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ABSTRACT

This paper takes a first look at investment strategies of managers of 769 pension funds, with total assets of \$129 billion at the end of 1989. The data show that managers of these funds tend to oversell stocks that have performed poorly. Relative sales of losers accelerate in the fourth quarter, when funds' portfolios are closely examined by the sponsors. This result supports the view that fund managers "window dress" their portfolios to impress sponsors and suggests that managers are evaluated on their individual stock selections and not just aggregate portfolio performance.

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The conventional wisdom on Wall Street is that portfolio managers are reluctant to produce annual reports that show holdings of shares that have sharply declined in value. One money manager is quoted by Jansson (1983) p.139 as saying: "Nobody wants to be caught showing last quarter's disasters... You throw out the duds because you don't want to have to apologize for and defend a stock's presence to clients even though your investment judgment may be to hold." The practice of deleting such shares from portfolios at year end is an example of "window dressing." Despite conventional wisdom, little is known of how widespread this practice is. In this paper, we look for evidence of window-dressing among an important group of portfolio managers, those who manage pension funds.

As of December 1989, pension funds owned close to \$900 billion of American equities, about 25 percent of the stock market capitalization. Of this amount, about \$700 billion is actively managed and the rest is invested in index funds. Some plans manage their money internally, but more commonly they hire several money managers and split pension plan's money among them. Plan sponsors typically evaluate fund managers once a quarter, but the main evaluation takes place at the end of the year. Based on these evaluations, assets are reallocated across money managers. Window dressing, if it occurs, is presumably a response to these evaluations.

Why might a fund manager engage in window-dressing? The main focus of fund evaluations is past performance relative to some benchmark, such as the S&P 500. Stock returns, however, are noisy and may not suffice to identify the manager's investment philosophy or to see whether he just got unlucky on a few stocks. As a result, sponsors may look at the actual portfolio holdings as well. To impress sponsors, fund managers may alter these portfolios at the end of the quarter, and especially at the end of the year, i.e., window dress. A finding that money managers window dress is therefore evidence that managers are evaluated on a broader set of criteria than performance alone.

Selling losers is the most frequently mentioned form of window dressing. Pension funds can also reduce the pace of sale of winners, increase the purchases of winners and reduce the purchases of losers to impress the sponsors with the looks of their portfolios.<sup>1</sup> Some of these strategies, however, may not be as effective as selling losers. When a fund buys winners after they rose in price, sponsors would realize that these winners were not held during the price rise. If a fund purchases losers, its manager can probably explain that he bought them after they have fallen. On the other hand, slowing down the sale of winners might be as attractive as speeding up the sale of losers. We will examine these less frequently mentioned and perhaps less sophisticated forms of window dressing as well as the generic dumping losers strategy.

### I. The Data

Our analysis is based on a proprietary sample of 769 equity pension funds provided by SEI, a professional fund evaluation service. Equity funds hold at least 90 percent of their money in equities. The data set contains, for each fund, complete equity portfolio holdings at the end of each quarter from 1985 to 1989. Sponsors of most of these funds are corporations, but there are some state, municipal and endowment pension funds as well.

Table 1 presents some summary statistics. The total amount under management in these 769 funds at the end of 1989 is \$124 billion, or about 18 percent of the total actively managed holdings of pension funds. The average equity holdings of a fund at the end of 1989 are \$161 million; the largest 5 percent of the funds manage 65 percent of the money. We do not observe all the trades that a fund makes in a given quarter because a fund might have bought and sold the same stock within that quarter. However, we can estimate purchases and sales based on portfolio changes from quarter end to quarter end. In the sample, in an average quarter, a fund buys 13 percent of the dollar value of its previous quarter's holdings, and sells 12 percent. Purchases exceed

sales in part because funds receive dividends and in part because new contributions to the funds from the sponsors typically exceed payouts to the retirees. The turnover rate of 50 percent a year is typical for institutions. Pension funds' holdings are heavily concentrated in the largest capitalization stocks. While the bottom 50 percent of stocks in terms of size comprise 4.3 percent of market capitalization, they only represent 1.4 percent of pension funds' equity holdings.

