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Do institutional investors exacerbate managerial myopia?

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Abstract

This study analyzes corporate expenditures for property, plant and equipment (PP&E), and research and development (R&D) for over 2500 US firms from 1988 to 1994. We find no support for the contention that institutional investors cause corporate managers to behave myopically. Indeed, we document a positive relation between industry-adjusted expenditures for PP&E and R&D and the fraction of shares owned by institutional investors. This relation is robust to a variety of empirical tests, including those that account for endogeneity between institutional ownership and firm-level discretionary expenditures.

Keywords: Institutional investors; Managerial myopia; Endogeneity

1. Introduction

During the 1980s, prominent CEOs and influential scholars voiced concerns that US equity markets force corporate managers to behave myopically (Dobrzynski, 1986; Frey, 1986; Smale, 1987; Monks, 1988; Jacobs, 1991; Porter, 1992). These and other commentators argued that two features of the US economy could be responsible for such myopic behavior: the prevalence of an active (some would

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say too active) market for corporate control and the concentration of shares in the hands of institutional investors with short-term horizons, both of which (it was argued) cause managers to underinvest in projects with long-term payoffs. Such public pronouncements were often made in concert with a comparison between the then not-too-healthy US economy and the superior performing economies of Germany and Japan. Contemporaneously with these headline-grabbing expressions of concern, some economists developed models that explored the causes and consequences of managerial myopia (e.g., Stein, 1988, 1989; Shleifer and Vishny, 1990; Thakor, 1990; Narayanan, 1985, 1996; Bebchuk and Stole, 1993 among others). These models do not conclude that corporate myopia exists. Rather, they derive conditions under which myopia can persist even with rational investors and rational managers. Other economists responded by arguing that the US system merely brings an appropriate level of discipline to bear on corporate managers (e.g., Jensen, 1986a).

Current conventional wisdom appears to have it that myopia is now not much of a problem for US firms — the accusatory headlines of the previous decade have fallen silent. Two factors appear to be responsible for this repositioning of conventional wisdom. First, for various structural reasons, the US economy performed very well during the 1990s, especially relative to Japan and Germany. While nay saying is never popular in a robust economic climate, this does not mean that *current* conventional wisdom is correct. After all, if conventional wisdom is correct now, then presumably, it was correct during the 1980s as well. It is unlikely that both are correct, and conventional wisdom seems a tenuous basis on which to ground policy conclusions.[2] Second, the 1990s witnessed a slowdown in hostile takeover activity, thereby eliminating one potential cause of managerial myopia. However, institutional ownership increased during the 1990s. Thus, if the concentration of equity ownership in the hands of institutional investors gave rise to corporate myopia in the 1980s, such myopia is unlikely to have disappeared in the 1990s.

Although popular concerns regarding myopia have been muted during the 1990s, some notable scholars have continued to express concerns (e.g., Porter, 1992; Blinder, 1992; Thurow, 1993). The basic argument positing the existence of institutionally induced myopia runs as follows: individual US shareholders generally are impatient and this impatience is communicated to corporate managers

[2] We are not the first to point out that conventional wisdom may be correlated with economic performance. For example, Rajan and Zingles (1998) argue, ''Just a few years ago, it was fashionable to decry the short-sightedness of the American financial system, the widely alleged tendency of US financial markets to ignore long-term corporate prospects while focusing on quarterly earnings reports… It is amazing what a banking crisis or two will do to popular fashion. Now the talk is all about the virtues of 'the market',…''.

through pressure on stock prices. One consequence of this pressure is that managers are discouraged from investing for the long-term and instead focus on projects with short-term payoffs. Furthermore, the natural impatience of individual shareholders is exacerbated by institutional investors who are judged on the basis of their own short-term portfolio performance (by the same impatient individual investors). The net result is that publicly traded US corporations underinvest relative to a value maximizing strategy and the degree of underinvestment is exacerbated by the share ownership and trading activities of institutional investors. Although he does not endorse such a perspective, Friedman (1996, p. 62) nicely summarizes this view:

> One frequently expressed fear is that institutional investors... systematically adopt a time horizon that is too short... to reflect the underlying preferences that individuals would exhibit on their own... And there are plausible reasons for thinking that institutional capital, managed by agents in place of principals, is less patient than individuals' own capital.

A fundamental premise underlying this argument is that institutional investment managers are a dominant force in setting stock prices and that they focus on reported short-term corporate earnings. Further, these investment managers are portrayed as being ever ready to ''dump'' a stock at the first hint of an earnings decline. Corporate managers, in turn, are thought to be sensitive to stock price performance and manage their firms so as to avoid the appearance of any sag in short-term earnings. To complete the loop, because of the accounting treatment of expenditures for property, plant and equipment (PP&E) and research and development (R&D), managers are sometimes ''forced'' to forego value-enhancing investments of this type so as to ''pump up'' short-term earnings.

A contrasting, though less widely recognized, view of the role of institutional ownership is that institutions act as a buffer between impatient individual shareholders and corporate managers and, thereby, allow corporate managers to focus on projects with long-term payoffs. A basis for such a view is that institutional investors may have an information advantage relative to individual shareholders. As a consequence, institutional investors are more likely to withstand the temptation to judge corporate managers on the basis of short-term reported earnings than do individuals.

