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The Buying and Selling Behavior of Individual Investors at the Turn of the Year

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ABSTRACT

The average returns on low-capitalization stocks are unusually high relative to those on large-capitalization stocks in early January, a phenomenon known as the turn-of-the-year effect. This paper finds that the ratio of stock purchases to sales by individual investors displays a seasonal pattern, with individuals having a below-normal buy/sell ratio in late December and an above-normal ratio in early January. Year-to-year variation in the early January buy/sell ratio explains forty-six percent of the year-to-year variation in the turn-of-the-year effect during 1971-1985.

IN RECENT YEARS, a number of "anomalies" have been discovered in stock returns, with the "turn-of-the-year effect" generating the greatest interest. The turn-of-the-year effect refers to the phenomenon that small stocks have unusually high returns during the period beginning on the last trading day of December and continuing through January, with the effect becoming progressively less pronounced as the month wears on. The effect occurs with amazing regularity, and is economically significant in magnitude: during 1971-1985, the average difference in returns between small and large stocks (defined here as the smallest and largest deciles of market value of the New York Stock Exchange) is 8.17 percent for the first nine trading days of the year. This phenomenon has been documented in a series of papers, each refining and extending earlier work, of which the most noteworthy are Banz [2], Keim [16], Roll [22], and Blume and Stambaugh [4].

A number of frameworks have been proposed to explain the turn-of-the-year effect. These approaches include what can be termed (i) the omitted-risk-factor hypothesis, (ii) the tax-loss-selling hypothesis, (iii) the information-release/insider-trading hypothesis, and (iv) the seasonality-of-the-risk-return hypothesis. In this paper I propose the "parking-the-proceeds" hypothesis. This hypothesis is related to the tax-loss-selling hypothesis, but does not view the high January returns on small stocks as merely a rebound following the abatement of tax-

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motivated selling pressure. Before presenting this hypothesis and evidence supporting it, a brief summary of the stylized facts to be explained is useful. A brief discussion of the above-mentioned alternative hypotheses is also presented. My discussion will be highly selective, both because the literature is large, and because recent surveys are available elsewhere (Keim [17], Clark and Ziemba [8]).

In Section I, the stylized facts about the turn-of-the-year effect are summarized. Section II presents the parking-the-proceeds hypothesis and discusses the empirical implications. Section III describes a new data set, the daily buy/sell orders of individuals' accounts at one of the nation's leading brokerage firms. Section IV uses this data to provide evidence that is consistent with the parking-the-proceeds hypothesis. Section V contains a summary and conclusions.

I. The Turn-of-the-Year Effect

Rozeff and Kinney [25] first documented the "January effect," that stock returns are higher, on average, in January than in other months. Using a combination of several indices spanning the seventy-one years from 1904-74 for New York Stock Exchange (NYSE) stocks, they found that the average return for the month of January was 3.48 percent, compared to only 0.42 percent per month for the other eleven months.[1]

While they were unaware of it, Rozeff and Kinney's finding of a January seasonal in returns is highly sensitive to the index used. For most of their sample period, they used the CRSP equally weighted index. If they had used a value-weighted index, they would not have found a January seasonal. For example, the arithmetic average January monthly return on the (market value-weighted) S&P 500 is only 1.37 percent for 1926-81, well below the 2.41 percent average return for July and the 1.73 percent average return for August.[2] In other words, using a value-weighted index, there is no January effect. Equally weighted indices display a January seasonal because low-capitalization ("small") stocks display high average returns in January. High-capitalization ("large") stocks do not have higher returns in January than in other months.

Banz [2] first documented that small stocks have unusually high returns. Ibbotson and Sinquefield [15] report Banz's monthly returns for 1926-81 on the lowest market-value quintile of NYSE securities. The arithmetic average annual return for 1926-81 is 18.12 percent, which is well above the arithmetic average annual return of 11.40 percent on the S&P 500.[3] Taking the difference in these numbers, the small-stock portfolio outperformed the S&P 500 by 6.72 percent. However, this annual small-firm premium is not evenly distributed over all months. The arithmetic average of the January small-stock monthly returns in Ibbotson and Sinquefield's Table B-4 is 7.42 percent, a full 6.05 percent above the January average of 1.37 percent for the S&P 500. For the other months, there is only a minor difference in returns. In other words, there is essentially no "small-firm effect" except in January.

[1] Rozeff and Kinney [25], Table 1, p. 388, row 5 of panel 2.

[2] Ibbotson and Sinquefield [15], Table B-1, p. 102.

[3] The small-stock returns are reported in Ibbotson and Sinquefield's [15] Table B-4, while the S&P returns are reported in their Table B-1.

Initial explanations of Banz's small-firm effect focused on the possibility of an omitted priced risk factor.[4] Banz had found that differences in CAPM betas between large and small firms could not explain the high realized returns on small firms. Most of the early (1981 to mid-1983) academic literature dealing with the small-firm effect contains statements about the "misspecification of the CAPM," along with statements that a productive line of inquiry for future research would be to search for an omitted priced risk factor. The logic of this argument is that the Sharpe-Lintner CAPM is not an accurate description of the factors generating equilibrium asset returns, that the market compensates investors for bearing other risks that are not captured by the market return, and that small firms are more sensitive to these other risks. This framework has considerable intellectual appeal, for it does not require jettisoning the market informational-efficiency paradigm that dominates academic finance research. New evidence about the seasonal structure of the small-firm effect, however, has resulted in a reduction of research effort attempting to explain the turn-of-the-year effect as equilibrium compensation for risk bearing.

