

Does Yearend Sweep Ameliorate the Disposition Effect of Mutual Fund Investors?

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Abstract

Even though mutual fund investors in general are less active than individual investors, they still exhibit the disposition effect: a tendency to sell winners too soon while keep losers too long. However, in January and February, the months approaching Chinese New Year, investors are less disposed to dealing with their winners and losers. This might be related to their urgency in need of money for preparing the spending during the Lunar New Year festival; or they trigger the self-control mechanism to clear position, dubbed as yearend sweep that is a tradition before the Lunar New Year festival in Chinese societies. In fact, we find that investors have higher average returns and higher ex-post returns when their tendency of disposition is ameliorated, as the case in January and February. Moreover, when the market return as a whole is less than satisfactory, investors tend to exhibit the disposition effect.

Keywords: disposition effect, mutual fund investors, yearend sweep

I. Introduction

Kahneman and Tversky (1979) propose prospect theory that is different from the traditional expected utility theory. Under prospect theory, investors separately treat their investment gains and losses. The value function is concave in the domain of gains and convex in the domain of losses implying that people are risk averse in treating their investment gains while are risk seeking in treating their losses. The value function is also steeper for losses than for gains. Shefrin and Statman (1985) label the tendency of holding losers too long and selling winners too soon as the disposition effect.

The literature has provided evidence for different treatment of investment gains and losses. For example, Odean (1998) finds that individual investors demonstrate a strong preference for realizing winners rather than losers. Their behavior is not motivated by a desire to rebalance portfolios, nor to avoid the higher trading costs of low priced stocks. Weber and Camerer (1998) conduct an experiment and find that subjects did tend to sell winners and keep losers. However, when their shares were automatically sold after each period, the disposition effect was greatly reduced. Krishnan and Booker (2002) find that in the presence of any analyst summary recommendation report, investors would reduce tendency to commit the disposition error for gains but not for losses. In contrast, a strong form of the analyst summary recommendation report, i.e., one with additional information supporting the analysts' position further, reduces investors' disposition error for gains and for losses.

There is sparse literature investigating whether mutual fund investors are disposed toward realizing gains rather than losses. The investigation of mutual fund investors is interesting and could provide further understanding of the nature of investors' behavior. First, mutual fund investors are more likely to be inactive ones who look for professional money managers in doing with their investment. We are wondering whether the asymmetric attitude toward dealing gains and losses also permeates through these inactive investors. In other word, the study examines the pervasiveness of investor's psychology in dealing with gains and losses.

Second, we assume that investors can independently treat their sold and unsold units within a fund. The separation allows investors to have varying reference prices in determining a gain and a loss. Even though the status quo is usually taken as the reference point; however, "there are situations in which gains and losses are coded

relative to an expectation or aspiration level that differs from the status quo...”(Kahneman and Tversky, 1979). In this study we use the first-in-first-out (FIFO), average-price, and last-in-first-out (LIFO) basis in determining investor’s reference price when they redeem shares from mutual funds. Under the FIFO basis of reference price, mutual fund investors are supposed to compare the sold price on a certain day to the average price of his former purchases and determine a realized gain or loss. For his remaining position in the fund, the average price of later purchases serves as the reference price in determining a paper gain or loss. The contrary condition applies to LIFO basis. From a different perspective, we allow investors to have different reference prices when they engage in selling partial position within a fund. He might refer to his earlier purchase price under FIFO assumption or later purchase price under LIFO in determining realized gains or losses. The varying reference prices for investors provide an alternative test of disposition effect where the reference points are critical in empirical examination.

In this study we collect 13,377 mutual fund investor’s accounts from an investment trust company in Taiwan for the period from January 1996 through 2000. Ours empirical results show that in general mutual fund investors have the tendency to hold losing investment too long while sell winning investments too soon. However, in January and February, the months approaching Chinese Lunar New Year, mutual fund investors are less disposed to dealing with their winners and losers. When using the reference price under LIFO assumption, the PGR (0.492) is even smaller than the PLR (0.479) in January and February. We offer two possible explanations to account for this phenomenon: they might have urgency in need of money for preparing the spending during the new year festival; or they trigger the self-control mechanism to clear position, dubbed as yearend sweep.

