Open-Market Share Repurchase Programs and Bid-Ask Spreads on the NYSE: Implications for Corporate Payout Policy

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Abstract

This study analyzes bid-ask spreads surrounding announcements of open-market share re-purchase programs for a sample of 248 announcements of repurchase programs by NYSE firms over the period January 1984 through June 1988. The sample includes 158 announce-ments of new programs and 90 announcements regarding continuations of already existing programs. Contrary to the theory that spreads increase surrounding the announcement of open-market share repurchase programs, with both univariate and multivariate tests that control for changes in volume, changes in stock price volatility, and changes in the level of stock price, we find no evidence of an increase in spreads surrounding announcements of open-market share repurchase programs.

I. Introduction

U.S. corporations rely upon two generic mechanisms for distributing value to shareholders: cash dividend payments and share repurchases.[1] Of these two, cash dividends historically have been the overwhelmingly preferred alternative. Unfortunately, traditional finance theory offers little by way of explanation for the reliance by U.S. corporations on cash dividends. Indeed, when taxes are considered, this theory predicts a preference for share repurchases.[2] Barclay and

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[1]Firms ordinarily distribute value to shareholders by paying regular cash dividends that are occa-sionally supplemented with "special" year-end cash dividends. Alternatively, value can be distributed by repurchasing shares. There are three types of share repurchase programs. The first is an open-market share repurchase program. In this case, a firm will usually announce its intent to repurchase a specified number or percent of its shares over an unspecified period of time in the open market. In the second type of repurchase program, firms repurchase shares through a tender offer in which they offer to repurchase a specified number of shares at a specified price range over a limited length of time. Finally, firms can privately negotiate to repurchase shares from major shareholders.

[2]The full cash dividend is taxed at the personal income tax rate, while shareholders who sell shares back to a firm pay tax on only the capital gain realized in the sale. The 1986 Tax Reform Act equalized the ordinary income tax rate and capital gains tax rate, but share repurchases continue to have a tax advantage because capital gains can be deferred.

Smith (1988) have, however, proposed a theory to explain U.S. corporations' reliance on cash dividends, as opposed to share repurchases, as a mechanism to distribute value to shareholders. They also present empirical support for their argument. In presenting the evidence, Barclay and Smith are careful to note its shortcomings. Still, the evidence is sufficiently strong to credibly support the theory. As a consequence, the theory deserves consideration as at least a partial explanation of the choice of corporate payout mechanism. It also deserves serious and careful ongoing empirical scrutiny. This study represents a contribution to that ongoing empirical process.

The core of the Barclay and Smith argument is that a firm's cost of capital is a function of the stock's bid-ask spread. The bid-ask spread, in turn, is a function of the probability that the specialist will trade with a better informed trader.[3] When a firm announces its intent to engage in an open-market share repurchase program that announcement is a signal to the specialist that his probability of trading with an informed trader has increased. In response to this signal, the specialist increases his spread to recoup his potential losses on trades with the firm. The increased cost of capital resulting from this wider spread is a previously unrecognized cost of open-market share repurchases that renders cash dividends the least cost method of distributing cash to shareholders.

Barclay and Smith test this hypothesis by examining bid-ask spreads for a sample of 153 NYSE firms that announced open-market share repurchase programs over the period 1970–1978. Their data set is limited to annual observations of the average relative bid-ask spread. They examine relative spreads for the period beginning five years prior to announcements of share repurchase programs and ending five years following repurchase announcements. Consistent with the prediction of their theory, they document that average relative spreads are wider for the year immediately following the year of announcement in comparison with average relative spreads in the five years preceding the announcement. By the third year following the announcement, they find that spreads have returned to their preannouncement levels.

We reanalyze bid-ask spreads around announcements of open-market share repurchase programs using NYSE listed stocks for comparability with the Barclay and Smith study.[4] However, our analysis differs from theirs on four dimensions. First, our sample encompasses a different and more recent time period (i.e., January 1984 through June 1988). Second, we employ daily bid-ask spread data covering the period from 50 trading days before through 10 trading days before the announcement and from 10 trading days after through 50 trading days after the announcement. Third, because changes in relative bid-ask spreads may result from

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[3] Amihud and Mendelson (1986) present a model in which investors' required return on a stock is a positive function of transactions costs as measured by the bid-ask spread. Holding all else constant, an increase in the spread leads to an increase in shareholders' required return which, in turn, leads to an increase in the cost of capital. Glosten and Milgrom (1985) and Copeland and Galai (1983) develop asymmetric information models of specialists' behavior when faced with the possible presence of better informed traders in the market. Both models predict the bid-ask spread to be a positive function of the probability the specialist will trade with a better informed trader.

[4] In a contemporaneous study Singh, Zaman, and Krishnamurti (1994) examine changes in relative bid-ask spreads surrounding announcements of open-market share repurchases by 181 NASDAQ firms during 1983–1990. They report that relative spreads do not increase following announcements of open-market share repurchases by NASDAQ firms.

either stock price changes or from changes in absolute bid-ask spreads, our study considers changes in both relative and absolute spreads surrounding announcements of open-market repurchase programs. And, fourth, our analysis includes announcements of the initiation of open-market share repurchase programs and announcements of the continuation of ongoing open-market share repurchase programs.