To determine whether managers engage in window dressing, we must classify stocks into performance categories. At the end of each quarter, we take the CRSP universe of all NYSE, American and NASDAQ stocks, and divide it into equal size quintiles based on stock returns over the past year up to the end of that quarter. This procedure is repeated every quarter, so the composition of each quintile changes each quarter. Since we know which stocks belong to which quintile, we can compute how much each fund holds, buys and sells each quarter from each quintile. We use the average of beginning and end of quarter stock prices to estimate the total value of purchases and sales in each quintile by each fund.

Table 2 presents the fractions of their stock portfolios that funds as a whole hold in each past performance quintile (averaging over years and quarters) and the fraction of value of the CRSP universe in those quintiles. Table 2 also reports the fraction of purchases and sales that the funds as a whole make in each quintile. Holdings, sales and purchases are all computed as if all money was in one aggregate fund. Table 2 shows that funds hold less of extreme losers and winners than exist in the universe. Funds hold only 5 percent of their portfolios in extreme losers, compared to 6 percent for the universe portfolio. They also hold 24 percent of their portfolios in extreme winners, compared to 28 percent for the universe. Obviously, funds are overrepresented in holdings of intermediate performance quintiles. One reason for the underrepresentation in extreme performance categories is that funds hold few small stocks, which are more likely to be among the extreme losers and extreme winners.

The evidence on purchases and sales reveals that trading is not always in proportion to holdings. Extreme losers represent 6 percent of both buying and selling, but just 5 percent of the holdings. Funds clearly trade extreme losers more. Perhaps they get rid of "mistakes," consistent with window-dressing, but they also buy stocks they think are undervalued. Winners in contrast are overrepresented in sales relative to holdings and underrepresented in purchases relative to holdings. One way to summarize these data is that funds are generally contrarian--buy losers and sell winners--except they get rid of "mistakes." The next section looks at the data more closely by comparing the fourth quarter to the first three.

## II. Activity of Pension Funds by Quarter

All accounts of window dressing stress the relative importance of the year-end report. This section compares trading in the first three quarters with that in the fourth.

About 20 percent of the funds in an average quarter have zero holdings in the bottom performance quintile. To avoid statistical problems this raises when we examine the cross-section of funds, we combine the bottom two quintiles, so the bottom group in a quarter is 40 percent worst performing stocks over the previous year. As a result of combining quintiles, funds holdings are more evenly distributed across the four groups.

Our measure of selling intensity in performance group  $i$  in quarter  $j$  by fund  $k$  is:

$$(1) \frac{\text{SELL}(i,j,k)/\text{HOLD}(i,j-1,k)}{\sum_i \text{SELL}(i,j,k) / \sum_i \text{HOLD}(i,j-1,k)}$$

where  $\text{SELL}(i,j,k)$  is the value of sales by fund  $k$  in quarter  $j$  and group  $i$ , and  $\text{HOLD}(i,j-1,k)$  is the value of holdings at the end of the previous quarter of the exact same stocks as those in performance group  $i$  in quarter  $j$ . Both  $\text{SELL}$  and  $\text{HOLD}$  are defined using the average of the beginning and end of quarter  $j$  prices. The numerator of (1) is the ratio of the sales in a performance group to holdings of the same stocks at the end of the previous quarter. The denominator is the ratio of total sales in this quarter to

holdings at the end of the previous quarter. So equation (1) measures the selling intensity of a fund in a given performance group relative to the overall selling intensity. It corrects for the fact that funds might be selling less in a given group at a given time only because they are selling less of everything. If a fund sold 50 percent of the extreme winners it holds, but only 20 percent of its total holdings, its sales index for winners according to (1) is 2.5. Having computed this number for every fund, quarter and year, we average it over funds, years, and quarters 1-3, and then compare the average over quarters 1-3 to that for quarter 4.

