefficient on *SIZE1* is significant at the 0.10 level both in a regression that includes the dollar value of the offering, and in a simple regression. For the sample of 38 secondaries in the trusts or estates category, the coefficient on *SIZE1* is significant at the 0.05 level in the multiple regression including the dollar value of the offer, and is significant at the 0.10 level in the simple regression. These results provide weak support for a supply effect. However, even for these offerings *SIZE1* may be a determinant of the market's perception of unfavorable information.

Second, since a supply effect implies that the price response is related not only to the relative size of the offering, but also to the elasticity of demand for a firm's shares, we attempt to control for possible differences in elasticity of demand across firms. We classify secondaries according to characteristics that are related to firm size or trading activity. We conjecture that demand for a firm's shares is less elastic for (1) smaller firms, (2) lower priced shares, (3) shares with lower average daily trading volume, and (4) shares with a smaller proportion of ownership by institutional investors. The conjecture implies that the relation between the announcement period prediction error and the relative size of secondary offerings depends on these factors.

For both the registered and non-registered samples, we test whether the cross-sectional relation between the announcement period prediction error and *SIZE1* differs between subsamples of offerings grouped according to one of these four characteristics.[16] That is, we test for equality of the coefficients on *SIZE1* between subsamples.[17] In none of the eight tests is the *F*-statistic significant at the 0.10 level. The relation between the announcement period

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[16] The market value of the equity, calculated as the offer price times the number of shares outstanding in the month prior to the announcement, is used as a proxy for firm size. The number of shares outstanding is reported in the *Security Owner's Stock Guide*. Average daily trading volume is calculated over the six months prior to the month of the first public disclosure, using monthly trading volume reported in the *Security Owner's Stock Guide*. Shares held by institutional investors were collected for the month prior to the disclosure of the offering from the *Security Owner's Stock Guide*.

[17] Our test of equality of coefficients on *SIZE1* is presented in Johnston (1972, pp. 192–199). For each of the four characteristics conjectured to be associated with demand elasticity, we sort the secondaries into two samples, for example the smallest third of the firms (S) and the largest third of the firms (L). Unrestricted regressions (i) (small firms) and (ii) (large firms) are estimated on the subsamples,

$$PE = \alpha_S + \beta_S(SIZE1),$$ (i)

$$PE = \alpha_I + \beta_I(SIZE1),$$ (ii)

For the unrestricted model, the total sum of squared residuals, denoted SS_u, equals the sum of squared residuals from the two simple regressions given above. *(Continued on next page)*

prediction error and the relative size of the offering (*SIZE1*) does not depend on any of the four variables that we conjecture are related to determinants of demand elasticity. These results do not support a supply effect.

Even though the identity of the seller and the relative size of the offering are related to the price response, there is evidence that secondaries are associated with a negative stock price reaction regardless of the characteristics of the offering that we hypothesize are important. Table 10 reports average prediction errors at the announcement of registered secondaries for the five categories of sellers defined in table 4 and for quartiles of secondaries grouped by relative size of offering (*SIZE1*). Column 4 presents two-day average prediction errors for days −1 and 0, where day 0 is the announcement date.

The two-day average prediction errors range from −2.44% for secondaries by individuals to −3.40% for secondaries by directors and officers. The two-day average prediction error is −2.57% for secondaries by sellers other than officers or directors.[18] The *Z*-values in column 6 indicate that the average prediction errors are significant at the 0.01 level for all seller types.[19] For

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Next a restricted regression model (iii) is estimated on the combined samples of small and large firms, where only the intercept term is allowed to vary between the two subsamples,

$$PE = \alpha + \alpha'(D) + \beta(SIZE1),$$ (iii)

where *D* is an index variable that equals one for subset *S* firms and equals zero otherwise. The sum of squared residuals of the restricted model is denoted SS_R.

To test for a difference in the coefficients on *SIZE1* between the two subsamples, we compute the following *F*-statistic:

$$F = (SS_R - SS_u)/[SS_u/(N_S + N_L - 4)],$$ (iv)

where N_S and N_L are the numbers of small and large firms in subsets *S* and *L*, respectively. A significant *F*-statistic implies a reduction in the sum of squared residuals due to allowing the coefficient on *SIZE1* to vary across the subsamples of firms.