The alternative perspectives on the role of institutional investors give rise to divergent empirical predictions. The perspective that institutions exacerbate whatever level of myopia is inherent in US individual investors predicts that, in a cross-section of firms, there will be a negative correlation between the fraction of shares owned by institutional investors and the level of corporate expenditures for projects with long-term payoffs. Given that it is not only the level of share ownership, but also the trading activity of institutions to which share prices (and, therefore, corporate managers) are (allegedly) sensitive, a second prediction is that there will be a negative correlation between share ownership by institutional

investors who trade most frequently and firm-level expenditures for projects with long-term payoffs. In contrast, the perspective that institutions act as a buffer between individual investors and corporate managers predicts that, in a cross-section of firms, there will be a positive correlation between share ownership by institutional investors and the level of corporate expenditures for projects with long-term payoffs. Similarly, the buffer perspective predicts a positive correlation between share ownership by institutional investors who trade most frequently and the level of corporate expenditures for projects with long-term payoffs.

In this paper, we empirically investigate the predictions of the alternative perspectives by examining the relation between share ownership by (and trading activity of) institutional investors and firm-level expenditures for property, plant and equipment (PP&E), and research and development (R&D) for over 2500 US corporations over the period 1988–1994. In cross-sectional regressions, we document a positive and statistically significant relation between industry-adjusted PP&E and R&D expenditures and the fraction of shares owned by institutional investors. This positive relationship persists after controlling for growth, leverage, profitability, insider ownership, firm-specific effects and calendar-year effects.

We are not the first to uncover this relationship. Beginning with Jarrell et al. (1985), a number of authors have discovered this basic relationship, albeit for much smaller samples, often confined to a few industries. However, this cross-sectional relationship is (notoriously) difficult to interpret because it is consistent with the view that institutions allow managers to investment more in PP&E and R&D expenditures, and also consistent with a clientele effect in which institutions disproportionately invest in firms with high PP&E and R&D expenditures. Thus, endogeneity between institutional ownership and firm-level expenditures causes an econometric problem in cross-sectional regressions, namely, a simultaneous equations bias. More importantly, it makes it difficult to draw causal inferences from such regressions.

We use two types of tests to account for endogeneity and to distinguish between a causal relationship and a clientele effect. First, our cross-sectional regressions employ a two-stage least squares' (instrumental variables) procedure which is free of the simultaneous equations bias. The positive relation between PP&E and R&D expenditures and institutional ownership is robust to this methodology. Second, we regress changes in PP&E and R&D expenditures from $t-1$ to t on changes in institutional ownership from $t-2$ to $t-1$. Here too, we find no evidence of institutions causing managers to investment less in projects with long-term payoffs; if anything, there is some evidence that changes in institutional ownership are associated with increases in PP&E and R&D expenditures.

Finally, to recognize the role of active trading by institutions, we classify institutions into quintiles based on their portfolio turnover and examine the relationship between expenditures for PP&E and R&D and the level of share ownership across turnover quintiles. Both two-stage least squares regressions and

change regressions identify a positive and often statistically significant relation between both PP&E and R&D expenditures and the fraction of shares owned by institutions with the highest levels of portfolio turnover.

A caveat is appropriate: our primary independent regression variable is the fraction of shares owned by institutional investors. The remainder is the fraction of shares owned by non-institutions, comprising mostly individual investors. Thus, our tests determine whether institutional ownership causes more or less myopia than individuals (i.e., we examine *relative* myopia). We cannot determine whether US firms under- or overinvest relative to a value-maximizing strategy (i.e., we have little to say about *absolute* myopia). Based on our results, it could be that all firms underinvest, but firms which have a larger fraction of shares held by institutions underinvest to a lesser degree. Or, it could be that all firms overinvest and firms with larger institutional ownership overinvest more. Our tests cannot make that distinction. Holding other factors constant, we can conclude, however, that firms with higher institutional share ownership invest more than firms with less institutional share ownership. To the extent that institutional investors have been identified as villains who depress corporate expenditures for projects with long-term payoffs, our results reject that contention.

The paper is organized as follows. Section 2 briefly reviews prior empirical studies of corporate myopia. Section 3 describes the data. Section 4 presents and discusses the empirical results. Section 5 concludes.

2. Prior empirical studies of corporate myopia

A number of prior empirical studies examine institutionally induced myopia (i.e., relative myopia). The earliest of these is by Jarrell et al. (1985). Jarrell et al. estimate a cross-sectional regression for the years 1980–1983 with a sample of 324 firms in which R&D expenditure is the dependent variable and institutional share ownership is the independent variable. They find a positive correlation between R&D expenditures and institutional ownership and, therefore, reject the contention that institutional investors depress corporate expenditures for R&D. A potential shortcoming of this study is that the authors do not include control variables (such as growth opportunities and leverage) that might also be correlated with R&D spending, nor do they account for endogeneity in their regressions. Subsequent empirical investigations, primarily in the management literature, refine the basic Jarrell et al. regressions by including various control variables. Graves (1988) finds a negative relation between institutional ownership and R&D spending but he restricts his analysis to the computer industry. Baysinger et al. (1991) and Hansen and Hill (1991), on the other hand, find a positive relation between institutional ownership and R&D spending, but again their samples are limited; Baysinger et al. examine 174 firms, while Hansen and Hill (1991) limit themselves

to four industries.[3] Unfortunately, most of these studies do not control for unobserved firm heterogeneity, which Himmelberg et al. (1999) show, can significantly affect inferences in such cross-sectional relationships. Moreover, none of these studies account for endogeneity or attempt to disentangle cross-sectional correlations from a causal relationship.

