

Do Institutions Window Dress? An Empirical Investigation

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This paper investigates whether institutional fund managers modify the composition of their portfolios at year end to increase their appeal to investors. The portfolio composition of over 1,000 institutions is evaluated between 1985 and 1988. Neither regression analysis nor means tests across quarters provide any evidence that a systematic shift to larger or lower risk firms occurs at year end. An unexplained third quarter anomaly is discovered.

INTRODUCTION

As the academic dissection of the stock market continues, researchers increasingly investigate market participant behavior. One practice hypothesized to influence returns is window dressing by institutional investors. Bildersee and Kahn (1987) suggest that fund managers may believe that a "better-looking" portfolio will increase investment in the fund and, consequently, increase the manager's compensation if it is a function of total fund assets.

Haugen and Lakonishok (1988) offer another motivation for window dressing. They suggest that institutional managers may lock profits earned throughout the year by switching from risky, high return securities to less risky, lower return securities.

The purpose of this paper is to test the window dressing hypothesis empirically. This paper differs from prior efforts in several important ways. First, it employs a comprehensive data set that details the portfolio composition of over 1,000 large institutional investors over a three year period. This data set allows us to track changes in the risk, return, and size of firms held by institutions during different quarters of the year. Second, the results are disaggregated by institutional type because different types of institutions may feel different marginal pressures to engage in window dressing. For example, the manager of a state-controlled pension fund may have little incentive to window dress, as neither compensation nor job security is at risk. Third, prior research has concentrated on the winner-versus-loser aspect of portfolio composition and window dressing. This paper focuses on the risk and size dimensions as well as prior performance.

Neither regressions nor means tests reveal significant evidence of institutional portfolio window dressing at year end. Disaggregating the results by institutional type demonstrates that even those institutions most expected to window dress show little evidence of such activity. A curious third quarter anomaly is uncovered, however. Our results suggest that from 1985 to 1988 institutions held fewer equities during the third quarter than during other quarters of the year. We are reluctant to attribute this to window dressing and can offer no other explanation for this finding.

WINDOW DRESSING

Pension plans typically hire several money managers and split the investable funds among them. The plan sponsors evaluate the managers' performance quarterly, but the

main evaluation occurs at year end. Similarly, mutual funds are graded for risk and return most frequently at year end. These publicized results are used by investors in choosing funds for investment. For this reason, window dressing, if it occurs, should be most evident at year end.

Why would investment managers window dress, when changing the composition of their portfolios cannot impact past performance? Lakonishok, Shleifer, Thaler, and Vishny (1991) argue that stock returns are noisy and may not reveal whether the manager is incompetent or whether he or she was unlucky on a few stocks. Sponsors may review portfolio composition as well as performance, and investment managers may alter the fund's composition in an effort to impress these sponsors.

The financial press often assumes that unusual end-of-quarter institutional trading activity occurs. For example, the *Wall Street Journal* reports (March 26, 1992): "But other analysts noted that with the first quarter almost over, money managers are engaging in 'window-dressing'—snapping up stocks that have performed well this quarter to add them to their portfolios." Despite the conventional wisdom, little convincing empirical evidence of window dressing has been reported. Lakonishok, *et al.* (1991) measure the buying and selling intensity of pension fund managers across quarters. They report that funds are generally contrarian (buy losers and sell winners), except that they oversell extreme losers. Lakonishok *et al.* conclude the overall evidence reveals some window dressing, but stress that fourth quarter strategies do not depart radically from usual practice.

Bildersee and Kahn (1987) use stock market block trading activity to examine the end-of-quarter trading activity of institutional managers. They report increased trading (days -15 to -6) followed by a trading lull toward the end of each calendar quarter (day -5 to -1). Bildersee and Kahn conclude their evidence is consistent with window dressing because trades executed during days -5 to -1 are not completed or reported until the following quarter.

