

## Capital Gains Tax Rules, Tax-loss Trading, and Turn-of-the-year Returns

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### ABSTRACT

Changes in the capital gains tax rules facing individual investors do not affect the incentives for “window dressing” by institutional investors, but they can affect the incentives for year-end tax-induced trading by individual investors. Empirical evidence for the 1963 to 1996 period suggests that when the tax law encouraged taxable investors who accrued losses early in the year to realize their losses before year-end, the correlation between early year losses and turn-of-the-year returns was weaker than when the law did not provide such an early realization incentive. These findings suggest that tax-loss trading contributes to turn-of-the-year return patterns.

A VARIETY OF EXPLANATIONS have been offered for the unusual behavior of stock returns at the turn of the calendar year. Some focus on the annual cash flow patterns to institutional investors, others focus on the incentives that year-end reporting requirements place on these investors, and others suggest that the income tax system facing individual investors may induce tax-motivated year-end security sales that are substantial enough to affect returns. This paper presents new evidence that tax-loss selling by taxable individual investors explains at least part of the return anomaly.

Taxable individual investors can use realized capital losses to reduce taxes on realized gains or to offset a limited amount of nongain income. Because taxes are computed on income within a calendar year, realizing a capital loss before year-end can accelerate the tax benefits of the loss by as much as twelve months. Taxable individual investors therefore have an incentive to sell shares with accrued losses at year-end. If this selling pressure abates after the turn of the year, it could result in a decline in prices at year-end, followed by rising prices and abnormally high returns after the turn of the year.

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Roll's (1983) classic study of the turn-of-the-year effect finds that firms that experienced more negative returns in one year displayed larger turn-of-the-year returns in the next. Although this is consistent with the returns being driven by tax-motivated trading, it does not provide a definitive link. Many of the tax-loss-selling hypothesis' predictions about patterns in returns coincide with those of the institutional investor "window dressing" hypothesis developed by Haugen and Lakonishok (1987) and Lakonishok et al. (1991). This hypothesis suggests that institutional investors sell shares that have experienced price declines prior to year-end, when they must disclose their portfolio holdings, to avoid revealing that they have held stocks that have performed poorly.

The current paper develops a new statistical test with some power to distinguish between window dressing and tax-loss selling. It is motivated by the fact that changes in capital gains taxation apply to individual investors but not to the untaxed institutions who are the primary clients of institutional money managers. If window dressing, rather than tax-loss selling, generates year-end selling pressure, then changes in the capital gains tax rules should not affect the relationship between the previous returns on a stock and its turn-of-the-year return. We extend previous work by Chan (1986), DeBondt and Thaler (1985, 1987), and Sims (1995), all of whom explore how turn-of-the-year returns are related to past stock returns. We focus on differences in this relationship across different tax regimes, and find that the prevailing tax law is correlated with the pattern of turn-of-the-year returns. We conclude that tax-loss selling by individual investors is at least a contributory factor in turn-of-the-year returns.

The paper is divided into five sections. Section I describes the capital gains tax provisions in the federal income tax code that bear on individual investor's realization decisions, and it summarizes the previous literature on how capital gains taxes affect investor behavior. Section II describes the data that we analyze and presents summary information on turn-of-the-year returns over the 1963 to 1996 period. The third section presents our primary results on the relationship between the capital gains tax regime and the relationship between past stock returns and turn-of-the-year returns. Section IV reports several tests for the robustness of our findings. There is a brief conclusion.

## **I. Capital Gains Taxation and Tax-Loss Selling**

The individual income tax treatment of capital gains has changed several times in the postwar United States. There have been changes in the length of the holding period that qualifies gains and losses as "long term," the fraction of long-term losses that can be deducted against nongain Adjusted Gross Income (AGI), and the dollar limit on the losses that can be deducted from AGI. Table I presents data on these tax parameters, using information from the U.S. Treasury Department (1985) for early years.

**Table I**  
**Key Provisions of the Federal Capital Gains Tax, 1942–1996**

Years	Long-term Holding Period (Months)	Percentage of Long-term Losses Deductible from AGI	Loss Limit
1942–1969	6	100	\$1,000
1970–1976	6	50	\$1,000
1977	9	50	\$2,000
1978 to June 1984	12	50	\$3,000
July 1984 to 1986	6	50	\$3,000
1987	6	100	\$3,000
1988–1996	12	100	\$3,000

Prior to 1976, gains and losses on assets held for more than six months were classified as long term. The 1976 Tax Reform Act raised this holding period to nine months for 1977 and 12 months for years after 1978. The Deficit Reduction Act of 1984 reversed this holding period change and returned the long-term holding period to six months for assets purchased between June 22, 1984 and December 31, 1987. The Tax Reform Act of 1986 reversed course once again, raising the long-term holding period to 12 months for assets sold after January 1, 1988.