Contrary to the prediction and empirical evidence of Barclay and Smith, we find that bid-ask spreads do not increase following open-market share repurchase announcements. Univariate tests do not provide any evidence of an increase in spreads for either repurchase initiation or continuation announcements. Additionally, cross-sectional multivariate regressions, in which the dependent variable is the change in bid-ask spread from before to after the share repurchase announcement and the independent variables include changes in stock price volatility, changes in stock price level, changes in volume, and a proxy for the probability that the specialist will trade with the firm following a repurchase announcement, do not reveal any significant relation between changes in bid-ask spreads and the increase in the probability that the specialist will trade with the firm. In short, our data do not support the idea that firms are deterred from engaging in open-market share repurchase programs because of the adverse effect of such programs on market liquidity and the indirect effect on cost of capital.

The following section reviews the Barclay and Smith data and empirical results in more detail. This review suggests that the use of annual data during a period in which stock prices declined and then rose sharply may have introduced a bias into the Barclay and Smith bid-ask spread data. Section III describes our sample of share repurchase announcements and the daily bid-ask spread data employed. Section IV presents the results of our univariate and multivariate statistical analysis. Section V concludes.

II.   A Brief Review of Barclay and Smith

To test their hypothesis that bid-ask spreads widen at the time of open-market share repurchase announcements, Barclay and Smith employ Vermaelen's (1981) sample of open-market repurchase announcements by NYSE firms that occurred over the period 1970–1978. The bid-ask spread variable used is the average of the beginning- and end-of-year relative spread for each stock where the relative spread is defined as

$$(\text{Ask Price} - \text{Bid Price})/((\text{Ask Price} + \text{Bid Price})/2).$$

Of the 153 announcements for which spread data are available, 95, or roughly 62 percent of the sample, occurred during 1973 and 1974. This clustering of repurchase programs is probably not coincidental. During the 1973–1974 period, stock prices generally were depressed relative to historical levels.[5] If, as appears to be the case, managers are more likely to repurchase shares during stock price

declines (Vermaelen (1981) and Comment and Jarrell (1991)), the relatively de-
pressed stock prices during the 1973–1974 period could explain the clustering of
share repurchases during that period. Additionally, this was the period during
which the Nixon Administration imposed wage and price controls, including con-
trols on cash dividend payments. One mechanism for skirting the controls on cash
dividends was open-market share repurchases. For that reason, share repurchase
programs announced during this period are less likely to be motivated by asym-
metric information considerations than during a more "normal" time period. To
the extent that Barclay and Smith have identified an effect of open-market share
repurchase programs on bid-ask, that effect is likely to be understated relative to a
"normal" time period (i.e., a period in which wage and price controls were not in
place and in which repurchase programs were more likely to have been motivated
by asymmetric information than by an attempt to skirt controls).

    Alternatively, it could be that the clustering of announcements during the
1973–1974 period, coupled with the general decline in stock prices during this
period, which was then followed by a market rebound, induced a positive bias into
the Barclay and Smith spread data. This positive bias may have occurred because
absolute spreads are discrete and because, as documented by Clark, McConnell,
and Singh (1992) and Christie and Schultz (1994), they are "sticky." That is, it may
be that absolute spreads are not adjusted immediately when stock prices change
(for example, because absolute spreads are discrete, the specialist may "wait" to
determine whether the price change "persists" before changing the spread).[6]

    To determine whether such a bias might have worked its way into the Barclay
and Smith analysis, we assemble a sample of 120 firms that announced open-
market share repurchase programs during 1973 and 1974 (84 in 1973 and 36 in
1974).[7] An equal-weighted index of the average annual prices of these stocks
is plotted in Figure 1. Consistent with Barclay and Smith's computation of the
average annual spread, the average annual price is the average of the beginning-
and end-of-year price. The figure indicates a sharp decline in stock prices during
1973 and 1974 and a significant rebound over the following two years. Overlaid
against the plot of average share prices is a plot of the average relative annual
bid-ask spreads for these same stocks.[8] The bid-ask spread plot is nearly the
mirror image of the stock price plot—spreads rise during 1973–1974 and decline
over the next two years. Figure 2 presents a plot of an equal-weighted index of all
other (i.e., all nonrepurchasing) NYSE stocks over the same time period. This plot
indicates that all nonrepurchasing shares also declined sharply during 1973–1974
and rebounded over the next two years. Overlaid against this plot is a plot of the
average annual relative bid-ask spread of these same stocks. Again, the plot of the

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in prices of all common stock—a decline of over 32% for the year" (NYSE Fact Book, 1974, p. 2).
Commenting on stock prices in 1974, the NYSE states, "In duration and intensity, the erosion of stock
values was unmatched since the days of the Great Depression. The NYSE Index of all common stock
dropped 30% in the year" (NYSE Fact Book, 1975, p. 2).
    [6]This assumes a certain level of price-setting power on the part of the specialist. Given that the
specialist "competes" with limit orders, this assumption is open to question.
    [7]The sample was compiled from an exhaustive search of the WSJ Index for 1973 and 1974. We
believe the sample is comprehensive, but, if not, it is most certainly representative.
    [8]These data were provided by Hans Stoll and are, thus, the same data employed by Barclay and
Smith.

average relative bid-ask spread is a mirror image of the plot of the average share prices.

