Tax-Loss Selling and the January Effect: Evidence from Municipal Bond Closed-End Funds

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Abstract

This paper evaluates the tax-loss-selling hypothesis as an explanation for the January effect. We examine the turn-of-the-year return and volume patterns of municipal bond closed-end funds, which are held mostly by tax-sensitive individual investors. First, we document a January effect for the municipal bond closed-end funds. Next, we provide direct evidence that the observed January effect can be largely explained by the tax-loss-selling activities at the end of the previous year. In addition, we find that funds associated with brokerage firms display more tax-loss selling behavior. The empirical findings provide new evidence supporting the tax-loss selling explanation of the January effect.

Introduction

Among the numerous stock return "anomalies", probably none has generated more interest than the "turn-of-the-year" or "January" effect, referring to the phenomenon that small capitalization stocks have unusually high returns in early January.[1] A number of hypotheses to explain this phenomenon have been offered. Examples include the tax-loss-selling hypothesis, the window-dressing hypothesis, the insider trading/information release hypothesis, and the seasonality of the risk-return relation hypothesis. The predominance of empirical evidence supports the tax-loss-selling hypothesis, with limited evidence in favor of the window-dressing hypothesis. The empirical evidence is not consistent with the insider trading hypothesis or the seasonality of risk-return hypothesis. Nevertheless, there is still a debate on whether the tax-loss selling of individual investors or the window-dressing of institutional investors is the main driver of the turn-of-the-year effect. Musto (1997) finds a turn-of-the-year effect among money market instruments, which do not generate capital losses, i.e., tax effects. He concludes that at least some of the January effect in the equity market represents window-dressing by portfolio managers, and not tax-loss selling. On the other hand, Sias and Starks

[1] Rozeff and Kinney (1976) first document the "January effect", whereby stock returns are higher, on average, in January than in other months. Using a combination of several indices, they find that from 1904 to 1974, the average return for NYSE stocks in January is 3.48 percent, as compared to an average of only 0.42 percent for each of the other eleven months. Banz (1981) and Reinganum (1983) document that the effect is driven by smaller firms, as measured by market capitalization, which have higher average rates of return than do larger firms. While Keim (1983) reports that roughly half of the annual difference between the rates of return on small and large stocks over the period 1963 to 1979 occurs during the month of January, Blume and Stambaugh (1983) adjust Keim's results for "bid-ask spread" bias, and show that virtually all of the size effect occurs in the month of January. Roll (1983) dubs this interrelationship the "turn-of-the-year effect".

(1997) and Poterba and Weisbenner (2001) document evidence consistent with the tax-loss-selling hypothesis in the equity market. As pointed out by Poterba and Weisbenner (2001), one difficulty in evaluating the tax-loss-selling hypothesis is that many of its predictions coincide with those of the window-dressing hypothesis for institutional investors. It is thus difficult to separate out institutional trades from individual trades, and tax-motivated trades from other trades. In fact, Sias and Starks (1997) and Poterba and Weisbenner (2001) both design controlled tests in order to disentangle and evaluate the two hypotheses in the equity market.[2]

In this paper, we examine the turn-of-the-year effect in a different financial market in which it is less difficult to isolate the trades of tax-sensitive individual investors. Specifically, we examine the trading and return patterns of a set of securities that are held almost exclusively by individual investors particularly sensitive to taxes: municipal bond closed-end funds.[3] If tax-loss selling explains the "January" effect in the equity market, we should observe a similar or stronger effect in municipal bond closed-end funds because these fund investors are most tax-sensitive by self-selection; thus they are more likely to sell on losses for tax reasons. Establishing a "January" effect in municipal closed-end bond funds is thus a more direct link between the turn-of-the-year price effects and tax-loss trading activities.

Two additional features of municipal bond closed-end funds are important for our study. First, unlike open-end funds, closed-end funds are traded like stocks. As a result,

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[2] Sias and Starks (1997) examine differences between securities dominated by individual investors versus those dominated by institutional investors and find that the effect is more pervasive in the former. Poterba and Weisbenner (2001) investigate the effect of specific features of the U.S. capital gains tax on turn-of-the-year stock returns and provide support for the role of tax-loss trading in contributing to the turn-of-the-year return patterns.

[3] See, for example, Laing (1987), Quinn (1987), Siconolfi (1987).

we are able to observe possible price effects of trading activities as well as patterns in trading volumes. Second, municipal bond closed-end funds are a relatively new set of securities introduced in the 1990s. Thus, there is less ambiguity in the tax basis of investors, that is, the differences in when securities are purchased as compared to that encountered in studying the tax effects of most equity shares.

We study a sample of 168 municipal bond closed-end funds from 1990 - 2000.[4] We first document that, during our sample period, the average return for municipal bond closed-end funds in January is 2.21 percent and is significantly higher than the average monthly return of -0.19 percent for the other eleven months in a calendar year. Even after controlling for the monthly returns on the municipal bond index, the January effect remains significant. Furthermore, our empirical results indicate a direct link between the observed January price effect and the tax-loss selling behavior of individual investors at year-end. Specifically, in cross-sectional tests of the closed-end funds, we find that the abnormal returns in January are positively correlated with the previous year-end volume measures and that the year-end volume measures are negatively related to past fund returns.[5] The year-end volume is significantly larger in years when fund prices have declined. Moreover, the losses appear to have a subsequent effect on the following year-end trading volumes when funds still have not regained their previous prices. As indicated by the year-by-year regressions and the fixed-effect panel regression, the year-end volume is negatively related to both the current and the previous years' returns. This

[4] Three funds went defunct during our sample period.

[5] To measure abnormal returns, we control for the average returns in the other months of the previous calendar year or the same period T-bill returns.

relation is more pronounced in years when the closed-end funds experience large price declines.

We also provide an additional unique analysis for the tax-loss selling hypothesis. We examine whether brokers play a role in advising investors to sell on losses. We hypothesize that fund investors who have access to brokerage advice, and presumably tax-counseling, display more tax-loss selling behavior. We find evidence to support this hypothesis in that funds associated with brokerage firms are more subject to year-end tax-loss selling, suggesting that brokerage firms advise their clients to engage in tax-motivated trading.

In summary, we find evidence that the January effect in municipal bond closed-end fund prices is largely explained by the fund investors' tax-loss selling behavior at the turn of the year. Our findings provide new evidence in support of the tax-loss-selling hypothesis in explaining the January effect.

The remainder of the paper is organized as follows. Section I discusses the literature of January effect. Section II describes the data. Section III presents the empirical results. Section IV concludes.

I. Literature Review

The cause of the January effect is still not clear, despite the fact that a variety of explanations have been offered. The main explanations include tax-loss selling by individual investors, insider trading/information-release, a January seasonal in the risk-return relation, and window-dressing by institutional investors. Empirical results are

largely consistent with the tax-loss selling and window-dressing hypotheses, and inconsistent with the insider trading or risk-return hypotheses.[6]

The tax-loss-selling hypothesis has been the most frequently cited explanation for the January effect since Branch (1977) documented high returns in January for stocks that incur negative returns during the previous year. The hypothesis posits that investors sell securities in which they have losses in order to take advantage of accrued capital losses before the end of the year. This selling pressure would depress prices and the prices would rebound in January.

Empirical tests of the tax-loss selling hypothesis provide mixed results. For example, Dyl (1977) finds abnormally high volume in December for stocks that had declined in price over a previous period. Reinganum (1983) finds higher January returns for stocks that experience large declines in price in the preceding year.[7] More recently, Badrinath and Lewellen (1991), Odean (1998) and Grinblatt and Keloharju (2001) document tax-loss selling behavior of individual investors at the end of the year by analyzing individual trading data.