Prior to 1970, all net long-term losses of up to \$1000 could be fully deducted from AGI.<sup>1</sup> The 1969 Tax Reform Act specified that only 50 percent of net long-term losses could be deducted from AGI after January 1, 1970, still subject to the \$1000 net loss limitation. The 1969 rule was in force until the Tax Reform Act of 1986 returned to the pre-1969 rule of 100 percent long-term loss deductibility.<sup>2</sup> Throughout this period, gross

<sup>1</sup> Investors with taxable losses in excess of loss-offset limits can carry forward nominal losses for use in future years. Future deductions are worth less than immediate deductions, so such taxpayers face smaller differences between the tax burdens on long-term and short-term losses than those who can deduct losses immediately. Tabulations from the Treasury Individual Tax Model show that no more than one-third, and often much less, of the dividend income reported on tax returns is reported on returns with net losses in excess of the loss limit. In this calculation, as in Poterba (1987), dividend income is a proxy for stock ownership.

<sup>2</sup> The impact of the differential deductibility for long-term and short-term losses depends on a taxpayer's particular circumstances. Gains and losses are "netted" against each other before they are added to, or subtracted from, AGI. For example, a taxpayer with long-term gains in excess of short-term losses would effectively face the long-term capital gains tax rate on incremental short-term loss realizations, because such losses would offset taxable long-term gains. Only taxpayers with either net short-term and net long-term losses, or net short-term and net long-term gains, face different tax rates on short- and long-term losses. In 1970, when long-term loss deductibility began, data from the Treasury Individual Tax Model show that taxpayers with both long- and short-term gains or long- and short-term losses reported 14 percent of the dividends reported by taxpayers with gains or losses. This fraction subsequently rose, reaching 33 percent in 1986, and then declined, falling to 25 percent in 1994.

loss realizations could be fully offset against gross gain realizations, and net short-term losses were fully deductible against AGI, subject to the loss-offset limits.

Constantinides (1984), Chan (1986), Sims (1995), Reese (1998), and others derive conditions under which an investor with an accrued loss late in the calendar year will find it optimal to realize the loss before year-end. To understand the investor's incentives, consider two cases. First, consider an asset that the investor has held long enough to qualify for long-term capital loss treatment. By realizing the loss before year-end, the investor may be able to accelerate the income tax benefits of the loss. This acceleration will maximize the present discounted value of the tax benefit. For an investor who has already realized net long-term or short-term gains during the year, the incentives for selling before the end of the year are particularly strong, because realizing the loss before year-end ensures that it can be used to reduce tax liability. The investor might not have realized gains in future years, so there is no guarantee that if the loss is not realized now, it will be as useful in future years as in the current year.

Second, consider the case of an asset for which the accrued loss is still short-term at year-end. The same considerations that applied to the long-term loss apply in this case, but in some years the tax system provides an additional incentive to realize the loss. This occurs when all net short-term losses, but only half of net long-term losses, could be used to offset nongain AGI. By holding a loss until it becomes long-term, an investor reduces its potential value for sheltering taxes. For example, an investor with a \$3,000 short-term loss in 1980 and no other realized gains or losses could realize the loss and reduce his taxable income by \$3,000. If he held the stock until the next tax year, and sold it at the same price but as a long-term loss, not only would the tax benefit be delayed by 12 months, it would also be reduced by 50 percent.

Constantinides (1984) demonstrates that when there are transactions costs to trading, and when short-term losses are more valuable to investors than long-term losses, it can be optimal for investors to realize their losses just before they become long-term, or just before the turn of the year, whichever comes first. The larger the difference between the short-term and long-term capital gains tax rates, the greater the incentive to realize short-term losses before year-end. In this setting, changes in the holding period for long-term capital losses and limits on the use of such losses to offset nongain AGI could affect optimal tax-loss selling behavior and therefore the year-end selling pressure on stocks.

## **II. Empirical Strategy and Data Description**

We relate turn-of-the-year returns on individual stocks over the 1963 to 1996 period to previous-year returns on these stocks. We divide this 34-year span into three capital gains tax regimes:

- *Regime I.* This includes years when the long-term holding period was six months and long-term losses were just as valuable as short-term losses for reducing AGI. This regime covers the month of January in years 1963 through 1969, as well as 1988.
- *Regime II.* This includes years when the holding period was six months, and long-term losses were only half as valuable as short-term losses for reducing AGI. It comprises the January returns from 1970 to 1976 and 1985 to 1986.
- *Regime III.* This includes the years with a 12 month holding period. It comprises the January returns from 1979 to 1984 as well as 1989 to 1996.