FIGURE 1

Relative Spreads and Share Prices of Repurchasing Firms
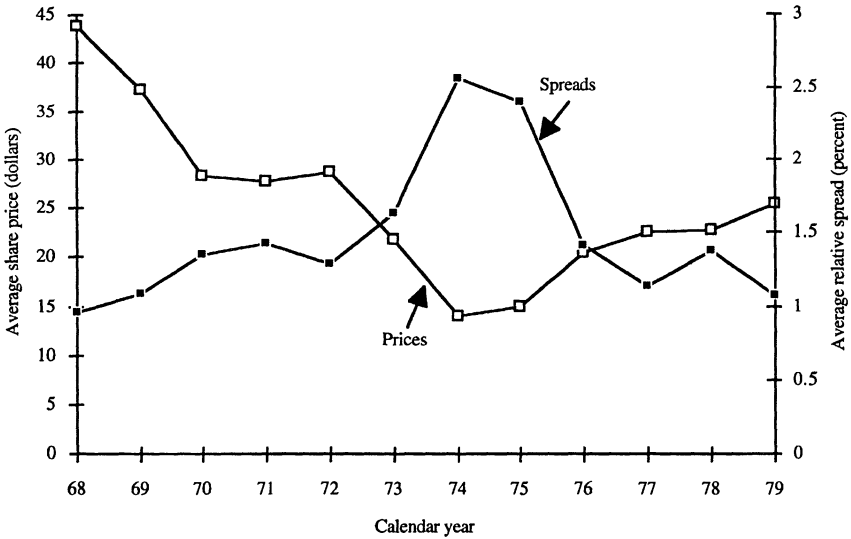
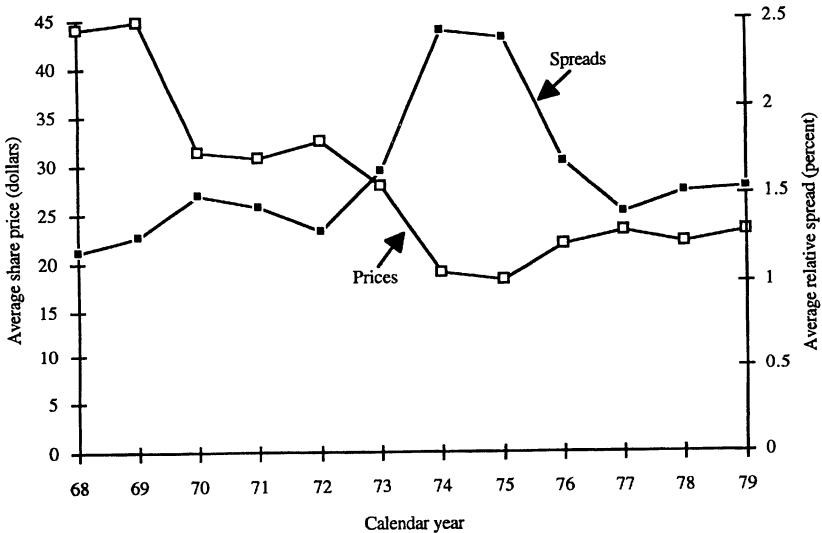Average annual bid-ask spreads and average annual prices for 120 NYSE firms that announced the initiation of open-market share repurchase programs during 1973 or 1974 (84 announcements in 1973 and 36 announcements in 1974).

The correlation between relative spreads of repurchasing and nonrepurchasing firms is even more evident in Table 1, where the average relative spread for each sample is presented for each year over the period 1970–1979. For each sample, relative spreads widen slightly in 1973, widen dramatically in 1974, remain high in 1975, decline in 1976, and return to their pre-1973 levels in 1977. While not conclusive, these results do indicate the potential bias that could be embedded in the Barclay and Smith data.

The data may embed one other bias that works against the Barclay and Smith tests. Their analysis employs end-of-year data, but share repurchases are announced throughout the year. Thus, the intervals between the announcements and the bid-ask spread observations are nonuniform across their sample. This nonuniformity in the length of time between the spread observations and the share repurchase announcements is likely to weaken their tests and reduce their ability to reject the null hypothesis.

Our review of the Barclay and Smith analysis suggests the usefulness of reexamining their hypothesis with data from a period free of major stock market swings, of analyzing absolute as well as relative bid-ask spreads, and of examining spread data taken from a time period closer in time and more uniformly distributed in time around the share repurchase announcements than end-of-year quotes. We now turn to that task.

FIGURE 2

Relative Spreads and Share Prices of Nonrepurchasing Firms

Average annual bid-ask spreads and average annual prices for 1370 NYSE firms that did not announce the initiation of open-market share repurchase programs during 1973 and 1974, for which spread and price data are available.

III.   Sample and Data

This study examines stock repurchases over the period January 1984 through June 1988. Two databases are compiled. First, a sample of NYSE firms that announced either the initiation or continuation of an open-market share repurchase program between January 1984 and June 1988 is collected.[9] Second, for each stock, a time series of closing (i.e., end-of-day) bid and ask quotes is collected for the 100-trading-day interval surrounding each announcement.

For the period January 1984 through June 1988, the "Reacquired Shares" section of the Wall Street Journal Index was used to identify firms that announced an intent to repurchase shares by means of an open-market share repurchase program. This search identified 389 open-market repurchase announcements by NYSE firms that were then classified as either initiations or continuations of share repurchase programs. The announcements are separated into these two categories because the information content of the two types of announcements may differ and, as a consequence, the two types of announcements may have different effects on bid-ask spreads. An announcement is classified as an initiation of a share repurchase program unless one of the following two criteria is met:

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[9]The time period covered by this study is constrained by the availability of bid-ask spread data. We have bid-ask spread data for the period June 1983 through September 1988. Because we analyze data for the 50 trading days (i.e., roughly 80 calendar days) following the announcement, the cut-off for announcements is June 30, 1988.

