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Seasonalities in NYSE Bid-Ask Spreads and Stock Returns in January

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ABSTRACT

Using end-of-month bid-ask spreads for 540 NYSE stocks over the period 1982–1987, we document a seasonal pattern in which both relative and absolute spreads decline from the end of December to the end of the following January. Cross-sectional regressions do not, however, provide evidence of a significant correlation between changes in spreads at the turn of the year and January stock returns. Either there is no cause and effect relation between the coincidental seasonals in bid-ask spreads and January returns for NYSE stocks or the data are too "noisy" to reveal any relation.

BID-ASK SPREADS HAVE played, and continue to play, an important role in explanations of the January effect in stock returns. For example, Roll (1983) argues persuasively that high January returns are the result of tax-loss selling pressure that occurs throughout the year which is released right after the beginning of the new tax year. Once the selling pressure is released, stocks rise in price which results in high January returns. However, these predictable excess January returns cannot be exploited fully by arbitrageurs because of round-trip transactions costs in the form of the bid-ask spread. This inhibitor to arbitrage is especially great for "small" or "low-priced" stocks, where, historically, high January returns have been most pronounced. Stoll and Whaley (1983) take a different tack. They do not focus on January returns, per se, but argue that the excess returns on small stocks are a result of higher proportional bid-ask spreads in low-priced stocks. In their view, the bid-ask spread itself is the "cause" of the higher returns on small stocks. That is, because of the higher proportional cost of transacting in small stocks, investors demand a higher rate of return.

In response, Keim (1983) and Schultz (1983) point out that small stock excess returns are concentrated in January and a seasonal in stock returns cannot be explained by the bid-ask spread unless there is a seasonal in the bid-ask spread as well. Schultz (1983) compares bid-ask spreads in December with those in June (plus round-trip commissions) for a sample of 40 small capitalization New York Stock Exchange (NYSE) stocks and finds no signifi-

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cant difference in bid-ask spreads between the two dates. He thus concludes that high transaction costs in December cannot explain the larger excess returns earned by small firms in January.

In this paper, we revisit the question of whether there is a seasonal in bid-ask spreads for NYSE stocks and the extent to which this seasonal can explain excess January returns. To investigate this issue, we analyze month-end relative and absolute bid-ask spreads for a randomly selected sample of 540 NYSE stocks for the period of February 1982 through January 1987. We find a distinct seasonal in relative bid-ask spreads in which the average spread is lower at the end of January than at the end of the previous December. The same is true for absolute spreads. Furthermore, this pattern is most pronounced among low-priced stocks where the January seasonal is also most pronounced (Brooks and Bhardwaj (1992)).[1] These results are consistent with the hypothesis that decreases in bid-ask spreads from the end of December to the end of January "cause" excess January returns.[2] There is, however, a fly in the ointment—we do not find that January returns are correlated cross-sectionally with changes in bid-ask spreads. For example, the average January return for stocks that experience a decline in absolute spread from the end of December to the end of January is approximately equal to the average return for stocks that experience an increase in absolute spread. We are left with three possible explanations for our findings, none of which is totally satisfying: (1) the temporal correlation between the seasonal in stock returns and the seasonal in bid-ask spreads is purely spurious, (2) both the seasonal in returns and the seasonal in bid-ask spreads are "caused" by a third as yet unidentified factor such that cross-sectionally the two contemporaneous seasonals are uncorrelated, or (3) measurement error in our bid-ask spread data is so great that we are unable to discern a cross-sectional relation between excess January returns and changes in spreads.

In Section I, we describe the data employed in the analysis. Section II contains the results of our analysis of seasonalities in returns and bid-ask spreads. Section III summarizes our results and presents our conclusions.

I. Data

Because the original evidence of a January seasonal in stock returns comes from stocks listed on the "organized" exchanges (i.e., the NYSE and the AMEX), because the NYSE is the most prominent locale for stock trading, and because of structural differences between the NYSE and NASDAQ, we

[1] Brook and Bhardwaj (1992) demonstrate convincingly that the January effect is more closely related to share price than market value.