We exclude three January returns from our analysis, on the grounds that they correspond to transition periods. January 1977 and January 1978 mark transitions from 6 to 9 and 9 to 12 month long-term holding periods, respectively. January 1987 marks a transition from half to full deductibility of long-term losses.

The incentive for individual investors to sell shares at year-end is affected by the long-term holding period. When the holding period is six months, as in Regimes I and II, and long-term losses are only partially deductible against other income, as in Regime II, investors with losses that accrued in the first half of the calendar year should sell their shares before year-end to obtain short-term capital loss treatment. If this takes place, then losses that accrue in the first half of the year should have a weaker effect on turn-of-the-year returns than losses between July and December. When the holding period is 12 months, however, investors might engage in year-end selling of stocks with losses that accrued in both the first and second halves of the year. Our empirical work studies whether the relationship between turn-of-the-year returns and returns in the previous calendar year is affected by the long-term capital gains holding period.<sup>3</sup>

We analyze returns on common stocks that are classified as “ordinary common shares” on the Center for Research in Security Prices (CRSP) return files. Our primary explanatory variable is LOSS, which measures the tax-loss potential of a stock. It is defined as the percentage difference between a

<sup>3</sup> The extent to which investors take advantage of the opportunity to realize tax losses remains an open issue. There is some evidence, notably Odean (1998), that investors are reluctant to sell their stocks with accrued losses despite the tax incentives to sell. Poterba (1987) and Auerbach, Burman, and Siegel (2000) suggest that a relatively small set of investors faces loss-offset constraints. Nevertheless, many studies reviewed in Poterba (forthcoming), including Dyl (1977), Branch (1977), Slemrod (1982), Reinganum (1983), Lakonishok and Smidt (1986), Ritter (1988), Dyl and Maberly (1992), Eakins and Sewell (1993), Sias and Starks (1997), and Reese (1998), suggest that tax rates do affect investor behavior and that at least some fraction of the investing population alters at least gain realization in response to tax rates.

stock's price at the beginning of a time period (say July 1) and its price at the end of the period. We construct LOSS for both the first and second halves of the calendar year:

$$\text{LOSS}_{\text{July-Dec}} = (P_{\text{Dec 24}}/P_{\text{July 1}} - 1) \quad (1a)$$

and

$$\text{LOSS}_{\text{Jan-June}} = (P_{\text{June 30}}/P_{\text{Jan 1}} - 1). \quad (1b)$$

LOSS<sub>July-Dec</sub> excludes returns on the last five trading days of December, on the grounds that these returns may already reflect some of the turn-of-the-year returns.<sup>4</sup> We set LOSS equal to zero if the firm experienced a capital gain. We define a complementary pair of variables, GAIN<sub>July-Dec</sub> and GAIN<sub>Jan-June</sub>, for firms that experienced capital gains.

We define turn-of-the-year returns following Roll (1983), Sims (1995), and others as the dividend-inclusive return on the last trading day in December and the first five days in January. When we exclude the return on the last trading day in December from our analysis, the results are very similar to those presented below. The CRSP NYSE and AMEX daily return files begin in July 1962. We do not analyze returns for Nasdaq firms, because the Nasdaq files begin in 1973, after some of the tax reforms we consider. We can obtain beginning-of-1962 prices for NYSE stocks from the monthly CRSP file, so we can define LOSS and GAIN and study turn-of-the-year returns for NYSE stocks beginning in January 1963. For AMEX stocks, we cannot obtain beginning-of-1963 prices, so we must begin our analysis in 1964. Our sample size is 14,932 firm-years for Regime I, 20,645 firm-years for Regime II, and 32,701 firm-years for Regime III.

Table II classifies years into our three capital gains tax regimes. It also shows mean and median turn-of-the-year returns for each regime. The turn-of-the-year returns are largest for Regime II, which includes 1970 to 1976 and 1985 to 1986. These are the years when restricted deductibility of long-term losses gave investors a strong incentive to realize losses while they were short-term. Regime II also shows the most substantial accrued losses in the second half of the calendar year. During Regime II, the median stock experienced a July–December capital loss of 7.4 percent. In Regime I, which includes 1963 to 1969 and 1988, the median July–December return was positive 0.9 percent, whereas in Regime III, spanning 1979 to 1984 and 1989 to 1996, the median stock showed a July–December capital loss of 0.4 percent.

<sup>4</sup> Sims (1995) and Grinblatt and Moskowitz (2000) find negative returns late in the calendar year, as well as positive returns in the last few days of the year and the first few days of the next year, for firms with substantial accrued losses.

