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Year-End Tax-Induced Sales and Stock Market Seasonality

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ABSTRACT

The paper relates two phenomena in the stock market: the high return during the month of January and the apparent existence of widespread sales of stocks for tax purposes towards the end of the fiscal year. The findings suggest that, due to the tax-induced sales, the price of many stocks over the last 35 years was temporarily depressed in December but recovered in the following January. This price recovery is a major contributor to the high returns observed in January. The tax effect is present in firms of all sizes but much more pronounced for small firms. The analysis also indicates that a more precise identification of the tax-switch candidates may prove that the tax-induced sales are, in fact, the sole contributor to the high January's returns.

THE ISSUE OF SEASONALITY in the stock market has attracted the attention of researchers for some time. Rozeff and Kinney [13] present evidence of seasonality in the market index with the months of January and July having a peak return. The seasonal movements in the average return in the market could not be fully accounted for by a corresponding seasonal pattern in the market risk. They offer three explanations to this phenomenon: tax-induced sales, release of accounting information, and seasonal demand for cash. The first explanation has received some support from recent research. Dyl [4] studied the effects of capital gain taxes on trading volumes of common stocks and concluded that "capital gain taxes affect investors' year-end portfolio decisions, and that this effect is, in turn, reflected in the trading volumes of common stocks in December" (p. 174). McEnally [10] and Branch [2] studied the effects of the tax-induced trading on securities return and found that depressed stocks at the end of the year are likely to bounce back immediately after year-end.

The existence of a pronounced seasonal behavior in the market might suggest some form of market inefficiency: a strategy under which stocks are bought towards the end of the year and sold at the beginning of the following year might yield an abnormal return. Despite the seasonal behavior of stock returns, it would be indeed surprising if this regularity, which has not gone unnoticed by the financial community, could be exploited to bring a risk-adjusted excess return.

The objective of this paper is to examine jointly the two phenomena: tax-

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induced sales and seasonality, and to determine the extent to which tax-induced sales of stocks during different months, and particularly during December, can explain the existence of seasonality in the stock market. It has recently been found that the seasonal effect observed in the stock market is largely due to the behavior of small firms during the month of January (see Keim [8]). In a recent paper Roll [12] provides evidence relating the firm size effect (documented earlier by Reinganum [11] and Banz [1], to January's rally and suggests that it might be caused, at least partly, by tax-induced sales. This paper provides more evidence on the differential effect of tax-induced sales on the performance of small and large firms.

The findings suggest that most of the seasonal behavior of stock returns in January is related to tax-induced sales; further, this tax effect exists for most firms but is particularly pronounced for small firms.

I. Methodology and Sample

The seasonality found in the market index could stem from several different sources: common seasonal factors affecting all securities (e.g., change in the money supply, interest rates, etc.); a seasonal pattern in the return of firms in certain industries, which does not "wash out" when returns across securities are aggregated to compute the market average; finally, the seasonality in the market index could be due to seasonal factors which affect each year a different group of securities (e.g., tax-induced sales or the release of favorable annual reports). Regardless of the source of seasonality, a large portfolio of randomly selected stocks will not produce an abnormal return in any month, since the market index itself incorporates the seasonal factor. However, when a portfolio is not constructed randomly but rather according to the factor responsible for the seasonality (e.g., industry affiliation), that portfolio is expected to produce an abnormal (positive or negative) return in particular months. Thus, the test of the source of market seasonality can rely on the examination of the return behavior of a portfolio whose securities are selected according to some attribute hypothesized to be the source of the return seasonality.

To test for the possibility of a capital gain tax induced seasonality, a portfolio of securities consisting of stocks which are believed to be likely candidates for tax-induced sales is constructed each month. The return characteristics of this portfolio are then examined and compared to those of a portfolio of the remaining stocks. The seasonal behavior of the entire market, and of the portfolio, is compared each month, and the impact of tax-induced sales on the seasonal pattern in the market is analyzed. To evaluate the differential impact of tax-induced sales on firms of different sizes, the above analysis is conducted separately for five size-groups of firms.