[18] The prediction errors of subsamples of secondaries grouped by the type of selling stockholder are also analyzed using a non-parametric test, the Mann–Whitney U-test. The results are very similar to the *Z*-values reported in table 10.

[19] The results in table 10 do not appear to be sensitive to our particular method of classifying sellers. Other classification schemes we investigated lead to similar results. These other procedures include (1) redefining the officer and director category to include their family members, trusts for their benefit, corporations controlled by them and non-profit institutions on whose boards they sit; (2) re-assigning officers and directors to other categories if there were multiple sellers involved and other sellers sold more shares than the officers and directors; and (3) classifying sellers based on information in the *SEC Statistical Bulletin*, as did Scholes. Based on the SEC seller categories, we also find the largest price response to sales by corporations, and the smallest price response to sales by trusts and estates, consistent with Scholes' findings. However, the average two-day prediction error is significant at the 0.01 level for each seller category.

In addition, we consider the possibility that the identity of the seller may not always be known at the initial public disclosure of registered secondaries. If the published report precedes the SEC filing date and the seller's identity is not revealed by *The Wall Street Journal*, then it is likely that the seller's identity is not known at the time of the first public disclosure of the secondary.

To determine the importance of these differences in disclosure, we partition the 53 observations in the officer and director category into two groups. The first group of 41 observations includes those where the identity of the seller is known at the announcement. The second group includes the 12 observations where the report in *The Wall Street Journal* precedes the SEC filing and does not disclose the seller's identity. The difference between the two-day average prediction errors for these two groups is not significant at the 0.10 level.

Table 10

Two-day announcement period common stock average prediction errors and proportions of negative two-day prediction errors for 146 registered secondary distributions of common stock classified by the type of selling stockholder and by offering size (1972–1981).

Sample of secondaries[a] (1)	Number of observations (2)	Average number of shares offered ÷ shares outstanding (SIZE1) (3)	Average two-day prediction error (4)	Proportion negative (5)	Z-value[b] (6)
Officers and directors	53	0.099	– 3.40%	0.85	– 8.47
All other sellers	93	0.076	– 2.57	0.82	– 8.36
Individuals	25	0.014	– 2.44	0.80	– 4.05
Corporations	20	0.143	– 2.90	0.85	– 4.27
Banks, insurance companies and investment companies	10	0.070	– 2.65	0.90	– 2.52
Trusts, estates, universities and foundations	38	0.064	– 2.47	0.79	– 5.41
Size quartile 1	36	0.189	– 3.94	0.92	– 6.96
Size quartile 2	37	0.075	– 2.83	0.78	– 5.84
Size quartile 3	37	0.041	– 2.73	0.81	– 6.52
Size quartile 4	36	0.019	– 2.00	0.81	– 4.48

[a] The classification of sellers is based on information disclosed in the offering prospectus, as described in section 3.2.

[b] The null hypothesis is that the average standardized prediction error for the two-day announcement period equals zero.

subsets of secondaries grouped by relative offering size, the average prediction error ranges from – 3.94% for the largest offerings (quartile 1) to – 2.00% for the smallest offerings (quartile 4). The average prediction errors are significant at the 0.01 level in all quartiles.

In column 5 we report the proportion of negative two-day prediction errors in each subset of secondary offerings. Among the subsamples grouped by type of seller the smallest proportion is 0.79, and among the size subsamples the smallest proportion is 0.78. These proportions, along with two-day average prediction errors in column 4, suggest that a negative price response is pervasive across the sample.[20]

[20] Scholes (1972) also compares average prediction errors of different seller types for his combined sample of registered and non-registered secondaries. Scholes calculates average prediction errors, by seller type, for 21 days surrounding the actual date of the offering. We see two possible problems with this procedure. First, it is likely that the identity of most sellers of registered offerings is disclosed *prior* to the time interval examined by Scholes. For example, for

The uniformly negative price effects presented in table 10 suggest two implications about the information conveyed by the sale of securities. First, the market's perception of who holds inside information may be quite broad. Second, the event of a secondary offering may convey unfavorable information since it suggests that the seller, or the selling agent, is unable to find a buyer willing to acquire a substantial block of shares at or above the current market price. For example, Bradley and Wakeman (1983) suggest that a firm's decision not to repurchase a block of shares and to allow it to be sold in a secondary distribution conveys unfavorable information about the firm's value. Moreover, a secondary offering generally distributes shares held by one or a few investors among a larger number of investors, and can be viewed as the opposite of stock purchases that result in the accumulation of a substantial block of shares by a single investor.[21] A secondary may reduce the likelihood of an attempt to acquire control of the firm.