**Table II**  
**Classification of Capital Gains Tax Regimes, 1963–1996**

The daily CRSP files are used to calculate mean and median returns. Standard errors for the regime-specific means, which are shown in parentheses, are calculated allowing for correlation amongst contemporaneous returns for different firms.

Tax Regime	Regime I	Regime II	Regime III
Applicable years	1963–1969, 1988	1970–1976, 1985–1986	1979–1984, 1989–1996
Capital gains tax rules	Six month short-term holding period, long-term losses 100 percent deductible against AGI	Six month short-term holding period, long-term losses 50 percent deductible against AGI	12 month holding period
Median return on NYSE and AMEX stocks	0.020	0.044	0.014
Mean return on NYSE and AMEX stocks	0.033 (0.011)	0.074 (0.017)	0.030 (0.006)

To explore the effect of loss-realization potential on the turn-of-the-year returns for individual firms, we estimate the following regression equation:

$$\begin{aligned}
 R_{\text{Jan},i,t} = & \beta_1 * \text{GAIN}_{\text{July-Dec},i,t-1} + \beta_2 * \text{GAIN}_{\text{Jan-June},i,t-1} \\
 & + \beta_3 * \text{LOSS}_{\text{July-Dec},i,t-1} + \beta_4 * \text{LOSS}_{\text{Jan-June},i,t-1} \\
 & + \beta_5 * (1/\text{PRICE}_{i,t}) + \phi_i + \lambda_t + \varepsilon_{i,t}.
 \end{aligned} \tag{2}$$

$R_{\text{Jan},i,t}$  is the turn-of-the-year return defined above. The terms  $\phi_i$  and  $\lambda_t$  correspond to firm-specific and year-specific intercepts. The firm-specific fixed effects capture return differentials that may be related to volatility, systematic risk, or other slowly changing firm characteristics. Time-specific effects capture the potential effect of aggregate market returns and other systematic factors that may vary across years. The key coefficients of interest are those on the LOSS variables. Because LOSS is nonpositive, negative values of  $\beta_3$  and  $\beta_4$  imply larger turn-of-the-year returns for firms with larger accrued losses. We test for differences between the effects of short-term and long-term losses by including both  $\text{LOSS}_{\text{July-Dec},i,t-1}$  and  $\text{LOSS}_{\text{Jan-June},i,t-1}$  in the regression.

PRICE is the stock's closing price on the second to last trading day in December. The variable  $1/\text{PRICE}$  serves as a proxy for trading costs and the coefficient  $\beta_5$  should control for the turn-of-the-year returns associated with

low share-price firms, as documented by Bhardwaj and Brooks (1992). Ritter's (1988) parking-the-proceeds hypothesis posits that investors rebalance their portfolio at the turn of the year, realizing losses in December and disproportionately reinvesting proceeds in small stocks in early January. This portfolio rebalancing effect may also be captured by the  $1/PRICE$  variable.

If tax-loss selling by individual investors is an important contributory factor in turn-of-the-year returns, then changes in tax rules should affect the relative magnitudes of the coefficients on the LOSS variables. In Regime I, with a six month long-term loss holding period and long-term losses 100 percent deductible against AGI, losses that accrue in the second half of the year should affect turn-of-the-year returns at least as much as losses that accrued earlier in the year. In terms of equation (2), this implies that  $\beta_3 \leq \beta_4 < 0$ . In Regime II, with a six month holding period and long-term losses only 50 percent deductible, we would expect an even stronger pattern:  $\beta_3 < \beta_4 < 0$  in Regime II. This is the regime with the strongest incentive to realize short-term losses on shares purchased in the first half of the year *before* year-end. Finally, when the long-term holding period is 12 months in Regime III, we would expect  $\beta_3 = \beta_4 < 0$ . This is the regime with the weakest pressure for investors to realize early year losses before year-end.

### III. Basic Results

Table III shows the results of estimating equation (2) for each of the three tax regimes. We report results both with and without firm-specific effects. Losses in the previous year predict higher turn-of-the-year returns in each of the three regimes. That is,  $\beta_3$  and  $\beta_4$  are both less than zero, and we reject the null hypothesis that they equal zero. The absolute effect of GAIN is much smaller than the effect of LOSS, and we often fail to reject the null hypothesis that the coefficients on the GAIN variables are zero.

The coefficients on the January–June and July–December losses are also different across the three tax regimes. The coefficients are substantively and statistically significantly different in Regime II (i.e., we reject the null hypothesis that  $\beta_3 = \beta_4$ ). We also reject this null hypothesis in Regime I, when, as in Regime II, the long-term loss holding period was also six months. In Regime III, the difference between the coefficients on the two LOSS variables is smaller than under the other regimes. When we include firm fixed effects in the regression specification, we do not reject the null hypothesis that  $\beta_3 = \beta_4$ . Without firm effects, the difference between  $\beta_3$  and  $\beta_4$  is smaller than for the other tax regimes, but we still reject the null hypothesis of equality.