On the other hand, Reinganum (1983) finds that small firm stocks without price declines also have abnormally high January returns. Constantinides (1984) evaluates rational tax trading and concludes that the optimal strategy is not to delay loss realization until December. Chan (1986) shows empirical evidence that is inconsistent with a model that explains the January seasonal by optimal tax trading. Jones, Pearce, and Wilson

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[6] For empirical results of the insider trading hypothesis, see Seyhun (1988) and Brauer and Chang (1990). For empirical tests of the seasonality of risk-return relation, see Rozeff and Kinney (1976), Tinic and West (1984) and Ritter and Chopra (1989).

[7] Other studies with results consistent with the tax-loss selling hypothesis include Ritter (1988), Lakonishok and Smidt (1986), Slemrod (1982), Dyl and Maberly (1992) and Eakins and Sewell (1993).

(1987) discovers a January effect before the imposition of income taxes when examining U.S. stock returns back to 1871. These results are inconsistent with the tax-loss selling hypothesis.

An alternative explanation for the January effect, proposed by Haugen and Lakonishok (1988) is institutional investor window-dressing. Window-dressing refers to actions by portfolio managers in which they sell losing issues before a period ends when they must disclose their portfolio holdings. The selling is an attempt to avoid revealing that they have held poorly performing stocks. Ritter and Chopra (1989) and Musto (1997) find evidence consistent with the window-dressing hypothesis.

Because many of the predictions of the window-dressing and tax-loss selling hypotheses are the same, it is difficult to determine which, if either, drives the January effect. Sias and Starks (1997) and Poterba and Weisbenner (2001) both design controlled tests to disentangle and evaluate the two hypotheses in the equity market and find evidence consistent with the tax-loss-selling hypothesis. However, neither of these studies is able to completely control for the potential existence of the window-dressing hypothesis.

In this paper, we provide a test of the tax-loss-selling hypothesis under conditions in which the window-dressing hypothesis would not be a competing explanation. We analyze the turn-of-year returns and trading patterns of municipal bond closed-end funds, which are held almost exclusively by tax-sensitive individuals.

II. Data

The principal data for this study is from the CRSP monthly stock file. For each year from 1990-2000, we obtain prices, shares outstanding, volumes and monthly returns

for a sample of 168 municipal bond closed-end funds (most of which were established in the early to mid 1990s). The number of funds grew from 17 in 1990 to 165 in 2000, as shown in the summary statistics in Table 1. Three funds went defunct during our sample period. The fund categorization is provided by CDA/Wiesenberger.

III. Empirical Results

1. The January effect: evidence from the municipal bond closed-end funds.

To test for a January effect among the municipal bond closed-end funds, we calculate, for each month, the average return for all funds that are available in that month for the period 1990-2000. In Table 2, we report the time-series average returns for each of the 12 months in a year. We find that the average return in January is 2.21 percent, as compared to an average of -0.19 percent for each of the other eleven months. We plot the monthly average returns in Figure 1.

Using a simple time-series regression of cross-fund average returns on a January dummy, we find that the return is significantly higher in January than in any other month at the one percent level. Even after controlling for the municipal bond index returns, the average returns in January are still significantly higher compared to other months. This means that the observed January effect is not due to the return seasonal in the underlying municipal bond index, which is a proxy for the NAV of the closed-end funds. Both regression results are shown in Table 2. The findings indicate that the well documented January return seasonal is also present among the municipal bond closed-end funds.

2. Tax-loss selling of municipal bond closed-end funds

Under the tax-loss-selling hypothesis, investors sell securities in which they have experienced losses by the end of the year in order to realize capital losses for tax benefits. Stock prices for these securities then rebound in January when the selling pressure dissipates. If tax-loss selling is the true explanation for the January effect, we would expect that the abnormal returns in January are positively correlated with the previous year-end volume measures. Although Constantinides (1984) argues that delaying the tax-loss-selling to the end of the year is not optimal, Badrinath and Lewellen (1990) find that most sales of losers occur in November and December. Further, Bhabra, Dhillon, and Ramirez (1999) document a November effect related to tax-loss selling. Thus, we use November and December volume in our volume measures. The regression equation we estimate is:

$$Janrret_{it} - ret_{it-1}^{2-10} = \alpha_{0t} + \alpha_{1t}\, vol\_ratio_{it-1} + \varepsilon_{it},$$

where *Janret* is the return in January and ret^{2-10} is the average monthly holding period return from February to October in the preceding year. We estimate the abnormal returns in January by controlling for the previous February to October returns. On the right-hand side, vol_ratio is defined as:

$$vol\_ratio_{it} = \frac{average\ November\ and\ December\ trading\ volume\ of\ fund\ i\ in\ year\ t}{average\ February\ to\ October\ trading\ volume\ of\ fund\ i\ in\ year\ t},$$

where vol_ratio is the average trading volume of the previous November and December divided by the average volume from February to October of the previous year. We report the year-by-year regression results in Table 3.[8] The coefficient on vol_ratio is positive and statistically significant at the 5 percent level for ten out of the eleven years. In Table

4 Panel A, we report the results for the panel regression: the coefficient on *vol _ ratio* is positive and significant at the 1 percent level.[9] The regression results show that abnormal returns in January are positively related to the previous year-end trading volume. The R-squared is 0.3814, indicating that a large proportion of the abnormal returns in January can be explained by the previous year-end trading activities. As a robustness test, in a similar set of regressions, instead of controlling for the previous February to October returns, we subtract from the January fund return the t-bill return for the same month. The estimates for the panel regressions are reported in Panel B of Table 4. The results are similar to those in Panel A. In summary, these results suggest that the abnormally high returns in January can be largely explained by the abnormally high volumes at year-end. This is consistent with the tax-loss selling hypothesis that the abnormal returns in January are due to the previous year-end selling pressure on these securities.

In order to examine further whether the observed January return seasonal is caused by loss-taking trading of individual investors at the previous year-end, we study the year-end volume and tax-loss selling attributes of municipal bond closed-end funds. If the January effect is caused by tax-loss selling, we would expect year-end volume to be greater for funds that declined in price during the year. Since municipal bond closed-end funds are held mostly by tax sensitive individuals, we expect to observe a relatively clear relation between year-end trading activities and tax-loss selling attributes. Specifically, we expect funds to display significant increases in year-end trading volume, i.e. tax-loss selling at year-end, when they have experienced negative returns.

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[8] All year-by-year regressions report t-statistics based on the Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors.

[9] All panel regressions report t-statistics based on the panel corrected standard errors (PCSEs).

Figure 2 exhibits the average annual return across funds for each year from 1990-2000. The return for a year is calculated by compounding the monthly average returns. In 3 of the 11 years, the average annual return is negative: around -3%, -20%, -22% in 1990, 1994 and 1999 respectively. Figure 3 shows the average turnover across funds for the sample of municipal bond closed-end funds for each month in the 1990-2000 period. Monthly average turnover is calculated by summing up the turnovers of all available funds in that month and dividing by the number of funds. (Due to the fact that closed-end funds have a relatively stable number of shares outstanding, there are no upward or downward trends in the data.) We find that, in each of the three years with negative returns, the year-end turnover is indeed larger. The pattern is most prominent in 1994 and 1999, when these funds experience the largest losses. Further, in years following large loss years, in particular 1995, 1996 and 2000, the year-end turnover is still higher most likely due to a lag effect. The losses in 1994 and 1999 are so large that the funds still do not regain their previous prices in the subsequent years of 1995 and 2000. Thus, investors can continue to realize accrued capital losses at the following year-ends. In order to see the year-by-year pattern more clearly, we display the monthly average volume for each year from 1990-2000 in Figure 4. Again, the pattern displayed is not subject to changes in shares outstanding. Notice that not all years display the same year-end volume pattern: only in the years of losses and the years subsequent to the large drops in prices is the year-end volume significantly larger than the volume in the other months; there is no clear pattern in the other years. In summary, the return and volume patterns seem to suggest that these fund investors display tax-loss selling behavior at the end of the year.