5. Underwriting and other costs of secondaries

The evidence reported in the preceding section shows that on average the news of a secondary distribution is met with a decrease in share price. Other potentially important wealth effects on the sellers are the underwriting and other costs associated with secondary distributions. In this section we document that these costs are substantial, suggesting that holders of shares cannot sell a large number of shares within a short period of time at a small cost. In addition, we examine whether costs are predominantly payments to underwriters or price discounts to the buyers of shares.

5.1. Descriptive statistics

Table 11 presents a summary of the dollar and percentage costs for the samples of registered and non-registered secondaries. The costs of secondaries include the underwriting spread (row 1), other expenses incurred by the seller (row 2) and the difference between the offer price and the market value of the

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119 of the 146 registered secondaries in our sample, the announcement date precedes the offering date by more than ten trading days. Second, it is unclear that the identity of most sellers of non-registered secondaries is known by ten days *after* the offering date. Neither the exchange nor the selling agent reveal the identity of the seller. In addition, very few sellers of non-registered secondaries appear to be insiders, and therefore are not required to report the sale as an insider transaction. For example, in our sample only 3% of the sellers are officers or directors.

[21] Mikkelson and Ruback (1984) find positive stock price effects for target firms when another firm files a Schedule 13D disclosing that a 5% or greater ownership position has been attained. For a sample of 184 filings where no plans to acquire control were disclosed, the average reported ownership position is 12.0% of the target firm's shares and the average two-day prediction error of the target firms is 1.73%.

Table 11

Summary of the average underwriting and other costs of 146 registered and 321 non-registered secondary distributions of common stock (1972–1981).

	Registered offerings[a]				Non-registered offerings[a]			
	Cost in millions		Cost as percent of value of offering		Cost in millions		Cost as percent of value of offering	
Type of cost	Mean (1)	Median (2)	Mean (3)	Median (4)	Mean (5)	Median (6)	Mean (7)	Median (8)
(1) Underwriting spread	$1.19	$0.65	4.9%	4.7%	$0.15	$0.10	4.7%	4.4%
(2) Other reported expenses	0.19	0.12	1.1	0.8	b	b	b	b
(3) Discount in offer price[c]	0.13	0.0	0.6	0.0	0.01	0.0	0.2	0.0
(4) Sum of costs: (1) + (2) + (3)	$1.44	$0.85	6.7%	6.0%	$0.16	$0.11	5.0%	4.6%

[a] The average offering sizes are $31.6 million and $3.5 million for the registered and non-registered offerings, respectively.

[b] These data are unavailable.

[c] The discount is the difference between the market value of the shares at the close of trading on the offering date and the offer price.

shares offered at the close of trading on the offering date (row 3).[22] Columns 1 and 5 present the average total dollar magnitudes and columns 2 and 6 present the median magnitudes. Columns 3 and 7 contain the average percentage costs measured relative to the total dollar value of the offering. Median percentages are reported in columns 4 and 8.

The largest component of the costs of both registered and non-registered secondaries is the underwriting spread, the difference between the seller's and underwriter's proceeds. The average underwriting compensation relative to the total dollar value of the offering is approximately 5% for both types of offerings. The costs of registered offerings are very similar to the proportional costs for various size categories of underwritten primary offerings of common stock reported by Smith (1977). For example, the 34 registered secondary offerings between $20 million and $50 million have an average underwriting spread of 4.28%, and other costs on average are 0.7% of the value of the offering. For 156 primary offerings in this size bracket, Smith reports an

[22] Other costs are not itemized in the offering prospectus. But according to the SEC documentation of the Registered Offering Statistics data base, other expenses reported in the offering prospectus include the SEC filing fee, state taxes, transfer fees, printing and engraving expenses, legal fees, accounting and auditing fees, engineering fees and miscellaneous expenses.

average underwriting spread of 4.3% and average proportional other expenses of 0.4%. Underwriting spreads are lower for non-registered than for registered secondaries in all categories of offering size. For example, the average underwriting spread is 2.79% for the four non-registered offerings between $20 million and $50 million. Most non-registered offerings in our sample are between $2 million and $5 million. The average underwriting spread is 4.44% for the 129 non-registered offerings in this category and is 6.18% for the 30 registered offerings in this category.