[2] Excess January returns (or, more generally, monthly seasonalities in stock returns) have been documented and analyzed by, among many others, Banz (1981), Berges, McConnell, and Schlarbaum (1984), Brown, Keim, Kleidon, and Marsh (1983), Gultekin and Gultekin (1983), Keim (1983), Lakonishok and Smidt (1988), Lamoureux and Sanger (1989), Reinganum (1983), Roll (1983), Rozeff and Kinney (1976), and Wachtel (1942).

focus our investigation on NYSE stocks.[3] To construct our database, closing bid and ask quotes were collected from the hard copy of the Francis Emory Fitch database for all stocks listed on the NYSE whose ticker symbol begins with the letters A through L. Only stocks for which month-end quotes are available for each month over the period beginning February 1982 and ending January 1987 and for which it is possible to calculate a monthly return for each month over this period based on the Center for Research in Security Prices (CRSP) tape are included in the database. The sample contains 32,400 observations (540 stock × 60 months). Absolute and relative spreads (measured as (ask − bid)/((ask + bid)/2)) are calculated for each stock for each month. Table I contains frequency distributions of the absolute and relative spreads for the entire sample. The mean relative spread is 1.27% and the median is 1.02%. The absolute spreads are, of course, calibrated in one-eights of a dollar. The modal and median absolute spread is \$0.25. Not surprisingly, the minimum absolute spread is \$0.125. More interestingly though, the maximum absolute spread is \$6.375 and there are 182 spreads greater than or equal to \$1.00.

II. Empirical Results: Monthly Seasonals in Stock Returns and Bid-Ask Spreads

A. Returns

Because interest in turn-of-the-year seasonals in bid-ask spreads arises from the documented seasonals in returns, for our purposes the first order of business is to determine whether the returns for the stocks in our sample exhibit a January seasonal over the period for which we have bid-ask spread data. To do that, a dummy variable regression is estimated as

$$R_{jt} = a_0 + a_1 D_1 + a_2 D_2 + \cdots + a_{11} D_{11} + \tilde{e}_t \qquad (1)$$

where R_{jt} is the return on security j in calendar month t, $t = 1, \ldots, 11$, with February = 1, March = 2, ..., December = 11. The dummy variable is assigned a value of one for months in which the security's return is observed and zero otherwise, and $\tilde{e}_t$ is the error term assumed to be normally distributed. This regression tests the hypothesis that January returns are different from returns during other months of the year. According to the regression results (not presented here), returns in January are significantly

[3]We should note that Fortin, Grube, and Joy (1989) and Lamoureux and Sanger (1989) have examined stocks traded on the NASDAQ system for a seasonal in bid-ask spreads and have come to slightly different conclusions. Both Lamoureux and Sanger and Fortin, Grube, and Joy document that relative bid-ask spreads on NASDAQ stocks tend to be lower in January than in December. Lamoureux and Sanger conclude that, although the difference between December and January spreads is statistically significant, it is unlikely to be of economic consequence. Fortin, Grube, and Joy conclude that the change in spreads at the turn of the year is sufficiently large to be of economic (as well as statistical) significance. Neither Lamoureux and Sanger nor Fortin, Grube, and Joy compare the change in spreads between December and January with January stock returns.

Table I

Frequency Distribution of Relative and Absolute Bid-Ask Spreads

Relative and absolute month-end bid-ask spreads for 540 stocks listed on the NYSE, February 1982 through January 1987. The relative bid-ask spread is measured as (ask − bid)/((ask + bid)/2).

Range	Number of Observations	Percent of Sample	Cumulative Percent of Sample
Panel A. Relative Bid-Ask Spread			
0.0000 < 0.0025	676	2.1	2.1
0.0025 < 0.0050	3,958	12.2	14.3
0.0050 < 0.0075	5,824	18.0	32.3
0.0075 < 0.0100	5,384	16.6	48.9
0.0100 < 0.0125	4,573	14.1	63.0
0.0125 < 0.0150	3,420	10.6	73.6
0.0150 < 0.0175	2,341	7.2	80.8
0.0175 < 0.0200	1,574	4.9	85.7
0.0200 < 0.0225	1,228	3.8	89.5
0.0225 < 0.0250	707	2.2	91.7
0.0250 < 0.0275	615	1.9	93.6
0.0275 < 0.0300	437	1.3	94.9
0.0300 < 1.0000	1,663	5.1	100.0
Total	32,400		
Mean = 1.27%		Minimum = 0.05%	
Median = 1.02%		Maximum = 25.44%	
Panel B: Absolute Bid-Ask Spread			
$0.125	8,169	25.2	25.2
0.25	15,019	46.4	71.6
0.375	6,913	21.3	92.9
0.50	2,039	6.3	99.2
0.625	30	0.1	99.3
0.75	42	0.1	99.4
0.875	6	0.0	99.4
1.00	80	0.2	99.6
> 1.00	102	0.3	100.0
Total	32,400		
Mode = $0.25		Mininum = $0.125	
Median = $0.25		Maximum = $6.375	