The empirical finding that refocused efforts to explain the small-firm effect was Keim's [16] finding that roughly half of the annual small-firm premium occurred during the month of January in 1963-79. Immediately thereafter, Blume and Stambaugh ([4], p. 403) reported that, after adjusting Keim's results for "bid-ask spread" bias, "the full-year size effect is half as large as previously reported using [daily] rebalanced returns, and, on average, all of the size effect is due to the month of January."

With the publication of the Keim and Blume and Stambaugh papers, it became clear that Rozeff and Kinney's January effect and Banz's small-firm effect are two manifestations of the high returns on small firms in January. Roll [22] coined the term "turn-of-the-year effect" to identify this phenomenon, and research attention immediately focused on the tax-loss-selling hypothesis, especially since Branch [5] had previously documented high returns in January for stocks that had negative returns during the prior year.

The tax-loss-selling explanation of the turn-of-the-year effect is stated by Roll ([22], p. 20) as follows:

> "There is downward price pressure on stocks that have already declined during the year, because investors sell them to realize capital losses. After the year's end this price pressure is relieved and the returns during the next few days are large as those same stocks jump back up to their equilibrium values. ... we are obliged to test every theory, even one so patently absurd as this, by the empirical strength of its predictions and not by its assumptions or even by its external logic."

The most direct empirical investigation of the tax-loss-selling hypothesis was performed by Reinganum [19].[5] Reinganum created portfolios of stocks based

[4] A priced risk factor (see Ross [23]) is a source of risk that the market rewards people for bearing via a higher equilibrium expected return. An example of a non-priced risk is "unique" risk that can be diversified away.

[5] Reinganum's [19] study is subject to bid-ask spread bias, which biases upwards the reported returns on small firms. His qualitative results are unchanged when a correction is made for this bias, however.

upon their market capitalizations and a measure of potential tax-loss selling (PTS). He found that the returns in early January are related to both variables, with small stocks that are high PTS candidates having very high returns, and this evidence convinced many that the turn-of-the-year effect was, at least partially, explained. Yet it was not a full explanation, for as Reinganum ([19], p. 104) states:

> "While tax-loss selling may account for the unusually large returns at the beginning of January, several questions still remain unanswered. First, why do firms exhibit a January seasonal effect even after purging the data of potential tax-loss selling effects? Furthermore, why does this seasonal pattern still seem to be related to market capitalization?"

Two other stylized facts that appear to be inconsistent with the tax-loss-selling explanation of the turn-of-the-year effect are the following. First, Debondt and Thaler [9, 10] and Chan [7] have documented that small stocks that have experienced a price decline have high returns not only in the following January, but also in subsequent Januaries, with this pattern extending at least five years into the future. Second, while small stocks that experience December declines do indeed have unusually large January returns (Rozeff, [24]), as a group small stocks do not display any noticeable December price decline. In other words, the January price rise for small stocks appears to be far in excess of any December price decline.

A third explanation of the turn-of-the-year effect is the insider-trading/information-release hypothesis. The reasoning behind this hypothesis is that, with most firms having a December 31 fiscal year, management becomes aware of non-public information in early January. Some managers use this information to engage in trading in which the investors on the other side of the transaction lose, on average. To protect themselves, investors demand a higher required rate of return—hence, the January effect. Seyhun [27] presents empirical evidence, however, that insider trading in small firms does not display the seasonal pattern that would be needed to generate the observed patterns in realized returns. Furthermore, the insider-trading/information-release hypothesis makes no prediction regarding the observed pattern that small firms that had previously experienced price declines have much higher January returns, on average, than other firms.

Another explanation of the turn-of-the-year effect is that there is a January seasonal in the risk-return relation. Using a traditional CAPM framework, where risk is measured by beta, Rozeff and Kinney pointed out that the slope coefficients in the Fama and MacBeth [11] study display a January seasonal.[6] This seasonality has recently been reemphasized by Tinic and West ([29], Table 4), who document that, using the Fama and MacBeth methodology, for 1935-82 the slope coefficient for the market risk premium is .0471 in January, but only .0038 for the rest of the year, when betas are calculated using the equally weighted CRSP

[6] Rozeff and Kinney [25], Table 5, rows 3 and 4. Note that there is a typographical error, so that the reported value of −.0430 should in fact be a positive .0430.

index.[7] As one might suspect, Tinic and West's January results are quite sensitive to the market index used in computing betas, as a comparison of their Tables 4 and 7 demonstrates. In Table 7, the value-weighted CRSP index is used for calculating betas, and the slope coefficient for January falls from its Table 4 value of .0471 to .0302, while the slope coefficient for the rest of the year is virtually unchanged, falling from .0038 to .0036. Furthermore, Ritter and Chopra [21] find that when portfolios are formed based upon both beta and market value, only the small-firm portfolios display a January seasonal in the risk-return relation, leading them to question whether Tinic and West's results are an explanation of, or merely a manifestation of, the observed high returns on small firms in January.

With the exception of the tax-loss-selling hypothesis, none of the above hypotheses has had much success in explaining either the year-to-year variation in the January small-firm premium or the cross-sectional patterns in returns. And the tax-loss-selling hypothesis has the difficulty that it fails to explain the high January returns for small stocks that haven't been subject to tax-loss-selling pressure.