The current research specifically examines the hypothesis proposed by Haugen and Lakonishok (1988). They suggest that institutional investors alter their portfolio composition prior to year end to improve a fund's appearance. Following the end of the year the managers move into small, more risky firms in hope of improving the fund performance. The managers look to smaller, lesser-known firms for the bargains needed to provide unusually high returns. As the portfolio returns climb throughout the year, the profits are locked by switching to less risky securities, i.e., Standard & Poor's 500 stocks and government bonds. The implication is that "when you're a winner, you'd best walk away from the roulette table" (Haugen and Lakonishok, 1988, p. 97). By the time the year-end picture is taken of the portfolio, risky and unknown stocks have been reduced and replaced with large, well-known stocks. Immediately following the turn of the year the game begins again as portfolio managers rebalance their portfolios with perceived bargains. This theory yields two testable implications:

- The proportion of institutional funds invested in high risk firms decreases across quarters;
- The proportion of institutional funds invested in small firms decreases across quarters.

Haugen and Lakonishok (1988) also note that if managers are concerned with improving fund performance, they will invest in prior period winners at year end. This provides a third testable implication.

- The proportion of institutional funds invested in prior period winners increases across quarters.

DATA SAMPLE

Separate samples are constructed for each year from 1985 to 1988. For each year the initial sample includes all firms listed on either the New York Stock Exchange, American Stock Exchange, or National Association of Securities Dealers daily returns tapes prepared by the Center for Research in Security Prices (CRSP). The samples are screened to eliminate firms without return data throughout the sample year. Any security not described as *ordinary common* by CRSP or having duplicate six digit CUSIP numbers reported are eliminated to exclude nonvoting shares. The resulting sample consists of over 5,000 firms across a four year period.

INSTITUTIONAL OWNERSHIP

Institutional ownership data are obtained from Control Data Advisors (CDA) Investment Technologies' Spectrum 3/4. These data consist of quarterly institutional ownership filings required by the Securities and Exchange Commission (SEC). All institutions with investment control of over \$100 million must report quarterly to the SEC equity holdings above 10,000 shares with market value above \$200,000. The Spectrum data set used in this study contains all filings made between 1985 and 1988.

The aim of this study is to examine changes across quarters in the proportion of the institution's portfolio invested in firms with different risk and size characteristics. We compute for each institution the proportion of its total portfolio invested in each firm such that:

$$(1) \text{Proport}_{ji} = \frac{\text{shares}_i \times \text{price}_i}{\sum_{i=1}^I (\text{shares}_i \times \text{price}_i)}$$

where:

Proport_{ji} = Proportion of institution j 's portfolio invested in firm i ;

shares_i = Number of shares held by institution j of firm i stock;

price_i = Price per share of firm i stock at end of year;

I = Total number of firms held by institution j .

There are approximately 1,000 different institutions reporting ownership interest to the SEC. As a result, for each of the 5,000 firms there are approximately 1,000 observations of the proportion of institutional ownership. Observations where the proportion of the institution's portfolio invested in firm i is equal to zero are discarded.

Following Brickley, Lease, and Smith (1988), institutions are classified by type according to the designations assigned by the *1988 Money Market Directory*. This source categorizes institutions as bank trusts, insurance companies, corporate pension funds, investment advisors (including mutual funds), endowment funds, foundations, or government pension plans.

INDEPENDENT VARIABLES

To measure the difference across quarters in institutional holdings, quarterly dummy variables are constructed. DUMQ2 is equal to one if the observation comes from the second quarter, DUMQ3 is equal to one if the observation comes from the third quarter, and DUMQ4 is equal to one if the observation comes from the fourth quarter. The intercept captures the first quarter.

We compute the abnormal return for each firm for the period from 1985 to 1988 using the market model:

$$(2) \text{MADJ}_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where:

MADJ_{it} = Market- and risk-adjusted abnormal return for firm i on day t ;

R_{it} = Cum dividend return for firm i on day t ;

α_i, β_i = Ordinary least squares (OLS) estimates of firm i 's OLS regression parameters;

R_{mt} = The CRSP equally weighted market index return on day t ; and

MADJ_i = Computed as the sum of daily returns across the prior year.

The OLS regression parameters are computed using the daily returns beginning with the first day and ending on the last day of the sample year.