Two methods for selecting the "likely candidates" for tax-induced sale are used in the literature. The method employed by Dyl [4] is to select securities exhibiting a certain percentage of depreciation in their price during a given period. On the other hand, Branch [2] selects securities achieving their 12-month low at the end

of the year. Rather than restricting the selection to Decembers, we considered securities exhibiting their 12-month low in any given month. This extension is useful for two reasons: first, if the abnormal return observed in January for securities achieving their 12-month low in December is also observed in other months, the results may stem, at least partly, from the particular sample selection and not necessarily from year-end tax switches. Thus, portfolios selected according to the same criterion, but in months other than December, may serve as a control group. Second, tax switch activities (wash sales or others), although likely to occur primarily during December, are not confined to this month and may occur in other months as well (e.g., during March, the end of the tax year for many firms).

In addition to examining those securities reaching their 12-month low in any given month, we also investigated a subgroup of these securities — those achieving their *24-month low* in that same month. The subgroup contains securities with an even greater likelihood of being sold for tax purposes.

Our sample consists of all New York Stock Exchange securities for which a record of returns is available on the monthly CRSP tape. Four portfolios were constructed in each month from January 1945 to December 1979. The first consisted of all NYSE stocks; the second consisted of all stocks reaching their lowest price over the previous 12 months (adjusted for stock splits and stock dividends); the third portfolio, a subset of the second portfolio, consisted of all stocks reaching their lowest price, over the preceding 24 months, in that month. The fourth portfolio was the complement of the second portfolio (and contained those securities that did not reach their 12-month low in that month).

For each of the four portfolios constructed for each month, we computed the rate of return and the abnormal return in both the month of the portfolio's creation and the following month. The market model (see Sharpe [14] and Lintner [9]) was used to derive the abnormal returns, so that

$$\tilde{R}_{it} = \alpha_i + \beta_i \tilde{R}_{mt} + \tilde{\epsilon}_{it}$$

where

$\tilde{R}_{it}$ = the return on security i in month t;
$\tilde{R}_{mt}$ = the return on the market portfolio in month t; and
$\tilde{\epsilon}_{it}$ = the error term with an assumed normal distribution, a constant variance, and zero mean.

The parameters of the regression were estimated anew for each month using data for the 60 months preceding the 12 or 24 months interval over which the price comparison was made. The estimation period is, therefore, completely divorced, not only from the test period, but also from the 12-month interval during which the security experienced a drop in its price. The market rate of return was represented by the equally-weighted NYSE index.

Based on the estimates $\hat{\beta}_{it}$ and $\hat{\alpha}_{it}$, we defined the abnormal return as

$$\hat{\epsilon}_{it} = R_{it} - (\hat{\alpha}_{it} + \hat{\beta}_{it} R_{mt})$$

The abnormal return for each portfolio was computed as the simple average across securities in the portfolio.[1]

Excluded from each portfolio were stocks for which return data for the construction month or for more than 30 of the 60 months estimation period, were missing. The sample size increased over the 35 years (1945 to 1979) from about 500 stocks to about 1300 stocks.

To assess the potential effect of tax-induced sales on firms of different sizes, the above analysis (centered around the division, each month, of the CRSP firms into four portfolios described earlier), was conducted for each of the last 15 years in the sample for, separately, five groups of firms ranked by the total market value of their equity at the beginning of each year.[2]

II. Empirical Results

To achieve parsimony, the results for the 420 portfolios created each month, from January 1945 to December 1979, are presented for subperiods of 5 years each.

The average number of stocks and the average beta for each of the monthly portfolios in each of the 5-year subperiods are presented in Table I. The beta of each group and in each subperiod is very close to one. The average beta for all the stocks included in the sample each period was slightly below 1.0. This might reflect a survivorship bias: since five years of complete data are necessary for an inclusion in the sample, the sample may be biased towards large and established firms.

The percentage of stocks (out of all stocks) that reach their 12-month low in each month is presented in Table II. Note that the sum of the percentages across months is not, and does not have to be, one hundred. The percentage in a particular month is not independent of the general stock market trend during that period. We expect more securities to reach their 12-month low in periods in which prices have generally declined. Indeed, during the early 1970s, for example, when the stock market declined, there was a high percentage of securities in this category in most months. The opposite is true for the late 1970s when the stock market was in an uptrend. It is also apparent from the table that during certain months, particularly May and June, an unusually high percentage of the stocks reach their low. On the other hand, other months and especially January and March are characterized by a very low frequency of stocks achieving their 12-month low.[3] An analysis of variance, in which the independent variable is the

[1] Firms which reached their 12 (or 24) month lows in a given month t have probably had increases in their debt/equity ratios and hence their beta's by the beginning of the month $t + 1$. Thus, the beta used to calculate month $t + 1$ residual might be too low. To assess the effect of this possible bias betas based on the 60 months following the test period were computed for the last 15 (of the 35) years. Although the betas computed this way were slightly higher, the main results remained essentially similar.