We also run cross-sectional regressions of the year-end volume measures on the current and the previous year returns for each year from 1990-2000. We again focus on year-end volume as the average trading volume of November and December. We use three different measures of year-end volume for each fund:

$$volume_{it} = \text{average November and December trading volume of fund } i \text{ in year } t$$

$$turnover_{it} = \frac{\text{average November and December trading volume of fund } i \text{ in year } t}{\text{Number of shares outstanding of fund } i \text{ in year } t}$$

$$vol\_ratio_{it} = \frac{\text{average November and December trading volume of fund } i \text{ in year } t}{\text{average February to October trading volume of fund } i \text{ in year } t}$$

The first measure is the average trading volume of November and December, denoted by volume. The second measure is turnover, defined as the average trading volume of November and December divided by the number of shares outstanding. This measure is not subject to variation in the numbers of outstanding shares across funds. Vol_ratio, the third measure of year-end volume, is defined as the average trading volume of November and December divided by the average volume from February to October of that the same calendar year. It measures the year-end volume relative to that of the other months in the same year for a fund. The relative volume measure controls for the fund-specific and time-specific fluctuations. For example, noise due to trends in the trading volume of individual funds is moderated by adjusting the year-end volume by the nine-month average. Also, the vol_ratio and turnover measures of trading volume allow comparisons across firms even when their normal trading volumes differ in magnitude.

The current year return of a fund is defined as the monthly return of holding that fund from January to October in that year. The previous year return is defined as the

monthly holding period return of the fund in the previous calendar year, from January to December. We run the following sets of regressions for each year 1990-2000:

$$volume_{it} = \alpha_{0t} + \alpha_{1t}\, return_{it}^{c} + \alpha_{2t}\, return_{it}^{p} + \varepsilon_{it}$$

$$turnover_{it} = \beta_{0t} + \beta_{1t}\, return_{it}^{c} + \beta_{2t}\, return_{it}^{p} + u_{it}$$

$$vol\_ratio_{it} = \gamma_{0t} + \gamma_{1t}\, return_{it}^{c} + \gamma_{2t}\, return_{it}^{p} + v_{it}$$

where $return^{c}$ and $return^{p}$ represent the current year return and the previous year return, respectively.

The coefficient estimates and their corresponding t statistics are reported in Table 5. Among the three year-end volume measures, the relative measures (turnover and vol_ratio) capture the volume-return relation better than the absolute measure (volume) as expected. Using turnover as the dependent variable, we find a negative coefficient on the current year return in all years but 1997. In seven out of the 11 years studied, the coefficient is statistically significant at the 5 percent level. The coefficient on the previous year return is negative in all years but 1998, and is significant at the 1 percent level in 5 years. Using Vol_ratio as the dependent variable, we find that the estimated coefficient on the current year return is negative and significant at the 5 percent level in eight years. The estimated coefficient on the previous year return is negative in all 11 years and is significant at the 1 percent level in four years. Furthermore, the negative relation between the year-end volume and the current year return is most prominent in 1994 and 1999, when funds experience the largest losses (the average annual returns are around –20% and –22%, respectively) and in years immediately following them. The negative relation between the year-end volume and the previous year return is strongest in 1995 and 2000 because of the lag tax-loss effect. Because of the huge losses in 1994

and 1999 for municipal bond closed-end funds, in the years immediately following them the funds still do not fully recover from their previous losses. As a result, investors continue to gain tax benefits from late-in-the-year loss-taking activities. The regression results again suggest a negative relation between year-end volume and current / previous fund returns and confirm the evidence presented in Figures 2 and 3.

In Table 6, we report the results of the panel regressions with fund fixed effects. The regressions include a total of 144 closed-end funds in 11 years.[10] The model specification is very similar to that of Table 5 (the year-end volume measures on the current and the previous year returns). The fixed effects control for the variations across funds. The coefficients on the returns are all negative and significant at the 1 percent level, indicating a negative relation between the year-end volume and past fund returns. When turnover and vol_ratio are used as volume measures, both R^2 values are higher than 50 percent, indicating that the past fund returns explain a large proportion of the volume variation. The above findings provide substantial support for the hypothesis that income tax considerations result in abnormal year-end trading volumes.

According to the tax-loss-selling hypothesis, the trading volume in January would also be higher for closed-end funds that have declined in value during the previous years, since the investors will reinvest in these funds in January. To test this hypothesis, we run similar regressions as those in Table 5 for each year from 1990 to 2000, using January volume measures (volume, turnover and vol_ratio) instead of year-end volume measures. Table 7 summarizes the results. When turnover is used as a proxy for January volume, the coefficient on the previous year return is negative in eight out of 10 years, and in four

[10] We lose some fund observations because we require each fund to have complete return data for the past two years.

of those years the coefficient is significant at the five percent level. Further, the coefficient on the lagged two year return is negative in nine years, in three of those years the coefficient is statistically significant at the five percent level. When we use vol_ratio as the dependent variable, the coefficients on the returns are almost all negative, and three-tenth of them are significant at the five percent level. We notice that the magnitude of the estimates is generally smaller than that in the November/December regressions. However, in years with large losses, the negative return-volume relation is still present and mostly significant. The results of the panel regressions with fund fixed effects are shown in Table 8. The regressions include a total of 141 closed-end funds in ten years. All the coefficients on the returns are negative and except for one, all are significant at the five percent level, indicating a negative relation between the volume in January and previous fund returns.

In summary, we find evidence that the abnormal returns in January can be explained largely by the year-end trading activities, which are in turn closely related to the tax-loss attributes of these funds in the previous two years.

3. Tax-loss selling and brokerage firms

In this section, we examine whether funds associated with brokerage firms display a stronger pattern of year-end tax-loss selling. The brokerage hypothesis can be viewed as a direct implication of the tax-loss-selling hypothesis. It posits that closed-end funds held by investors who receive more tax counseling would experience more tax-loss selling. Under this hypothesis, funds associated with a brokerage firm are more subject to tax-loss selling because the brokers would presumably advise the investors to take advantage of the tax benefits in realizing capital losses at year-end.

To test this hypothesis, we include a brokerage dummy and its interaction terms with the current and previous year returns. We do not estimate the year-by-year regressions because the number of closed-end funds associated with brokerage firms is smaller. The fixed-effect panel regression results are shown in Table 9. The three columns of the table differ in their dependent variables: the first column uses volume as the year-end volume measure while the second and third columns use turnover and vol_ratio, respectively. Note that the dummy variable estimates are not listed in the table because they are picked up by the intercepts (fixed effects). As shown in the table, the coefficients on the past fund returns and the brokerage-return interaction terms are all negative and they are significant at the five percent level in all but one case. The regression results indicate that in addition to the negative return-volume relation, brokerage counseling is an important factor that explains investor year-end tax-motivated trading activities. Thus, funds associated with brokerage firms display a stronger pattern of tax-loss selling at the end of the year, which supports the hypothesis that brokerage firms advise their clients to engage in tax-motivated trading.

In summary, Table 9 indicates that the end-of-year trading volume of municipal bond closed-end funds is closely related to the past fund returns. Furthermore, we find evidence that tax counseling has significant effects on year-end tax-motivated trading as the brokerage-related closed-end funds display a stronger pattern of tax-loss selling.