Size is computed as the end-of-year market price times the number of shares outstanding at year end. Beta is computed as discussed above, and the standard error (SE) is computed as:

$$(3) (S_{it})^2 = (R_{it} - (\alpha_i + \beta_i R_{mt}))^2,$$

$$(4) S_i^2 = \sum_{t=1}^N S_{it}^2, \text{ and}$$

$$(5) SE = \sqrt{\frac{s^2}{N - 2}}$$

Summary statistics appear in Table 1.

ANALYSIS

The institutional window dressing hypothesis suggests that a greater proportion of portfolio assets should be in small and risky firms during the first quarter than during the fourth. Risk is proxied with the firm beta and the standard error of the daily returns. The window dressing hypothesis also suggests that investment managers will choose firms at year end that have displayed positive returns over the year. We examine these hypotheses using regression analysis and means tests.

Table 1—Summary Statistics

	Bank	Insurance	Gov. Pension	Corp. Pension	Investment Counsel	Endowments	Foundations	Combined
Panel A								
Mean Values of the Independent Variables								
Mean-Adjusted Return	.076	.078	.072	.083	.074	.077	.093	.075
Firm Size (x 1000)	2,755	2,658	2,082	3,148	2,524	3,144	4,330	2,621
Beta	1.10	1.18	1.10	1.19	1.15	1.186	1.23	1.14
Standard Error	.021	.021	.021	.019	.022	.021	.020	.021
Panel B								
Proportion of Firm Shares Held by Institutions by Quarter								
Prop 1 ¹	.0026	.0039	.0027	.0103	.0045	.0075	.0211	.0039
Prop 2	.0026	.0039	.0026	.0104	.0045	.0078	.0206	.0038
Prop 3	.032	.0049	.0031	.0125	.0055	.0093	.0218	.0047
Prop 4	.0029	.0042	.0029	.0110	.0049	.0077	.0211	.0042
Prop All ²	.0029	.0043	.0030	.0112	.0051	.0083	.0210	.0043

¹Prop 1 to Prop 4 is the proportion of the institutional investor's fund invested in the average firm at the end of the first quarter through the fourth quarter, respectively.

²Prop All is the proportion of the institutional investor's funds invested in the average firm averaged across quarters.

Table 2 (equation (1)) reports the ordinary least squares regression results where the proportion of each institutional portfolio that each firm composes is regressed on the market-adjusted return (MADJ), size, beta, and the standard error (SE). The regression model is:

Table 2—OLS Regression of the Mean Proportion of the Institutional Portfolio Invested in the Firm on Abnormal Return (MADJ), Size, Beta, Standard Error (SE), Quarterly Dummy Variables (DUMQ2-4), and Interaction Dummy Variables (t-statistics in parentheses)

Independent Variable	Equation 1	Equation 2	Equation 3
INTERCEPT	0.19** (3.97)	0.27* (5.08)	0.29** (2.94)
MADJ	0.25** (2.58)	0.23** (2.33)	0.10 (0.55)
SIZE	4.38** (18.44)	4.38** (18.47)	4.66** (9.51)
BETA	0.037* (1.77)	0.036 (1.14)	0.02 (0.25)
SE	-3.52** (-2.33)	-3.59** (-2.38)	-3.35 (-1.05)
DUMQ2		-0.001 (-0.22)	-0.015 (-0.11)
DUMQ3		-0.33** (-7.47)	-0.38** (-2.74)
DUMQ4		-0.02 (-0.42)	-0.03 (-0.20)
XRET2			0.11 (0.37)
XRET3			0.35 (1.25)
XRET4			0.11 (0.43)
XSIZE2			-10.84 (-0.16)
XSIZE3			-95.50 (-1.38)
XSIZE4			-11.16 (-0.17)
XBETA2			0.0058 (0.06)
XBETA3			0.09 (1.01)
XBETA4			-0.004 (-0.05)
XSE2			0.03 (0.01)
XSE3			-1.82 (-0.34)
XSE4			0.77 (0.19)
F-statistic	99.67	68.47	25.21

** Significant at the 1 percent level

* Significant at the 5 percent level

$$(6) \text{Proport}_{ji} = \alpha + \beta_1(\text{MADJ}_i) + \beta_2(\text{SIZE}_i) + \beta_3(\text{BETA}_i) + \beta_4(\text{SE}_i) + E$$

The positive coefficients for market-adjusted returns and size suggest that institutions are attracted to large, winning firms. The weakly positive sign on BETA indicates they are willing to assume a slightly higher than average level of market risk. The significantly negative sign on SE indicates institutions avoid firm-specific risk. This is somewhat surprising, as current theory holds that such risk should be irrelevant in a fully diversified portfolio.