greater than returns during all other months of the year except August. The average January return for our sample is 5.6%. The average monthly return for all other months of the year is 1.6%.

To determine the extent to which the January seasonal in returns differs among low- and high-priced stocks, the 540 stocks are sorted into five portfolios according to their end-of-November prices. The 108 stocks with the lowest end-of-November prices comprise portfolio one, the 108 stocks with the next lowest prices comprise portfolio two, and so forth. The portfolios are

reformed each November. The average end-of-November prices for the five portfolios are \$9.76, \$18.86, \$26.19, \$34.89, and \$59.72, respectively.

The January return for the lowest-price portfolio is 2.5% greater than the January return of the highest-price portfolio. For the five portfolios, January returns are 7.4%, 6.0%, 5.3%, 4.2%, and 4.9%, respectively. Additionally, when the dummy variable regression is estimated for the share-price portfolios, the results indicate that the January return is significantly greater than the return for every other month for portfolio one and significantly greater than every month except August for portfolio two. Contrarily, for the two highest-price portfolios, the January return is significantly greater than the return for eight months and is actually less than the return for three months. Thus, the January seasonal in stock returns that has been documented for various other time periods is cleary present during the 1982 through 1987 interval and, as in other time periods, it is stronger among low-priced stocks.

B. Bid-Ask Spreads

We now turn to the question of whether there is a monthly seasonal in bid-ask spreads. To investigate that question, a second dummy variable regression is estimated as

$$SP_{jt} = b_0 + b_1 D_1 + b_2 D_2 + \cdots + b_{11} D_{11} + \tilde{e}_t \qquad (2)$$

where SP_{jt} is the relative bid-ask spread for security j at the close of the last trading day in month t, $t = 1, 2, \ldots, 11$, with February = 1, March = $2, \ldots,$ December = 11. The dummy variable is assigned a value of one for the month end in which the spread is observed and zero otherwise.

The coefficients of the regression are presented in column 2 of Table II. The coefficients represent the average difference between bid-ask spreads at the end of January and bid-ask spreads at the end of other months. End-of-January bid-ask spreads are significantly smaller than bid-ask spreads for other month ends throughout the year. Most importantly, the end-of-January bid-ask spread is significantly smaller than the end-of-December bid-ask spread. Thus, on average, relative spreads decline from the end of December to the end of January. Beyond that, however, there does not appear to be a pattern in spreads throughout the year. That is, relative spreads appear to decline in January, rebound in February, and remain at approximately their end-of-February levels throughout the remainder of the year.

To determine the extent to which changes in bid-ask spread are related with share price, the dummy variable regresssion is reestimated for each share-price portfolio. The results are presented in columns 3 through 7 of Table II.

For the various share-price portfolios, January spreads also tend to be smaller than those for other months of the year, but the pattern is more pronounced for the two lowest-price portfolios. For portfolios one and two,

Table II

Seasonality of Relative Bid-Ask Spreads

Numbers in the columns are coefficients of a dummy variable regression in which the dependent variable is the month-end relative bid-ask spread for 540 NYSE stocks and dummy variables represent months of the year, February 1982–January 1987.