The results for Regime II imply that a 10 percent July–December capital loss is associated with a 151 basis point increase in the turn-of-the-year return. A similar loss over the January–June period is associated with only a 53 basis point increase in turn-of-the-year returns. The results for Regime I are similar.



**Table III**  
**Regressions Relating Returns on Last Day of December and First Five Trading Days of January to Previous-year Gains and Losses**

Regression models are estimated using data from the CRSP daily return files and for the pooled sample of NYSE and AMEX stocks. All equations include a set of dummy variables for each calendar year. Equations with firm effects include firm-specific intercept terms. Equations without firm effects include separate intercept terms for NYSE and AMEX stocks. "Difference in LOSS Coefficients" equals the coefficient on  $LOSS_{July-Dec, t-1}$  minus that on  $LOSS_{Jan-June, t-1}$ . Values in parentheses are heteroskedasticity-consistent standard errors.

Explanatory Variable	Tax Regime I		Tax Regime II		Tax Regime III	
$LOSS_{Jan-June, t-1}$	-0.084 (0.012)	-0.102 (0.012)	-0.053 (0.007)	-0.057 (0.007)	-0.068 (0.013)	-0.069 (0.013)
$LOSS_{July-Dec, t-1}$	-0.143 (0.015)	-0.167 (0.012)	-0.151 (0.010)	-0.178 (0.017)	-0.086 (0.015)	-0.118 (0.020)
$GAIN_{Jan-June, t-1}$	-0.016 (0.005)	-0.006 (0.003)	-0.001 (0.003)	0.003 (0.003)	0.003 (0.006)	0.008 (0.003)
$GAIN_{July-Dec, t-1}$	-0.017 (0.004)	-0.013 (0.003)	-0.002 (0.005)	-0.011 (0.004)	-0.017 (0.004)	-0.015 (0.003)
1/PRICE	0.032 (0.032)	0.060 (0.014)	0.154 (0.019)	0.129 (0.027)	0.051 (0.014)	0.047 (0.013)
Firm effects	Yes	No	Yes	No	Yes	No
Difference in LOSS coefficients	-0.059 (0.018)	-0.066 (0.015)	-0.097 (0.011)	-0.121 (0.017)	-0.018 (0.016)	-0.049 (0.019)
Adjusted $R^2$	0.384	0.277	0.430	0.373	0.317	0.268
Sample size	14,932		20,645		32,701	

Table III reports specifications that relate turn-of-the-year returns to losses and gains over the previous 12 months. We have also estimated equations with additional lagged returns, in the spirit of models estimated by DeBondt and Thaler (1985). Including further lagged returns does not affect the coefficients on the returns over the most recent 12 months. Losses in the 24 to 12 months prior to the turn-of-the-year do have some predictive power for turn-of-the-year returns. The estimated coefficients are  $-0.055$  (0.009) for Regime I,  $-0.076$  (0.007) for Regime II, and  $-0.053$  (0.014) for Regime III. For Regimes I and II, the 6-month holding period regimes, the effect of losses 6 to 12 months prior to the turn of the year is not statistically different from that for losses 12 to 24 months before the turn of the year. These results suggest that the legal distinction between long-term and short-term losses is important in determining how past returns are correlated with turn-of-the-year returns. Grinblatt and Moskowitz (2000) present additional empirical evidence consistent with this finding.

Including returns more than 12 months before the realization date provides an additional test of the link between the fraction of long-term losses that can be deducted from AGI and turn-of-the-year returns. In Regime III, when the long-term holding period was 12 months, the long-term loss deduction fraction was 50 percent from 1979 to 1984 and 100 percent from 1989 to 1996. For some investors, the incentive to realize a loss before the

asset is held more than one year is greater in the earlier period. To test this, we related turn-of-the-year returns to returns from the previous two years. The estimated coefficients on losses over the previous year, 0 to 12 months before the turn-of-the-year, were  $-0.070$  (0.009) for 1979 to 1984 and  $-0.071$  (0.016) for 1989 to 1996. The effect of losses that accrued between 12 and 24 months before the turn of the year was smaller for the 1979–1984 period than for the latter period. The differences between the 0 to 12 month loss and the 12 to 24 month loss coefficients was  $-0.030$  (0.011) for the 1979–1984 period, compared with  $-0.016$  (0.014) for the 1989–1996 period.