II. The Parking-the-Proceeds Hypothesis

The parking-the-proceeds hypothesis of this paper can be viewed as a generalization of the tax-loss-selling hypothesis. My analysis attempts to answer Reinganum's questions. The parking-the-proceeds hypothesis is that the turn-of-the-year effect is caused by the buying and selling behavior of individual investors. As the end of the year approaches, individuals sell securities in order to realize the losses for tax purposes. Some of the proceeds from the sales are not immediately reinvested, but instead "parked" until January. When these funds are reinvested, the buying pressure pushes up the price of the small firms in which individual investors typically invest. The argument relies upon differential portfolio composition of individual and institutional investors, price-pressure effects, and portfolio shifts by individuals.

The reasoning behind the parking-the-proceeds explanation of the turn-of-the-year effect involves three separate steps. The first requirement is that the portfolio composition of individual investors is more intensive in low-priced, low-capitalization stocks than that of institutional investors. This is in fact the case. For instance, in the April 18, 1986 issue of *Business Week* [6], the 1000 largest firms in terms of market capitalization are listed, along with the percentage of each firm's stock held by institutions. The correlation between this percentage and the log of market value is .329. Further corroborating evidence is contained in Blume and Friend ([3], Table 27), who report that stocks with a market value of less than $50 million in 1985 comprised only 0.8 percent of the equity portfolios of institutions, while comprising 2.7 percent of the market value of all stocks.

[7] The slope coefficients can be interpreted as showing that stocks with a beta of 1.5 have average returns that are 4.71 percent above the average return on stocks with a beta of 0.5 in January, and only .38 percent per month higher in other months.

This difference in ownership is important for my explanation of the turn-of-the-year effect, for many institutional owners have no incentive to engage in tax-motivated buying and selling activities. Individuals, on the other hand, have an incentive to sell stocks that have declined in price, for the losses incurred can be deducted only if the loss is realized. While the difference in tax status of individual and institutional investors has been noted by, among others, Reinganum ([19], p. 97), what hasn't been emphasized is that *whenever individuals buy stock, their buying is intensive in low-priced and low-capitalization stocks.*

The second requirement is that, especially for small stocks, buying and selling pressure affects stock prices. Evidence in Lakonishok and Smidt [18] and Rozeff [24] is consistent with the existence of price pressure. Furthermore, recent evidence by Harris and Gurel [14] and Shleifer [28] regarding the valuation effects of listing in the S&P 500 is consistent with price-pressure effects.

The third requirement is that the proceeds from December's tax-motivated sales are not immediately reinvested in the same or other stocks. (Schultz [26] presents an analysis in which it is optimal for individual investors to concentrate their tax-motivated loss realizations in December.) Instead, individuals typically "park" the proceeds in their brokerage accounts for a period of time, and only later reinvest it. Discussions that I have had with stockbrokers indicate that, throughout the year, it is common for individuals who have sold stock to wait for several days or weeks before investing the proceeds. Normally, stock sales on a given day are offset by purchases using funds from previous sales. However, if stock sales in December are much higher than stock sales in November, as Lakonishok and Smidt's ([18], Table 3) evidence indicates occurs for small stocks, then the lagged reinvesting of November's proceeds will be less than the dollar volume of December's selling. Similarly, the lagged reinvesting of December's large selling activity will overwhelm the more normal selling activity that occurs in January.[8] Consequently, the seasonal pattern in tax-motivated selling, combined with a normal lag in reinvesting the proceeds from stock sales, will create a seasonal pattern in the buy/sell ratio of individual investors, ceteris paribus.[9]

These, then, are the three requirements for the parking-the-proceeds hypothesis to result in the turn-of-the-year effect: (i) when individuals buy stocks, they buy a disproportionate number of small stocks; (ii) the price of these small stocks is affected by buying pressure; and (iii) individuals are net buyers of small stocks in early January, because of the proceeds remaining from December's tax-motivated sales.

[8] Lakonishok and Smidt's Table 3 indicates heavy trading in small stocks in early January. Presumably some of this involves the selling of winners by individuals wanting to postpone the payment of capital-gain taxes. On average, I would expect the winners to have larger market capitalizations than the losers sold in December. Some of the proceeds from the early January sales is undoubtedly reinvested in small stocks.

[9] In addition to the proceeds from December's tax-motivated security sales, some individuals also receive year-end bonuses. This additional source of cash augments the ability of individuals, in the aggregate, to become net buyers of securities in January.

III. Data

To examine the buying and selling behavior of individuals at the turn of the year, I make use of a unique data set: the daily buy/sell ratios of the cash-account customers of the nation's largest retail brokerage firm, Merrill Lynch, Pierce, Fenner and Smith. Since June 19, 1970, Merrill Lynch's Market Analysis Department has recorded the daily dollar volume of sales and purchases of New York Stock Exchange-listed common stocks by the brokerage firm's cash-account customers (non-institutional investors who do not have margin accounts). I use the ratio of these purchases and sales as a measure of the net buying activity of individual investors.[10]

In Table I, I present summary statistics on this daily buy/sell ratio for the fifteen-year period from December 17, 1970 through December 16, 1985.[11] The period of analysis includes the fifteen turn-of-the-year periods for which both buy/sell data and returns from the 1986 version of the CRSP daily returns tape are available. The data show that the buy/sell ratio is, on average, low in late December and high in early January.