Since investors are less disposed to prefer realizing gains than losses around the Chinese Lunar New Year, the average return for realized gains in January and February is larger and the average return for realized losses is smaller in magnitude than the corresponding returns in the rest months. Moreover, for the entire sample the ex-post average return for realized gains is much larger than that for paper losses, indicating that investors could be better off if they can forbear tendency of asymmetric disposition. In contrast, for January and February we find that the ex-post average returns for realized gains are smaller than those for paper losses. The differences in average ex-post returns between realized gains and paper losses are -9.21%, -7.17%, -5.56%, and -22.63% for 1, 3, 6, 12-month holding period subsequent to the sales of winners and losers, respectively. The overall picture further

indicates that when investors are less disposed regarding to sales of gains rather than losses, as the case in January and February, they will have higher average returns and higher ex-post returns.

In this paper we also provide robustness check for the main finding. First, we use different assumptions of reference prices, namely the FIFO, average cost, and LIFO. Second, we check the results assuming that independence only exists in account level rather than in transactional level. Moreover, we also try to exclude the confounding effect of rebalancing portfolio proposed by Lakonishok and Smidt (1986) by examining the subsample that an account's entire position is sold, and the subsample that sales for which there is no new purchase into a portfolio on the sale day or during the following month. The overall results under different assumptions are mainly consistent with previous findings.

We also partition the sample by year, market condition, gender, investor's type, and extreme winners versus losers. We find that only in 1998 and 2000, two years with negative market returns, investors demonstrate asymmetric attitude in tackling their gains and losses. Male and female are disposed to deal with their investment gains and losses, while the latter is more likely to exhibit disposition effect than the former. Moreover, both monthly-installment investors and one-shot investors are prone to realize gains than losses. Finally, even for more self-controlled investors who experience top 10% of paper gains and top 10% of realized losses are also dictated by disposition effect. This paper is organized as follows. Section I introduces the paper. Section II describes the data set and methodology. Section III reports the empirical findings. Section IV concludes.

II. The Data and Methodology

The data for this study are provided by a well-known investment trust company in Taiwan. From all accounts active from January 1996 through December 2000, 13,377 mutual fund investor's accounts are randomly selected. The data are composed of three files: a customer's file, a trade file, and a position file. The customer's file includes characteristic variables of fund investor, such as date of birth, date of opening account, gender identity, regional identity, and an internet dummy that is assigned value 1 if the trade is executed through internet, and 0 otherwise. The trade file has 171,526 records, each record is made up of an account identifier, the trade date, a buy-sell indicator, a monthly-installment indicator that is assigned value 1 if the investor of the account regularly invest a certain amount of money per period into

their account, the quantity of trades, and the expenses. The position file is replicated from the updated information on December 2001 and contains monthly position information for each account. We screen out the inactive investors who did not trade throughout the sample period and those sales that their original purchase prices cannot be traced. In total the effective sample used in this study is composed of 163,190 trade records in 4,760 accounts.

Table 1 summarizes the basic statistics of the data set of mutual fund investors. According to the nature of trades, we classify the sample into one-shot purchase, monthly-installment purchase, and redemption. One-shot purchases refer to those trades by investors who independently make each purchase decision. In contrast, monthly-installment purchases are those trades by investors who regularly pour a certain amount of money into their accounts. Redemptions refer to those trades by investors who sell some funds in his/her fund portfolio. The results show that some one-shot investors invest in a large amount of money or considerable quantities of units in funds, which leads to the mean amount of purchase (NT\$290,070) more than four times to that of the median amount (NT\$61,523). In contrast, the monthly-installment investors are high frequent traders who regularly pour money into accounts with the mean amount of purchase (NT\$6,259) far smaller than the mean amount of the one-shot investors. Moreover, excluding the monthly-installment purchase there are slightly more purchases (25,482) than sales (22,782) during our sample period, though the average value of sales (NT\$373,700) is higher than the value of purchases (NT\$290,070).

The previous literature regarding disposition effect mainly focuses on their investment on stocks (Schlarbaum et al, 1978; Badrinath and Lewellen, 1991; Odean, 1998). There is no study that specifically investigates the disposition effect of mutual fund investors. The investigation of mutual fund investors might potentially contribute to the understanding of investor's disposition effect. First, on average, mutual fund investors less active to engage in trading than individual investors who invest on their own. Whether those inactive investors whose portfolios in turn are managed by fund managers also asymmetrically deal with their gains and losses is an interesting issue.