IV. Conclusion

The fact that municipal bond closed-end funds are held almost entirely by tax-sensitive individual investors make them good candidates for the study of tax-loss selling as an explanation for the January effect. In this paper we find evidence that the tax-loss

selling behavior of investors at year-end accounts for a large proportion of the January effect for this particular set of securities. In particular, we find that the abnormal returns of the municipal bond closed-end funds in January are positively correlated with the year-end trading volumes and that the year-end volumes are negatively related to the current and the previous year returns. Our findings support the tax-loss-selling hypothesis. In addition, we find that closed-end funds that are associated with brokerage firms display more tax-loss selling behavior.

In summary, we find a significant January effect among a set of securities that are held only by individual investors. We provide direct evidence that the observed January effect can be explained by the tax-loss-selling hypothesis.

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Table 1
Descriptive Statistics of Municipal Bond Closed-End Funds
Over the Period 1990-2000

Year	Variable	Mean	Std Dev	Minimum	Maximum	N
1990	SHROUT	27018.94	28225.53	3113	159110	17
	VOL	637467.8	610549.5	21500	4066100	
	RETX	-0.00234	0.028391	-0.10811	0.090909	
1991	SHROUT	25828.05	25783.04	3119	161132	30
	VOL	653597	555367.4	12300	3702800	
	RETX	0.004562	0.020862	-0.08955	0.075758	
1992	SHROUT	21954.01	22673.08	2607	162145	37
	VOL	572512.9	580170.5	5000	5329000	
	RETX	0.000124	0.027073	-0.10084	0.088496	
1993	SHROUT	17157.68	19615.5	1007	164230	62
	VOL	477409.9	551556.5	3500	5723700	
	RETX	0.00159	0.027923	-0.125	0.103896	
1994	SHROUT	16641.69	19241.33	1007	166371	107
	VOL	557166.8	762609	9200	9102200	
	RETX	-0.01822	0.040001	-0.14851	0.105263	
1995	SHROUT	17435.09	19180.86	1007	166371	140
	VOL	491234.1	561003.2	8000	6709800	
	RETX	0.012917	0.034963	-0.08491	0.192771	
1996	SHROUT	18002.86	21027.94	1007	194960	141
	VOL	473169.8	598960.7	5900	10940500	
	RETX	0.003026	0.025149	-0.08929	0.130952	
1997	SHROUT	18106.74	21131.1	1007	194960	141
	VOL	450436.8	618346.5	8800	8608000	
	RETX	0.00757	0.021618	-0.07767	0.085	
1998	SHROUT	18039.57	20996.81	1007	194960	141
	VOL	403139.2	513977.3	4800	6470200	
	RETX	0.003163	0.023215	-0.09884	0.072034	
1999	SHROUT	17949.15	20039.73	1007	194960	145
	VOL	579137.8	871530.1	1200	15146498	
	RETX	-0.02072	0.02801	-0.19745	0.075438	
2000	SHROUT	18029.93	20124.97	1007	194960	165
	VOL	497481.7	608110.4	3500	7449100	
	RETX	0.008166	0.030918	-0.17949	0.139535	

a All variables are on a monthly basis. Shares outstanding are in units of one thousand shares.

Table 2

Monthly Average Return for
Municipal Bond Closed-End Funds
(1990-2000)

Month	Average Return
1	0.0221
2	0.0011
3	-0.0153
4	-0.0025
5	-0.0012
6	0.0065
7	0.0102
8	-0.0033
9	-0.0093
10	-0.0105
11	0.0023
12	0.0009

Monthly Return
= -0.00192 (Intercept) + 0.02404 (Jan) [11]
(-1.03) (2.74)***

Monthly Return
= -0.00369 (Intercept) + 0.02007 (Jan) + 0.46942 (Muni index return) [12]
(-1.74) (2.31)** (2.80)***

[11] Dummies for the other months are also included in the regression, but the estimated coefficients are not statistically different from zero.
** indicates statistically significant at the 5 percent level; *** at the 1 percent level.
All t-statistics are based on the Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors (t-statistics in parentheses).
[12] Monthly returns on muni index are available from January 1990 through April 1999.

Table 3

Regression Results for January Returns Adjusted for Previous Feb-Oct Average Returns on Previous Year's Volume Ratios[a] (1990-2000)

Coefficient Estimates (t-statistics in parentheses)

$$Janrret_{it} - ret_{it-1}^{210} = \alpha_{0t} + \alpha_{1t}\, vol\_ratio_{it-1} + \varepsilon_{it}$$

Year	α_0	α_1	$R^2_{adjusted}$	N
1990	-0.0455**	0.0582***	0.2029	17
	(-2.72)	(3.49)		
1991	-0.0187	0.0341	0.0834	30
	(-0.77)	(1.90)		
1992	-0.0314***	0.0429***	0.2355	37
	(-2.78)	(4.08)		
1993	-0.0079	0.0376**	0.0658	62
	(-0.60)	(2.47)		
1994	0.0008	0.0133**	0.0434	107
	(0.11)	(2.14)		
1995	0.0418**	0.0313***	0.2142	140
	(2.61)	(4.79)		
1996	-0.0127	0.0307***	0.2043	141
	(-1.65)	(6.13)		
1997	-0.0133**	0.0203***	0.0682	141
	(-1.99)	(3.80)		
1998	0.0006	0.0150***	0.0421	141
	(0.11)	(2.76)		
1999	-0.0539***	0.0208***	0.0472	145
	(-8.02)	(2.86)		
2000	0.0245***	0.0081***	0.0501	165
	(3.14)	(2.96)		

** indicates statistically significant at the 5 percent level; *** at the 1 percent level.

a All t-statistics are based on the Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors.

Table 4

Results for Panel Regression:
Number of Cross Sections: 144. Time Series Length: 11.

Panel A. January Returns Adjusted for Previous Feb-Oct Average Returns on Previous Year's Volume Ratios[a]

Coefficient Estimates (Panel Corrected Standard Errors in Parentheses)

	Coefficients	T Value	R^2
Intercept	-0.0273	-1.52	0.3814
	(0.0180)		
Vol_Rratio	0.0370***	3.40	
	(0.0109)		

Panel B. January Returns Adjusted for Same Period T-Bill Returns on Previous Year's Volume Ratios

Coefficient Estimates (Panel Corrected Standard Errors in Parentheses)

	Coefficients	T Value	R^2
Intercept	-0.0180	-1.08	0.2538
	(0.0167)		
Vol_Rratio	0.0257**	2.52	
	(0.0102)		

** indicates statistically significant at the 5 percent level; *** at the 1 percent level.
a All t-statistics are based on the panel corrected standard errors (PCSEs).

Table 5
Regression Results for Year-End Volume Measures on Current Year and Previous Year's Returns[a]
(1990-2000)

Coefficient Estimates (t-statistics in parentheses)

$$volume_{it} = \alpha_{0t} + \alpha_{1t}\, return^{c}_{it} + \alpha_{2t}\, return^{p}_{it} + \varepsilon_{it} \qquad turnover_{it} = \beta_{0t} + \beta_{1t}\, return^{c}_{it} + \beta_{2t}\, return^{p}_{it} + u_{it} \qquad vol\_ratio_{it} = \gamma_{0t} + \gamma_{1t}\, return^{c}_{it} + \gamma_{2t}\, return^{p}_{it} + v_{it}$$