Because the daily values of the buy/sell ratio are highly autocorrelated, even for long lags, throughout the rest of the paper I work with the values of each year's subperiod means. Thus, the empirical analysis is performed on the fifteen annual values of the January, mid-January to mid-December, and December mean buy/sell ratios reported in Table I. The nine trading days prior to the last trading day of December are referred to as "December" and the first nine trading days of January are referred to as "January" throughout the paper.

It is easy to formally reject the hypothesis that there are no seasonal patterns in the buy/sell ratio. Because of the high autocorrelation of the daily buy/sell ratios, rather than test whether the column means are equal in Table I, I test whether the yearly changes from one subperiod to another are reliably non-zero. This is a more powerful test for a seasonal pattern in the presence of highly autocorrelated daily levels than a simple comparison-of-means test.

In Table I, I report that the t-statistic for the hypothesis that the January buy/sell ratio shows no change from the prior December's buy/sell ratio is 4.96. The t-statistic for the hypothesis that the December buy/sell ratio shows no change from the prior mid-January to mid-December buy/sell ratio is 5.71. Indeed, in every single year during the fifteen-year sample period, the December buy/sell ratio is lower than the preceding mid-January to mid-December buy/sell ratio, and the January buy/sell ratio is at least as high as the preceding December's value. While the January buy/sell ratio is higher on average than the following mid-January to mid-December buy/sell ratio, the t-statistic is only 0.81.

[10] Using the buy/sell ratio, rather than, say, the net purchases, reduces heteroscedasticity problems associated with the changing level of the stock market's volume over time. Also, only the ratio itself is available for the period prior to November 1978.

[11] During this period, there are nine days for which I do not have legible buy/sell ratios. Thus I use 3780 out of the 3789 possible trading days, starting in mid-December, 1970 and continuing until mid-December, 1985. None of the missing days occurs near the turn of the year.

Table I

Mean Buy/Sell Ratios, 12-17-70 through 12-16-85[a]

Period by Years	Entire Period	Subperiods Excluding Last Day of the Year		
		First 9 days of January	Mid-January to mid-December	Last 9 days of December[b]
Entire Period 12-17-70 to 12-16-85	.911[c]	.957	.916	.747
1970		—	—	.781
1971		.843	.860	.688
1972		.853	.942	.703
1973		.943	1.170	.977
1974		1.167	1.401	.862
1975		1.438	.995	.679
1976		.850	.857	.692
1977		.940	.910	.643
1978		1.069	.899	.797
1979		.988	.818	.717
1980		.911	.939	.772
1981		.772	.798	.744
1982		1.201	.815	.801
1983		.808	.900	.822
1984		.898	.731	.522
1985		.673	.710	.519

Tests of differences between columns:[d]

H_0: Mean difference between the January buy/sell ratio and the mid-January to mid-December buy/sell ratio = 0.

t-statistic = 0.81

H_0: Mean of difference between the January buy/sell ratio and the prior December's buy/sell ratio = 0.

t-statistic = 4.96

H_0: Mean difference between the mid-January to mid-December buy/sell ratio and the December buy/sell ratio = 0. (This test uses the December 1985 buy/sell ratio and excludes the December 1970 buy/sell ratio.)

t-statistic = 5.71

[a] The daily buy/sell ratios are computed as Σpurchases/Σsales, measured in dollars, of the cash-account customers of Merrill Lynch. The means are calculated as the arithmetic average of the daily ratios. The range of the buy/sell ratio is from 0.35 to 2.87. There are 3780 observations during the fifteen-year period, involving 3789 trading days less nine days for which the buy/sell ratio is not available.

[b] The last nine days of December are the last nine before the last day. In other words, the last nine days as used here are trading days −10 through −2. The last trading day is excluded due to peculiarities discussed in the text. The column average of .747 is calculated using the fifteen Decembers from 1970 to 1984. The December 1985 value of .519 is not included except for testing the hypothesis that the mean difference between the mid-January to mid-December and the December buy/sell ratios is zero.

[c] The first-order autocorrelation of the daily buy/sell ratios, based upon a regression of daily values with dummy variables for the first nine days of January and the last nine days of December before the last day, is 0.68. The higher order autocorrelations remain significantly above zero for many months.

[d] The tests assume independence from year to year. The t-statistics are computed by dividing the mean annual difference by the standard deviation of the mean difference.

Table II

Yearly Average Buy/Sell Ratio and Net Equity Sales by Household Sector

Year (1)	Mean Buy/Sell[a] (2)	Net Selling of Equities by Households, $Billions[b] (3)	U.S. GNP Deflator (4)	Real Net Selling (columns (3)/(4))
1971	.853	6.4	.9602	6.67
1972	.929	9.9	1.0000	9.90
1973	1.153	4.3	1.0592	4.06
1974	1.371	1.0	1.1620	0.86
1975	.999	7.3	1.2725	5.74
1976	.850	0.4	1.3388	0.30
1977	.901	8.2	1.4170	5.79
1978	.900	6.2	1.5205	4.08
1979	.820	23.3	1.6277	14.31
1980	.931	10.8	1.7736	6.09
1981	.794	34.9	1.9551	17.85
1982	.828	14.7	2.0715	7.10
1983	.893	17.3	2.1502	8.05
1984	.728	74.3	2.2393	33.18
1985	.701	104.2	2.3139	45.03

[a] These numbers include the last ten trading days of 1985 and exclude the last ten trading days of 1970, unlike the sample used in the rest of the paper.

[b] Source: Goldman Sachs and Company, *Portfolio Strategy*, January, 1987, Table 10, updated by Patricia Shangkuan of Goldman Sachs.