Second, since it is uncommon for fund investors to have many accounts in fund corporations, and if we analogize the number of stocks in the portfolio of an individual investor to the number of accounts of a mutual fund investor when calculating the Proportion of Gains Realized (PGR) or Proportion of Losses Realized

(PLR), the current sample would not allow us to explore investor's disposition effect since only those investors who have more than two (include) accounts are qualified sample. Hence, we follow the definition of Odean (1998) in defining PGR and PLR as follows while make minor adjustment.

$$\text{PGR} = \text{Realized Gains} / (\text{Realized Gains} + \text{Paper Gains}) \quad (1)$$

$$\text{PLR} = \text{Realized Losses} / (\text{Realized Losses} + \text{Paper Losses}) \quad (2)$$

where Realized Gain (Losses) is simply the counts of sales when their selling price are higher (lower) than the reference price. For those unsold portion of an investor, including the remaining position in the account and the position in other account(s), paper gains (losses) are recognized when the days of sales take place and the net assets value of the fund(s) are higher (lower) than the reference price. On days when no sales take place in an account, no gains or losses, realized or paper, are counted

Our definition of paper gain and paper loss is different from that of Odean (1998). According to Odean (1998), the remaining shares of a stock that was sold and recognized as realized gain or loss is excluded from the counts of paper gain and paper loss. This implies that investor's psychology is hard to separate a gain or loss within a stock. For example, an investor has 10 shares of stock A in the beginning and sells 7 shares with the selling price higher than the reference price on a certain day, which is counted as a realized gain. How to count the 3 remaining shares? Can the investor discern the remaining position from those shares that have been sold? In this study, we treat the sold position and unsold position separately. In other word, on each day a sale takes place, the sold position is recognized as a realized gain or realized loss depending on the selling price relative to its reference price, and, the remaining position is also recognized as a paper gain or paper loss depending on the net asset value of the fund relative to its reference price.

The separation of sold and unsold positions has its merits. First, we do not need to concern whether investors sell part of their position is based on his asymmetric attitude toward gains and losses or just for rebalancing portfolio since we assume that investors can treat his sold units and unsold units separately. Second, if the mutual fund investor has only one account and use the average purchase price as his reference price, one realized gain (loss) of his sale would usually accompany one paper gain (loss), which results in that both PGR and PLR approximate 0.5 and their difference is insignificantly different from zero. Thus, our measurement of disposition effect is

conservative and more strictly defined than the one used in Odean (1998). Also, the definition of PGR and PLR is consistent with the intuition that mutual fund investors are more conservative than the individual investors with only common stock investment.

Note that the PGR and PLR in this study would more or less approximate to 0.5, which might significantly different from the evidence of Odean's investigation. It is more important that whether the PGR of mutual fund investors is significantly higher than their PLR. Moreover, the reference prices used in this study are estimated on different bases: first-in-first-out (FIFO), average price, and last-in-first-out (LIFO). Under the FIFO assumption, we compare the selling price to the average price of earlier purchase(s) with the same units in determining realized gains or losses. For those unsold units, we compare the net asset value to the average price of unsold units at latter purchase(s), and determine paper gains or losses. Under the average cost assumption, the reference price is the average purchase price for determining realized and paper gains/losses. Under the LIFO assumption, the reference price in determining realized gains or losses is the average price of latter purchase(s), and is the average price of unsold portfolio at earlier purchase(s) in determining paper gains or losses.

III. Empirical Results

Table 2 reports the PGR realized and PLR realized for the entire year, for January and February, for December, and for March through November. The partition by month is to test the tax-loss selling hypothesis and the self-control argument. Two arguments predict that the difference between PGR and PLR would be mitigated in December. The first one is the tax-loss selling argument proposed by Lokonishok and Smith, 1986; Badrinath and Lewllen, 1991. However, the investors in Taiwan are exempted from the taxes on capital gain. Thus the tax argument is less than an issue in Taiwan. The second argument is derived from investor psychology that an investor is prone to trigger self-control mechanism in December in order to control the losses within tolerable limit (Shefrin and Statman, 1985). January or February is the month approaching Chinese Lunar New Year. The self-control argument can be applied herein that investors are more willing to realize losses at the end of Chinese Lunar New Year than the rest months, which is dubbed yearend sweep. Moreover, there is a custom for Chinese people to prepare themselves for the spending during Chinese Lunar New Year. Thus it is more likely for them to engage in sales of investment and realize losses in the approaching month(s) than the rest months.

The results in Table 2 show that for the entire year mutual fund investors do sell a higher proportion of their winners than that of their losers, regardless different reference prices under different assumptions. As stated earlier, we assume investors can independently separate their sold and unsold portion or categorize them into different psychological accounts, thus the PGR and PLR would converge to 0.5 when one realized gain (loss) tends to accompany one paper gain (loss). In this sense our measurement is defined more strictly than Odean (1998). The results show that PGR and PLR for the entire year under FIFO assumption are 0.638 and 0.517, with the difference of 0.121 significant at the 1% level. The results of using different reference prices, i.e., average price in panel B and LIFO assumption in panel C, are similar.