		Share Price Quintiles					Share Price Portfolios	Share Price Portfolios
Month	Full Sample	(Lowest) 1	2	3	4	(Highest) 5	1 and 2	4 and 5
Int	1.195	2.281	1.246	1.034	0.850	0.563	1.763	0.707
Feb	0.068**	−0.037	0.115**	0.106**	0.088**	0.070**	0.039	0.079**
Mar	0.067**	−0.020	0.086**	0.098*	0.089**	0.082**	0.033	0.085**
Apr	0.059*	−0.023	0.083*	0.113**	0.059	0.064**	0.030	0.061**
May	0.083**	0.033	0.098**	0.130**	0.095**	0.057**	0.066	0.076**
Jun	0.081**	0.074	0.093**	0.126**	0.081**	0.032	0.084	0.056**
Jul	0.139**	0.209**	0.195**	0.117**	0.112**	0.061**	0.202**	0.087**
Aug	0.084**	0.166	0.077*	0.087*	0.056	0.030	0.122*	0.043**
Sep	0.119**	0.236**	0.145**	0.146**	0.040	0.029	0.191**	0.034*
Oct	0.084**	0.196*	0.103**	0.073	0.047	0.002	0.149**	0.025
Nov	0.064*	0.159	0.101**	0.045	0.026	−0.013	0.130**	0.007
Dec	0.108**	0.289**	0.157**	0.057	0.027	0.011	0.223**	0.019

*Significantly different from January at the 0.05 level.
**Significantly different from January at the 0.01 level.

January relative bid-ask spreads typically are smaller than are the relative spreads for any other month ends. Importantly, for these two portfolios, the end-of-January bid-ask spread is significantly smaller than the end-of-December spread. Thus, for low-priced stocks, the data indicate that, on average, bid-ask spreads decline by a statistically significant amount from the end of December to the end of January. Contrarily, for the higher-price portfolios, the month-end spread for January is not significantly different from the end-of-December spread. Thus, for high-priced stocks, relative bid-ask spreads do not exhibit a turn-of-the-year seasonal.

In the last two columns of Table II, the regression is repeated with the stocks in share price portfolios one and two grouped together and those in portfolios four and five grouped together. For the sample composed of the stocks in portfolios one and two, the bid-ask spread is smaller at the end of January than at the ends of every other month. Further, for the low-priced stocks, the data exhibit an interesting pattern in which the spreads decline significantly from the end of December to the end of January and then gradually increase throughout the year. For the months February through June, the average end-of-month spread is not significantly greater than the end-of-January spread; but for each of the months July through December, the end-of-month spread is significantly greater than the end-of-January spread. For portfolios four and five (the high-priced stocks) the pattern is reversed. Spreads tend to narrow throughout the year and the end-of-

December spread is not significantly different from the end-of-January spread.

The coincidental seasonals in monthly stock returns and end-of-month bid-ask spreads are consistent with the hypothesis that changes in bid-ask spreads at the turn of the year "cause" excess January returns, but it is very possible that the line of "causation" runs from returns to spreads rather than the other way around. For an investor, it is true that the relevant transaction cost is the proportional bid-ask spread. But, absolute bid-ask spreads are adjusted in discrete intervals. Suppose that absolute bid-ask spreads are constant or, at least, "sticky," Suppose, also, that there is an exogenous increase in stock prices in January. This combination of discrete but unchanged (or, at least, "sticky") absolute bid-ask spreads and stock price increases in January would give rise to the pattern of changes in relative bid-ask spreads and excess January returns that we observe, but cause and effect are reversed. That is, price increases in January cause relative spreads to decline from the end of December to the end of January only because absolute spreads are unchanged.

To determine whether a seasonal pattern exists in absolute spreads, the dummy variable regression is reestimated. The regression is estimated with month-end absolute spreads as the dependent variable for the full sample, for share-price portfolios one and two combined, and for share-price portfolios four and five combined. The results of these regressions, presented in Table III, are even more striking than are those which use relative bid-ask spreads. For the full sample, for six months of the year, the month-end average absolute bid-ask spread is smaller than at the end of January and for five months it is larger than at the end of January. Furthermore, the end-of-December spread is larger than the spread for any other month end. However, the December spread exceeds the January spread at only the 0.12 level of significance ($t = 1.525$).[4] For the sample composed of low-priced stock (i.e., portfolios one and two combined), the absolute spread is greater at the end of every month (except June) than at the end of January; the largest absolute spread occurs at the end of December; and the end-of-December spread is significantly greater than the end-of-January spread. These results indicate that absolute bid-ask spreads for low-priced stocks tend to be adjusted downward after the end of the year. In contrast to the low-priced stocks, for the sample composed of the two high-price portfolios, in no month, including December, is the absolute spread significantly different from the absolute spread at the end of January.