Year	α_0	α_1	α_2	$R^2_{adjusted}$	β_0	β_1	β_2	$R^2_{adjusted}$	γ_0	γ_1	γ_2	$R^2_{adjusted}$	N
1990	825480	10608115	46203053	-0.0676	0.0224***	-0.5575	-0.5306	0.0367	1.1197***	-31.0409***	-21.2405	0.3587	17
	(2.06)	(0.30)	(0.99)		(6.19)	(-1.98)	(-1.38)		(13.40)	(-4.62)	(-1.76)		
1991	254533	63259329***	8139526	0.0973	0.0251***	-0.2162	-0.3219	-0.0465	1.1350***	-32.9375	-26.5554	0.1223	30
	(1.72)	(2.77)	(0.49)		(5.87)	(-0.30)	(-0.83)		(7.60)	(-1.50)	(-2.01)		
1992	496603***	-24733156	19388830	0.0247	0.0246***	-1.2421***	-0.4741	0.3191	0.9588***	-14.2994***	-16.0399***	0.4193	37
	(4.39)	(-1.50)	(1.83)		(13.91)	(-3.41)	(-1.95)		(38.05)	(-6.12)	(-4.35)		
1993	1116272***	-49825939	-29951926	0.0223	0.0295***	-0.3357	-0.7385***	0.0610	1.4394***	-39.1786**	-19.6083	0.1543	62
	(3.62)	(-1.51)	(-1.56)		(9.35)	(-1.03)	(-2.77)		(10.53)	(-2.64)	(-1.99)		
1994	1022926	-15648104	-30316751	-0.0039	0.0247***	-1.8760***	-0.1353	0.2401	1.8882***	-30.6106***	-22.1838	0.0883	107
	(1.81)	(-0.69)	(-0.72)		(3.76)	(-5.39)	(-0.30)		(10.03)	(-3.76)	(-1.46)		
1995	884244**	-10845013	3913997	-0.0065	0.0139***	-0.7737**	-1.9054***	0.2348	1.0656***	-29.3155***	-44.3644***	0.1658	140
	(2.29)	(-0.73)	(0.25)		(2.75)	(-2.48)	(-4.96)		(6.45)	(-3.04)	(-4.73)		
1996	899996	-31224614	-19556437	0.0165	0.0313***	-0.0755	-0.0215	-0.0139	1.3141***	0.5561	-6.6137	-0.0048	141
	(1.96)	(-0.99)	(-0.75)		(13.39)	(-0.33)	(-0.11)		(19.05)	(0.09)	(-1.35)		
1997	601185***	-1099983	-62904552	0.0784	0.0207***	0.5679***	-0.7552***	0.1523	1.0026***	-5.8208	-20.6876***	0.0566	141
	(4.01)	(-0.14)	(-1.70)		(13.32)	(2.81)	(-3.85)		(21.96)	(-0.98)	(-2.91)		
1998	503555***	-30814832***	-5612285	0.0570	0.0206***	-0.4429***	0.0648	0.0479	1.0407***	-20.7269***	-6.1782	0.0788	141
	(5.67)	(-4.18)	(-0.64)		(12.49)	(-2.71)	(0.35)		(12.78)	(-4.20)	(-0.62)		
1999	1109127**	-27560062	-118491985***	0.0855	0.0160**	-2.8102***	-1.6566***	0.3496	1.1279***	-88.1825***	-22.8311	0.4005	145
	(2.37)	(-1.46)	(-3.85)		(2.03)	(-7.78)	(-2.80)		(5.22)	(-8.01)	(-1.63)		
2000	40221	-17535032	-32874291***	0.0487	0.0069	-2.4447***	-2.0182***	0.3085	0.9553***	-42.1940***	-30.3601***	0.3620	165
	(0.24)	(-1.77)	(-3.97)		(1.24)	(-3.99)	(-4.85)		(8.07)	(-7.44)	(-5.73)		

** indicates statistically significant at the 5 percent level; *** at the 1 percent level.
a All t-statistics are based on the Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors.

Table 6
Results for Panel Regression with Fixed Effects for Funds:
Year-End Volume Measures on Current Year and Previous Year's Returns[a]
Number of Cross Sections: 144. Time Series Length: 11.

Coefficient Estimates (Panel Corrected Standard Errors in Parentheses)

	Volume			Turnover			Vol_ratio		
	Coefficients	T Value	R^2	Coefficients	T Value	R^2	Coefficients	T Value	R^2
Return[c]	-26927049***	-7.44	0.2783	-1.3426***	-6.60	0.5302	-55.0748***	-7.24	0.6228
	(3619227)			(0.2034)			(7.6059)		
Return[p]	-12892523***	-3.65		-0.6593***	-3.02		-22.8392***	-2.95	
	(3532198)			(0.2182)			(7.7379)		

** indicates statistically significant at the 5 percent level; *** at the 1 percent level.
a All t-statistics are based on the panel corrected standard errors (PCSEs). Coefficients on firm fixed effects and constants are not reported.

Table 7
Regression Results for January Volume Measures on Previous Two Year's Returns[a]
(1991-2000)

Coefficient Estimates (t-statistics in parentheses)

$volume_{it}^{J} = \alpha_{0t} + \alpha_{1t}\, return_{it}^{-1} + \alpha_{2t}\, return_{it}^{-2} + \varepsilon_{it}$ $\quad tover_{it}^{J} = \beta_{0t} + \beta_{1t}\, return_{it}^{-1} + \beta_{2t}\, return_{it}^{-2} + u_{it}$ $\quad vol\_ratio_{it}^{J} = \gamma_{0t} + \gamma_{1t}\, return_{it}^{(-1)} + \gamma_{2t}\, return_{it}^{(-2)} + v_{it}$

Year	α_0	α_1	α_2	$R^2_{adjusted}$	β_0	β_1	β_2	$R^2_{adjusted}$	γ_0	γ_1	γ_2	$R^2_{adjusted}$	N
1991	792612	17679485	53677342	-0.0381	0.0210***	-0.3094	-0.3561	-0.0038	1.0910***	-14.6156	-10.8022	0.0132	17
	(1.96)	(0.50)	(1.16)		(8.00)	(-0.98)	(-0.91)		(10.60)	(-1.19)	(-0.68)		
1992	262835	94221355***	30161857	0.0704	0.0268***	0.2634	-0.0035	-0.0616	1.2366***	-18.4453	-16.4147	-0.0245	30
	(1.44)	(2.93)	(1.00)		(5.32)	(0.32)	(-0.01)		(7.13)	(-0.78)	(-1.12)		
1993	430012***	-16946662	17971843	0.0056	0.0214***	-0.9695	-0.3728	0.2149	0.8426***	-5.9326	-11.6659**	0.0245	37
	(4.38)	(-1.02)	(2.02)		(13.36)	(-1.98)	(-1.39)		(24.77)	(-0.88)	(-2.06)		
1994	1281785**	-74955428	-35691905	0.0240	0.0280***	-0.5898	-0.8746***	0.0948	1.4153***	-53.0471**	-22.8620**	0.1102	62
	(2.32)	(-1.33)	(-1.80)		(9.09)	(-1.99)	(-4.12)		(6.54)	(-2.46)	(-2.18)		
1995	611361***	2045687	-16934927	0.0012	0.0190***	-0.3468***	-0.0976	0.0732	1.1534***	1.3211	-17.9507	0.0301	107
	(2.80)	(0.25)	(-1.02)		(8.32)	(-3.11)	(-0.50)		(11.51)	(0.32)	(-1.55)		
1996	965376***	-6836114	14531098	0.0057	0.0194***	-0.3614	-1.0459***	0.0980	1.2189***	-15.9233**	-16.7933**	0.0305	140
	(2.75)	(-0.49)	(1.08)		(4.36)	(-1.53)	(-4.10)		(8.65)	(-2.02)	(-2.50)		
1997	821029	-31378064	-18143178	0.0176	0.0259***	-0.2036	0.0322	-0.0072	1.0782***	-4.6844	-1.6504	-0.0106	141
	(1.92)	(-1.03)	(-0.75)		(11.92)	(-1.02)	(0.19)		(13.49)	(-0.70)	(-0.28)		
1998	627013***	740313	-53706890	0.0601	0.0230***	0.7337**	-0.4536	0.0645	1.1348***	-7.0541	-6.0408	-0.0057	141
	(4.56)	(0.08)	(-1.62)		(12.35)	(2.33)	(-1.74)		(19.84)	(-0.88)	(-0.68)		
1999	662537***	-50550591***	-7200906	0.1113	0.0291***	-0.5800**	-0.4328	0.0358	1.5116***	-25.4007***	-34.4897	0.0426	141
	(6.33)	(-3.04)	(-0.66)		(9.23)	(-2.21)	(-1.27)		(9.06)	(-2.62)	(-1.91)		
2000	737152***	-1663687	-55373124***	0.0591	0.0231***	-0.4573***	-0.6345***	0.1194	1.3157***	-1.9154	-4.8086	-0.0112	144
	(3.03)	(-0.17)	(-4.07)		(9.12)	(-3.77)	(-2.94)		(11.51)	(-0.37)	(-0.56)		

** indicates statistically significant at the 5 percent level; *** at the 1 percent level.
a All t-statistics are based on the Newey-West (1987) heteroskedasticity and autocorrelation consistent standard errors.