TABLE 1

Time Series of Average Annual Relative Bid-Ask Spreads for 120 Repurchasing and All
Nonrepurchasing NYSE Firms, 1970 to 1979

| | Average Annual Relative Bid-Ask Spreads in Percent | |
Year	Nonrepurchasing Firms	Repurchasing Firms[a]
1970	1.49%	1.35%
1971	1.43	1.43
1972	1.29	1.29
1973	1.63	1.63
1974	2.43	2.56
1975	2.39	2.39
1976	1.68	1.42
1977	1.40	1.13
1978	1.51	1.37
1979	1.54	1.07

[a]The repurchase sample consists of 84 NYSE firms that announced open-market repurchase programs in 1973 and 36 NYSE firms that announced open-market repurchase programs in 1974.

 i) the announcement explicitly states the firm is continuing and/or expanding a presently ongoing open-market repurchase program or that the firm is extending an ongoing program;

 ii) within the two-year period preceding the announcement, the firm made a similar announcement of an open-market repurchase program.[10]

This classification scheme segregates the sample into 251 initiation announcements and 138 continuation announcements. Of these, 64 initiation and 19 continuation announcements are deleted from the sample due to contemporaneous news events,[11] and three initiation and three continuation announcements are deleted because the firm experienced a stock split over the 100-trading-day interval surrounding the announcement.   Additionally, in some cases, firms made several continuation announcements in rapid succession.   In these instances, the 100-trading-day analysis periods surrounding the continuation announcements overlap. For these firms, only the first announcement is retained in the dataset and 11 subsequent continuation announcements (by the same firms) are deleted from the sample.

The period analyzed in this study includes October 19, 1987, the day of the stock market crash. Because this event could have a confounding effect on the analysis of bid-ask spreads, we exclude repurchase announcements between

[10]The choice of two years as a classification criterion is arbitrary and was selected because of the approximately two-year long widening of spreads detected by Barclay and Smith. Only four observations were classified as continuations based on this criterion, so the selection of two years vs. one year vs. six months, etc., will have a negligible effect on the results. Rarely do firms announce the expected length of time that their open-market repurchase programs are expected to last.

[11]For initiation announcements, 20 coincide with dividend and/or earnings announcements, 13 with restructuring announcements, 18 with spin-off, acquisition or takeover announcements, and 13 with other significant news releases. For the continuation announcements, five coincide with dividend and/or earnings announcements, four with restructuring announcements, three with spin-off or acquisition announcements, and seven with other significant news releases. These observations are deleted due to the possible confounding influence of these simultaneous events on the bid-ask spread.

July 23, 1987, and January 14, 1988. That is, we exclude firms for which the 100-day time series of bid-ask spreads surrounding the repurchase announcement lies within 10 days of October 19, 1987, to minimize any effect of the crash on our analysis.[12]

The final repurchase sample contains 158 announcements of initiations and 90 announcements of continuations of repurchase programs. Panel A of Table 2 gives a frequency distribution by year of announcement. The announcements are spread relatively evenly through the sample period. The number of observations in 1987 is smaller than in the prior three years because observations surrounding the crash have been deleted and the number in 1988 is smaller than in prior years because the sample includes only the first six months of the year.

Announcements describing repurchase programs are open-ended on two dimensions: the announcements neither provide a definitive beginning or ending date for the repurchase program, nor do they indicate a minimum number of shares to be repurchased, thereby, leaving open the possibility that no shares will be repurchased. The typical announcement does, however, indicate the maximum number of shares that will be repurchased under the program. This upper limit on the number of shares to be repurchased is reported for 150 of the 158 initiation announcements and for all 90 of the continuation announcements. For each firm, this maximum number of shares to be repurchased is converted to a percent of shares outstanding. Summary statistics for this distribution are reported in panel B of Table 2. The distribution is slightly skewed. For the initiation sample, the mean of the upper bounds on the percent of shares to be repurchased is 6.3 percent and the median is 5.0 percent. This variable ranges from a low of 0.09 percent to a high of 27.53 percent. For the continuation sample, the mean and median are 6.4 percent and 4.8 percent, respectively, with a range of 0.3 percent to 24 percent. As a benchmark, these percentages can be compared with the number of shares repurchased in intrafirm tender offers. For samples of intrafirm tender offers that occurred during the 1960s and 1970s, Dann (1981) and Vermaelen (1981) report that, on average, firms offered to buy slightly in excess of 15 percent of the firm's outstanding shares. For the 1980s, Bagwell (1992) and Comment and Jarrell (1991) report an average slightly in excess of 17 percent. In short, firms anticipate repurchasing fewer shares in the typical open-market share repurchase program than in the typical self-tender offer.

The second dataset utilized in this study is a time series of closing bid and ask quotes for two time intervals. The first begins 50 trading days prior to the announcement and ends 10 trading days prior to the announcement. The second interval begins 10 trading days after the announcement and ends 50 trading days after the announcement. Thus, for each firm, a complete dataset would include 40 end-of-day bid-ask spread observations from before and 40 observations after the repurchase announcement. The end-of-day bid-ask spreads were collected from hard copies of Francis Emory Fitch publications. Missing observations account for less than 1 percent of the total number of possible observations.

Because the relative or percentage spread represents the cost of transacting per dollar traded, it is generally the preferred measure of the bid-ask spread. How-

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[12]For the initiation (continuation) sample, 25 (14) observations are excluded from 1987 and one (three) observations from 1988.