Of primary interest in this paper, however, is whether institutional preferences change across quarters. This question is examined in equations (2) and (3) in Table 2. Equation (2) is an analysis of variance model that includes dummy variables representing quarters two, three, and four. The regression model is:

$$(7) \text{Proport}_{ji} = \alpha + \beta_1(\text{MADJ}_i) + \beta_2(\text{SIZE}_i) + \beta_3(\text{BETA}_i) + \beta_4(\text{SE}_i) + \beta_5(\text{DUMQ2}_i) + \beta_6(\text{DUMQ3}_i) + \beta_7(\text{DUMQ4}_i) + E_i$$

The dummy variables allow the intercept to shift across different quarters. DUMQ2 and DUMQ4 are insignificant, while DUMQ3 is significant ($t = -7.47$). The other variables remain significant, as above. The failure to find DUMQ4 significant suggests window dressing is unlikely at year end.

Equation (3) adds to the original variables both the quarterly dummy variables and interaction variables computed as the quarterly dummy times either market-adjusted returns, beta, size, or standard error. The regression of equation (3) is:

$$(8) \text{Proport}_{ji} = \alpha + \beta_1(\text{MADJ}_i) + \beta_2(\text{SIZE}_i) + \beta_3(\text{BETA}_i) + \beta_4(\text{SE}_i) + \beta_5(\text{DUMQ2}_i) + \beta_6(\text{DUMQ3}_i) + \beta_7(\text{DUMQ4}_i) + \beta_8(\text{XRET2}_i) + \beta_9(\text{XRET3}_i) + \beta_{10}(\text{XRET4}_i) + \beta_{11}(\text{XSIZE2}_i) + \beta_{12}(\text{XSIZE3}_i) + \beta_{13}(\text{XSIZE4}_i) + \beta_{14}(\text{XBETA2}_i) + \beta_{15}(\text{XBETA3}_i) + \beta_{16}(\text{XBETA4}_i) + \beta_{17}(\text{XSE2}_i) + \beta_{18}(\text{XSE3}_i) + \beta_{19}(\text{XSE4}_i) + E_i$$

The interaction terms allow the slope to shift across different quarters. While the third quarter dummy variable remains significant, all other dummy and interaction variables are insignificant. These results also fail to support the window dressing hypothesis.

Table 3 reports the results of analysis of variance for institutions disaggregated by type of institution. It is apparent from Table 3 that different types of institutions have different investment agendas. For example, corporate pension plans appear to invest a greater proportion of their portfolio in the stocks of high standard error firms than do the other institutional types. Corporate pension funds also invest a smaller proportion of their portfolio in the stocks of higher beta firms, while all other institutional types, with varying levels of significance, invest a larger proportion of their portfolio in higher beta stocks.

Table 3—OLS Regression of the Mean Proportion of the Institutional Portfolio Invested in the Firm on Abnormal Returns (MADJ), Size, Beta, Standard Error (SE), Quarterly Dummy Variables (DUMQ2-4), and Interaction Dummy Variables, by Institutional Type (t-statistics in parentheses)