Our results provide complementary evidence to Odean (1998) that asymmetry in treating investment gain versus loss is not only sustainable for individual equity investors but also for mutual fund investors. In general mutual fund investors are more inactive than individual equity investors. Thus reluctance to dealing with their investment loss could be applicable to general investors.

The difference between PGR and PLR in January and February is smaller and less significant as compared to that of the rest months and it verifies our yearend financial-need hypothesis. Note that when using the reference price under LIFO assumption, the PGR (0.492) is even smaller than the PLR (0.497) in January and February. The result indicates that investors tend to counterbalance their inclination of realizing gains rather than losses when they have greater need for cash. In Chinese custom people have a greater need of money before the yearend. For example, senior people will give children fortune money to wish them luck for the coming year. It also happens to between superiors and subordinates in the same organization. Another explanation is also derived from Chinese custom that people sweep up everything for preparing the coming of New Year, which is dubbed yearend sweep. Either for the urgency in need of money or for the yearend sweep, mutual fund investors less asymmetrically treat their gains versus loss when Chinese Lunar New Year is approaching. In contrast, we do not find a significant deviation of the difference between PGR and PLR in December since the investors in Taiwan are exempted from taxes on capital gains.

Besides the comparison of the proportion for realizing gains and the proportion for realizing losses, the average returns and ex-post returns for investors' realized and paper winners and losers provide information to a better depiction of the disposition

effect. Table 3 reports the average and median returns since the day of purchase for realized and paper winners and losers. Odean (1998) illustrates that investors are less disposed to asymmetrically deal with their investment gains and losses in December due to tax-motivated selling and finds that in December the losses that are realized are of much greater magnitude than those realized through the rest of year. The results in Table 3 show that the average realized loss in January and February is -0.125% (panel A), which is much smaller than that of the rest months. And the average return for realized gains is 0.312% , which is much larger. Our previous finding illustrates that investors tend to counterbalance their reluctance of realizing losses in January and February. We offer two explanations to reconcile the above results. First, investors who forbear their inclination of realizing small gains and reluctance of realizing losses can have larger realized gains and smaller realized losses. Second, in the sample period of 1996 through 2000, the average market return in January and February is 2.95% , which is much larger than the average return of rest months (-0.34%). This also provides an extra explanation.

In Table 4 we calculate the ex post buy-and-hold average return for realized and paper gains and losses over 1 month and 3, 6, and 12 months subsequent to each sale. The differences in returns between realized gains and paper losses are then compared in order to portray whether investors are disposed to deal with their investment *ex post*. If investors realize winners too soon and keep losers too long, we expect the subsequent return of the former is smaller than that of the latter. The results of panel A in Table 4 show that the average and median returns of realized gains are much larger than the paper losses. The differences in average returns for 1 month and 3, 6, and 12 months are 0.59% , 20.2% , 7.07% , and 4.12% , respectively. The differences in mean returns are even much larger and reach the highest of 9.81% in 6 months subsequent to the realization of gains. The result indicates that investors could be more profitable if they hold winners longer while sell losers earlier.

The result in panel B further verifies that investors might have better payoffs when they restrict themselves to some extent from prematurely realizing small gains and the reluctance of realizing losses. In January and February the disposition effect is less severe (Table 2), and the reserved losers tend to have higher subsequent average return than that of realized gains. The differences in average returns between realized gains and paper losses are -9.21% , -7.17% , -5.56% and -22.63% for 1 month, 3, 6, and 12 months subsequent to the sales of winners and losers, respectively. The results in panel C and panel D show that the buy-and-hold average and median returns of realized gains are larger than those of paper losses for 3 months and beyond

subsequent to sales of realizing gains and losses. Combining the results in Table 3 and Table 4 we conclude that investors in general exhibit the disposition effect, and their asymmetric attitude in dealing gains and losses lowers their returns on mutual fund investment. However, in January and February investors are less disposed and have higher average returns.

Table 5 provides robustness check. First, the aforementioned results in comparing PGR and PLR are based on the assumption that independence exists at the transaction level. What if independence only exists at the account level? We recalculate the PGR and PLR for each account, and their equally weighted and trade-weighted averages. Panel A shows that the difference between PGR and PLR is 0.08% and 0.073% for equally weighted average and trade-weighted average, respectively. Even though both are much smaller than that assuming the existence of independence at the transaction level, the mean of (PGR-PLR) is still greater than zero with a t-statistic of 7.92 and 7.38 for equally weighted and trade-weighted estimation.