A more recent contribution is by Bushee (1998), who examines reductions in R&D spending to determine whether firms with higher institutional ownership are more likely to cut R&D spending in response to an earnings decline. He is specifically interested in whether managers of firms with high institutional ownership are more or less likely to cut R&D spending to manage short-term earnings. His sample encompasses firms that experienced an earnings decline during a year, which could subsequently be reversed by a cut in R&D expenditures. He estimates a logistic regression in which the dependent variable is one if the firm cut R&D expenditures (and zero otherwise) and the key independent variable is the fraction of shares owned by institutional investors. Unfortunately, interpretation of his results regarding institutionally induced myopia is also problematic.

An implicit assumption of Bushee's analysis is that a firm's current level of R&D expenditures is ''optimal''. Suppose, however, that causation runs from institutional ownership to R&D spending such that firms with high institutional ownership have low R&D expenditures. If so, then firms with high institutional ownership will have ''less room'' to cut expenditures in response to an earnings decline. In that case, a logistic regression of the type estimated by Bushee will indicate that firms with higher institutional ownership are less likely to cut R&D expenditures, even though institutional investors may generally depress corporate expenditures for R&D. Thus, while Bushee's tests can speak for the issue of earnings management, they do not address the question of whether institutional ownership leads to lower spending for projects with long-term payoffs, such as PP&E and R&D.

3. Data and sample construction

3.1. Data

According to Section 13F of the Securities and Exchange Act of 1934 (Rule 13F-1) institutional investors with investment discretion over $100 million in equity securities are required to report their portfolio holdings to the SEC. In the case of shared investment discretion, only one manager includes information regarding the securities held, thereby avoiding double counting (see Lemke and

[3] Kochlar and David (1996) and Wright et al. (1996) also examine related issues but their interest is in new product introduction and risk-taking behavior, respectively.

Lins, 1987 for a description of the disclosure rules). Furthermore, the data are aggregated to the level of the money manager. So, for example, the holdings of all funds under the Fidelity family umbrella are aggregated and reported under the parent (Fidelity Management and Research). These data are compiled by CDA/Spectrum and made available through Compact Disclosure.

From Compact Disclosure, we obtain quarterly institutional ownership data for all NYSE, Amex, and Nasdaq listed firms from the fourth quarter of 1988 through the fourth quarter of 1994. The data contain a security identifier and information on the number of shares of each firm owned by each institution. For each firm-year, we obtain from Compustat, total assets, sales, R&D expenditures, PP&E expenditures (also referred to as ''capital expenditures''), total property, plant and equipment, operating income, debt and net income before extraordinary items. Finally, we obtain insider ownership information (i.e., shares owned by officers and directors) from Compact Disclosure.[4]

3.2. Sample construction

We impose two restrictions on the sample. First, we eliminate financial firms (firms with SIC codes from 6000 to 6999) because Compustat does not report PP&E and R&D expenditures by financial firms. Second, if a firm is missing R&D data for a year, we delete that firm-year observation from our sample.[5] Our final sample consists of over 2500 firms and 17,500 firm-years of data for the period 1988–1994.

4. Empirical analysis

4.1. The link between reported earnings and PP&E and R&D expenditures

An essential element of the argument that institutional ownership influences long-term corporate expenditures for projects with long-term payoffs is that such expenditures reduce short-term reported earnings. On a prima facie basis, that link seems straightforward: accounting treatments of long-horizon investment expenditures appear to reduce measures of short-term performance in at least two ways. First, investments in PP&E are depreciated beginning with the year of purchase. Because earnings generated by those assets may not show up for several years,

[4] Compact Disclosure reports insider ownership date from two sources: proxy statements and Spectrum 6. We employ proxy-statement-based data in all our tests. See Anderson and Lee (1997) for a discussion of costs and benefits of insider ownership data sources.

[5] Some studies use the median R&D ratio for the industry when firm-level data are missing. Because we are interested in the cross-sectional variation, this is not a feasible alternative in our investigation.

near-term reported after-tax net income is likely to be deflated. Second, and similarly, R&D expenditures for which payoffs may not occur for even more years in the future must be fully expensed at the time of the expenditure. Thus, R&D expenditures, too, are likely to depress short-term earnings.

Of course, recognition of the likelihood that expenditures for PP&E and R&D depress short-term earnings is not the same as demonstrating that such expenditures reduce near-term reported earnings. That requires empirical investigation. To make that determination, for our sample of firms, we estimate regressions in which annual reported earnings is the dependent variable and PP&E and R&D are the independent variables. Specifically, for our full sample for all years, we regress annual PP&E expenditures divided by the total book value of PP&E from the prior year-end against contemporaneous net income before extraordinary items divided by the book value of total assets from the prior year-end. The estimated regression coefficient is -0.05 with a *t*-statistic of 18.1. We also estimate this regression on a year-by-year basis. In these regressions, the coefficients vary from -0.11 to -0.02 and each has a *t*-statistic greater than 2.00.

Similarly, with the full sample for all years, we regress annual R&D expenditures divided by sales for the prior year against current-year net income before extraordinary items divided the book value of total assets from the prior year-end. The estimated regression coefficient is -0.18 with a *t*-statistic of 32.7. This regression is also estimated on a year-by-year basis. The coefficients vary from -0.26 to -0.11 and each has a *t*-statistic greater than 2.00.