The relative discount between the offer price and the market price at the close of trading on the offering date is 0.6% for the registered offerings and is 0.2% for the non-registered offerings. Although on average the offering occurs at a discount, for 59% of registered and 55% of non-registered offerings the offering price equals the closing price.

The costs presented in table 11 are substantial. The average total cost of registered offerings is 6.7% of the value of the offering. This includes the underwriting spread, other selling costs and the discount between the closing and offering prices. The average total cost of non-registered offerings is 5.0%, which includes the underwriting spread and the discount between the closing and offering prices. Therefore, in addition to the significant stock price effects at the initial announcement, the underwriting and other costs of secondaries are an important part of the wealth effect of a secondary offering on the selling shareholder. A potential determinant of underwriting costs is investigated below.

5.2. Underwriting and the costs of liquidity

Another possible price effect associated with the actual sale of a large number of shares is a liquidity cost effect, a temporary price decline reflecting compensation to the buyer for providing liquidity to the seller. Buyers may require compensation for (1) an undesired portfolio composition due to acquiring the shares upon short notice, (2) the transactions costs of adjusting portfolio composition to accommodate the shares or (3) the costs of reselling the shares. One form of compensation to the buyers is selling the shares at a discount relative to market price. Kraus and Stoll (1972) call this a 'distribution effect due to short-run liquidity costs.'

We differentiate a liquidity cost effect from a supply effect, and our distinction is similar to that drawn by Kraus and Stoll (1972). A liquidity cost effect on share price represents compensation to the marginal buyer through a temporary deviation from the equilibrium price at the offering, and a price recovery following the sale of shares. A supply effect represents a change in equilibrium price and does not imply a price recovery. Therefore, for registered secondaries a supply effect is expected to occur in response to the initial

announcement in an efficient market. In contrast, a liquidity cost effect is expected to occur at the offering, since this effect represents compensation to the buyers.

The average daily stock returns in the first few days following the distribution date of registered secondaries (table 6) and non-registered secondaries (table 5) show no evidence of a price recovery that supports a liquidity cost effect.[23] The only evidence of positive returns is observed six or more days after registered offerings. This is in contrast to Kraus and Stoll's finding of a price decline and a partial price recovery by the close of trading following large block trades they classify as sales.

There are two possible reasons that we do not detect a temporary decrease in price associated with secondaries. First, the price decline and recovery may be observable only in intraday price changes. Second, as pointed out by Kraus and Stoll, there may be no compensation to the buyers of underwritten secondaries because underwriters provide liquidity to sellers by locating investors willing to buy all of the shares at the prevailing market price, and guaranteeing the net proceeds of the sale.

It may be costly to identify investors willing to buy at the current market price when the relative offering size is large. That is, the relative size of a secondary offering is a possible determinant of selling costs that are reflected in the underwriting spread. One view of this relation is that the marginal costs of search for buyers increase with the relative size of the offering. A second view is that underwriters provide assurance to potential buyers about the accuracy of information about the sale. The costs of providing this assurance may depend on the relative size of the offering, since offering size is a possible determinant of the market's perception of unfavorable information. Therefore, we test the following proposition:

> The relative underwriting spread of a secondary is positively related to the relative size of the offering.

That is, an effect of an increase in relative size of the offering is an increase in underwriting costs per share.

Table 12 presents estimates of cross-sectional regressions of underwriting spread per share on the relative size of the offering and on the natural log of the total dollar value of the offering ($DVAL$). We measure offering size relative to the number of shares outstanding ($SIZE1$) as well as relative to average daily trading volume measured over the six months preceding the announce-

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[23] We do not have an explanation for the significant positive average prediction errors on the second, third and fourth trading days that follow the announcement date of registered secondaries (table 5). The pattern of returns suggests a price recovery, but it is unclear how these returns can be interpreted as compensation to the eventual buyers or as a liquidity cost effect. We are unaware of a theory that predicts positive stock returns between the announcement and distribution dates of secondaries.