For the fifteen-year period, the average value of the buy/sell ratio is .911, which is noticeably below 1.00. The fact that the mean buy/sell ratio is below 1.00 suggests that individuals were net sellers of stock during the period of analysis.[12] This is consistent with data reported by Goldman Sachs and Company [13], based upon the Federal Reserve Board's Flow of Funds accounts, which show that for every single year in the 1971-85 period, the household sector (i.e., individual investors buying and selling stock directly, rather than via mutual funds or other intermediaries) was a net seller of stock. In Table II, I report annual net sales of equity by the household sector, along with the average buy/sell ratio, by year, for 1971-85. The simple correlation between the inflation-adjusted annual net sales of stock and the annual mean buy/sell ratio is −.593, showing a reasonably strong correspondence between a low buy/sell ratio and high net equity sales by individuals.

In Table III, I present mean differences in the daily return on small- and large-

[12] There are two other reasons why the mean buy/sell ratio can differ from 1.00. The first reason is that I report the equally weighted average of the daily buy/sell ratios in this paper, rather than the volume-weighted average. If the buy/sell ratio is correlated with daily volume, then the equally weighted average will not equal 1.00, even if the dollar volume of buying was equal to the dollar volume of selling by individuals over the sample period. Secondly, since this is a ratio, even if the numerator and the denominator had the same average values, the average value of the ratio would not in general equal one.

Table III

Mean Difference in Daily Returns on Smallest and Largest Deciles of NYSE Stocks ($r_{small} - r_{large}$), 12-17-70 through 12-16-85[a]

Period by Years	Entire Period	Subperiods Excluding Last Day of the Year		
		First 9 days of January	Mid-January to mid-December	Last 9 days of December[b]
Entire Period 12-17-70 to 12-16-85	.00042[c]	.00876[d]	.00010	−.00079
1970		—	—	.00556
1971		.00826	.00015	−.00075
1972		.00846	−.00088	−.00314
1973		−.00025	−.00175	−.00546
1974		.01862	−.00033	−.00474
1975		.03737	−.00010	.00354
1976		.00697	.00114	.00087
1977		.00614	.00114	−.00194
1978		.00383	.00072	−.00138
1979		.00835	.00054	.00299
1980		.00295	−.00023	−.00155
1981		.00641	.00063	.00009
1982		.00545	.00053	−.00236
1983		.00620	.00086	−.00257
1984		.00680	−.00078	−.00095
1985		.00585	−.00019	.00477

Tests of differences between columns:[e]

H_0: Mean difference between the January small-firm premium and the mid-January to mid-December small-firm premium = 0.

t-statistic = 3.77

H_0: Mean difference between the January small-firm premium and the prior December's small-firm premium = 0.

t-statistic = 3.51

H_0: Mean difference between the mid-January to mid-December small-firm premium and the December small-firm premium = 0. (This test uses the December 1985 small-firm premium, and excludes the December 1970 small-firm premium.)

t-statistic = 1.32

[a] Small and large stocks returns are, respectively, the returns on the smallest and largest deciles of New York Stock Exchange stocks, ranked according to market value at the end of the previous November 30. The daily portfolio returns are computed as

$$r_{p,t} = [\Sigma_{i=1}^{n} (1 + r_{i,t-1})(1 + r_{i,t})]/[\Sigma_{i=1}^{n} (1 + r_{i,t-1})] - 1$$

for the n stocks in each decile. This procedure adjusts for bid-ask bias (see Blume and Stambaugh [4]). Nine trading days are omitted from the sample due to the nonavailability of buy/sell data.

[b] The last nine days of December are the last nine before the last day. In other words, the last nine days as used here are trading days −10 through −2. The last trading day is excluded due to peculiarities discussed in the text.

[c] The first-order autocorrelation of the daily values is 0.22, based upon a Cochrane-Orcutt regression of daily values with dummy variables for the first nine days of January and the last nine days of December before the last day. This regression,

$$r_t - \rho r_{t-1} = b_1 + b_2 (\text{JANDUMMY}_t - \rho \text{JANDUMMY}_{t-1}) + b_3 (\text{DECDUMMY}_t - \rho \text{DECDUMMY}_{t-1}) + e_t$$

where r_t is the daily small-firm premium ($r_{small} - r_{large}$), has an F-statistic of 64.59, which has a p-value of less than .0001.

[d] .00876, or .876 percent per day, totals $(1.00876)^9 - 1 = .0817$, or 8.17 percent for the nine-day period.

[e] The tests assume independence from year to year. The t-statistics are computed by dividing the mean annual difference by the standard deviation of the mean difference.

stock portfolios for the same time period and subperiods as in Table I.[13] In both Tables I and III, the last half of December includes only the first nine of the last ten trading days in December. The reason for excluding the last trading day of the year (normally December 31) is that there are peculiarities due, probably, to institutional factors, which I will discuss below. The small- and large-stock portfolios are, respectively, the smallest and largest market-value deciles of common stocks on the New York Stock Exchange (NYSE). NYSE-listed securities are used because the buy/sell ratios are for NYSE-listed stocks only.

The small- and large-stock portfolios are formed based upon the November 30 ranking of market values of NYSE stocks. The portfolios are reformed annually. The reason for using a November 30 date, rather than the more conventional December 31 date, for reforming portfolios is to keep portfolio composition constant during the December-Janaury period. The qualitative and quantitative conclusions of this paper are not sensitive to the portfolio-formation date, however. (The analysis has been duplicated using December 31 market values and portfolio-formation dates.) Securities are removed from the portfolios as they are delisted from the CRSP daily returns tape.