Our various regressions have reasonable explanatory power with an average adjusted R^2 of approximately 0.15. Thus, according to these univariate regressions, expenditures for PP&E and R&D do, indeed, reduce current reported earnings.

4.2. Descriptive statistics

Table 1 provides the year-by-year means and medians for the key dependent and independent variables used in our analysis. Panel A presents data for PP&E expenditures, panel B presents data for R&D expenditures, and panels C and D present data on institutional share ownership.

According to panel A, the distribution of expenditures for PP&E is highly skewed. In each year, the mean level of expenditures for PP&E is about 15 times the median level. The data exhibit some time-series variation, but no pronounced time-series trend. In our empirical tests, we scale the firm's annual expenditures for PP&E by aggregate PP&E as of the prior year-end. As shown in panel A, the means and medians of this ratio show some modest rightward skewness and even less time-series variation than do the raw dollar amounts. The mean of this ratio is about 0.25 with a maximum of 0.267 in 1994 and a minimum of 0.221 in 1991. The median of this ratio hovers around 0.20 with a maximum of 0.209 in 1994 and a minimum of 0.171.

Table 1
Descriptive statistics

	1988	1989	1990	1991	1992	1993	1994
Panel A: PP&E expenditures per firm							
Annual expenditures for $PP\&E_t$ in $ millions							
Mean	105.1	118.9	128.4	119.9	105.3	108.5	120.6
Median	7.3	8.0	8.2	6.6	6.7	8.3	10.7
Aggregate $PP\&E_{t-1}$ in $ millions							
Mean	580.7	655.2	708.7	743.1	752.0	687.5	721.3
Median	32.3	35.6	38.1	40.5	38.9	35.0	40.9
$PP\&E\ expenditures_t / PP\&E_{t-1}$							
Mean	0.246	0.253	0.248	0.221	0.241	0.252	0.267
Median	0.201	0.207	0.198	0.171	0.180	0.191	0.209
N	2251	2228	2306	2411	2623	2580	2537
Panel B: R&D expenditures per firm							
$R\&D_t$ in $ millions							
Mean	63.9	67.6	73.3	74.9	67.8	71.7	81.4
Median	4.13	4.6	4.8	5.2	5.4	6.6	7.95
$Sales_t$ in $ millions							
Mean	1481.7	1517.4	1634.1	1599.9	1433.5	1507.7	1723.1
Median	142.6	155.8	151.8	147.8	140.0	163.0	192.3
$R\&D_t / Sales_t$							
Mean	0.059	0.063	0.065	0.068	0.076	0.075	0.072
Median	0.035	0.035	0.037	0.036	0.038	0.040	0.039
N	1071	1060	1093	1149	1268	1238	1182
Panel C: Percent of shares owned by institutional investors per firm (%)							
Mean	29.1	30.3	31.1	33.4	32.2	36.1	39.5
Median	25.2	27.0	27.7	30.5	28.7	33.3	37.6
N	2410	2378	2468	2583	2847	2773	2699
Panel D: Number of institutional shareholders per firm							
Mean	51.6	55	54	56.4	53.3	63.6	70.7
Median	22	25	25	27	25	32	37

Panel A presents annual PP&E expenditures, aggregate PP&E from the prior end-of-year, and PP&E expenditures divided by the prior end-of-year PP&E. Panel B presents annual R&D expenditures, sales and R&D expenditures divided by sales. Data are from Compustat. Panels C and D present data on the equity ownership by institutions. Data are from Compact Disclosure. *N* is the number of firms.

According to panel B, the distribution of R&D expenditures across firms is highly skewed. In each year, the mean level of R&D expenditures is about 10 times the median. Expenditures for R&D show somewhat greater time-series variation than do expenditures for PP&E. In our empirical tests, we use annual

expenditures for R&D scaled by contemporaneous annual sales. This statistic (also in panel B) exhibits some time-series variation with a minimum of 0.059 in 1988 and a maximum of 0.076 in 1992. Also, in the typical year, the mean of this ratio is about twice the median. Thus, the distribution of the ratio of R&D to sales evidences some rightward skewness as well.

The mean percentage of shares owned by institutional investors (panel C) evidences the expected upward trend through time — institutional ownership increases from an average of 29.1% per firm in 1988 to 39.5% per firm in 1994.[6] This time-series trend is also evident in the number of institutional investors per firm (panel D). The average number of institutional investors per firm increases from 51.6 in 1988 to 70.7 in 1994. These same upward trends are evident in the median institutional share ownership and median number of institutional investors per firm.

4.3. Methodological approach

We investigate the relation between corporate expenditures with long-term payoffs and institutional ownership by estimating a number of time-series cross-sectional regressions with our measures of scaled PP&E and R&D expenditures as the dependent variable. To account for any industry factors that may affect expenditures for PP&E and R&D, we adjust these numbers for the industry median. To do so, we identify all firms in the same three-digit SIC code as each firm in the sample in each year. We subtract the median ratio for the industry from that firm's scaled PP&E or R&D for that year. These measures of scaled industry-adjusted PP&E and R&D expenditures are used as the dependent variables in our regressions. Thus, our dependent variables are measured as deviations from the industry median.