Our measure of buying intensity by fund  $k$  in quarter  $j$  in performance group  $i$  is:

$$(2) \quad \frac{\text{BUY}(i,j,k) / \sum_i \text{BUY}(i,j,k)}{\text{UNIV.HOLD}(i,j) / \sum_i \text{UNIV.HOLD}(i,j)}$$

where  $\text{BUY}(i,j,k)$  is dollar purchases by fund  $k$  in group  $i$  in quarter  $j$  and  $\text{UNIV.HOLD}(i,j)$  is the value of CRSP universe holdings in quarter  $j$  in group  $i$ . Again, both variables are computed using the average of beginning and end of quarter  $j$  prices. This number is the fraction of purchases that a fund makes in a performance category relative to the fraction of universe holdings in that performance category. So if 20 percent of a fund's purchases were in performance group 4, which is only 10 percent of the universe value in that quarter, the number for the fund in that quarter and quintile is 2. Equation (2) controls for the value of each performance group that a fund can buy in every quarter, so purchases are scaled by the availability of stocks to buy. In this respect, the numbers for sales and purchases are parallel: the universe holdings define availability of stocks for purchase, and since funds in general do not take short positions, their own holdings define the availability of stocks for sale. We compute (2) for each fund, and then, as with measure (1), average over funds and years for each quarter, and finally average over quarters 1 through 3 and compare that average to the one for quarter 4.

Table 3 presents the results, with cross-sectional standard errors for each quarter-

performance group mean (in parentheses) and t-tests of equality of means for quarters 1-3 on the one hand and quarter 4 on the other. Unlike the results in Table 2, which were computed as if all holdings and trades were by one aggregate fund, in Table 3 we compute measures (1) and (2) first for each fund and then average over funds. This enables us to compute cross-sectional standard errors.

To begin, consider the findings for quarters 1-3. First, when it comes to purchases, funds are clearly contrarian: relative to availability they overbuy losers (ratio of 1.22) and underbuy winners (ratio of .90). Second, when it comes to sales funds oversell winners relative to their holdings (ratio of 1.44), but they also oversell losers (ratio of 1.32). Much less selling activity is observed in the middle quintile groups. These results confirm Table 2's findings that funds are generally contrarian, except that they oversell extreme losers, consistent with the window-dressing hypothesis.

The comparison across quarters shows that the sale of losers relative to other quarters does accelerate in the fourth quarter, as it should if fund evaluations are most critical at the end of quarter four. In quarters 1-3, an average fund sells 32 percent more of the extreme losers (relative to its holdings of those losers) than it sells of all stocks; in quarter 4 this measure rises to 42 percent ( $t=1.75$ ). Consistent with window dressing, funds actively sell losers, especially in the fourth quarter.

What about other forms of window dressing? There is weak evidence of increased demand for winners in the fourth quarter: the sale of winners slows down ( $t=1.22$ ) although purchases do not rise. In addition, there is strong evidence of an increase in the purchases of losers in the fourth quarter relative to the first three ( $t=5.47$ ). In quarters 1-3, funds buy 22 percent more losers than they would if they bought stocks randomly from the universe, in quarter 4 this number rises to 33 percent. This result is robust in a variety of specifications. It is inconsistent with the simple version of window dressing, according to which just holding a portfolio that performed well (regardless of how long they have been held) is rewarded by the sponsors, but consistent with the



more sophisticated view that buying losers after they have fallen can be justified to the sponsors. Funds might buy losers in the fourth quarter to provide liquidity for individuals who are selling them to realize losses in the current tax year. In this case, losers might be particularly good bargains in the fourth quarter.

To check robustness of these results, we have also performed the analysis by value-weighting the funds rather than equally weighting them. This amounts to assuming that all the funds' holdings and trades are done by one aggregate fund. The results, which are not presented, are qualitatively similar, although dumping losers is less pronounced when funds are value-weighted. For example, in quarters 1-3 value weighted sales of losers relative to holdings (corrected for all sales relative to holdings) are 1.0, but for quarter 4 this number is 1.06. This result suggests that window dressing is more prevalent in small funds. Indeed, we have performed the analysis for the 20 percent smallest funds as of the first quarter of 1985, and found a stronger propensity to sell losers in general, and in the fourth quarter in particular, for this subsample. For small funds, our measure of selling activity for losers is 1.37 in quarters 1-3 and 1.59 in quarter 4 ( $t=2.02$ ). More extensive window dressing by small funds suggests that it may be too hard to fool the sophisticated sponsors of large funds by window dressing, so their managers don't even try.