Table 8
Results for Panel Regression with Fixed Effects for Funds:
January Volume Measures on Previous Two Year's Returns[a]
Number of Cross Sections: 141. Time Series Length: 10.

Coefficient Estimates (Panel Corrected Standard Errors in Parentheses)

	Volume			Turnover			Vol_ratio		
	Coefficients	T Value	R^2	Coefficients	T Value	R^2	Coefficients	T Value	R^2
Return[c]	-2674130	-1.84	0.0320	-0.1226***	-2.66	0.1505	-5.9771**	-2.06	0.0711
	(1455538)			(0.0461)			(2.8963)		
Return[p]	-5751099***	-3.53		-0.3970***	-6.91		-11.3432***	-3.82	
	(1627305)			(0.0574)			(2.9724)		

** indicates statistically significant at the 5 percent level; *** at the 1 percent level.
a All t-statistics are based on the panel corrected standard errors (PCSEs). Coefficients on firm fixed effects and constants are not reported.

Table 9
Results for Panel Regression with Fixed Effects for Funds: Year-End Volume Measures on Current Year and Previous Year's Returns with Brokerage Dummy and Interaction Terms Added[a]
Number of Cross Sections: 144. Time Series Length: 11.

Coefficient Estimates (Panel Corrected Standard Errors in Parentheses)

	Volume			Turnover			Vol_ratio		
	Coefficients	T Value	R^2	Coefficients	T Value	R^2	Coefficients	T Value	R^2
$Return^c$	-24020598***	-7.06	0.2900	-1.1636***	-5.80	0.5665	-51.4226***	-7.53	0.6319
	(3402351)			(0.2005)			(6.8305)		
$Return^p$	-11273099***	-3.46		-0.5458**	-2.56		-21.7059***	-3.10	
	(3258121)			(0.2134)			(6.9959)		
$Return^c$_D	-12908240***	-4.76		-0.8001***	-6.27		-15.7831**	-2.02	
	(2711815)			(0.1277)			(7.8270)		
$Return^p$_D	-8378671***	-2.89		-0.5984***	-5.26		-5.9738	-0.70	
	(2896743)			(0.1138)			(8.4917)		

** indicates statistically significant at the 5 percent level; *** at the 1 percent level.
a All t-statistics are based on the panel corrected standard errors (PCSEs). Coefficients on firm fixed effects and constants are not reported.

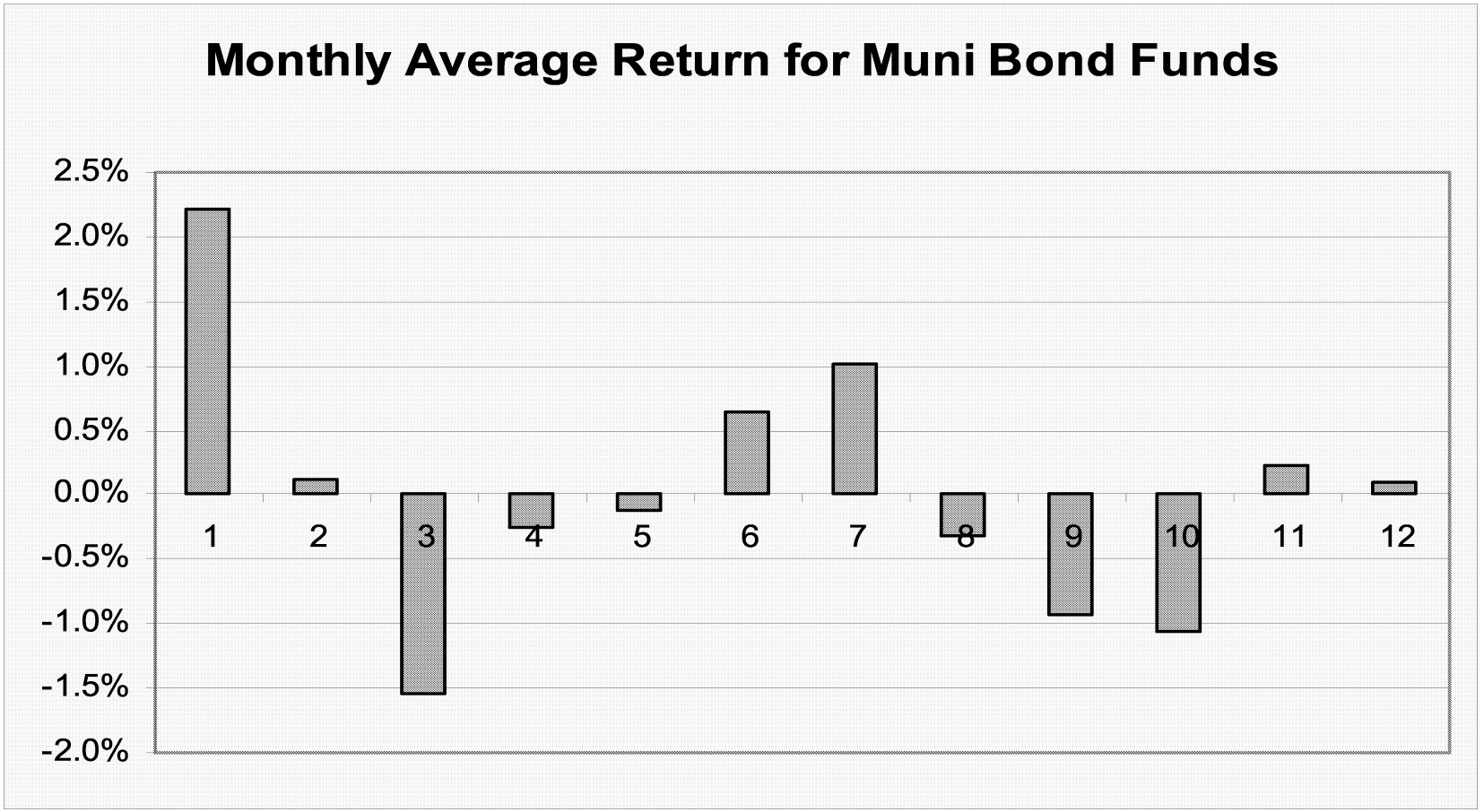

Figure 1.. Monthly Average Return for Muni Bond Funds, 1990-2000.