Our primary independent variable is the fraction of shares owned by institutional investors. We also include various other independent variables to control for factors that might influence PP&E and R&D expenditures. We include the ratio of the market value of equity plus book value of debt to book value of total capital (the market-to-book ratio) at year-end $t-1$ to control for differences in growth

[6] It is possible that the number of institutions required to file 13F statements with the SEC increased simply because of strong performance of the stock market over the sample period. This enhanced coverage of Rule 13F-1 would show an increase in institutional ownership (and number of institutions) over time even if there was no true increase. To assess the importance of this potential bias, we gross the reporting criterion ($100 million) by the value-weighted market return over each quarter and tabulate institutional ownership and the number of institutional shareholders declines somewhat from those presented in Table 1, the time-series trend is still overwhelmingly positive. We do not report these results because our tests rely on as clean a measure of institutional ownership as possible, irrespective of the reporting criteria.

opportunities across firms. The total leverage ratio (total debt-to-total assets) is used as an independent variable because debt may affect capital expenditures, either negatively (Myers, 1977) or positively (Jensen, 1986b), or, depending upon the circumstances of the firm, both positively and negatively (Stulz, 1990; McConnell and Servaes, 1995). We include operating income from year $t-1$ (scaled by total assets from year $t-1$) as a proxy for the availability of internal capital. Finally, because insiders may be more (or less) patient than institutional investors, we include insider ownership (i.e., the fraction of shares owned by officers and directors) and the square of that variable to control for the relative patience of insiders (Morck et al., 1988; McConnell and Servaes, 1990). A variable that has been used in some prior studies (e.g., McConnell and Servaes, 1990; Bethel et al., 1998) that we do not include is the fraction of shares owned by blockholders. Blockholders can be either institutional or individual investors. If they are institutions, their ownership is included in total institutional ownership. If they are individuals, their ownership is effectively included in the remainder: one minus total institutional ownership.

Identifying causality between institutional ownership and expenditures with long-term payoffs is not straightforward. It could be that high institutional ownership causes firms to spend more (or less) on PP&E and R&D. Alternatively, it could be that institutions are attracted to firms with high (or low) PP&E and R&D expenditures. This potential endogeneity causes a simultaneous equation bias and makes it difficult to infer causality from cross-sectional regressions.[7] We follow two procedures to correct for the endogeneity problem and to distinguish any causal relationship from a clientele effect.

First, we estimate regressions using a two-stage least squares (instrumental variables) procedure. The instruments used in the first stage regressions are the lagged values of the control variables described above as well as the following: the lagged market value of equity, the lagged annualized dividend yield, and a dummy variable equal to one if the firm is a member of the *S&P 500 Index*. In the second stage, we regress the scaled industry-adjusted PP&E and R&D expenditures on the fraction of shares owned by institutions from the first stage regression and various contemporaneous control variables.[8]

Second, we estimate regressions of changes in scaled industry-adjusted PP&E and R&D expenditures on changes in institutional ownership and other indepen-

[7] We follow Hausman (1978) and conduct a formal test of the null hypothesis of exogeneity of institutional ownership. This test rejects the null with a *p*-value of 0.00.

[8] Many of the other control variables in the analysis, such as debt and insider ownership, are also arguably endogenous. However, debt and insider ownership equations take us far afield from the purpose of this paper and we do not estimate such equations (see Cho, 1998 for insider ownership equations). As we describe in Section 4.8, we do estimate regressions in which the control variables are lagged, thus obviating the need for separate debt and insider ownership equations. The results of such regressions are similar to those reported in the paper.

dent variables. Because we are interested in causal relationships, we specify these first-difference regressions with a particular lagged time-series structure. Specifically, we regress changes in PP&E and R&D expenditures (from year $t-1$ to year t) on changes in the fraction of shares owned by institutions (from year $t-2$ to year $t-1$). Changes in the control variables are measured over the same time period, as are changes in institutional ownership.

Given the pooled time-series, cross-sectional nature of our regressions, the firm-year observations are unlikely to be independent. Thus, standard errors in both the two-stage least squares and first-difference regressions are likely to be downwardly biased. As a result, we also report specifications in which we include an indicator variable for each firm and each calendar year (i.e., we estimate a fixed effects model for both firms and years). We report the results of these regressions in Table 2. We also estimate separate regressions for each year. The results of these regressions are summarized in Table 3.

4.4. Two-stage least squares regressions

Columns 2 and 3 of Table 2 report the estimated coefficients of the two-stage least squares regressions with industry-adjusted PP&E expenditures as the dependent variable (the column 3 regression includes fixed effects, while the column 2 regression does not). Columns 4 and 5 report similar regressions with industry-ad-

Table 2
Two-stage least square regressions of scaled and industry-adjusted expenditures for PP&E and R&D

	Industry-adjusted PP&E expenditures		Industry-adjusted R&D expenditures	
Intercept	−0.016 (2.3)	−0.102 (4.5)	0.016 (4.1)	0.037 (9.6)
Market-to-book ratio	0.010 (13.0)	0.002 (1.5)	0.007 (18.1)	−0.002 (0.7)
Debt/assets	−0.130 (15.8)	−0.119 (5.3)	−0.047 (10.0)	−0.007 (2.0)
Operating income/assets	0.209 (16.0)	0.406 (15.2)	−0.228 (31.0)	0.009 (2.2)
Insider ownership	0.208 (8.9)	0.011 (0.2)	0.017 (1.3)	−0.026 (1.5)
(Insider ownership)^2	−0.225 (−7.0)	0.049 (0.6)	−0.01 (0.9)	0.021 (1.5)
Total institutional ownership	0.077 (5.1)	0.066 (5.0)	0.048 (6.4)	0.074 (4.5)
Fixed effects	No	Yes	No	Yes
Number of firm-year observations	12,826	12,826	6141	6141