To explore further the pattern of changes in absolute spreads throughout the year, the month-end absolute spread for each stock is compared with its absolute spread at the end of the prior month. Each observation is then

[4]A nonparametric test—specifically, the Wilcoxon Scores (Rank Sums) test—does indicate that absolute spreads at the end of December are greater than spreads at the end of January at the 0.01 level of significance.

Table III

Seasonality of Absolute Bid-Ask Spreads

Numbers in the columns are the coefficients of a dummy variable regression in which the dependent variable is the month-end absolute bid-ask spread for 540 NYSE stocks and dummy variables represent months of the year, February 1982–January 1987.

Month	Full Sample	Stock Price Portfolios 1 and 2	Stock Price Portfolios 4 and 5
Intercept	+0.27009	+0.225926	+0.309144
Feb	+0.00005	+0.010301*	−0.011921
Mar	+0.00074	+0.007755	−0.005324
Apr	−0.00319	+0.003403	−0.016475*
May	+0.00025	+0.005903	−0.007939
Jun	−0.00477	−0.000116	−0.014699
Jul	−0.00218	+0.004051	−0.005903
Aug	−0.00347	+0.001620	−0.010880
Sep	−0.00116	+0.005787	−0.014005
Oct	−0.00204	+0.000231	−0.006019
Nov	+0.00079	+0.004398	−0.003009
Dec	+0.00681	+0.013194**	+0.001157

*Significantly different from January at the 0.05 level.
**Significantly different from January at the 0.01 level.

classified as an "increase," a "decrease,"' or "no change." These data are tabulated in Panel A of Table IV. The number of decreases in absolute spreads from the end of each month until the end of the next month are given in column 2 and the number of increases are given in column 3. Based on these data, absolute spreads are less "sticky" than one might imagine. Over each month, roughly 55% of the bid-ask spreads change. Furthermore, over most months, the number of decreases in spreads is roughly equal to the number of increases. There is, however, a notable exception to this rule—over the period from the end of December to the end of January, spread decreases significantly outnumber increases (at the 0.10 level of significance). Additionally, over the period from the end of November to the end of December, spread increases substantially (though not statistically significantly) outnumber decreases.

To further investigate the seasonal in absolute bid-ask spreads, the number of month-to-month increases and decreases for the months of December, January, and February are given in Panel B of Table IV for each of the five share price portfolios. These data reveal an interesting pattern. For the period from the end of December to the end of January, for the two low-price portfolios, decreases in spreads substantially outnumber increases, whereas for the high-price portfolios, decreases roughly equal increases. For example, for the two low-price portfolios, there are 325 decreases in spread versus 233 increases. For the two high-price portfolios, there are 310 decreases versus

Table IV

Frequency Distribution of Month-to-Month Changes in Absolute Bid-Ask Spreads

Frequency distribution of month-to-month decreases, increases, and no changes in absolute bid-ask spreads for 540 stocks listed on NYSE, February 1982 through January 1987.

Panel A. Month-to-Month Changes in Absolute Spreads For the Full Sample

Period of Change	Number of Decreases	Number of Increases	Ratio of Decreases to Increases	Number of No Changes
January to February	706	709	1.00	1285
February to March	773	756	1.02	1171
March to April	779	746	1.04	1177
April to May	701	792	0.89	1205
May to June	791	700	1.13	1209
June to July	737	771	0.96	1192
July to August	751	744	1.01	1205
August to September	774	749	1.03	1177
September to October	735	761	0.97	1204
October to November	724	752	0.96	1224
November to December	682	778	0.88	1240
December to January	802	690	1.16	1208

Panel B. Month-to-Month Changes in Absolute Spreads According to Five Stock-Price Portfolios

	November to December		December to January		January to February	
Stock Price Portfolio	Number of Decreases	Number of Increases	Number of Decreases	Number of Increases	Number of Decreases	Number of Increases
1 (lowest)	118	151	145	108	108	148
2	119	156	180	125	135	143
3	150	152	167	153	144	144
4	156	155	147	153	169	143
5 (highest)	139	164	163	151	150	139

304 increases. Thus, these data indicate that the decreases in absolute spreads that occur after the turn of the year are concentrated in lower-priced stocks. During the last month of the year, however, these same low-priced stocks experience more increases than decreases in spreads. For example, for the two low-price portfolios, from the end of November to the end of December there are 237 decreases in spreads versus 307 increases. Thus, for low-priced stocks, where high January returns tend to be concentrated, the analyses of absolute spreads also yield results consistent with the notion that changes in spreads at the turn of the year cause excess January returns—for these stocks, absolute spreads tend to increase toward the end of the year and to decrease after the turn of the year.