Lakonishok and Smidt (1986) suggest that investors might sell winners and hold on to losers in an effort to rebalance their portfolios. In order to reduce the confounding effect caused by investors' desire to rebalance, the PGR and PLR are recalculated using the sales that close an account's entire position, and the results are summarized in panel B of Table 5. The result of this subsample is not substantially changed. When partial sales are ignored, investors continue to prefer to sell winners for the entire year and for each specific months of interest. Moreover, investors who sell winners for the purpose of rebalancing their portfolios are likely to make new purchases. In an alternative effort to eliminate trades that may be motivated by a desire to rebalance, we calculate PGR and PLR using only sales for which there is no new purchase into a portfolio on the sale date or during the following month. The result in panel C portrays a similar picture. Once again, investors are less disposed in realizing gains and losses in January and February.

In Table 6 we retest the results by partitioning the sample on different bases. First, panel A shows the PGR and PLR when sample are partitioned by yearly breakdown. We find that only in 1998 and 2000 investors demonstrate asymmetric attitude in dealing with their gains versus losses. The returns on market index from 1996 through 2000 are 34.02%, 18.08%, -21.60%, 36.63%, and -43.91%, respectively. It seems that investors are inclined to realizing gains rather than losses only in a sluggish stock market. In panel B we further partition the sample based on market

condition. When the return on market index of the quarter that a sale takes place is positive, we classify it a bull market. A bearish market is similarly defined when the return on market index is negative. Again, we find that the difference between PGR and PLR is much larger in bearish market (0.101%) than in bull market (0.068%). This result implies that investors are more reluctant to realizing losses when market conditions are unfavorable to them. Our finding is consistent with Shu, Yeh, and Yamada's (2001) that small-amount investors of large funds tend to chase past winners and redeem shares once fund performance improves. However, they do not discipline the performance-deteriorating funds by redemption.

The result in panel C is partitioned by gender and indicates that both males and females exhibit the disposition effect, while females are more likely to exhibit the disposition effect than males. Moreover, either monthly-installment investors or one-shot investors are prone to realize gains than losses (panel D). Finally, we are wondering whether the disposition effect still exists in extreme paper winners and realized losers since they are supposed to be more self-controlled and less disposed to deal with their investment gains versus losses. The returns for paper gains and for realized losses are sorted in absolute magnitude. We then recalculate the PGR and PLR for the investors who experience the top 10% of paper gains and top10% of realized losses. However, the result in panel D also indicates that even these investors also exhibit the disposition effect, though the difference between PGR and PLR is smaller than our major finding in Table 2.

IV. Conclusion

In this paper we examine whether mutual fund investors who tend to be passive investors exhibit the disposition effect. The general picture conclude that mutual fund investors have the tendency of holding losers too long while selling winners too soon. However, in January and February, the months approaching Chinese Lunar New Year, investors are less likely to exhibit the disposition effect. This might be related to their urgency in need of money for preparing the spending during the New Year festival or the trigger of the self-control mechanism to clear position, dubbed as yearend sweep. In fact, we find that investors will have higher average returns and higher ex-post returns when they are less likely to exhibit the disposition effect in January and February.

The disposition effect indicates people's reluctance to face their investment losses. In this study we extend the examination of the disposition effect to mutual

fund investors who are presumably less active than individual investors. Thus, the disposition effect is applicable to different groups of investors. Krishnan and Booker (2002) find that in the presence of analyst recommendation report, investors would reduce tendency to commit the disposition error. We find that in approaching the Chinese Lunar New Year, investors in Taiwan are less likely to exhibit the disposition effect. When the market as a whole is less than satisfactory, for example in 1998 and 2000, investors tend to commit the disposition error. The conditions that affect the disposition effect merit further research.

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Table 1: Summary Statistics for Purchase and Redemption of Mutual Fund Investors

In this table we summarize the basic statistics of the data set of mutual fund investors provided by an investment trust company. The data set is composed of a trade file of 171,526 records and a position file of 26,169 records made in 13,377 accounts from January 1996 through December 2000. We screen out the inactive investors who did not trade throughout the sampling period and those sales that their original purchase prices cannot be traced. In total the effective sample used in this study is composed of 163,190 trade records made in 4,760 investors. Panel A reports the mean, 1st, 2nd, and 3rd quartile, and standard deviation of the dollar amount of trade, units of trade, and expense for one-shot purchases. Panel B and C report the corresponding statistics of the same variable for monthly-installment and redemption.