This table presents estimates of two-stage least squares regressions of PP&E and R&D expenditures on control variables and the level of institutional ownership. The dependent variable is the level of expenditures for PP&E in year t divided by the total book value of PP&E at year $t-1$ or R&D expenditure in year t divided by sales in year t, minus the median of this ratio for firms in the industry. Industries are matched on the basis of three-digit SIC codes. The instruments used in the first stage regressions are the lagged values of the exogenous variables, the lagged market value of equity, the lagged annualized dividend yield and a dummy variable equal to one if the firm is a member of the S&P 500 (and zero otherwise). t-Statistics are reported in parentheses below the parameter estimates.

Table 3
Selected coefficients from year-by-year two-stage least square regressions of scaled and industry-adjusted expenditures for PP&E and R&D

Year	Institutional ownership coefficients from year-by-year PP&E expenditure regressions	Institutional ownership coefficients from year-by-year R&D expenditure regressions
1988	0.055 (1.2)	0.001 (1.4)
1989	0.014 (1.3)	0.044 (2.1)
1990	0.050 (2.0)	0.056 (2.0)
1991	0.071 (2.8)	0.031 (1.2)
1992	0.101 (2.7)	0.065 (3.1)
1993	0.138 (3.1)	0.110 (3.9)
1994	0.033 (2.4)	0.036 (2.5)

This table presents coefficients for institutional ownership from year-by-year two-stage least squares regressions of PP&E and R&D expenditures on control variables and the level of institutional ownership. The dependent variable is the level of expenditures for PP&E in year t divided by the total book value of PP&E at year $t-1$ or R&D expenditure in year t divided by sales in year t minus the median of this ratio for firms in the industry. Industries are matched on the basis of three-digit SIC codes. The instruments used in the first stage regressions are the lagged values of the exogenous variables, the lagged market value of equity, the lagged annualized dividend yield and a dummy variable equal to one if the firm is a member of the S&P 500 (and zero otherwise). *t*-Statistics are reported in parentheses below the parameter estimates.

justed R&D expenditures as the dependent variable. *T*-Statistics are reported in parentheses below the estimated coefficients.

In each of the four regressions, the coefficient of the relevant measure of institutional ownership is positive and has a *t*-statistic greater than 2.00. Thus, according to the regression results, not only do institutions not ''cause'' myopia; institutional share ownership appears to lead to greater expenditures for PP&E and R&D than does ownership of shares by individual investors.

Table 3 reports only the coefficients and the *t*-statistics of the institutional ownership variables for the year-by-year two-stage least squares regressions with firm-level fixed effects. (In general, the coefficients of the control variables, which are not shown, are the same sign as those in Table 2.) In the PP&E regressions, each of the seven coefficients on institutional ownership are positive, and five out of the seven have *t*-statistics greater than 2.00 (column 2). Similarly, in the R&D regressions, all seven coefficients on institutional ownership are positive and five have *t*-statistics greater than 2.00. Thus, the year-by-year regressions, too, do not support the argument that institutions ''cause'' corporate managers to invest less in projects with long-term payoffs. Indeed, to the extent that any relationship is evident, it is that institutional investors allow firms to invest more in projects with long-term payoffs than would individual investors.

Of course, statistical significance is not the same as economic significance. Because PP&E and R&D expenditures are measured as scaled deviations from

the industry median, the coefficients for the fraction of shares owned by institutions have to be interpreted as measuring increases or decreases in industry-adjusted scaled expenditures for PP&E or R&D. For example, the coefficient on the fraction of shares owned by institutions in the fixed effects PP&E regression is 0.066 (column 3 of Table 2) implying that a 1% change in the fraction of shares owned by institutions is associated with an increase in the industry-adjusted scaled PP&E ratio of about 0.0007. For a firm moving from the 25th percentile to the 75th percentile in institutional ownership in 1990 (from 12.6% to 48.1%), the implied increase in the industry-adjusted PP&E expenditure is 0.025. The median scaled PP&E expenditure for the entire sample of firms is approximately 0.20. For a firm with a total book value of $100 million in PP&E and an annual PP&E expenditure of $20 million, the implied increase in annual PP&E expenditure based on the regression coefficient is $2.5 million. A similar calculation for the coefficient of the fraction of shares owned by institutions in the fixed effects R&D expenditure regression (which is 0.074), indicates that a firm moving from the 25th percentile in institutional ownership to the 75th percentile, would experience an increase in the industry-adjusted R&D ratio of 0.0026. The median scaled R&D expenditure is about 0.03. Thus, for a firm with sales of $100 million and an annual R&D expenditure of $3 million, the implied annual increase in R&D expenditure is $78,000.

Another way to determine whether these effects are economically significant is to compare the coefficients with other explanatory variables in the regressions. Consider, for example, the coefficient of the market-to-book ratio. In the first PP&E regression (column 2 of Table 3), the coefficient of the fraction of shares owned by institutions in the PP&E regression is over seven times that of the market-to-book ratio. For the R&D regression (column 4 of Table 3), the coefficient of the fraction of shares owned by institutions is six times that of the market-to-book ratio. We view these as economically consequential. Whether others share this view depends, of course, on the eye of the beholder. Regardless, the regression results appear to soundly reject the argument that increases in the fraction of shares owned by institutional investors cause corporate managers to invest less in projects with long-term payoffs than they would if those shares were owned directly by individual investors.