To avoid bid-ask spread bias in the computation of daily returns on the portfolios, I have followed the procedure suggested by Blume and Stambaugh [4]. In particular, the daily portfolio returns are computed as

$$r_{p,t} = \left[\sum_{i=1}^{n} (1 + r_{i,t-1})(1 + r_{i,t}) / \sum_{i=1}^{n} (1 + r_{i,t-1}) \right] - 1$$

which weights $r_{i,t}$, the current day's return on stock i, by the previous day's relative gross return. Thus, the difference in daily returns ($r_{small} - r_{large}$) reported in Table III approximates the return realizable from a buy-and-hold strategy. The average daily difference in return of 0.00042, or 0.042 percent per day, corresponds to an annualized difference of 11.16 percent, assuming 252 trading days per year.

As is the case for the buy/sell ratio, it is easy to reject the hypothesis that there are no seasonal patterns in the daily small-firm premium, ($r_{small} - r_{large}$). In Table III, I report a t-statistic of 3.51 for the hypothesis that the January small-firm premium shows no change from the prior December's small-firm premium. The t-statistic for the hypothesis that the mid-January to mid-December small-firm premium shows no change from the January small-firm premium is 3.77. While the December small-firm premium is lower on average than the prior mid-January to mid-December small-firm premium, the t-statistic is only 1.32.

In Figure 1, I present graphical evidence on the behavior of the buy/sell ratio and the daily excess return of small stocks at the turn of the year. The buy/sell ratio is very low at the end of December, and takes an enormous jump as soon as the new year starts. This behavior is consistent with the notion that investors who engage in tax-motivated selling in late December do not immediately reinvest

[13] While Table III only reports the mean differences in daily returns on small and large stocks, the seasonal pattern is due almost exclusively to movement in r_{small}. The mean daily returns on r_{large} for the first nine days of January, mid-January to mid-December, and the last nine days of December are, respectively, .00038, .00037, and .00212 for the fifteen years of analysis.

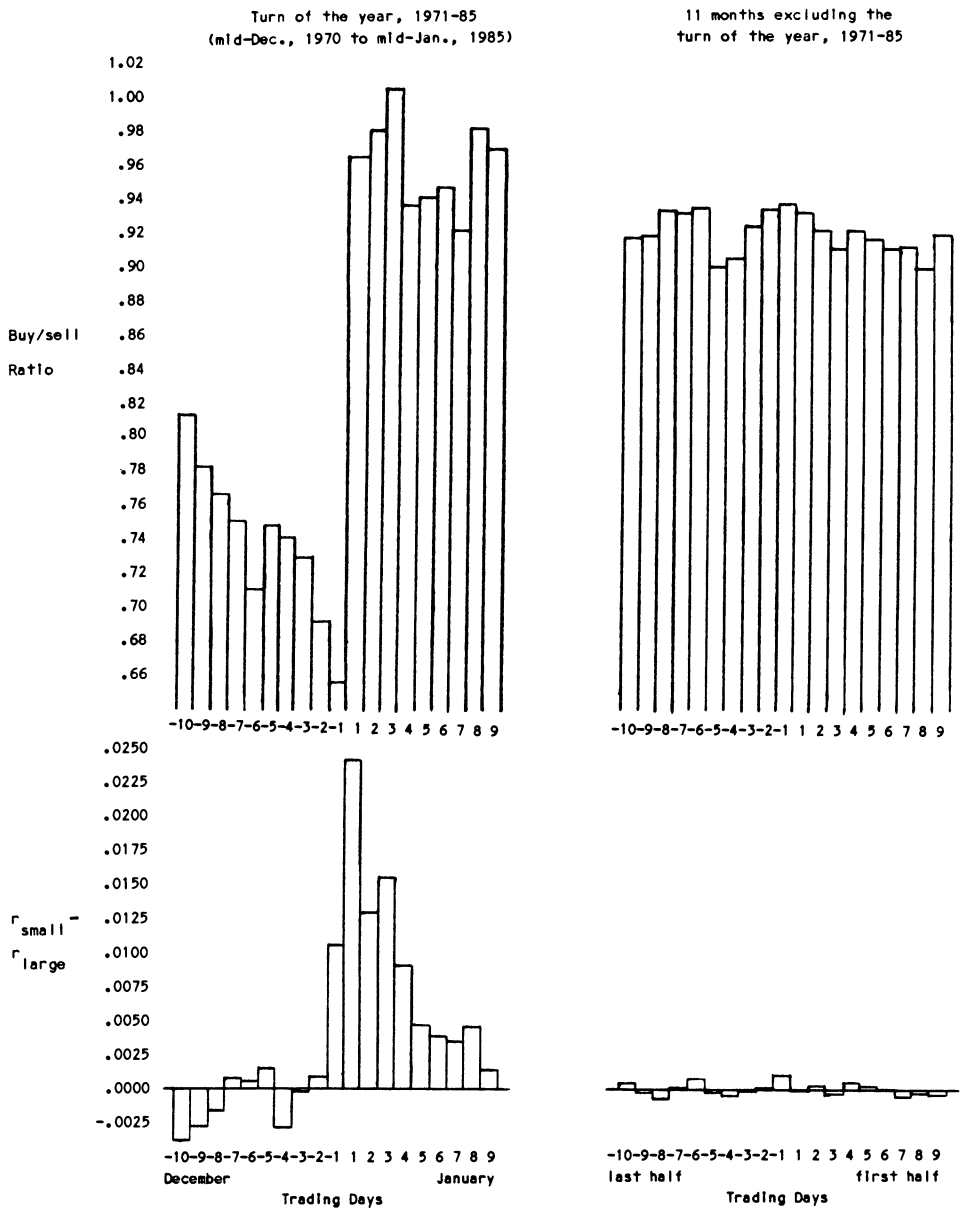

Figure 1. Mean Buy/Sell Ratio (top) and the Excess Return on Small Firms (bottom) by Trading Day. A Daily Return of .0100 Is 1.00 Percent Per Day.