[2] The analysis in the breakdown of firm size was not conducted for earlier years because of the unavailability of COMPUSTAT Information for those years.

[3] If the price series is symmetric around a constant mean, we would expect that the relative frequency of stocks achieving their 12-month low in any given month would not be significantly different from 1/12 (or 8.33%). The relative frequency in most months, however, is higher, reflecting primarily the fact that the return distribution is positively skewed; that is, the median return is lower than the mean.

frequency of stocks reaching their 12-month low in each month, shows that both the year and the month are significant explanatory factors (at the 1% significance level) of this phenomenon.

More direct evidence on the issue of seasonality is contained in Table III. The results show the existence of seasonality in stock returns, with January being associated with the highest average rate of return over the year. While the (arithmetic) average monthly rate of return over the 35-year period is 1.17%, the

Table I

Average Number of Stocks and Average Beta of the 420 Monthly Portfolios, by Period of Portfolio Formation[a]

	Monthly Portfolios Consisting of All Stocks		Monthly Portfolios Consisting of Stocks that reached their 12-month low		Monthly Portfolios Consisting of All other stocks	
Months of portfolio formation	Average number of stocks in a monthly portfolio	Average beta	Average number of stocks in a monthly portfolio	Average beta	Average number of stocks in a monthly portfolio	Average beta
1/1945–12/1949	527	0.94	78	0.98	449	0.90
1/1950–12/1954	651	0.97	61	0.94	590	0.95
1/1955–12/1959	728	0.98	86	1.02	642	0.97
1/1960–12/1967	801	0.98	123	1.08	678	0.96
1/1965–12/1969	940	0.99	143	0.95	797	0.99
1/1970–12/1974	1112	0.99	283	1.04	829	0.96
1/1975–12/1979	1331	0.97	108	0.92	1223	0.98

[a] Each period represents 60 months and thus 60 portfolios. The averages which are reported in the table for each period are the simple averages over 60 portfolios formed in these 60 months.

Table II

Percentage of Stocks (Out of All Stocks) Reaching their 12-Month Low, in Any Given Month

	Month in Which the 12-Month Low was Reached											
Years	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
All years	8.8	11.2	9.4	14.1	18.7	18.4	12.8	13.9	17.4	17.1	15.8	15.2
1945–1949	8.6	20.8	8.8	19.3	21.8	13.2	6.6	9.8	20.7	13.6	22.1	14.5
1950–1954	3.4	5.2	5.8	11.8	8.2	15.1	8.6	13.6	14.6	10.5	7.4	10.7
1955–1959	9.2	8.7	5.1	6.0	8.6	9.0	5.8	11.2	20.8	23.9	18.0	19.6
1960–1964	9.4	8.9	11.4	18.8	22.1	23.3	10.8	8.2	19.7	20.6	9.0	9.8
1965–1969	5.1	9.9	11.8	8.3	12.3	21.9	24.8	21.8	20.8	11.8	15.6	17.5
1970–1974	17.7	15.5	15.9	29.3	38.9	39.7	24.3	26.2	23.6	17.2	28.7	23.3
1975–1979	7.4	10.0	5.0	5.7	7.9	4.0	3.9	4.7	7.1	20.3	10.2	11.0

Table III

Average Rate of Return by Month (percentages; the standard deviation of the return over the 35 years is in parentheses)

	Month											
Years	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
All Years	4.36	0.53	1.84	0.94	0.00	−0.34	1.49	0.79	−0.11	0.14	2.24	2.17
	(6.69)	(3.77)	(3.56)	(4.73)	(4.53)	(4.39)	(4.43)	(4.39)	(4.86)	(5.07)	(5.45)	(3.83)
1945–1949	3.00	−1.70	2.78	1.24	2.04	0.38	−0.16	0.22	−1.20	3.52	−0.62	3.62
1950–1954	4.42	0.56	0.32	0.72	1.50	−1.98	4.38	0.68	1.86	−0.04	4.40	3.74
1955–1959	2.66	1.46	2.50	2.24	0.68	1.64	2.82	−0.84	−1.64	−0.34	2.92	1.18
1960–1964	2.60	1.98	1.50	−0.86	0.32	−1.90	1.60	2.62	−2.48	0.46	4.36	0.58
1965–1969	4.54	−1.10	0.94	4.46	−0.88	−2.02	−0.28	0.68	1.86	2.24	1.88	0.62
1970–1974	3.10	1.28	0.20	−3.86	−5.34	−3.22	1.30	0.68	1.32	0.60	−2.38	2.58
1975–1979	10.20	1.26	4.66	2.60	1.68	4.70	0.74	1.46	−0.48	−5.44	5.12	2.86