### III. Conclusion

This paper took a preliminary look at portfolio strategies of a sample of 769 pension funds representing about 18 percent of private pension equity holdings in the United States. We have found that the average pension fund is contrarian, in that it buys more intensively stocks that have performed poorly and sells a disproportionately high fraction of stocks that have performed well. Such contrarian investment tendencies of the funds suggest that, contrary to a common perception, trading practices of institutions might reduce volatility of stock prices. This result obviously deserves a closer

look.

We have also found evidence that in every quarter funds sell poorly performing stocks disproportionately to their holdings, that is, they get rid of "mistakes." Moreover, the pace of dumping mistakes accelerates in the fourth quarter, consistent with the most common window-dressing strategy. This result is stronger for small funds. This finding supports the view that window-dressing is a response to costly monitoring by fund sponsors of individual portfolio decisions, for it pays less for large funds, whose portfolios are monitored more frequently and completely, to pursue this practice.

Interestingly, purchases of losers also rise in the fourth quarter. This suggests that sponsors do not just look at the funds' holdings of winners and losers, but recognize that buying losers after their prices fell might be smart. The overall evidence reveals some window-dressing by pension fund managers. However, we stress that fourth quarter strategies do not radically depart from the usual practice, but rather accentuate the typical investment strategy of funds: buy losers and sell both extreme winners and losers.

## FOOTNOTES

1. Haugen and Lakonishok (1988) suggest window dressing as a possible explanation of the "January Effect." Lakonishok and Smidt (1988) find a very substantial increase in the Dow Jones Industrial Average (an index of 30 large stocks) in the last week of December. They offer window dressing as a possible explanation of this finding.

## REFERENCES

- Haugen, R., and Lakonishok, J., The Incredible January Effect, Homewood: Dow Jones Irwin, 1988.
- Jansson, S., "The Fine Art of Window Dressing," Institutional Investor, December 1983, 139-40.
- Lakonishok, J. and Smidt, S., "A Seasonal Anomalies Real: A Ninety Year Perspective," The Review of Financial Studies, Winter 1988, 1, 403-426.

TABLE 1

## Characteristics of Pension Funds, End of 1989

Mean Equity Holdings	\$ 161 million
Median Equity Holdings	\$ 29 million
Max Equity Holdings	\$ 11,835 million
Min Equity Holdings	\$ .123 million
Percent of Dollars in 5% Largest Funds	64%
Percent of Dollars in 50% Largest Funds	96%
Average Quarterly \$ Purchases/ Previous Quarter \$ Holdings	13.3%
Average Quarterly \$ Sales/ Previous Quarter \$ Holdings	12.4%
Holdings in the Bottom Half by Market Capitalization (Universe in Parentheses)	1.43% (5.32%)

TABLE 2

Holding, Buying, Selling\* by Past Performance Quintile, All Funds Combined

<u>Past Performance Quintile</u>	<u>Universe Holding in Quintile as Percent of Total Universe Holdings</u>	<u>Fund Holdings in Quintile as Percent of Total Fund Holdings</u>	<u>Sales in Quintile as Percent of Total Sales</u>	<u>Purchases in Quintile as Percent of Total Purchases</u>
1	.06	.05	.06	.06
2	.16	.17	.17	.19
3	.23	.25	.22	.24
4	.28	.29	.27	.28
5	.28	.24	.28	.23

\*All numbers are averaged over quarters and years.

TABLE 3

## Sales and Purchases\* of Pension Funds by Quarter

Quintile	Sales Relative to <u>Own Holdings</u>		t-test Quarter 1-3 = Quarter 4	Purchases Relative to <u>Universe Holdings</u>		t-test Quarter 1-3 = Quarter 4
	Quarter 1-3	Quarter 4		Quarter 1-3	Quarter 4	
1-2	1.32 (.026)	1.42 (.033)	1.75	1.22 (.012)	1.33 (.024)	5.47
3	.92 (.009)	1.02 (.084)	1.76	1.07 (.009)	1.09 (.017)	.097
4	.91 (.007)	.89 (.014)	.24	1.01 (.008)	1.00 (.013)	.44
5	1.44 (.053)	1.37 (.028)	1.22	.90 (.009)	.88 (.015)	.71

\*Sales number is from equation (1), purchase number is from equation (2). Both are averaged over funds and years.