4.5. Change regressions

Table 4 reports the results of regressions of changes in PP&E and R&D expenditures from year $t-1$ to year t on changes in institutional ownership (and other control variables) from year $t-2$ to year $t-1$. These first-difference regressions are appealing in that they help distinguish between causation (institutions allowing managers to make long-term expenditures) and a clientele effect (institutions purchasing equity in high expenditure firms).

Table 4
Ordinary least square regressions of changes in scaled and industry-adjusted expenditures for PP&E and R&D

	Δ Industry-adjusted PP&E expenditures $(t, t-1)$		Δ Industry-adjusted R&D expenditures $(t, t-1)$	
Intercept	−0.190 (9.8)	−0.19 (10.0)	−0.001 (1.6)	−0.001 (1.3)
Δ Market-to-book ratio $(t-1, t-2)$	0.005 (4.4)	0.003 (2.6)	−0.001 (1.3)	−0.001 (1.2)
Δ Debt/assets $(t-1, t-2)$	−0.145 (6.6)	−0.150 (5.9)	0.014 (2.6)	0.035 (5.9)
Δ Operating income/assets $(t-1, t-2)$	0.281 (11.1)	0.256 (8.4)	0.018 (3.2)	0.032 (4.9)
Δ Insider ownership $(t-1, t-2)$	0.037 (1.7)	0.001 (0.0)	−0.013 (2.4)	−0.009 (1.6)
Δ Total institutional ownership $(t-1, t-2)$	0.053 (2.5)	0.044 (2.0)	0.002 (1.3)	0.001 (1.2)
Fixed effects	No	Yes	No	Yes
Number of firm-year observations	7459	7459	4731	4731

This table presents estimates of regressions of changes (from $t-1$ to t) in PP&E and R&D expenditures on changes in control variables and changes in the level of institutional ownership. The dependent variable is the change in the industry-adjusted, scaled PP&E and R&D expenditure. PP&E expenditures in each year are scaled by the total book value of PP&E at year $t-1$ and R&D expenditures in each year are scaled by sales in the same year. The industry adjustment is made by subtracting the median ratio for firms in the industry. Industries are matched on the basis of three-digit SIC codes. Changes in the exogenous variables are computed from year $t-2$ to year $t-1$. *t*-statistics are reported in parentheses below the parameter estimates.

Columns 2 and 3 report coefficients of regressions with changes in PP&E expenditures as the dependent variable; the column 3 regression includes fixed effects while the column 2 regression does not. Similarly, columns 4 and 5 report regressions with changes in R&D expenditures as the dependent variable. *t*-Statistics appear in parentheses, below the coefficients.

In all four regressions, the coefficient on the change in institutional ownership is positive. In the PP&E regressions, both coefficients on the change in institutional ownership have a *t*-statistic greater than 2.0. In the R&D regression, however, the *t*-statistics are 1.3 and 1.2, respectively. Thus, the change regressions also do not support the notion that institutions cause managers to invest less in project with long-term payoffs.

4.6. Institutional portfolio turnover

As we have noted, it is sometimes argued that only those institutions who trade most actively induce myopia on the part of corporate managers. Because the

Table 5
Year-by-year portfolio turnover of institutions

	Turnover quintile 1 (lowest)	Turnover quintile 2	Turnover quintile 3	Turnover quintile 4	Turnover quintile 5 (highest)
1988	0.026	0.094	0.159	0.250	0.628
1989	0.019	0.090	0.158	0.257	0.652
1990	0.024	0.091	0.150	0.257	0.726
1991	0.022	0.095	0.165	0.263	0.626
1992	0.030	0.090	0.162	0.261	0.798
1993	0.035	0.120	0.194	0.308	0.712
1994	0.034	0.113	0.189	0.305	0.718

This table presents statistics on the portfolio turnover of institutional investors. Portfolio turnover quintiles are formed at the end of each year by calculating the portfolio turnover of each institution during the fourth quarter. The number in each cell is the average turnover of the institutions in the quintile.

regressions reported in Tables 2–4 combine heterogeneous institutions, it is possible that this pooling masks a fundamental relationship that is more pronounced among those institutions that trade most actively. To examine this possibility, we estimate regressions conditional on portfolio turnover of the institutions.

To conduct this analysis, we calculate the portfolio turnover of each institution, during the fourth quarter of each year as:

$$\text{PortTurn}_{jt} = \frac{\sum_{i=1}^{N} \left| \text{Shr}_{jit} \text{AvgP}_{it} - \text{Shr}_{jit-1} \text{AvgP}_{it} \right|}{\sum_{i=1}^{N} \text{Shr}_{jit-1} \text{AvgP}_{it}}$$

where Shr_{jit} is the number of shares owned by institution j in firm i at time t, AvgP_{it} is the average of the beginning and end-of-quarter price of stock i at time t, and N_{jt} is the number of firms in institution js portfolio at time t.[9] We rank institutions from lowest to highest turnover each year based on their turnover in the fourth quarter. We then classify institutions into quintiles. Because new institutions enter the sample each year, we reformulate the quintiles each year.