C. Cross-Sectional Analysis

To this point, the analyses document coincidental seasonals in stock returns and bid-ask spreads at the turn of the year, especially for low-priced stocks. However, they do not indicate whether there is a direct linkage between January stock returns and changes in the bid-ask spreads from the end of December to the end of January. To determine whether such a linkage exists, a regression is estimated as

$$R_j = a_0 + b_1(\Delta ABSP_j/P_j) + \tilde{e} \tag{4}$$

where R_j is the return on stock j in January, $\Delta ABSP_j/P_j$ is the change in the absolute bid-ask spread for stock j from the end of December to the end of January divided by the price of stock j at the end of December, and $\tilde{e}$ is the error term. The natural inclination in estimating this regression is to employ the change in the relative bid-ask spread from the end of December to the end of January as the independent variable. Doing so, however, means that, essentially, we would be regressing change in stock price against the inverse of change in stock price which would undoubtedly yield the predicted negative coefficient. To avoid this bias, we use the change in absolute spread from the end of December to the end of January divided by the end-of-December price as the independent variable in our regression.

The results of the regression are reported in column 2 of Table V. They indicate that the coefficient of the change in bid-ask spread is negative, as predicted, but not significantly different from zero ($t = -0.60$). Because this regression includes many stocks with unchanged bid-ask spreads, 1208 of the observations of the independent variable (out of 2700) are zero. In the third column, the regression includes only those observations for which the change in bid-ask spread is not zero. In this regression, the coefficient of the change in bid-ask spread is again negative and is again not significantly different from zero ($t = -0.61$). As we have noted, changes in relative bid-ask spreads are correlated with stock price as are January returns. To control for this effect, the regression is reestimated including both the change in the bid-ask spread (if it is non-zero) and stock price as independent variables. The results are presented in column 4 of Table V. The coefficient of the change in bid-ask spread is again negative, but not significantly different from zero. The coefficient of stock price is also negative and highly significantly different from zero.[5]

As a further consideration of the relation between changes in bid-ask spreads and January stock returns, the average January return is calculated for those stocks which experienced a decrease in their absolute bid-ask spreads from the end of December to the end of January, those that experienced an increase in absolute spread, and those that experienced no change in spread. The average January returns for the three samples are essentially identical—they are 5.3%, 5.9%, and 5.4%. Thus, in the aggregate, the

[5]Stock price is the ask price per share as of the end of December.

Table V

Regressions of January Returns Against Changes in Bid-Ask Spread and Stock Price

Numbers in the columns are coefficients of regressions in which the dependent variable is the January return for 540 NYSE stocks and the independent variables are the change in absolute bid-ask spread from the end of December to the end of January divided by the end-of-December price.

	Estimated Coefficients (t-Statistic)		
Variable	Full Sample	Sample With Changes in Spreads Only	Sample With Changes in Spreads Only
Intercept	0.056	0.056	0.064
	(26.6)	(20.3)	(12.9)
ΔSP	−0.17	−0.170	−0.126
	(−0.60)	(−0.61)	(−0.45)
P			−0.003*
			(−2.01)
F-statistic	0.36	0.37	2.20
Adjusted R^2	−0.0000	−0.0000	0.002

Variable Definitions

ΔSP: Change in absolute spread from the end of December to the end of January divided by the end-of-December price.

P: Stock price at the end of December.

*Significantly different from zero at the 0.05 level.

various cross-sectional tests, at best, provide weak evidence (i.e., the negative, but insignificant, coefficient in the cross-sectional regression) of a direct link between January returns and changes in bid-ask spreads from the end of December to the end of January.

D. Commentary

We can think of three possible explanations for our results. First, the coincidental seasonals in stock returns and changes in bid-ask spreads are purely spurious. This is, of course, the null hypothesis against which other explanations must compete.