TABLE 2

Descriptive Statistics for the Sample of Share Repurchase Programs Announced by NYSE Firms, January 1984–June 1988

Panel A. Time Series of Repurchase Announcements by NYSE Firms, 1984–1988

Year	Number of Announcements of Initiations of Share Repurchase Programs	Percent of Total	Number of Announcements of Continuations of Share Repurchase Programs	Percent of Total
1984	63	37.9%	29	32.2%
1985	32	20.3	18	20.0
1986	37	23.4	21	23.3
1987	16	10.1	14	15.6
1988[a]	10	6.3	8	8.9
Total	158	100.0%	90	100.0%

Panel B. Characteristics of the Sample of Repurchase Announcements

	Initiation Sample	Continuation Sample
Number of Announcements	158	90
Number of Firms	155	81
Upper bound on the number of shares to be repurchased as a percent of total shares outstanding[b]		
Mean	6.30%	6.34%
Median	5.00	4.80
Maximum	27.53	24.00
Minimum	0.09[c]	0.30

[a] 1988 observations include only those for January through June of 1988 due to the unavailability of bid-ask spread data for the second half of 1988.
[b] The Wall Street Journal announcements report the upper bound on shares to be repurchased for 145 of the 158 initiation announcements and for all of the 90 continuation announcements.
[c] The minimum of 0.09 percent is an outlier. IBM announced plans to repurchase 300,000 shares when the company had 316 million shares outstanding.

ever, as demonstrated by our reexamination of the 1973–1974 time period, the relative spread is sensitive to changes in share price, which acts as a scaling factor in its calculation. Indeed, observed changes in relative spreads can, at times, be due primarily to changes in share price, rather than to a response by the specialist to changes in the trading environment, such as an increase in the probability of trading with an informed investor. Consequently, in the following analysis, we examine the behavior of relative and absolute spreads around open-market repurchase programs.

IV.   Analysis

A.   Univariate Tests

We begin by examining the behavior of relative bid-ask spreads surrounding the announcement of open-market repurchase programs during the 1984–1988 period. To test for a change in relative spreads, both a difference of means tests and a sign test are conducted. For the difference of means test, the sample mean bid-ask spread from the time period before the announcement is compared with the sample mean bid-ask spread from the time period after the announcement. A t-test determines whether the mean bid-ask spread before the announcements is significantly different from the mean spread after the announcements. To conduct the sign test, for each firm, the day -1 relative spread is paired with the day $+1$ relative spread, the day -2 relative spread is paired with the day $+2$ relative spread, and so on for all days. The difference within each pair of spreads is calculated and our null hypothesis is that the median of the population of differences is zero. To test the null, we use a binomial test to determine if the fraction of positive differences is significantly different from 0.5.

Summary data for the pre- and post-announcement relative and absolute bid-ask spreads are presented in panels A and B of Table 3. For the initiation sample, the average relative bid-ask spread over the period from 50 days before through 10 days before the announcement of the initiation of share repurchase programs is 1.044 percent. The mean relative spread over the period from 10 days after through 50 days after repurchase initiation announcements is 1.046 percent. The difference of means test indicates that this difference is not significant ($p = 0.902$). The sign test, however, indicates a significant decrease in relative spreads following repurchase announcements ($p = 0.030$).

For the sample of announcements of continuations of open-market share repurchase programs, both the difference of means test and the sign test indicate a significant decrease in relative spreads following continuation announcements. The mean relative bid-ask spread in the period prior to the continuation announcements is 0.883 percent. For the post-announcement period, the mean relative bid-ask spread falls to 0.842 percent. The p-value for the difference of means test is 0.004; the p-value of the sign test is 0.0007.

The analysis of relative spreads for both the initiation and continuation samples is inconsistent with the Barclay and Smith hypothesis and their evidence. However, the evidence of a significant decrease in relative spreads following repurchase initiation and continuation announcements could be confounded by the well-documented increase in prices that occurs in conjunction with announcements of share repurchase programs. This decrease in relative spread (or lack of an increase) may simply reflect an increase in share price, not necessarily a response by the specialist to changes in the level of informed trading.[13] Consequently, in an attempt to further identify the extent to which changes in bid-ask spreads are

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[13]For both the continuation sample and the initiation sample, we find that average share price over the period from 10 days after through 50 days after the announcement is significantly greater than the average share price over the period from 50 days before to 10 days before the announcement. P-values are 0.055 and 0.002, respectively.

TABLE 3

Frequency Distributions of Relative and Absolute Bid-Ask Spreads Surrounding Announcements of Initiations and Continuations of Open-Market Share Repurchase Programs

Relative Spread	Initiation Sample		Continuation Sample	
	Number of Observations	Percent of Sample	Number of Observations	Percent of Sample
Panel A. Preannouncement Frequency Distribution of Relative Bid-Ask Spreads				
0.0000 < 0.0050	1,332	21.3%	1,120	31.3%
0.0050 < 0.0100	2,250	35.9	1,323	37.0
0.0100 < 0.0150	1,440	23.0	586	16.4
0.0150 < 0.0200	682	10.9	375	10.5
0.0200 < 0.0250	326	5.2	81	2.2
0.0250 < 1.000	230	3.7	95	2.6
Total	6,260	100.0	3,580	100.0
	Mean = 1.044%		Mean = 0.883%	
	Standard Deviation = 0.734%		Standard Deviation = 0.644%	
Panel B. Post-Announcement Frequency Distribution of Relative Bid-Ask Spreads				
0.0000 < 0.0050	1,401	22.4%	1,203	33.7%
0.0050 < 0.0100	2,288	36.5	1,373	38.4
0.0100 < 0.0150	1,322	21.0	529	14.8
0.0150 < 0.0200	738	11.7	283	7.9
0.0200 < 0.0250	290	4.5	118	3.4
0.0250 < 1.000	242	3.9	66	1.8
Total	6,281	100.0	3,572	100.0
	Mean = 1.046%		Mean = 0.842%	
	Standard Deviation = 0.812%		Standard Deviation = 0.607%	