the funds, but instead wait, to at least some degree, until the beginning of January to do so. In other words, some investors do indeed park their proceeds.

This evidence parallels Rozeff's [24] findings. Rozeff uses monthly data on the buy/sell ratios of five groups of market participants to document that "nonpublic" investors shift out of stocks during December, and back in during January. These

"nonpublic" investors include both individuals and institutions that are not NYSE members. Consequently, his data aggregate the individuals who are intensive in small stocks with institutions that are intensive in large stocks. Nevertheless, Rozeff documents the same phenomenon that I document here—the shifting out during December *and* the shifting in during January.

The lower left-hand panel of Figure 1 graphs the extremely high returns on small stocks in early January that other researchers have documented. On the first trading day of January, the excess return on small stocks is an incredible 2.4 percent for the day.

Three aspects of Figure 1 are troubling for the parking-the-proceeds hypothesis. First, on the last day of December, the buy/sell ratio is extremely low (in fact, it is at its lowest point of the entire year), while the excess return on small stocks is at its lowest point of the entire year), while the excess return on small stocks is very high (the fourth-highest day of the year). I believe what is occurring on this day is that small-firm stocks tend to close at their ask prices, following a is contained in Lakonishok and Smidt ([18], Table 4), which reports the ratio of (closing price − low)/(high − low) for stocks, categorized by size decile, for days at the turn of the year. In discussing their findings, Lakonishok and Smidt ([18], p. 448) state that "... the data in Table 4 confirm Roll's [22] suggestion that at least part of the observed turn of the year return is a shift from transactions at the bid price to transactions at the ask price, and identify the last trading day of December as the day on which the shift occurs."

The second troubling aspect of Figure 1 is that, given that the buy/sell ratio is so low in December, why don't small-stock prices fall more than they do during the month? My conjecture is that other market participants, knowing that during December individuals are net sellers for tax-motivated reasons, stand ready to buy up the shares being "dumped" by individuals.

The third troubling aspect of Figure 1 is that the January small-firm premium is so large, while the January buy/sell ratio is only slightly above average. My conjecture is that individuals are indeed heavy net buyers of small firms in January, but simultaneously they are selling securities on which they had long-term capital gains. Since the securities that had appreciated in price are unlikely to remain in the smallest decile of firms, this reasoning would predict a pattern in the buy/sell ratio by size decile in January. Unfortunately, the buy/sell ratio is available only in the aggregate. Suggestive evidence is contained in Reinganum [19], however.

Reinganum's Table 1 presents the distribution of firms classified by both his measure of tax-loss-selling-group quartiles and market-value decile. Firms are not evenly distributed over the forty categories. For example, in the lowest decile of market value, his numbers show that "losers" outnumber "winners" (where "losers" are those firms in the bottom quartile of the tax-loss-selling measure distribution, and "winners" are in the upper quartile of this distribution) by a ratio of 8.6 (6.21 to 0.72), while in the highest decile of market value, this ratio is only 0.15 (0.68 to 4.44). If individuals wait until January to sell "winners," and reinvest some of the proceeds in small stocks, significant January buying pressure could exist without the aggregate buy/sell ratio being abnormally high.

In the right-hand panels of Figure 1, the behavior of the buy/sell ratio and the excess return on small firms are graphed for the eleven non-January turns of the month. No patterns are evident.

IV. Empirical Evidence

In Table IV, I report the results of a regression for the fifteen turn-of-the-year periods in which the dependent variable is the average excess return on small stocks during the nine-day period commencing on the first trading day of January. The explanatory variable is the average daily buy/sell ratio during the first nine trading days of January. Forty-six percent of the temporal variation in the turn-of-the-year effect is explained. Furthermore, the slope-coefficient estimate of .0321 implies that, for a January buy/sell ratio of 1.2 rather than 1.0, the January excess return on small-firms is .0064, or .64 percent, higher *per day* during the nine-day early January period, certainly an economically meaningful effect.

Alternative specifications of the regression (not reported here), such as using the change in the buy/sell ratio from December to January, produce qualitatively similar results. Furthermore, the results are not sensitive to the length of the "window" analyzed at the turn of the year. I have chosen to compute the average buy/sell ratio and small-firm premium for the first nine days of January, but similar results are obtained if the number analyzed is increased or decreased by a few days.

V. Summary and Conclusions

Using the buy/sell ratio of individual investors at Merrill Lynch, I have documented that December's net selling abruptly switches to net buying at the turn of the year. The year-to-year behavior of this buy/sell ratio is strongly related to the magnitude of the turn-of-the-year effect.