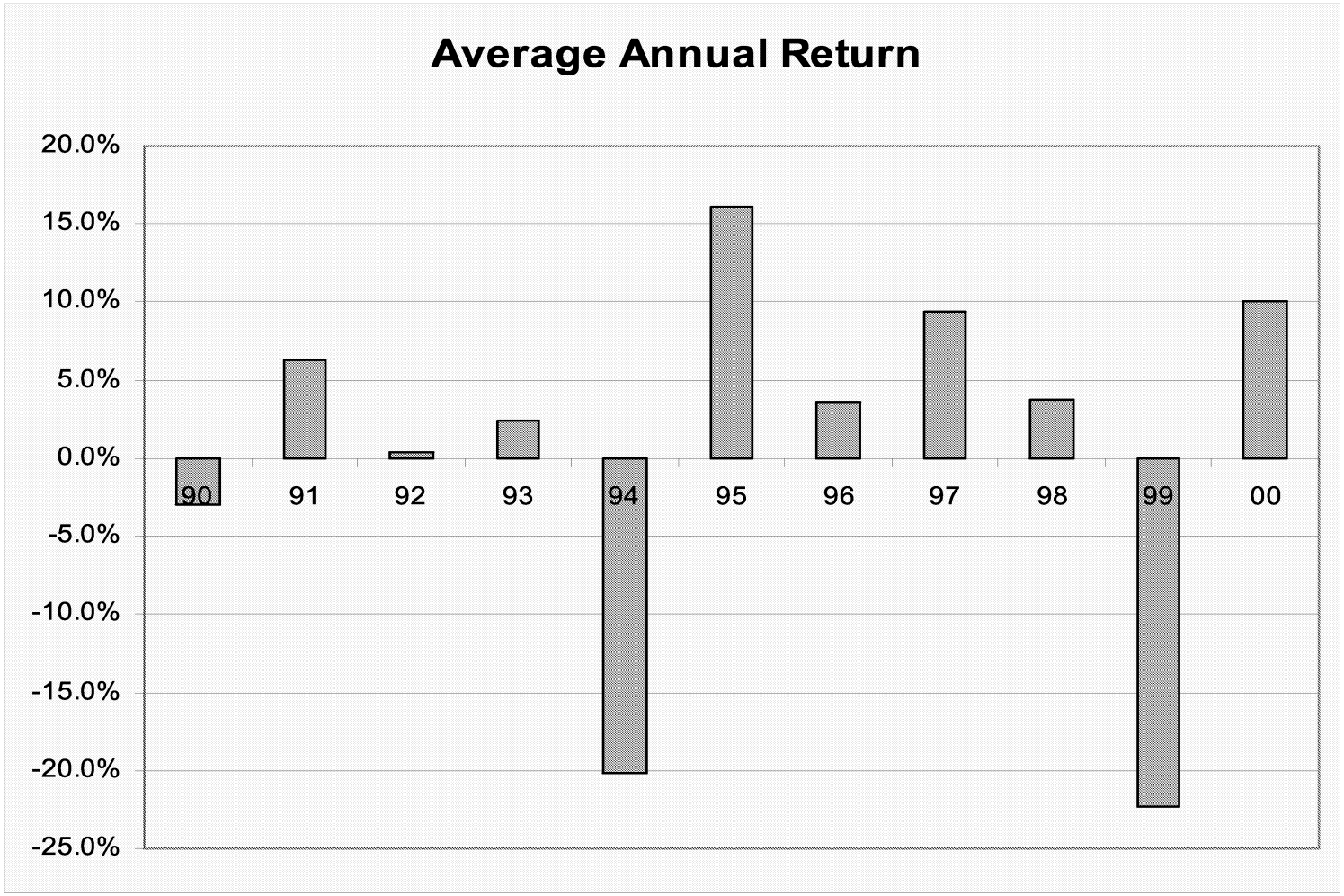

Figure 2. Average Annual Return, 1990-2000.

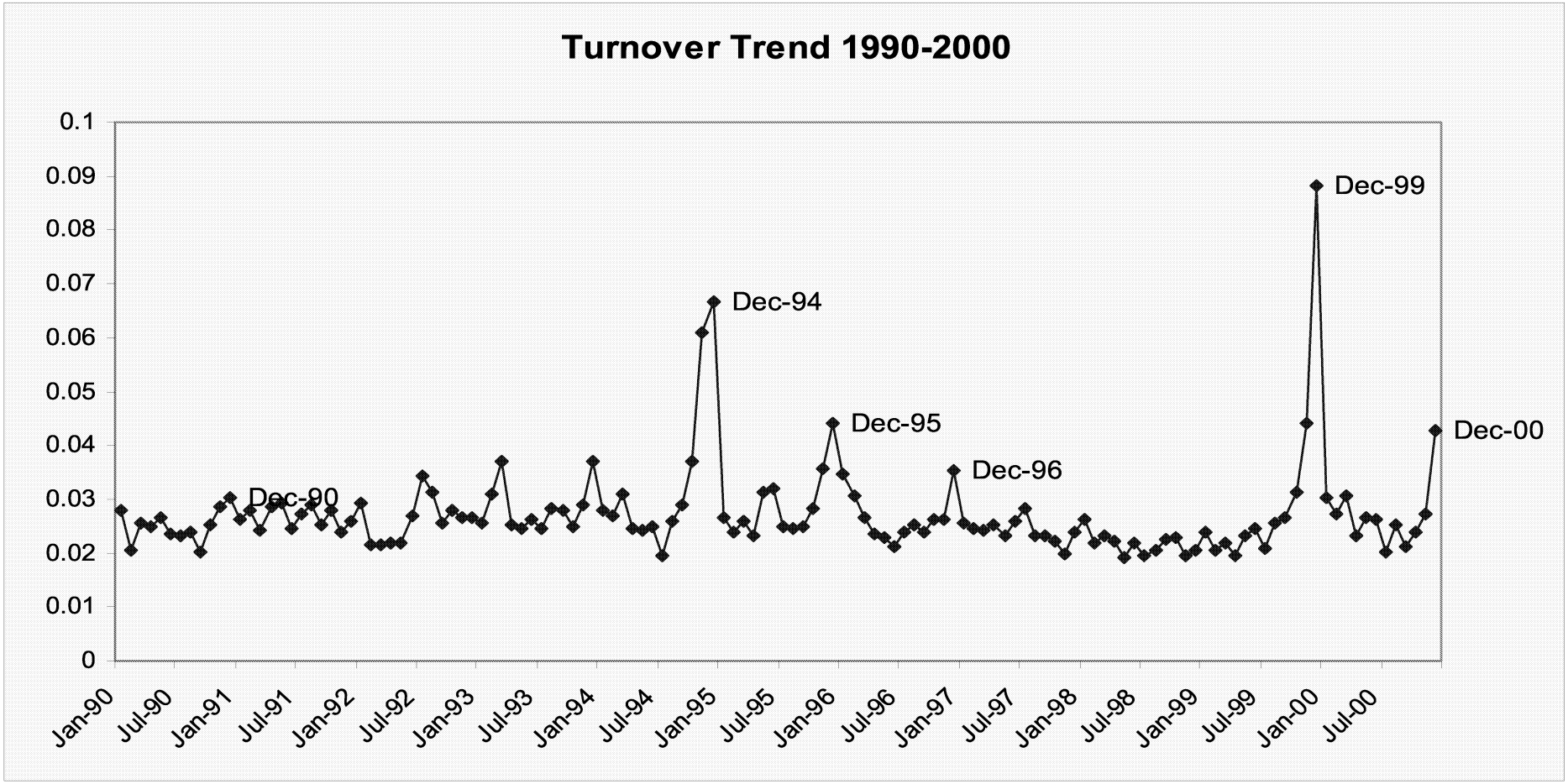

Figure 3. Monthly Average Turnover Trend, 1990-2000.