One difficulty in interpreting our results is that the capital gains tax law is not the only factor that varies across three “regimes” defined above. The years 1973 and 1974, which are part of Regime II, displayed very poor stock market returns, so the set of stocks with losses to realize at year-end was larger than in the other regimes. To test whether the different pattern of turn-of-the-year returns in Regime II and other regimes is due to the changing distribution of previous returns, we re-estimated our equations for Regime II excluding turn-of-the-year returns for January 1974 and January 1975. The resulting difference between the July–December and January–June loss coefficients is  $-0.094$  (0.012), compared with  $-0.097$  when these years were included in the sample. Our Regime II results are not driven by the two years with substantial market-wide losses.

We also estimated equation (2), without either year or firm effects, separately for each year to look for differences in the LOSS coefficients across tax regimes. This estimation strategy provides a check on whether the coefficient patterns are homogeneous within tax regimes. Table IV presents these results. A July–December loss is associated with a significantly greater turn-of-the-year return relative to a January–June loss in 5 out of 9 years in Regime II, but only 2 of the 8 years in Regime I and 3 out of 14 years in Regime III. Within Regime II, there are statistically significant differences between the January–June and July–December losses in some years from the early 1970s as well as from the mid-1980s. These results provide support for our focus on tax regime differences as a key factor in the changing coefficient patterns.

#### **IV. Evidence of Robustness**

When the long-term capital loss holding period is six months, so that investors have an incentive to sell stocks that accrue losses in the first half of the year before year-end, the relationship between January–June losses and turn-of-the-year returns is weaker than when the holding period is 12 months. This suggests that changes in tax rules are linked to turn-of-the-year returns, and it therefore supports the role of tax-induced trading in contributing to turn-of-the-year return anomalies.

To explore the robustness of this finding, we carried out three further empirical tests. First, we considered the role of small firms in contributing to our finding. Keim (1983) and many others suggest that large turn-of-the-

**Table IV**  
**Year-by-Year Regressions Relating Returns on Last Day of December**  
**and First Five Trading Days of January to Gains**  
**and Losses in the Previous Year**

All equations are estimated for the pooled sample of NYSE and AMEX stocks using the CRSP daily returns file. The table shows the coefficient on  $LOSS_{July-Dec, t-1}$ , the coefficient on  $LOSS_{Jan-June, t-1}$ , and the difference between these two coefficients. Values in parentheses are heteroskedasticity-consistent standard errors for the coefficients or coefficient difference. The estimating equations also include accrued gains for the July–December and January–June periods and the variable  $1/PRICE$ . They also allow separate intercepts for NYSE and AMEX stocks.

Year	Cumulative Loss, July– December	Cumulative Loss, January– June	Difference in LOSS coefficients	Year	Cumulative Loss, July– December	Cumulative Loss, January– June	Difference in LOSS coefficients
Regime I				Regime III			
1963	-0.049 (0.049)	-0.101 (0.013)	0.052 (0.050)	1979	-0.125 (0.016)	-0.107 (0.035)	-0.018 (0.039)
1964	-0.169 (0.033)	-0.154 (0.057)	-0.016 (0.067)	1980	-0.006 (0.021)	0.013 (0.042)	-0.019 (0.049)
1965	-0.150 (0.032)	-0.190 (0.030)	0.040 (0.047)	1981*	-0.095 (0.025)	-0.012 (0.019)	-0.084 (0.031)
1966	-0.040 (0.044)	-0.009 (0.026)	-0.031 (0.048)	1982*	-0.074 (0.012)	0.066 (0.017)	-0.140 (0.022)
1967*	-0.235 (0.020)	-0.151 (0.021)	-0.084 (0.031)	1983	-0.147 (0.048)	-0.126 (0.013)	-0.021 (0.051)
1968	-0.064 (0.030)	-0.079 (0.057)	0.015 (0.068)	1984	-0.132 (0.021)	-0.113 (0.084)	-0.019 (0.082)
1969*	-0.113 (0.020)	-0.021 (0.014)	-0.091 (0.026)	1989	-0.082 (0.031)	-0.054 (0.047)	-0.029 (0.059)
1988	-0.158 (0.014)	-0.111 (0.054)	-0.047 (0.055)	1990	-0.180 (0.039)	-0.176 (0.052)	-0.005 (0.059)
Regime II				1991*	-0.096 (0.019)	-0.036 (0.032)	-0.060 (0.039)
1970*	-0.140 (0.015)	-0.050 (0.013)	-0.090 (0.020)	1992	-0.180 (0.078)	-0.116 (0.104)	-0.063 (0.127)
1971	-0.034 (0.036)	0.011 (0.010)	-0.046 (0.037)	1993	0.071 (0.070)	0.009 (0.026)	0.063 (0.071)
1972*	-0.128 (0.022)	-0.056 (0.042)	-0.072 (0.049)	1994	-0.136 (0.028)	-0.107 (0.018)	-0.029 (0.034)
1973	-0.038 (0.015)	-0.036 (0.017)	-0.002 (0.024)	1995	-0.052 (0.024)	-0.072 (0.019)	0.020 (0.024)
1974*	-0.156 (0.025)	-0.056 (0.017)	-0.100 (0.031)	1996	-0.110 (0.026)	-0.072 (0.036)	-0.038 (0.041)
1975*	-0.264 (0.023)	-0.125 (0.030)	-0.139 (0.032)	"Transition" years			
1976	-0.142 (0.017)	-0.088 (0.094)	-0.053 (0.096)	1977	-0.025 (0.023)	-0.026 (0.049)	0.001 (0.057)
1985	-0.011 (0.018)	-0.029 (0.013)	0.018 (0.023)	1978	-0.038 (0.017)	-0.014 (0.017)	-0.024 (0.023)
1986*	-0.214 (0.042)	-0.056 (0.035)	-0.158 (0.053)	1987	-0.098 (0.022)	-0.061 (0.027)	-0.038 (0.036)