Second, it may be that both phenomena are "caused" by a still unidentified third factor. For example, it may be, as suggested by Tinic and West (1984), that high January returns merely reflect normal compensation for some unidentified risk that is especially large during January. This risk may also induce market makers to widen their bid-ask spreads toward the end of the year to generate additional compensation for bearing this extra risk during January. Once this risk has subsided toward the end of January, market makers return spreads to their "normal" levels. While this explanation is

plausible, it also predicts a cross-sectional relation between changes in spreads and excess January returns. That is, those stocks which have the highest January risk should have the highest January returns and they also should experience the largest decreases in their bid-ask spread after the turn of the year. As noted above, we do not detect such a relation.

Third, it may be that the bid-ask spread data that we employ are not sufficiently precise to detect a cross-sectional pattern between spread changes and excess returns. Such imprecision could affect our tests in two ways. First, spreads are reported by the specialist and, while the specialist must stand ready to trade at least 100 shares at these quotes, unlike transaction prices, no money necessarily changes hands at these prices. Second, we have taken bid-ask quotes from two points in time, whereas price changes (i.e., returns) occur through time. Suppose that a stock's price increases during January in anticipation of a reduction in bid-ask spread, but the reduction in spread does not actually occur until the first week of February. If so, some of the spreads that we classify as "no change" should actually be classified as decreases. Alternatively, suppose that the specialist actually reduces his spread on the next to the last day of December in anticipation of the need to run off inventory during January. In that case, measuring spread changes from the end of December to the end of January would classify some "decreases" as "no change." Thus, classifications of what are actually "decreases" as "no change" could bias our tests against detecting a significant relation between January returns and changes in bid-ask spreads. Misclassifications of "decreases" as "increases" on this basis are more difficult to justify. However, it is not inconceivable.

To investigate the possibility that classification error is biasing our tests, we compare end-of-December absolute bid-ask spreads with end-of-February absolute bid-ask spreads for the January "no change" sample and for the January "increase" sample. For these same two samples, we also compare end-of-November spreads with end-of-January spreads. If any of these stocks experience a decline in absolute bid-ask spread from the end of December to the end of February or from the end of November to the end of January, they are reclassified into the "decrease" spread sample. This procedure results in the reclassification of 595 observations into the "decrease" sample. Average returns are then calculated for the "new" decrease sample and for the sample composed of all other stocks. If classification error explains our failure to detect a connection between changes in bid-ask spreads at the turn of the year and January stock returns and if our reclassification procedure corrects these misclassifications, then the January return for the new decrease sample should be significantly greater than the January return for the "all other" sample. Unfortunately, the data do not support this conjecture. The average returns for the two samples are 5.43% and 5.70%, respectively.

As another experiment to determine whether classification error is biasing our tests, we estimate the regression using only those observations for which we actually observe a decline in absolute bid-ask spread from the end of December to the end of January. For this sample, the coefficient of the

bid-ask spread variable is negative and significantly different from zero for both specifications of the model. That is, the model is estimated when spreads are included separately and when stock price is also included. The *t*-statistics of the spread coefficients are −3.688 and −3.245. This regression provides some, albeit weak, evidence of a cross-sectional relation between changes in bid-ask spreads at the turn of the year and January stock returns.

As a final experiment, bid-ask spreads were collected for a subset of the stocks in our sample at the end of the fifth from the last trading day of the year for all stocks whose name begins with the letter A. For these same stocks, the bid-ask spread was collected for trading day +5 after the turn of the year and trading day +10. Again the data encompass five turn-of-the-year periods—1983 through 1987. The sample includes 68 stocks. For these stocks, the number of increases and decreases in absolute spreads are calculated from trading day −5 to trading day +5; from trading day −5 to trading day +10; and from trading day −5 to the end of January.

As with end-of-month comparisons, the results for various other intervals around the turn of the year indicate that absolute spread decreases tend to outnumber increases. For the period from day −5 to day +5 there are 99 decreases in spreads and 91 increases for a ratio of 1.09; for the period day −5 to day +10, there are 98 decreases in spreads and 85 increases and the ratio of decreases to increases is 1.15; and for the period day −5 to the end of January there are 106 decreases and 83 increases for a ratio of 1.28.