average monthly rate of return during January is 4.36%. The next-highest return months are November, December, and March, which are well behind (with returns of 2.24%, 2.17%, and 1.84%, respectively). The lowest-return months are June (−3.4%), September (−1.1%), and May (0.0%). Similar results are reported by Rozeff and Kinney [13] for the partly overlapping period 1941–74. The superior performance of stocks during January and their dismal performance during June is quite persistent over time. January is the highest-return month in 11 of the 35 years and among the three highest-return months in 17 years. June's returns are the lowest of the year in 9 years and among the three lowest in 14 years.

Months with higher returns are characterized also by a higher cross-section variability of the rate of return. The standard deviation of the returns computed across securities (not shown in the table) during the highest-return month, January, and the lowest-return month, June, is, on average, 0.0865 and 0.0693 respectively. The Spearman rank correlation between the return and its cross-sectional standard deviation is 0.76, which is significant at the 5% level. This relationship may reflect the fact that the average seasonal pattern is not common to all stocks and may suggest that, in so far as the identity of the stocks that experience seasonality cannot be determined beforehand, the higher return in certain months is also associated with a greater risk.

We turn now to the analysis of the effect of tax-induced sales on the behavior of the stock market. The examination of the return behavior of stocks which achieve their 12-month low in December and that are, therefore, likely to be sold for tax purposes is revealing. Table IV shows the return and the abnormal return in month t for the entire population and for two groups: group (1) consists of stocks which achieve their low in the previous month; and group (2) of all other stocks. Although January returns in both groups are high, the average January returns of the first group (7.01%) is significantly higher (at the 1% significance level) than the return of the other stocks (the mean difference is 3.63%; the t-test for pairs was applied to 33 yearly differences between the respective averages). The January return for group (1) is greater than that of group (2) in 31 of the 33 years in which the comparison could be made. The difference between the returns of the two groups in each of the other months is insignificant; this suggests that the particular selection criterion (12-month low) could not, by itself, explain the return behavior of group (1) in January.

That the seasonal effect in January is not common to all securities is also evident from the abnormal return in that month, which is significantly positive for group (1) (at the 1% significance level) and, as a consequence, significantly negative for the complement group (2). Again, this relationship between the abnormal return of the two groups is persistent and exists in 32 of the 33 years in which the comparison could be made. The rebounding effect in month t of stocks that achieved their 12-month low in the previous month is present also, albeit less pronounced, in December. The 1.04% abnormal return in December for group (1) is significantly greater than zero (at the 1% significance level); this finding is consistent with early tax-induced sales occurring in November.

The recovery in January, of stocks whose price was depressed in December, is reflected also in the high frequency of sign reversals in the abnormal return of these stocks. Table V presents this frequency for all stocks and for groups (1) and

Table IV

Average Return and Average Abnormal Return for Different Groups of Stocks[a] (percentages)

	Month											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
A. Return												
All Stocks[b]	4.36	0.53	1.84	0.94	0.00	−0.34	1.49	0.79	−0.11	0.14	2.74	2.17
Stocks that achieved their 12-month low in the previous month	7.01[c]	0.18	2.24	−0.13	0.13	0.20	1.88	1.26	−0.11	0.42	2.10	2.98
All other stocks	3.63[c]	0.54	1.85	1.08	0.12	−0.19	1.33	0.75	−0.11	0.08	2.24	2.29
B. Abnormal Returns												
All Stocks[b]	0.01	0.04	0.05	0.03	0.06	0.04	0.07	−0.03	0.11	0.06	0.05	−0.14
Stocks that achieved their 12-month low in the previous month	2.43[d]	−0.46	−0.07	−1.14	0.04	0.23	0.24	0.56	0.23	0.51	−0.03	1.04[d]
All other stocks	−0.85[d]	0.01	0.40	0.15	0.10	0.18	−0.07	0.07	−0.06	−0.01	0.09	0.16

[a] The averages are computed over 35 yearly means.