Independent	Bank	Insurance	Government Pension	Corporate Pension	Investment Counsel	Endowments	Foundations
INTERCEPT	0.20 ** (6.54)	0.36** (4.18)	0.05 (1.08)	0.61** (4.49)	0.38 (1.81)	0.59 (3.27)	2.68* (2.16)
MADJ	0.07 (1.27)	-0.08 (-0.50)	0.18* (2.05)	0.64* (2.47)	0.09 (0.23)	0.10 (0.29)	1.53 (0.62)
SIZE	3.94** (25.89)	4.68** (11.22)	3.45** (14.30)	10.03** (17.38)	5.01** (4.72)	5.41** (9.60)	8.46* (1.90)
BETA	0.02 (0.81)	0.00 (0.00)	0.11** (3.52)	-0.26** (-2.79)	0.01 (0.08)	0.27* (2.21)	1.71 (1.88)
SE	-3.55** (-3.59)	-5.40 (-1.75)	-0.81 (-0.43)	12.52* (2.47)	-4.61 (-0.68)	-17.78** (-2.85)	-125.47** (-2.59)
DUMQ2	-0.01 (-0.20)	-0.03 (-0.24)	0.04 (0.69)	-0.07 (-0.34)	-0.01 (-0.05)	-0.13 (-0.52)	-0.26 (-0.15)
DUMQ3	-0.08 (-1.81)	0.10 (0.86)	0.12 (1.83)	0.10 (0.53)	-0.83** (-2.77)	-0.09 (-0.36)	-0.23 (-0.13)
DUMQ4	-0.02 (-0.46)	-0.02 (-0.20)	-0.00 (-0.06)	0.18 (0.72)	-0.02 (-0.08)	-0.03 (0.12)	0.78 (-0.47)
XRET2	0.06 (0.66)	0.30 (1.19)	0.07 (0.53)	-0.16 (-0.40)	0.13 (0.23)	0.40 (0.76)	-2.04 (-0.54)
XRET3	-0.15 (-1.66)	-0.32 (-1.31)	-0.07 (-0.55)	-0.57 (-1.45)	0.89 (1.50)	-0.26 (-0.49)	-2.75 (-0.71)
XRET4	0.02 (0.30)	0.28 (1.20)	-0.08 (-0.64)	0.06 (0.17)	0.17 (0.31)	0.46 (0.95)	-1.61 (-0.46)
XSIZE2	-0.04 (-0.18)	-0.11 (-0.19)	-0.11 (-0.32)	-0.64 (-0.79)	-0.13 (-0.09)	0.15 (0.18)	0.08 (0.07)
XSIZE3	-0.70** (-3.28)	-2.17** (-3.69)	1.98** (5.83)	-3.91** (-4.81)	-1.02 (-0.68)	-1.22 (-1.54)	2.78 (0.44)
XSIZE4	1.35** (6.53)	-0.29 (0.53)	2.02** (6.38)	0.10 (0.13)	-1.49 (-1.05)	-0.73 (-0.99)	3.96 (0.67)
XBETA2	-0.00 (-0.03)	-0.00 (-0.33)	-0.01 (1.15)	0.15 (0.03)	0.00 (-0.51)	-0.00 (-0.13)	-0.16
XBETA3	-0.03 (-0.90)	-0.10 (-1.22)	-0.11* (-2.48)	0.11 (0.85)	0.26 (1.32)	-0.23 (-1.32)	0.21 (0.16)
XBETA4	-0.08 (-2.75)	-0.01 (-1.18)	-0.05 (0.21)	0.02 (0.23)	0.04 (-0.84)	-0.13 (-0.33)	-0.38
XSE2	0.20 (0.14)	1.32 (-0.96)	2.48 (-0.73)	-5.22 (-0.01)	-0.09 (1.23)	0.11 (0.21)	14.28
XSE3	0.72 (0.51)	-5.25 (-1.19)	-3.33 (-2.27)	-16.60* (-0.07)	-0.70 (1.47)	0.13 (-0.07)	
XSE4	2.16 (1.67)	1.24 (0.31)	-0.33 (-1.30)	-8.78 (-0.02)	-0.21 (0.86)	6.84 (0.75)	44.69
F-statistic	195.71	29.30	97.27	59.78	7.67	23.48	3.57

** Significant at the 1 percent level

* Significant at the 5 percent level

1 size x 10 = 10

Only government pension funds and corporate pension funds are attracted significantly to high return firms. Larger size firms are preferred by all institutional types.