Absolute Spread	Initiation Sample		Continuation Sample	
	Number of Observations	Percent of Sample	Number of Observations	Percent of Sample
Panel C. Preannouncement Frequency Distribution of Absolute Bid-Ask Spreads				
0.125	1,578	25.3%	790	22.1%
0.250	2,996	47.9	1,723	48.1
0.375	1,352	21.6	812	22.7
0.500	323	5.2	216	6.0
≥ 0.625	11	0.1	39	1.1
Total	6,260	100.0%	3,580	100.0%
	Mean = 0.2599		Mean = 0.2740	
	Standard Deviation = 0.109		Standard Deviation = 0.130	
Panel D. Post-Announcement Frequency Distribution of Absolute Bid-Ask Spreads				
0.125	1,566	24.9%	863	24.2%
0.250	3,080	49.0	1,655	46.3
0.375	1,347	21.5	766	21.4
0.500	273	4.4	249	7.0
≥ 0.625	15	0.2	39	1.1
Total	6,281	100.0%	3,572	100.0%
	Mean = 0.2587		Mean = 0.2716	
	Standard Deviation = 0.110		Standard Deviation = 0.130	

"caused" by changes in informed trading, we consider changes in absolute spreads surrounding announcements of open-market repurchase programs.

To test for a change in absolute bid-ask spreads surrounding the announcements of open-market share repurchase programs, we conduct both a difference of means test and a chi-square test. As shown in Table 3, the mean end-of-day absolute bid-ask spread over the period from 50 days before through 10 days before the announcement of the initiation of share repurchase programs is $0.2599. The mean absolute spread over the period from 10 days after through 50 days after repurchase announcements is $0.2587. This slight decline in the mean spread following repurchase announcements is not statistically significant according to the difference of means test ($p = 0.56$).

The same statistic is calculated for the sample of continuations of share repurchase programs. Here, too, the mean absolute spread declines slightly following repurchase announcements. Prior to the continuation announcements, the mean spread is $0.2740. Following the announcements, the mean absolute spread is $0.2716. For the difference of means test, $p = 0.44$.

The chi-square test is used to determine whether there is a significant difference between the full distributions of pre- and post-announcement bid-ask spreads. For neither the initiation sample nor for the continuation sample does the chi-square test reject, at the 0.05 level, the null hypothesis that the pre- and post-announcement spread distributions are the same ($p = 0.200$ and $p = 0.082$, respectively).[14]

In sum, the set of univariate tests conducted is not consistent with the hypothesis that open-market share repurchase programs lead to increases in bid-ask spreads. However, an announcement of an open-market share repurchase program may have an effect on other factors that affect bid-ask spreads. These other factors may, in turn, have an influence on spreads that counteracts the effect of the open-market share repurchase program. For example, it has been documented that bid-ask spreads are a function of stock return volatility, trading volume, and level of share price. If these variables systematically change around share repurchase announcements, their influence on the spread may offset the effect of the increased probability of the specialist trading with the informed firm. In an attempt to disentangle the influence of these other factors on bid-ask spreads, multivariate tests are conducted.

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[14]One other statistic is calculated. For each sample firm, we standardize both pre- and post-announcement absolute bid-ask spreads by dividing pre- and post-announcement absolute spreads by the average preannouncement share price. This calculation provides a measure of relative spread that is uncontaminated by changes in stock price associated with the share repurchase announcement. For the initiation sample, the average value of this standardized spread over the period from 50 days before announcement through 10 days before the announcement is 1.081 percent. For the period spanning 10 days after the announcement to 50 days after the announcement, the average of this standardized spread is 1.077 percent. For the continuation sample, the preannouncement standardized spread is 0.8929 percent and the post-announcement standardized spread is 0.8753 percent. The null hypothesis of no change in spread is not rejected for either sample by any of the tests employed.

B.   Multivariate Tests

1.   The Variables

To conduct the multivariate tests, a variety of cross-sectional regressions is estimated.[15] In the various regressions, the dependent variable is a specification of the change in the average absolute spread from the period before in comparison with the average absolute spread during the period after the repurchase announcement. The independent variables include the change in return volatility from the period before to the period after the repurchase announcement, the change in average share price from the period before to the period after the repurchase announcement, and the change in average daily trading volume from the period before to the period after the repurchase announcement. Each of these variables may be changing systematically around share repurchase announcements. For example, as noted by Barclay and Smith, when a firm enters the market for its own shares, it may be competing with the market maker by placing a limit order, which establishes a floor under the specialist's bid price. If so, that may have the effect of systematically reducing stock price volatility. Because spreads are a positive function of return volatility,[16] a systematic reduction in volatility could have the effect of reducing bid-ask spreads at the time of share repurchase announcements.

Further, it is well documented that, on average, stock prices increase in response to share repurchase announcements.[17] It has also been documented that, on average, spreads are a positive function of share price.[18] Thus, it is possible that the increase in share price at the time of the repurchase announcement could have the effect of increasing the absolute bid-ask spread.