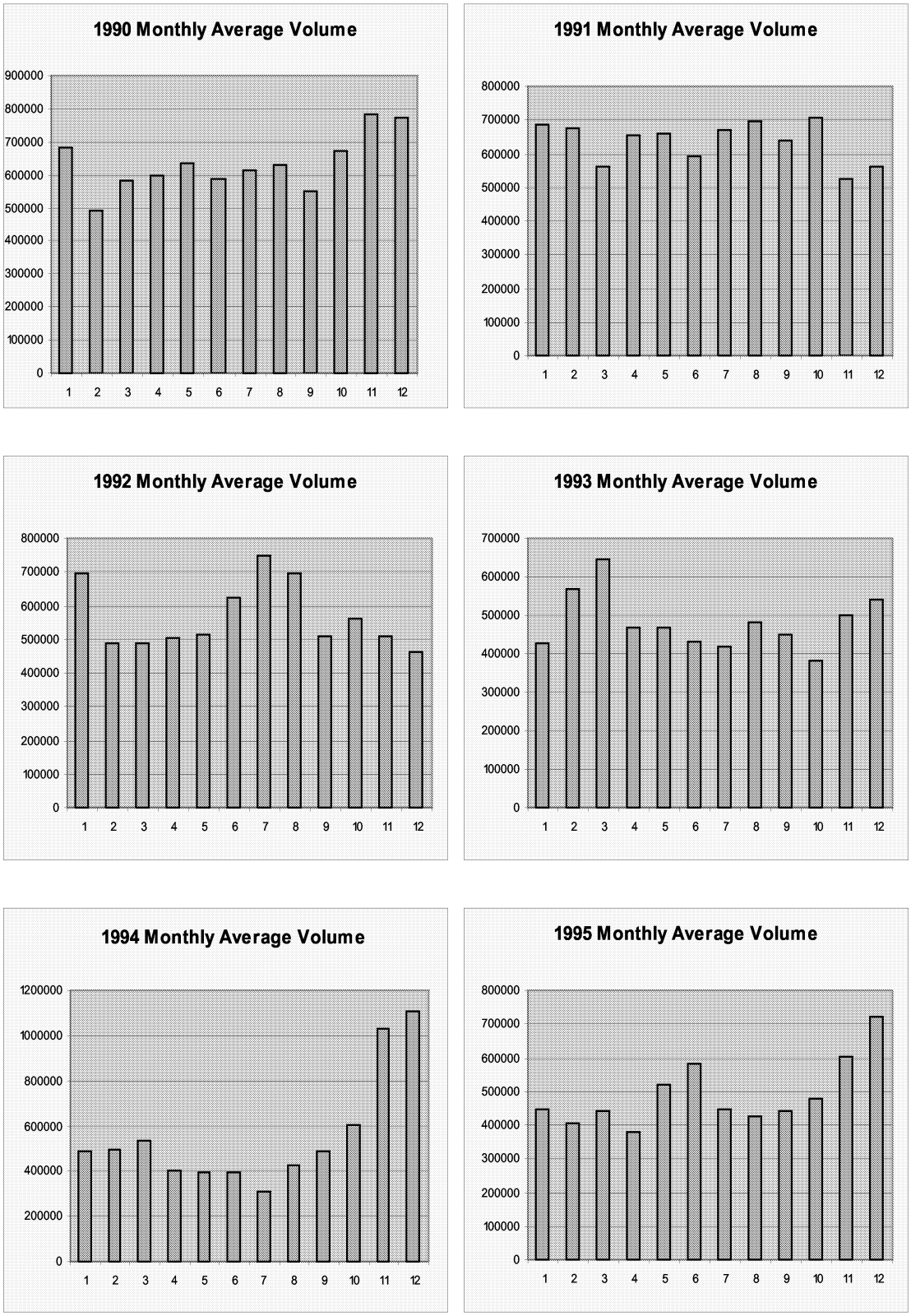

Figure 4. Monthly Average Volume, 1990-2000.

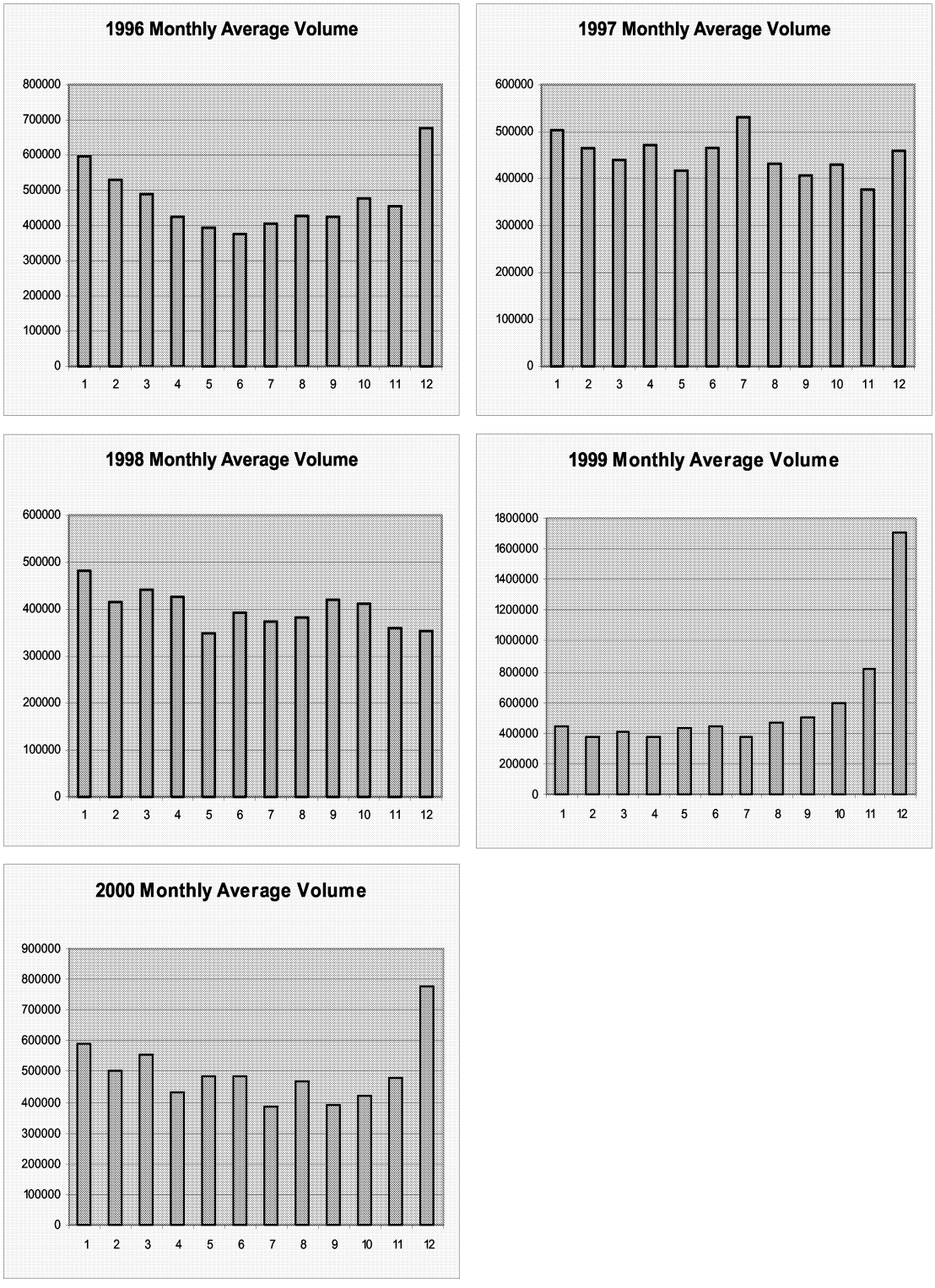

Figure 4. Monthly Average Volume, 1990-2000 (continued).