	Mean	1 st quartile	Median	3 rd quartile	S. D.	No. of Obs.	Proportion
Panel A: One-Shot Purchase							
Amount of Trades (\$)	290,070	20,000	61,523	200,000	1,400,314	25,482	14.9%
Units of Trades	21,734	1,112	5,000	14,612	122,877	25,482	14.9%
Expenses (\$)	1,428	14	300	1,200	3,709	25,482	14.9%
Panel B: Monthly Installment							
Amount of Trades (\$)	6,259	3,000	5,000	10,000	4,683	123,262	71.9%
Units of Trades	384	193	284	462	330	123,262	71.9%
Expenses (\$)	72	45	60	90	52	123,262	71.9%
Panel C: Redemption							
Amount of Trades (\$)	373,700	43,903	107,615	269,000	1,815,411	22,782	13.3%
Units of Trades	25,404	2,935	6,869	18,051	165,189	22,782	13.3%
Expenses (\$)	0	0	0	0	0	22,782	13.3%

Table 2: PGR and PLR for the Entire Data Set

This table compares the aggregate Proportion of Gains Realized (PGR) to the aggregate Proportion of Losses Realized (PLR) of mutual fund investors. A realized gain (loss) is recognized when a sale takes place and its selling price is higher (lower) than the reference price. A paper gain (loss) is recognized when the day of a sale take place and the net assets value of the fund is higher (lower) than the reference price. On days when no sales take place in an account, no gains or losses, realized or paper, are counted. The reference price in determining a gain or loss is composed of different estimation bases. Under the First-In-First-Out (FIFO) assumption (Panel A), the reference price in determining realized gains or losses is the average price of earlier purchase(s), and is the average price of remaining unsold portfolio in determining paper gains or losses. Under the average holding cost assumption (Panel B), the reference price is the average purchase price for determining realized and paper, gains and losses. Under the Last-In-First-Out assumption (Panel C), the reference price in determining realized gains or losses is the average price of latter purchase(s), and is the average price of remaining unsold portfolio in determining paper gains or losses. PGR, according to Odean (1998), is the number of realized gains divided by the number of realized gains plus the number of paper (unrealized) gains, and PLR is the number of realized losses divided by the number of realized losses plus number of paper (unrealized) losses. Realized gains, paper gains, realized losses, and paper losses are aggregated over time (1996-2000) and across all accounts in the data set. PGR and PLR are reported for the entire year, for January and February (Chinese New Year), for December, and for March through November. The t-statistics test the null hypotheses that the difference in proportions are equal to zero assuming that all realized gains, paper gains, realized losses, and paper losses result from independent decisions.

	Entire Year	Jan.-Feb.	December	March- Nov.
Panel A: Reference Price under the FIFO Assumption				
Realized Gains	10961	1440	698	8823
Realized Losses	3485	241	277	2967
Paper Gains	6210	994	361	4855
Paper Losses	3251	218	243	2790
PGR	0.638	0.592	0.659	0.645
PLR	0.517	0.525	0.533	0.515
Difference (PGR-PLR)	0.121	0.067	0.126	0.130
t-statistic	17.615	2.626	4.810	16.727
Panel B: Reference Price of Average Holding Cost				
Realized Gains	11005	1440	700	8865
Realized Losses	3441	241	275	2925
Paper Gains	6497	1029	387	5081
Paper Losses	2964	183	217	2564
PGR	0.629	0.583	0.644	0.636
PLR	0.546	0.568	0.559	0.533
Difference (PGR-PLR)	0.083	0.015	0.085	0.103
t-statistic	11.367	0.570	3.187	13.058
Panel C: Reference Price under LIFO Assumption				
Realized Gains	11104	1441	742	8922
Realized Losses	3342	230	253	2859
Paper Gains	6766	1048	409	5310
Paper Losses	2695	164	196	2335
PGR	0.540	0.492	0.561	0.542
PLR	0.462	0.497	0.476	0.463
Difference (PGR-PLR)	0.078	-0.005	0.085	0.079
t-statistic	9.603	-0.174	2.777	8.908

Table 3: Average Returns

This table reports the mean return and median return in parentheses that fund investors sold for a gain or loss. It also reports mean (median) return that could be realized but not sold for a gain or loss. Panel A, B, and C report the returns when the gains and losses are recognized with respect to the reference price under FIFO, average holding cost, and LIFO assumption, respectively.