Finally, the effect of repurchase announcements on trading volume is indeterminate. To the extent that repurchase activity means that outside investors are more likely to be trading with better informed insiders, trading volume by these investors may decline. On the other hand, to the extent that the firm becomes an active trader, volume may increase. Thus, a priori, the effect of a change in volume in response to an open-market share repurchase announcement may be either positive or negative.[19] Regardless of the effect of the share repurchase announcement on volume, previous empirical studies indicate that the change in spread varies inversely with the change in volume.[20] To control for any effect of volume on spread, the change in volume is entered as a control variable in the regressions.

If the specialist does change the spread in response to the announcement of an open-market share repurchase program, presumably, the change in spread is positively related to the change in the probability of trading with an informed manager. Ideally, we would measure this change in probability directly. Unfortu-

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[15]Because cross-sectional regressions exhibit heteroskedasticity, we estimate the regressions using a weighted least squares procedure. The standard error of the residuals is used as the weight.

[16]See, for example, Benston and Hagerman (1974).

[17]See, Dann (1981), Vermaelen (1981), Comment and Jarrell (1991), and Bagwell (1992).

[18]See, among others, Demsetz (1968), Tinic (1972), Tinic and West (1972), and Benston and Hagerman (1974).

[19]An analysis of trading volume before and after repurchase announcements shows an insignificant increase in volume after initiation announcements and an insignificant decrease in volume after continuation announcements.

[20]See Stoll (1978) and those references cited in footnote 18.

nately, such data are not available. Instead, we employ two proxies for the change in this probability. The first proxy is the announced upper limit on the number of shares to be repurchased divided by average daily trading volume measured over the interval from 10 trading days after through 50 trading days after the announcement. The second proxy is the announced upper limit on the number of shares to be repurchased divided by the total number of shares outstanding at the month-end prior to the announcement. We refer to these proxies collectively as the "intensity" of the firm's share repurchase activity. In doing so, we recognize that these are imperfect proxies for what it is that we seek to measure. Nevertheless, it seems reasonable that, if the specialist does adjust her spread in response to share repurchase programs, she is more likely to adjust in response to the announcement of larger rather than smaller repurchase programs.

2.   The Results

The various regressions can be separated into two sets according to the specification of the dependent variable. In the first set of regressions, the dependent variable is calculated by dividing the difference between the post-announcement mean absolute spread and the preannouncement mean absolute spread by the preannouncement average absolute spread. The post-announcement mean absolute spread is measured over the interval from 10 days after through 50 days after the repurchase announcement and the preannouncement spread is measured over the interval from 50 days prior to through 10 days prior to the announcement. In short, this dependent variable is the change in absolute spread divided by the beginning absolute spread. In the second set of regressions, the dependent variable is the change in the mean absolute spread as described above divided by the average daily share price over the 40-day interval prior to the announcement. In short, this variable is the change in the average spread normalized by preannouncement average share price.

In both sets of regressions, the independent variables are the normalized change in return volatility, the normalized change in share price, and the normalized change in trading volume surrounding the share repurchase announcement. The daily return volatility is estimated over the interval from 50 days before through 10 days before the repurchase announcement and for the interval from 10 days after through 50 days after the announcement. The normalized change in return volatility is calculated as the variance of daily return over the interval following the announcement minus the variance of daily returns over the interval before the announcement divided by the variance of daily return over the interval prior to the announcement. The normalized change in share price and the normalized change in trading volume are calculated in a similar manner except that the change in mean share price is divided by the mean share price over the interval prior to the announcement and the change in trading volume is normalized by the mean daily trading volume over the interval prior to the announcement.

The results of the first set of regressions are presented in columns 1 through 4 of Table 4. The results from the second set of regressions are presented in columns 5 through 8. The results are presented separately for the initiation and continuation samples. For each of these samples, the regression is estimated twice, once for

each of the alternative proxy variables for the intensity of share repurchase activity. In total, the table presents the results of eight regressions.

In general, the normalized change in absolute spread is positively and significantly correlated with the normalized change in stock price and with the normalized change in return volatility. It is negatively and significantly correlated with the normalized change in trading volume. Most importantly for the question investigated here, however, neither of the proxy variables for the "intensity" of share repurchase activity enters any of the regressions significantly, and in only two regressions does the proxy enter the regression with the predicted sign. If anything, the greater the "intensity" of share repurchase activity by the firm, the smaller the bid-ask spread.

Two further issues are investigated to examine the robustness of the results. First, to control for possible nonlinearities in the relation between bid-ask spread and the independent variables, the regressions are reestimated including each of the independent variables squared. In most regressions, the coefficient of the proxy for the intensity of trading by the firm continues to be negative and in no case is it statistically significantly different from zero.

Second, it is possible that the increase in share repurchase activity on the part of the firm does not represent an increase in trading by informed traders. Suppose, rather, that trading by the firm merely substitutes for direct trading on personal account by informed managers. To consider this possibility, data on managerial trading is collected from The Insiders' Chronicle for the interval beginning 90 trading days before through 90 trading days following the share repurchase announcement. These data provide little support for the substitution hypothesis. On average, over the 90-day interval following the announcement of the initiation of repurchase programs, trading by insiders is 153 percent of trading by insiders over the 90-day interval preceding the announcement. Similarly, on average, over the 90-day interval following the announcement of the continuation of share repurchase programs, trading by insiders is 102 percent of trading by insiders over the 90-day interval preceding the announcement. Consequently, it is unlikely that a substitution of trading by the (informed) firm substitutes for trading by (informed) managers on personal account. Thus, it is unlikely that such a substitution effect can explain the lack of any apparent impact of share repurchase programs on bid-ask spreads. In sum, the results from neither the univariate nor the multivariate analysis are consistent with the hypothesis that bid-ask spreads are adversely affected by open-market share repurchase activity.