\*The null hypothesis that the difference in the LOSS coefficients is zero can be rejected at the 0.10 confidence level.

**Table V**  
**Difference in Effects of July–December and January–June**  
**Accrued Losses on Turn-of-the-year Returns,**  
**Stratified by Market Capitalization Deciles**

Each entry shows the value of  $\beta_3 - \beta_4$  from equation (2), that is, the coefficient estimate for  $\text{LOSS}_{\text{July–Dec}, t-1}$  minus that for  $\text{LOSS}_{\text{Jan–June}, t-1}$ . Other coefficients are not reported. All equations are estimated using data on NYSE and AMEX stocks in the daily CRSP files. Market capitalization deciles for year  $t$  are defined using data on firm market values at the beginning of year  $t - 1$ . Standard errors for the coefficient difference ( $\beta_3 - \beta_4$ ) are shown in parentheses.

Size Decile	Regime I	Regime II	Regime III
1st (smallest)	–0.072 (0.056)	0.012 (0.036)	–0.030 (0.051)
2nd	–0.058 (0.047)	–0.107* (0.031)	0.016 (0.035)
3rd	–0.082* (0.040)	–0.116* (0.027)	–0.040 (0.030)
4th	–0.102* (0.035)	–0.058* (0.026)	0.003 (0.036)
5th	–0.059* (0.029)	–0.133* (0.022)	–0.119* (0.069)
6th	–0.004 (0.034)	–0.118* (0.024)	0.025 (0.022)
7th	0.007 (0.032)	–0.084* (0.022)	0.049 (0.024)
8th	0.032 (0.029)	–0.077* (0.020)	0.057 (0.021)
9th	0.019 (0.027)	–0.064* (0.020)	0.069 (0.019)
10th (largest)	0.050 (0.025)	–0.006 (0.022)	0.023 (0.018)
Adjusted $R^2$	0.396	0.447	0.328

\* $\beta_3 - \beta_4$  is significantly less than zero at the 0.05 level (one-sided test).

year returns are concentrated among small-capitalization stocks. We estimated equation (2) allowing the LOSS coefficients to vary by firm market capitalization deciles. Table V reports the difference between the coefficients on the July–December and January–June loss variables,  $\beta_3 - \beta_4$  in equation (2), for each size decile and for each capital gains tax regime.

The effect of lagged losses on turn-of-the-year returns is strongest for small- and medium-size firms, which might be expected given their higher individual as opposed to institutional ownership. For Regime II, July–December losses have a statistically significant, larger effect on turn-of-the-year returns than January–June losses for 8 of the 10 size deciles. The two estimated coefficients are statistically indistinguishable for the largest and smallest size classes. For Regime I, the analogous result emerges for three size deciles near the middle of the size distribution. For Regime III,  $\beta_3$  is

statistically significantly smaller than  $\beta_4$  for only one size decile. Thus, stratifying firms by size does not alter our earlier conclusion that the strongest effect of lagged losses on turn-of-the-year returns is concentrated in Regime II.

Second, we considered the role of bid-ask spreads in affecting our results. Keim (1989) and Bhardwaj and Brooks (1992) suggest that year-end trades are more likely to take place at the bid price, because they are “sell” orders, whereas trades in early January are more likely to occur at the “ask” price because they are “buy” orders. In this case, turn-of-the-year return anomalies may simply be the result of changes in the location of transaction prices within the bid-asked price range.