	Entire Year	Jan.-Feb.	December	March- Nov.
Panel A: Reference Price under FIFO Assumption				
Realized Gains	0.306 (0.195)	0.312 (0.195)	0.267 (0.149)	0.308 (0.198)
Paper Gains	0.273 (0.161)	0.311 (0.194)	0.285 (0.151)	0.258 (0.157)
Realized Losses	-0.133 (-0.076)	-0.125 (-0.058)	-0.151 (-0.098)	-0.132 (-0.075)
Paper Losses	-0.118 (-0.069)	-0.097 (-0.054)	-0.125 (-0.086)	-0.119 (-0.068)
Panel B: Reference Price of Average Holding Cost				
Realized Gains	0.291 (0.191)	0.307 (0.191)	0.253 (0.145)	0.291 (0.193)
Paper Gains	0.302 (0.198)	0.336 (0.215)	0.309 (0.180)	0.295 (0.196)
Realized Losses	-0.129 (-0.073)	-0.119 (-0.055)	-0.146 (-0.093)	-0.129 (-0.073)
Paper Losses	-0.114 (-0.062)	-0.093 (-0.052)	-0.124 (-0.082)	-0.115 (-0.061)
Panel C: Reference Price under LIFO Assumption				
Realized Gains	0.305 (0.189)	0.319 (0.180)	0.252 (0.127)	0.307 (0.193)
Paper Gains	0.322 (0.229)	0.381 (0.233)	0.365 (0.196)	0.355 (0.230)
Realized Losses	-0.126 (-0.066)	-0.115 (-0.053)	-0.147 (-0.091)	-0.125 (-0.066)
Paper Losses	-0.116 (-0.066)	-0.096 (-0.053)	-0.135 (-0.092)	-0.123 (-0.066)

Table 4: Ex Post Returns

This table summarizes the ex-post average (median) returns that fund investors sold for a profit (loss) and that fund investors could realize but have not sold for a gain (loss). Returns are measure over 1-, 3-, 6-, and 12-month periods subsequent to the sale of a realized gain (loss) and subsequent to the corresponding periods on which other sales take place in portfolio of paper gains (losses). The gains or losses are determined based on the reference price of the average holding cost of investors. Panel A reports the ex-post return of entire sample, panel B, C, and D report the ex-post returns for January-February, December, and March-November (the rest months), respectively. In each cell, the mean return and median return in parentheses are provided accordingly.

Panel A: Entire Sample				
	1 month	3 months	6 months	12 months
Realized Gains (%)	1.14 (1.01)	3.01 (2.23)	5.47 (1.30)	4.48 (1.01)
Paper Gains (%)	17.98 (1.99)	18.60 (3.02)	11.05 (2.03)	6.47 (1.22)
Realized Losses (%)	-0.57 (-0.21)	-1.54 (-0.52)	-1.03 (-1.34)	4.66 (0.10)
Paper Losses (%)	0.55 (-4.52)	0.99 (-7.00)	-1.60 (-8.51)	0.37 (-8.05)
Realized Gains- Paper Losses (%)	0.59 (5.53)	2.02 (9.23)	7.07 (9.81)	4.12 (9.06)
Panel B: January-February				
Realized Gains (%)	3.29 (2.98)	4.92 (2.41)	7.59 (1.72)	-8.06 (-19.09)
Paper Gains (%)	2.20 (1.24)	7.73 (5.84)	12.11 (3.49)	27.12 (9.34)
Realized Losses (%)	24.35 (4.15)	20.51 (3.16)	18.93 (1.81)	-7.38 (-18.13)
Paper Losses (%)	12.50 (3.23)	12.10 (3.67)	13.15 (1.81)	14.57 (-1.44)
Realized Gains- Paper Losses (%)	-9.21 (-0.25)	-7.17 (-1.26)	-5.56 (-0.09)	-22.63 (-17.65)
Panel C: December				
Realized Gains (%)	2.50 (1.35)	9.82 (7.83)	10.37 (4.66)	1.20 (-6.76)
Paper Gains (%)	-2.14 (-1.40)	-0.24 (0.13)	1.37 (-0.65)	8.28 (-0.10)
Realized Losses (%)	22.11 (3.55)	27.77 (10.54)	23.31 (9.36)	5.76 (-7.91)
Paper Losses (%)	4.49 (-4.11)	6.81 (-1.59)	6.16 (-3.61)	10.43 (-1.73)
Realized Gains- Paper Losses (%)	-1.98 (5.46)	3.01 (9.42)	4.20 (8.27)	-9.23 (-5.03)
Panel D: March-November				
Realized Gains (%)	0.69 (0.49)	2.17 (1.18)	4.74 (-2.94)	6.78 (-2.80)
Paper Gains (%)	-0.65 (-0.21)	-2.42 (-1.24)	-2.34 (-2.41)	2.47 (0.01)
Realized Losses (%)	16.38 (1.50)	17.52 (2.26)	15.17 (-0.40)	9.32 (-2.83)
Paper Losses (%)	2.17 (-5.98)	-0.98 (-9.64)	-3.95 (-10.54)	-2.37 (-10.56)
Realized Gains- Paper Losses (%)	-1.48 (6.47)	3.14 (10.82)	8.69 (7.60)	9.15 (7.76)