3.   Commentary on Tests and Results

Two caveats should be mentioned in interpreting our results. First, our tests rely upon end-of-day quotes. McInish and Wood (1992) have documented a U-shape in bid-ask spreads such that, on average, spreads are wider at the end of the day than during the middle of the trading day. If this U-shape is not uniform before and after repurchase announcements, the use of mid-day spreads could give different results from end-of-day spreads. Second, our procedure uses a narrow interval around repurchase announcements to mitigate against any bias that might be induced by major movements in stock price. An alternative methodology would employ a matched sample to control for this effect. Such a procedure would

TABLE 4

Cross Sectional Regressions of Change in Average Absolute Bid-Ask Spread against Change in Average Daily Trading Volume, Change in Average Share Price, Change in Return Volatility, and a Proxy for the Intensity of Informed Trading by the Firm (t-statistics are in parentheses below coefficients)

Variable	Dependent Variable ΔSP/BSP				Dependent Variable ΔSP/BPRC			
	Initiations of Share Repurchase Programs		Continuations of Share Repurchase Programs		Initiations of Share Repurchase Programs		Continuations of Share Repurchase Programs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	0.0125 (0.91)	0.0077 (0.47)	−0.0177 (−0.99)	−0.0184 (−0.776)	−0.0003 (−0.16)	−0.0007 (−0.39)	−0.0031*** (−1.89)	−0.0002 (−0.839)
Δ Price	0.2607* (3.757)	0.2529* (3.583)	0.2094** (2.253)	0.2010** (2.304)	0.0025* (3.37)	0.0024* (3.24)	0.0022** (2.187)	0.0023** (2.231)
Δ Volume	−0.0254** (−2.098)	−0.0240 (−1.597)	−0.0318* (−2.815)	−0.0312* (−2.940)	−0.0003*** (−1.649)	−0.0002 (−1.196)	−0.0003*** (−1.853)	−0.0003** (−2.254)
Δ Volatility	0.0148 (1.113)	0.0147 (1.100)	0.0543* (3.082)	0.0547* (3.081)	0.0027*** (1.753)	0.0003*** (1.724)	0.0007* (3.113)	0.0007* (2.985)
Fracvol	−0.0021 (−0.443)		−0.0008 (−0.265)		−0.3401 (−0.59)		−3.7×10⁻⁵ (−0.644)	
Frac		−0.0002 (−0.063)		0.0004 (−0.12)		8.4×10⁻⁶ (−0.215)		−3.9×10⁻⁵ (−0.974)
F-Statistic	3.60*	3.49*	2.86**	2.85**	2.73**	2.57**	3.37*	3.63*
Adjusted R^2	0.07	0.07	0.08	0.08	0.04	0.04	0.10	0.11

Variable Definitions

Δ SP/BSP	=	(Average Post-Announcement Absolute Spread−Average Preannouncement Absolute Spread)/Average Preannouncement Absolute Spread.
Δ SP/BPRC	=	(Average Post-Announcement Absolute Spread−Average Preannouncement Absolute Spread)/Average Preannouncement Share Price.
Δ Price	=	(Average Post-Announcement Daily Closing Price−Average Preannouncement Daily Closing Price)/Average Preannouncement Daily Closing Price.
Δ Volume	=	(Average Post-Announcement Daily Trading Volume−Average Preannouncement Daily Trading Volume)/Average Preannouncement Daily Trading Volume.
Δ Volatility	=	(Post-Announcement Return Volatility−Preannouncement Return Volatility)/Preannouncement Return Volatility.
Fracvol	=	(Announced Upper Limit on the Number of Shares to be Repurchased)/(Post-Announcement Average Daily Trading Volume).
Frac	=	(Announced Upper Limit on the Number of Shares to be Repurchased)/(Total Shares Outstanding during Month Preceding Repurchase Announcements).

*, **, ***Significant at 0.01, 0.05, and 0.10 levels, respectively.

be especially useful if the data indicated a change in spreads around repurchase announcements. Unfortunately, we do not have such data. Fortunately, our data give no evidence of a change in spreads.

V. Summary and Conclusions

This paper empirically examines the proposition that bid-ask spreads for NYSE stocks increase following the announcement of open-market share repurchase programs. This hypothesis has been proposed by Barclay and Smith (1988) as an explanation for the preference by corporations for the distribution of wealth to shareholders by means of cash dividends as opposed to share repurchases. To examine this proposition, a sample of 389 announcements of share repurchase programs by NYSE firms over the period 1984–1988 was assembled. Daily end-of-day bid-ask spreads were examined for 40 days before and 40 days after the announcements. Both relative and absolute spreads were analyzed and both uni-variate and multivariate tests were conducted. Suffice it to say that neither set of tests supports the hypothesis that spreads increase following announcements of open-market share repurchase programs.

Depending upon whether one views the glass as half-empty or half-full, the empirical results presented here can be viewed as either good news or bad news. The bad news is that what initially appeared to be an important clue toward solving at least part of the "dividend puzzle" seems to be less of a clue than originally hoped. That is, increased spreads (and decreased liquidity) do not appear to explain firms' preference for cash dividend payments. The good news is that the evidence seems to indicate that corporate managers who are considering the distribution of wealth to shareholders by means of open-market share repurchases may do so without undue concern for the effect of the repurchase program on the stock's bid-ask spread. We lament the failure to resolve the dividend puzzle, but prefer to focus on the glass-is-half-full interpretation of our results.

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