[b] The mean for "all stocks" each year is the weighted average of the means of the other two groups. The average for "all stocks" presented here is a simple average of the 35 yearly means; it is very close but does not have to be equal to the average of the mean values of the subgroups over the 35 years.

[c] The difference between the two subgroups is significant (at the 1% significance level).

[d] The value is significantly different from zero (at the 1% significance level).

Table V

Proportion of Sign Reversals of Abnormal Returns by the Month in which the Reversal Occurred

	All Months	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
All Stocks:													
All reversals[a]	0.512	0.554	0.513	0.519	0.493	0.506	0.506	0.521	0.511	0.504	0.509	0.503	0.510
Reversals of negative abnormal returns[b]	0.480	0.619	0.492	0.468	0.432	0.459	0.448	0.510	0.481	0.479	0.448	0.467	0.447
Stocks that achieved their 12-month low in the previous month													
All reversals[a]	0.497	0.719	0.497	0.492	0.390	0.448	0.459	0.540	0.501	0.496	0.499	0.490	0.440
Reversals of negative abnormal returns[b]	0.486	0.747	0.473	0.463	0.375	0.404	0.426	0.532	0.497	0.519	0.437	0.481	0.408
All other stocks													
All reversals[a]	0.514	0.524	0.514	0.522	0.504	0.516	0.576	0.516	0.513	0.505	0.511	0.505	0.523
Reversals of negative abnormal returns[b]	0.479	0.575	0.497	0.469	0.443	0.472	0.456	0.502	0.479	0.469	0.450	0.476	0.461

[a] Proportion of abnormal returns in the previous month that have a different sign in the current month.

[b] Proportion of negative abnormal returns in the previous month that are followed by a positive abnormal return in the current month.

(2). Assuming a symmetric distribution of the abnormal returns, then, in the absence of a seasonal effect and, in general, of a serial correlation in the abnormal returns, one would expect the frequency of sign reversals of abnormal return in consecutive months to be 0.500. The table shows that the frequency for the entire sample is only slightly (although significantly) above 0.5, which reflects a negative serial correlation. This is consistent with previous findings on the existence of negative autocorrelation in the monthly abnormal return (see, for example, Fama, Fisher, Jensen, and Roll [5] and Fisher [6]).

The frequency of sign reversals in all months is around 0.5 in both groups (1) and (2). However, the frequency of sign reversals in group (1) during January is strikingly high, 0.719, and due completely to the high proportion of January's reversal of negative abnormal returns recorded in December (0.747). The difference in the percentage of January reversals between stocks achieving their 12-month low in December and all other stocks is significant at least at the 5% level.

The finding concerning the frequency of sign reversals is, of course, not independent of the previously reported higher-than-average return in January for stocks achieving their 12-month low in December. Rather, this evidence is complementary and suggests an across-the-board rebounding of these stocks in January, which is quite impressive considering the above-average returns that characterized the January months.

The proportion of cases with a negative abnormal return in December that become positive in January is somewhat higher than 0.5, even for group (2). This, coupled with the finding of a somewhat higher-than-average return in January for this group, suggests that either tax-induced sales are not the only explanation to the high returns observed in January, or the "12-month low" criterion does not perfectly capture the tax-sale candidates; that is, some of the stocks which were sold for tax purposes might not meet the criterion, while others that met it might not be sold. It is perhaps impossible to identify those stocks in which the end-of-year trade is tax-induced. In an attempt to evaluate the validity of the "12-month low" criterion, we repeated all the tests for a subset of group (1), consisting of stocks which reached their *24-month low* in the month of December. These stocks suffered, on average, an even bigger drop in price; thus, they are even more likely to be sold for tax purposes as the year-end approaches than those in group (1).

The January results for this subset, which are shown in Table VI, are consistent with the hypothesis that the subset contains a higher percentage of stocks sold for tax purposes. The average January return of this subset 9.14%, is even higher than the average return for the entire group (1) (7.01%). The subgroup's abnormal return during January is also higher than that of the entire group (4.94% vs. 2.43%). And as could be expected, the proportion in this subset of sign-reversals in January of negative abnormal returns observed in December is extremely high (0.838 vs. 0.712 for the entire group).

The results for the "24-month low" subgroup suggest that a more accurate identification of the stocks which are traded for tax purposes might reinforce the tax-sale explanation for the seasonal behavior of the stock market in January.