Table 5: Robustness Check of PGR and PLR on Different Estimation Bases

This table provides robustness check when PGR and PLR are estimated under different bases. In panel A we assume the proportions of gains and losses realized in each account are independent of those realized in other account. PGR and PLR are then estimated for account rather than transactional level. In order to eliminate trades that are motivated by a desire to rebalance, we calculate PGR and PLR using only sales that the entire position of an account is sold (Panel B), and sales for which there is not new purchase into portfolio one sale day or during the following month (Panel C). The t-statistics test the null hypotheses that the differences in proportions are equal to zero.

Panel A: Estimated on Account Basis				
	Equally Weighted	Weighted by Trading Units		
PGR	0.574	0.599		
PLR	0.495	0.526		
PGR-PLR	0.080	0.073		
t-statistic	7.920	7.380		

Panel B: The Entire Position Is sold				
	Entire Year	Jan.-Feb.	December	March- Nov.
PGR	0.759	0.709	0.783	0.766
PLR	0.632	0.629	0.667	0.629
PGR-PLR	0.127	0.08	0.116	0.137
t-statistic	13.861	2.369	3.496	13.692

Panel C: No New Unit is Purchased Within One Month				
	Entire Year	Jan.-Feb.	December	March- Nov.
PGR	0.753	0.701	0.787	0.758
PLR	0.641	0.621	0.667	0.640
PGR-PLR	0.111	0.080	0.120	0.118
t-statistic	11.366	2.185	3.508	11.073

Table 6: PGR and PLR on Different Partition Bases

This table reports the PGR, PLR, and their differences by different partition bases. Panel A reports the result of yearly breakdown. Panel B reports the result based on market condition. When the return on market index of the quarter that a sale takes place is positive, we classify it a bull market, and a bearish market when the return on market index is negative. Panel C reports the result based on gender of the person who opened account. Panel D reports the result portioned by investor's type, namely, monthly-installment and one-shot investor. Monthly-installment investor regularly puts certain amount of dollars into account unless a notice of withdraw or increment of the amount invested. One-shot investor irregularly invests dollars in fund. Panel E reports the result for extreme paper winners and realized losers. The extreme paper winners (realized losers) refer to the investors whose trades are in the top 10% of paper gains (realized losers) in absolute dollar amount. For these investors we recalculate their PGR, PLR, and their difference.

Panel A: Partitioned by Year					
	1996	1997	1998	1999	2000
PGR	0.843	0.691	0.689	0.625	0.544
PLR	0.804	0.613	0.593	0.576	0.481
PGR-PLR	0.039	0.078	0.096	0.049	0.063
t-statistic	0.686	1.698	7.490	0.065	5.669
Panel B: Partitioned by Market Condition					
	Bull Market		Bearish Market		
PGR	0.626		0.631		
PLR	0.559		0.530		
PGR-PLR	0.068		0.101		
t-statistic	5.003		11.386		
Panel C: Partitioned by Gender					
	Female		Male		
PGR	0.629		0.622		
PLR	0.521		0.563		
PGR-PLR	0.107		0.059		
t-statistic	9.498		6.207		
Panel D: Partitioned by Investor's Type					
	Monthly-Installment Investor		One-Shot Investor		
PGR	0.592		0.658		
PLR	0.501		0.591		
PGR-PLR	0.091		0.067		
t-statistic	8.807		6.702		
Panel E: Extreme Paper Winners and Realized Losers					
	Top10% Paper Gains		Top10% Realized Losses		
	Equally Weighted	Weighted by Trading Units	Equally Weighted	Weighted by Trading Units	
PGR	0.547	0.57	0.572	0.591	
PLR	0.454	0.454	0.518	0.552	
PGR-PLR	0.093	0.116	0.055	0.038	
t-statistic	5.183	6.509	4.676	3.288	