The fourth quarter dummy is insignificant across all types of institutions. The fourth quarter size interaction variable is positive and significant for banks and government pension funds. The fourth quarter beta interaction term is significant only for banks. These results suggest that banks and government pension plans allocate a greater proportion of

their fund to larger firms in the fourth quarter than during other quarters and that banks also allocate a greater proportion of their fund to lower risk firms during the fourth quarter. These findings only weakly support window dressing. It is conceivable that bank trusts may be concerned about portfolio appearance at year end to attract additional trust business. Government pensions, however, should be relatively free from any such motivation to window dress. Theory also suggests that investment advisors, who depend exclusively on investors turning control of investments over to them, would be most likely among all the different types of institutional investors to window dress (Brickley, Lease, and Smith, 1988). No evidence of such behavior is observed.

The third quarter anomaly continues to surface in Table 3. The third quarter size interaction variable is negative and significant for three of the seven institutional types. This implies that these institutions prefer smaller firms during the third quarter.

An alternative approach to investigating window dressing is applied in Table 4. The sample is disaggregated into quintiles based on size, beta, or prior year return. The mean proportion of the institutional portfolio invested in firms in the largest and smallest quintiles is computed. The results are reported by quarter. A t-test measures the significance of the difference between the first quarter and the last quarter. If Haugen and Lakonishok's window dressing hypothesis were true, there would be greater ownership of small, high risk firms in the first quarter and greater ownership of large, low risk, high return firms in the fourth quarter.

The results are generally not consistent with window dressing. Only an insignificant drop in the proportion of the institution's portfolio made up of small firm stock is observed, and no change in the proportion of large firm stock held is reported. A statistically significant increase in the proportion of high risk firm stock held and a significant decrease in the proportion of high return firm stock are observed. The proportion of low return firm stock held falls significantly in the fourth quarter. These results are consistent with the finding of Lakonishok, *et al.* (1991) who find institutions buy prior period losers except that they sell prior period extreme losers.

The third quarter continues to provide anomalous results.

Table 4—Mean Proportion of the Institutional Portfolio Invested in Firms in the Largest and Smallest Quintile of Size, Beta, and Prior Year Annual Return, by Quarter, 1985 to 1988 (t-tests are reported for the difference between the first and fourth quarters and for the difference between the first and third quarter)

Proportion Held by Institution	Quarter				t-test Quarters	
	1	2	3	4	1-4	1-3
Large Size	.0045	.0044	.0054	.0045	-0.45	-19.25
Small Size	.0011	.0011	.0012	.0007	1.73	
	-0.14					
High Beta	0.0039	0.0038	0.0047	0.0041	-2.74*	-10.05*
Low Beta	0.0027	0.0024	0.0034	0.0027	0.77	-1.11
High Return	0.0041	0.0039	0.0049	0.0039	2.47*	-9.26*
Low Return	0.0013	0.0015	0.0013	0.0010	3.51*	0.01

* Significant at the 1 percent level or greater

CONCLUSIONS

This paper investigates whether institutions alter the composition of their portfolios at year end to improve the appearance of the fund. The window dressing hypothesis suggests that as the year progresses, institutions will reduce the riskiness of their investments and increase the average firm size. Institutions may select prior period winners.

We investigate this hypothesis by analyzing the portfolio composition of over 1,000 institution investors. We regress the proportion of the institution's portfolio invested in a firm on that firm's abnormal return, beta, standard error of returns, and quarterly dummy and quarterly interaction dummy variables. Neither the fourth quarter dummy nor any of the interaction dummy variables is significant. We further disaggregate our sample by type of institution. The institutional types most likely to engage in window dress do not have significant dummy or interaction dummy coefficients.

An alternative approach in the investigation of window dressing is to measure the proportion of the institution's portfolio invested in firms in the largest and smallest quintiles by size, risk, and return. If window dressing were to occur, we would expect the proportion invested in large firms to be higher in the fourth quarter and the proportion in small firms to be smaller in the fourth quarter than during earlier quarters. Similarly, we would expect less ownership of high beta, low return firms and more ownership of low beta, high return firms at year end. We fail to detect this pattern of stock ownership.

This paper brings into question earlier studies that purported to support window dressing. Using both regression analysis and means test we do not find evidence of institutional window dressing.

We are unable to explain a third quarter anomaly and leave its investigation to future research.

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