So far, we have treated the stocks which achieved their 12-month low in December as a transient group whose seasonal behavior was attributed to the tax-sales phenomenon. However, these stocks might share common permanent

Table VI

January Returns of Stocks Which Achieved Their 24-Month Low in Previous Month

Years	Return (%)	Abnormal Return (%)	Proportion of Sign Reversals of Negative Abnormal Returns[a]
All Years	9.14	4.94	0.838
1945–1949	4.50	3.40	0.900
1950–1954	6.60	3.05	0.816
1955–1959	6.00	5.73	0.872
1960–1964	11.40	7.20	0.807
1965–1969	5.46	2.78	0.828
1970–1974	19.56	8.94	0.913
1975–1979	8.38	2.96	0.634

[a] Proportion of negative abnormal returns in December that are followed by a positive abnormal return in January.

characteristics, such as industry affiliation, which could be the true force behind their observed seasonal behavior. To ascertain whether the group of stocks achieving their 12-month low in any given December is transient, we analyzed the frequency distribution of the number of years (out of the 35) in which a stock reached its 12-month low in December. If there is a permanent feature common to these stocks (for instance, industry affiliation), the same stocks may show their 12-month low in December, year after year. In the absence of such regularity, the number of years in which the lowest-price month of a given company is December should be distributed according to the binominal distribution with a probability, p, equal to the relative frequency of the group in the population.

We examined the distribution for 319 stocks which were represented in the sample in all 35 years. The results in Table VII show that the actual distribution is similar to the theoretical binomial distribution with $p = 0.126$ (which is the relative frequency of 12-month-low Decembers in that subsample) and $n = 35$. The null hypothesis that the distribution is binomial could not be rejected using the Kolmogorov Goodness-of-Fit Test (see Conover [3], pp. 295–8).

The relationship between the tax-induced sale phenomenon and what has become to be known as the "small-firm" effect is explored by the analysis whose results are reported in Tables VIII and IX. The analysis is based on the 15 years 1965–79 for which market values of the stocks were available. Five portfolios are constructed each year based by the market value of the stocks at the beginning of the year. Each portfolio represents 20% of the stocks: Portfolio 1 consists of 20% of the stocks with the lowest market value and Portfolio 5 consists of 20% of the stocks with the highest market value. Table VIII shows summary results for January for the 5 firm-size portfolios. The table reveals that stocks reaching their 12-month low in December have a higher return in January than the rest of the stocks (and hence a higher abnormal return and a higher percentage of sign

Table VII

Distribution of Stocks by the Number of Years (of 35) in which December is the 12-Month Low Month

Number of Years in which December is the 12-Month Low	Cumulative Proportion of Stocks in the Sample	Cumulative Proportion under the Theoretical Binomial Distribution[a]
0	0.009	0.009
1	0.078	0.054
2	0.235	0.165
3	0.395	0.341
4	0.580	0.543
5	0.715	0.724
6	0.796	0.854
7	0.875	0.932
8	0.925	0.971
9	0.975	0.988
10	0.981	0.994
11 and over	1.000	1.000

[a] $p = 0.126$, $n = 35$

reversals of the abnormal return) in all 5 portfolios. However, the difference between the two groups is larger for the portfolios with smaller firms.

At first glance, it might appear that the dominant factor affecting the return is the firm's size rather than the potential tax-sale: for example, the return of the "normal December" stocks in Portfolio 1 (7.55%) is still greater than the return on the "12-month-low" stocks in Portfolio 3. However, what appears to be an independent firm size effect might represent the imperfection of the 12-month-low criterion in identifying tax-sale candidates. First, the criterion does not consider the magnitude of the drop in price; that is, how low the 12-month-low is relative to past price levels. Given the fact that small firms' returns are more volatile, it is likely that the loss by the 12-month-low group in the small firm portfolio is more sizeable than the loss by that group in the larger firm portfolios. Second, as pointed out earlier, the 12-month-low criterion does not apparently identify tax-sale candidates perfectly, partly because stocks which reach the 12-month-low may not necessarily trigger a tax-induced sale.

The 24-month-low criterion is expected to produce more likely tax-sale candidates. Summary results for the 24-month-low tests by firm size are exhibited in Table IX. In each portfolio, the January return is higher than that of the corresponding 12-month-low, presented in Table VIII. It is instructive to note, however, that the difference between the returns of the 12-month-low and the 24-month-low groups is much more pronounced for the larger firm portfolios than for the smaller firm portfolios (for instance, in Portfolio 5 the difference is 7.95% = 11.08% − 3.13%, while in Portfolio 1 the difference is only 2.89% = 16.38% − 13.49%). This finding reinforces our interpretation of the results; namely, that the tax-effect, rather than the firm-size effect, is the dominant factor in explaining the high January's returns.