Table 12

Estimated coefficients for regressions of the underwriting spread on measures of size and natural log of the dollar value of the offering for 146 registered secondaries and 321 non-registered secondary distributions of common stock (1972–1981) (*t*-statistics are in parentheses).

| Sample | Independent variables[a] | | | | R^2 | *F*-stat.[b] |
	Const. (1)	*SIZE1* (2)	*SIZE2* (3)	ln(*DVAL*) (4)		
(1) Registered secondaries	0.123 (19.64)	0.056 (5.18)		−0.088 (−12.78)	0.58	98.18 (3,143)
(2) Registered secondaries	0.126 (19.63)		0.00003 (3.90)	−0.008 (−12.62)	0.55	86.49 (3,143)
(3) Non-registered secondaries	0.110 (14.29)	0.220 (4.64)		−0.009 (−8.76)	0.21	41.73 (3,318)
(4) Non-registered secondaries	0.108 (14.30)		0.0002 (5.42)	−0.009 (−8.69)	0.23	46.38 (2,319)

[a] Independent variables are defined as follows: *SIZE1* = number of shares offered divided by number of shares outstanding, *SIZE2* = number of shares offered divided by average daily trading volume for the six months preceding the month of the announcement, and *DVAL* = dollar value of the offering.

[b] The *F*-statistic tests the hypothesis that all the coefficients (including the intercept) are different from zero. Degrees of freedom are in parentheses under the *F*-statistic.

ment month (*SIZE2*). Motivation for the second independent variable (*DVAL*) is provided by Smith (1977), who reports that underwriting spread decreases by incrementally smaller amounts as the dollar value of primary offerings of common stock increases. We investigate whether there is a positive association between underwriting spread and the relative size of the offering, controlling for the effect of the dollar value of the offering.

The positive and significant coefficients reported in columns 2 and 3 suggest that in both the registered and non-registered samples there is a positive relation between underwriting spread and the relative size of the offering, regardless of the measure of size.[24] The coefficients on the log of the dollar value of the offering presented in column 4 are negative and significant, consistent with the summary data presented in Smith (1977).

The regressions reported in table 12 are also estimated using a dependent variable that measures the sum of the underwriting spread and the proportional discount between the offer price and the closing market price on the offering date. The new dependent variable equals the difference between the

[24] To investigate the view that underwriters provide assurance to buyers about the accuracy of information, an index variable is added to the regressions reported in rows 1 and 2 in table 12. The variable equals one if the seller is classified as an officer or director and equals zero otherwise. Presumably the effort required in assuring investors about the accurate disclosure of information is greater for secondaries by officers and directors. We find, however, that the coefficient on this index variable is not significant at the 0.10 level.

closing market price and the offering price net of underwriting spread, divided by the closing market price. The coefficients for *SIZE1* and *SIZE2* are positive and significant at the 0.01 level in each regression, and are not sufficiently different from the results in table 12 to warrant a detailed presentation.

The positive relation between underwriting spread and relative offering size, demonstrated in table 12, suggests that for secondary distributions a component of underwriting compensation is related to the costs of selling shares. This holds under the assumption that the effort underwriters expend providing liquidity to sellers increases with the relative size of the offering. Furthermore, given Kraus and Stoll's finding of an intraday price recovery following large block transactions, one can argue that without underwriting secondary distributions completed within the same amount of time would be associated with larger price discounts than are observed in our samples.[25] Therefore, our failure to find a large average discount between closing price and offering price or a price decline and recovery around the offering date does not necessarily imply that liquidity costs are unimportant for secondaries.

6. Summary and conclusions

This study reports significant negative average stock returns at the earliest public announcement of secondary distributions of common stock and documents the substantial underwriting and other costs involved. The average two-day risk-adjusted stock return at the initial announcement is −2.87% for registered secondaries and is −1.96% for non-registered secondaries. Average underwriting compensation is approximately 5% of the value of the offering for both registered and non-registered secondaries. Average total selling costs are 6.7% for registered offerings and are 5.0% for non-registered offerings. Overall, our evidence does not support the view that a shareholder can sell a large quantity of shares within a short period of time at the prevailing market price and at a small cost.