To investigate this, we defined an alternative turn-of-the-year return variable as the difference between the bid (or low) price at the end of the fifth trading day in January, and the ask (or high) price at the beginning of the last trading day in December. (CRSP reports low and high prices for the day if the stock was traded, and the closing bid and ask prices if there were no trades.) The estimated coefficients using this return specification are only slightly smaller than those in Table III, and our conclusions about the importance of lagged losses and about the difference in LOSS coefficients across tax regimes are unchanged. It is possible that  $1/\text{PRICE}$  partially controls for the portion of the turn-of-the-year return that is due to movement within the bid-ask spread.

Finally, we considered several alternatives to our measure of loss potential in equation (2). The results in Table III use LOSS variables that measure, for example, between January and June, the return for an investor who bought the security on January 1 and sold on June 30. We considered two alternative measures. The first weights the stock's holding period returns from each day within the interval to the end of the interval by the trading volume on the given day. The second incorporates volume-weighted returns over the entire period, but weights more recent returns more heavily. This allows for the possibility that price declines lead to more tax-loss-selling pressure when they occur later in the period. Poterba and Weisbenner (1998) report results using these alternative measures. They are qualitatively similar to those in Table III. Losses in the second half of the year have the largest impact on turn-of-the-year returns in Regime II, and the difference between the LOSS coefficients for the two halves of the year is largest in Regime II.

## V. Conclusion

Our results provide some support for the view that year-end, tax-motivated trading by individual investors contributes to turn-of-the-year return anomalies. Although the institutional window dressing hypothesis may also help to explain turn-of-the-year returns, it cannot explain the empirical patterns that we find. Because most institutional investors are not affected by the individual income tax, there is no reason for changes in the definition of the long-term holding period to affect their trading behavior. Therefore,

changes in such tax rules should not affect the relationship between past returns and turn-of-the-year returns. Yet our empirical findings suggest that there are substantial differences across capital gains tax regimes in the nature of these links. Our findings provide indirect support for tax-motivated trading behavior by taxable individual investors.

It is of course possible that some factor other than tax rates also changes across tax regimes, and that it, rather than tax changes, explains our findings. One such factor might be trading costs. The changing structure of NYSE commissions in the periods before and after 1975, the growth of discount brokers during the four decades we study, and the development of derivatives markets could all affect the degree to which individual investors engage in tax-motivated trading. The general differences in the relative performance of large and small stocks between the first two decades of our sample and the later period could be another potential factor.

Such alternative explanations for our findings would be particularly worrying if our tax regimes were nonoverlapping intervals and if our results were driven by a trend in the relative importance of July–December and January–June losses over time. However, Regime II includes years from the early 1970s and the mid-1980s, and our results are not driven by only one of these periods. Regime III, which yields the weakest differences between accrued losses in the first and second halves of the calendar year, includes the early 1980s as well as the 1990s. We are not aware of other factors that have changed on a timetable that would confound our results.

Our results raise several issues for further study. One is the effect of the “supply” of realizable losses on turn-of-the-year effects. There are some years, such as 1974, when the aggregate market experiences substantial losses and investors are likely to have many unrealized capital losses in their portfolios. In such years investors may have little need to engage in year-end tax loss trading, and this may affect turn-of-year returns. Dhaliwal and Trezevant (1993) find that the turn-of-the-year return to shares that declined during the previous year is larger in down-market years than in up-market years.

A second issue for further work is the effect of tax rules on taxable investors other than individuals in affecting security sales and ultimately returns. Bhabra, Dhillon, and Ramirez (1999) present interesting evidence on the role of mutual funds, which close their tax years on October 31, in contributing to a potential “November effect” in stock returns.

Finally, although the results in this paper suggest that tax-motivated trading by individual investors contributes to the turn-of-the-year effect for stock returns, they do not provide much guidance on the substantive importance of such trading in contributing to observed returns. Several previous studies investigate turn-of-the-year effects in institutional settings where investors do not face capital gains taxes. These studies include work by Berges, McConnell, and Schlarbaum (1984), who study pre-1973 Canada; Reinganum and Shapiro (1987), who study Britain before 1965; and Schultz (1985), Jones, Pearce, and Wilson (1987), and Jones, Lee, and Apenbrink (1991),

who study the United States before 1917. In some cases, notably the pre-1917 United States, institutional investors also play a minimal role in capital markets. These studies yield mixed results. Finding a turn-of-the-year return effect in a setting without a capital gains tax does not imply that tax-loss selling does not contribute to turn-of-the-year returns when capital gains are taxed on realization. It simply implies that other factors also contribute to such return patterns. Rather than trying to reject one of many explanations for turn-of-the-year return patterns, future research should focus on quantifying the relative importance of different factors that may contribute to turn-of-the-year returns. It should also recognize that changes in transaction costs, in bid-ask spreads such as those considered in Cox and Johnston (1998), and in other factors may affect the profitability of tax-loss selling, and therefore the importance of this factor relative to other influences on turn-of-the-year returns.

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