Table VIII

January Returns of Stocks which Achieved Their 12-Month-Low in December by Firm Size

Size (Quintiles)	Average January Return (%)		Average January Abnormal Return (%)		Proportion of Reversals of Negative Abnormal Return[a]	
	Stocks Achieving their 12-Month-Low in December	All Other Stocks	Stocks Achieving their 12-Month-Low in December	All Other Stocks	Stocks Achieving their 12-Month-Low in December	All Other Stocks
Portfolio 1 (smallest firms)	13.49	7.55	6.00	0.84	0.827	0.649
Portfolio 2	10.41	7.07	2.95	0.30	0.806	0.643
Portfolio 3	7.34	5.26	0.76	−0.90	0.730	0.609
Portfolio 4	4.04	3.31	−2.14	−2.62	0.688	0.499
Portfolio 5 (largest firms)	3.13	2.05	−1.92	−3.22	0.612	0.436

[a] Proportion of negative abnormal returns in December that are followed by a positive abnormal return in January.

Table IX

January Returns of Stocks Which Achieved their 24-Month-Low in December by Firm Size

Size (Quintiles)	Average Monthly Return (%)	Average Monthly Abnormal Return (%)	Proportion of Reversals of Negative Abnormal Return
Portfolio 1 (smallest firms)	16.38	8.55	0.881
Portfolio 2	14.64	6.03	0.836
Portfolio 3	14.41	5.81	0.743
Portfolio 4	12.23	3.99	0.688
Portfolio 5 (largest firms)	11.08	3.44	0.800

[a] Proportion of negative abnormal returns in December that are followed by a positive abnormal return in January.

III. Implications for Market Efficiency

The existence of abnormal returns in January for stocks reaching a periodic low in December may indicate inefficiency in the market. While the abnormal return in January of a portfolio of stocks reaching their 12-month low in December (2.43%) hardly covers the typical round-trip transaction cost, the abnormal return of stocks which reached their 24-month low (9.14%) is large enough to offset such a cost. Moreover, since transaction costs are incurred anyway in the frequent process of expanding or contracting a portfolio, selection of stocks with the above characteristics may increase the return of a portfolio without entailing an incremental transaction cost.

Note, in addition, that the use of monthly return data does not allow for the exploitation of potentially more profitable strategies which are based on the weekly or daily price movements within each month.

Any conclusion concerning market inefficiency should, nonetheless, be qualified on the following grounds: the strategy of investing in the above portfolios is, strictly speaking, not available to investors, since it assumes a foreknowledge of the return on the last day of the year. Deferring the investment decision to the first trading day in January may remove the abnormal return if the rebounding effect takes place on that day. This qualification is not major, however: the rebounding effect in January is likely to affect also stocks which almost reached their 12-month low in the day immediately preceding the year-end. Note also that on average, 50% of those achieving their "12-month-less-a-day" low will achieve their 12-month low in the following day.

IV. Summary and Concluding Remarks

The paper documents and analyzes the phenomenon of high rates of return of common stock in January. The results are consistent with the tax-sales explana-

tion. While this is not the only possible explanation, it appears to be the major one. The results also suggest that a further refinement in the procedure employed to identify tax-sale candidates may further support this explanation. One avenue for further research is the examination of brokers' recommendations towards the end of the year. Several brokerage houses and analysts issue tax-switch lists in which they suggest a substitute stock to each stock on a list of tax-sale candidates. Thus, the lists contain stocks which analysts feel are the most likely candidates for disposal (as well as the recommended substitute stocks).

The issue of market inefficiency due to market seasonality has not been fully explored. Investment strategies which are based on revision periods shorter than a month and which exploit also the magnitude of the price decline would be a useful and perhaps profitable extension.

Finally, alternative or supplementary explanations to stock market seasonality might be examined. The behavior of institutional investors around year-end needs, perhaps, a further examination. Could the massive sales of losing stocks in December, and their subsequent repurchases during January be, at least in part, a reflection of "window-dressing" efforts by mutual funds trying to show their investors a more attractive portfolio? The magnitude and persistence of the seasonal behavior of the stock market makes its examination an important research task.

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