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[25] Scholes (1972, p. 208) states that the seller incurs similar costs in selling shares through a secondary versus selling shares in the open market after news of the sale is divulged. For our sample of non-registered secondaries, on average the seller incurs costs of 5.0% (see table 11). If the seller waits until the market fully incorporates news of the secondary, say five days after the offering, the average additional price decrease is −3.0%. Therefore, if the commission costs of selling shares are less than 2.0%, the total costs incurred by the seller appear to be lower when shares are sold in the market, even if the market has fully incorporated news of the sale. An alternative view of these data is that on average the commission and liquidity costs of selling a large number of shares without the services of an underwriter are at least 2.0%; otherwise sellers would not choose an underwritten secondary as the method to sell shares.

The seller of a registered secondary on average incurs cost of 6.7% and does not avoid a price effect due to news of the offering, since these offerings are announced in advance. The substantial decrease in wealth borne by the sellers of registered offerings suggests that there are substantial costs of selling the shares without the services of an underwriter. It is unclear why a shareholder sells shares through a registered secondary offering, if the costs of selling the shares in the market are only the normal commission costs of a large block transaction.

We analyze various characteristics of sellers of registered secondary offerings that may determine the stock price response to the initial announcement. We find evidence that the decrease in stock price is greater for offerings by officers or directors, consistent with an effect that reflects the market's inference that the seller holds unfavorable information about the firm. The announcement period stock price response is not significantly related to the seller's pre-offering or post-offering ownership stake nor to the dollar value of the offering. We also find weak evidence of a negative relation between the announcement period stock return and the size of the offering measured relative to total shares outstanding. This evidence could be interpreted as consistent with less than perfectly elastic demand for shares. However, this result is also consistent with a relation between relative offering size and the market's perception that the seller holds unfavorable information.

Perhaps the most striking finding of our study is that significant negative stock price effects are observed for all types of secondaries. Regardless of the type of seller or the size of the offering, news of a secondary is met with a decrease in share price. One interpretation is that the market's perception of investors with inside information is much broader than just corporate insiders. A second interpretation is that unfavorable information is conveyed by the event of a sale. That is, a secondary informs the market that the seller, or a selling agent, was unsuccessful in locating a buyer willing to acquire the entire block of shares at or above the prevailing market price. Thus, information that reduces share price possibly is conveyed by the characteristics of the buyer(s) of a concentrated holding of shares, as well as by the method of sale and the particular characteristics of the offering.

No evidence of a temporary price decrease that reflects compensation to the buyers is observed in daily stock returns immediately following the distribution date. We find, however, that the underwriting spread of secondaries is related positively to the relative size of the offering, controlling for the effect of dollar value of the offering. This is consistent with the argument that the underwriting spread in part reflects compensation for the underwriters' selling effort or liquidity services, and that selling effort depends on relative offering size. Therefore, even though we find no evidence of a decrease in share price followed by a price recovery for secondary offerings, we cannot conclude that the costs of liquidity are unimportant. The evidence is consistent with Kraus and Stoll's suggestion that the selling effort of underwriters in secondaries mitigates the temporary decrease in share price that otherwise would be associated with the sale of a large quantity of shares within a short period of time.

Finally, the significant stock price effects and substantial costs of offering shares in a secondary distribution raise three questions that we leave unanswered. First, what benefits to the selling shareholders offset the costs of secondaries? For example, it is unclear what factors motivate a shareholder to

sell shares in a secondary offering when the average sum of underwriting and other costs exceeds 5% of the value of the offering and the average price response to the announcement of the offering is less than -2%. Second, can the selling stockholder, or the firm whose shares are being sold, take actions to reduce the stock price effects? For example, as Black and Scholes (1974) propose, the selling stockholder may be able to convey a credible signal to market participants that the sale is not motivated by private information. Our results, however, indicate that significant price effects are associated with both small and large offerings, with registered and non-registered offerings and with offerings by all types of sellers. Third, how do the costs of a secondary compare to the costs of alternative methods of selling a large number of shares?

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