The behavior of the buy/sell ratio is consistent with the following interpretation: in order to realize losses for tax purposes, individuals sell stocks that have

Table IV

OLS Regression Results with the January Small-Firm Premium as the Dependent Variable for the Fifteen Januaries from 1971-1985[a]

	Coefficient estimates			
Dependent Variable	Intercept	Average buy/sell ratio during the first nine days of January	$R^2_{adjusted}$	Number of Observations
Average ($r_{small} - r_{large}$) during the first nine days of January	−.0220 (.0088)[b]	.0321 (.0090)	.46	15

[a] The data for this regression are reported in Tables I and III.

[b] Standard errors in parentheses.

declined in price during December. They do *not* immediately reinvest all of the proceeds from these sales in other stocks, however. Instead, in the aggregate they wait until January, when they invest in a broad spectrum of small stocks. This January buying may be augmented by cash infusions from year-end bonuses and from the sales of larger firms on which long-term capital gains are being realized.

This explanation highlights the difference between this paper and other tax-loss-selling papers (Givoly and Ovadia [12], Reinganum [19], Roll [22], Rozeff [24]) that focus on the selling pressure in December, and view the January rise as a recovery from this selling pressure. My focus is on the abrupt switch to net buying of small stocks by individuals in early January. This difference in emphasis is subtle, but significant.

This interpretation explains why (i) the turn-of-the-year effect is strongest following bear markets, (ii) the turn-of-the-year effect concerns small stocks and not all stocks, (iii) small stocks that are good candidates for tax-loss selling have the strongest effect, and (iv) why small stocks, taken as a group, display a turn-of-the-year effect. A brief discussion of these four points follows.

Following stock market declines, tax-motivated selling is heavy in the subsequent December.[14] This not only depresses the prices of the stocks subject to this selling pressure, but also results in a large amount of funds being reinvested in the following January. Consequently, the turn-of-the-year effect is strongest following bear markets, e.g., January 1975. When individuals reinvest their funds, they tend to invest in small stocks, just as they do throughout the year. This is why small stocks as a group outperform large stocks in January. However, investors do show some selection in which small stocks they reinvest their funds. I am sure that the data would show that individuals who sell a given stock in December have a disproportionately high probability of reinvesting in that stock, after the thirty-day "wash sale" restriction is satisfied. Consequently, small stocks that had been subject to tax-loss selling pressure outperform other small stocks in January.

My analysis explains why small stocks do well at the turn of the year. It does not explain why, over the course of a year, small stocks have higher returns than large stocks. In other words, my framework is capable of partly explaining the temporal variation of small-stock returns, but it cannot explain why small stocks outperform large stocks. While the temporal behavior of small-stock returns in January, is, I believe, a market inefficiency, the excess return on small firms over the course of the year could conceivably be an equilibrium compensation for risk-bearing. Alternatively, it could be a manifestation of DeBondt and Thaler's [9, 10] evidence of stock market overreaction, in that, for individual stocks, there is negative autocorrelation of excess returns, measured on an annual (or longer) basis.

The framework that I am proposing is completely antithetical to that of the

[14] Whether or not it is rational for individual investors to wait until December to realize losses for tax purposes is a question outside the scope of this paper. Schultz [26] presents an analysis in which it is optimal to realize a disproportionate number of losses in December. The evidence in various studies (see the references in Lakonishok and Smidt [18]) indicates that individual investors behave this way.

efficient-market hypothesis (in combination with an equilibrium framework such as the CAPM or APT). I am proposing that the turn-of-the-year effect can be best understood in terms of a framework where the small-stock sector is subject to *predictable* price patterns due to price pressure resulting from *predictable* portfolio-rebalancing behavior by individual investors. In other words, I am emphasizing institutional factors, rather than equilibrium risk/expected return tradeoffs, as the explanation of the turn-of-the-year effect.

This paper can be viewed as a response to Reinganum's [20] analysis of asset-pricing research. I think that the institutionally oriented framework that I am proposing has some merit, especially in competition against equilibrium frameworks that seem incapable of explaining the empirical regularities that have been documented in the literature. The price-pressure framework may be able to explain Ariel's [1] findings that stock prices, on average, rise during the first half of trading months while remaining flat during the second half. Research might demonstrate that institutions have cash inflows that are concentrated during the first half of trading months.

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DISCUSSION

WILLIAM T. ZIEMBA*: The evidence is very strong for the existence of a turn-of-the-year effect. The prices of small-capitalized stocks increase significantly relative to large-capitalized stocks on the first ten or so trading days of January. The effect seems to begin on trading day −1 where there is a tendency for a shift in sales of the small stocks at the asked rather than at the bid. Trading days +1 to +4, on average, show enormous gains in the small stocks over the large stocks and this effect continues until mid-January. The total average difference between the smallest and largest deciles of stocks from −1 to +9 is on the order of 6 to 10 percent. Studies supporting this effect use data over extremely long periods. For example, the original Rozeff-Kinney study concerned the period 1904–74. The period from 1962 to present has been especially thoroughly analyzed. One additional useful empirical study not referenced by Ritter is Smidt and Stewart [7].

Why does this effect occur and with such regularity? Jay Ritter's excellent paper provides us with more insight into the understanding of this phenomenon with an analysis of the "parking-the-proceeds" hypothesis. Using a unique data set for the fifteen turns of the years from 1971 to 1985, he finds that the buy/sell ratio of individual investors at Merrill Lynch explains 46% of the variance of the excess returns of small over big stocks in the first half of January. During

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