Cross-sectional regressions are also estimated with these data. Specifically, the dependent variable in the regression is the return over the first five trading days of the year, the first ten trading days of the year, and the month of January. The independent variable is the change in absolute spread from trading day −5 to trading day +5, trading day −5 to trading day +10, and trading day −5 to the end of January, respectively, with each change in spread divided by the end-of-December stock price. As with the regressions which employ end-of-December to the end-of-January spread changes, in no case is the coefficient of the spread variable significantly different from zero. Thus, these results are consistent with those using end-of-month spreads.

E. Trading Seasonalities, Transaction Prices, and Biases in January Returns

A final concern follows from Keim (1989), who has argued that high January returns are, at least in part, an illusion induced by a seasonal pattern in investors' stock trading activity. The seasonal in trading activity interacts with the bid-ask spread so that the turn-of-the-year returns measured with end-of-day transaction prices are biased upward. The interaction occurs as follows: Toward the end of December, for some unidentified reason, investors are net sellers of stock. As a consequence, end-of-December transactions tend to take place at the bid price. After the turn of the year, investors tend to be net buyers and transactions tend to take place at the ask price. Thus, even if the "true" price of the security is unchanged, returns measured with transaction prices tend to be biased upward.

Keim estimates the bias in returns that follows from the year-end trading pattern by comparing turn-of-the-year returns computed with transaction prices against those computed with bid prices. His primary sample includes all NASDAQ National Market System (NMS) stocks over the five turns of the year from 1983 through 1988. For this sample, he groups stocks into ten portfolios based on stock price. He reports that, for the lowest-price stock portfolio, over the two-day interval that encompasses the last trading day of the year and the first trading day of the following year, the bias in returns computed with transaction prices is roughly 3.3%. For the highest-price stock portfolio, the bias is only 0.20%. If such a bias were to exist in *our* sample of NYSE stocks, it could explain all of the difference (i.e., 2.5%) between the average January return of the lowest- and highest-stock price portfolios.

Keim also analyzes a smaller set of NYSE/AMEX data. This sample encompasses only one turn of the year, 1988–89. Nevertheless, the results are consistent with those generated with NMS stocks:

> ... low-priced stocks substantially outperform high-priced stocks on the last trading day in December (3.5%) and the first trading day in January (6.9%) as measured with transaction-price returns. Using returns measured with bid prices, the effect on these two days is roughly halved. (Keim, 1989, p. 90).

Similar results are reported by Brooks and Bhardwaj (1992) for NYSE stocks over the period 1982–1986.

To determine the extent to which the trading pattern and bias in returns described by Keim occurs in our monthly data, we calculate January returns with closing transaction prices and then with bid prices. The difference between the two returns measures the bias in returns caused by the use of transaction prices. For the low-price portfolio, the bias is only 0.04% and for the high-price portfolio it is actually negative—it is −0.005%. Thus, the bias in returns computed with transaction prices does not appear to explain the January seasonal in stock returns on the NYSE, at least not for our sample.

III. Summary and Concluding Remarks

We examine monthly returns and month-end relative and absolute bid-ask spreads for a random sample of 540 stocks listed on the New York Stock Exchange over the period February 1982 through January 1987. We document contemporaneous seasonals in returns and bid-ask spreads for low-priced stocks in which average January returns are significantly higher than average returns during other months of the year and average bid-ask spreads (both relative and absolute spreads) are significantly lower at the end of January than at the end of December (and at the ends of other months of the year). These coincidental seasonals are consistent with the conjecture that

high January stock returns are "caused" by reductions in bid-ask spreads from the end of December to the end of January.

This conjecture also predicts a negative cross-sectional correlation between changes in spreads and January returns. The evidence in support of this prediction is, at best, weak. For example, when January returns are regressed against changes in the bid-ask spread from the end of December to the end of January, the coefficient of the spread variable is negative, but not significantly different from zero at even the 0.10 level. We offer several possible explanations for the failure to detect a significant cross-sectional correlation between turn-of-the-year stock returns and changes in bid-ask spreads, none of which are totally satisfying. There is, however, enough hint of such a relation to merit further investigation with other sets of data. One avenue of inquiry is to expand the analysis of NYSE stocks to encompass other time periods. A second, easier approach, is to expand the analysis to NASDAQ stocks for which bid-ask data are more readily available. Further inquiry might provide stronger evidence of a direct link between the contemporaneous seasonals in stock returns and changes in bid-ask spreads. Alternatively, such investigation might reveal that the coincidental seasonals documented here are specific to the time period or sample considered.

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