Table 5 reports the average portfolio turnover for each turnover quintile for each year. The data show considerable variation in portfolio turnover across quintiles. For example, in 1991, for the highest turnover quintile, the average quarterly portfolio turnover is 0.626, which implies an average annual turnover of

[9] We adjust all the holdings data for stock splits. Our results are unchanged whether we use beginning-of-quarter, end-of-quarter or average prices in computing portfolio turnover.

2.48, and, therefore, an average holding period of less than 5 months. For the lowest turnover quintile, the implied average annual turnover is 0.088 for an implied average holding period of over 11 years. The data show a modest upward trend in turnover through time. In 1988, for the entire sample, the average annual turnover is 0.92; for 1994, for the entire sample, the average annual turnover is 1.08.[10]

4.7. Institutional portfolio turnover and long-term expenditures

We now re-estimate the regressions of Tables 2 and 4 except that institutional ownership is decomposed across the trading-activity quintiles. For each firm, the fraction of shares (or the change in the fraction of shares) owned by institutions in each trading-activity quintile is entered as a separate independent variable. There are, thus, five independent ''institutional ownership'' variables in each regression. If some firms do exhibit institutionally induced myopia, and if it is the trading activity of institutional investors that gives rise to this effect, then the effect should be most pronounced among firms whose ownership is most concentrated among institutions that trade the most frequently. For our purposes, the prediction is that the coefficients of institutional share ownership and change in institutional share ownership should be negative for high turnover quintiles (i.e., quintiles 4 and 5 are predicted to have negative coefficients or, at a minimum, to have coefficients that are significantly lower than those of quintiles 1 and 2).

Unfortunately, we can think of no good instrumental variables for the ownership of each quintile. Therefore, we cannot estimate regressions using the two-stage least squares procedure employed in Tables 2 and 3. However, we can ensure that the ownership in each quintile is at least predetermined by employing a 1-year lag. The results of these regressions are reported in columns 2 (for PP&E expenditures) and 4 (for R&D expenditures) of Table 6. The change regressions are estimated in a manner similar to those in Table 4 and are reported in columns 3 and 5. Although control variables are included in all the regressions, to conserve space, we do not report their coefficients.

In both level regressions (columns 2 and 4), for portfolio turnover quintiles 4 and 5, the coefficient of the institutional ownership variable is positive. Three out of four coefficients have *t*-statistics greater than 2.00 and one has a *t*-statistic of 1.9. Contrarily, for quintiles 1 and 2, across the two regressions, three of the four coefficients are negative, but all have *t*-statistics less than 2.00.

A similar pattern is evident in the change regressions, although the statistical significance is somewhat reduced. For portfolio turnover quintiles 4 and 5, the

[10] For all the years and for all institutions, the average annual turnover is 0.84. Perhaps surprisingly, this rate of turnover is similar to the 0.80 annual turnover for individual investors reported by Barber and Odean (1998).

Table 6
Selected coefficients from fixed effects regressions of levels and changes in scaled and industry-adjusted expenditures for PP&E and R&D using portfolio turnover quintiles

	PP&E expenditures		R&D expenditures	
	Industry-adjusted expenditures	Δ Industry-adjusted expenditures $(t, t-1)$	Industry-adjusted expenditures	Δ Industry-adjusted expenditures $(t, t-1)$
Ownership of quintile 1 $(t-1)$	−0.003 (0.1)	–	−0.002 (0.2)	–
Ownership of quintile 2 $(t-1)$	−0.055 (1.2)	–	0.007 (0.8)	–
Ownership of quintile 3 $(t-1)$	−0.043 (1.6)	–	0.001 (0.1)	–
Ownership of quintile 4 $(t-1)$	0.065 (2.5)	–	0.003 (1.9)	–
Ownership of quintile 5 $(t-1)$	0.186 (5.9)	–	0.006 (2.7)	–
Δ Ownership of quintile 1 $(t-1, t-2)$	–	0.030 (0.6)	–	0.001 (0.1)
Δ Ownership of quintile 2 $(t-1, t-2)$	–	−0.022 (0.5)	–	−0.002 (0.2)
Δ Ownership of quintile 3 $(t-1, t-2)$	–	−0.035 (1.0)	–	−0.005 (0.6)
Δ Ownership of quintile 4 $(t-1, t-2)$	–	0.024 (0.7)	–	0.003 (0.4)
Δ Ownership of quintile 5 $(t-1, t-2)$	–	0.147 (3.8)	–	0.005 (1.6)

This table presents selected coefficients from fixed effects regressions of PP&E and R&D expenditures and changes in PP&E and R&D expenditures on control variables, the lagged level of institutional ownership in each portfolio turnover quintile and lagged changes in institutional ownership in each portfolio turnover quintile. Turnover quintiles are formed at the end of the year by calculating the turnover of each institution relative to the previous quarter. Coefficients for control variables are not shown. *t*-Statistics are reported in parentheses below the parameter estimates.

coefficients on change in ownership are positive in both regressions, but only one has a *t*-statistic greater than 2.00. For the low turnover institutions (turnover quintiles 1 and 2), two coefficients are negative and two are positive, but none have *t*-statistics greater than 2.00.

In general, the results in Table 6 do not provide support for the argument that active institutional trading exacerbates corporate myopia. Indeed, they provide some support for the alternative perspective that institutional investors allow managers to adopt longer investment horizons than would individual shareholders.

4.8. Other regression specifications

We perform a battery of checks to assess the robustness of our results. We discuss the results below, but do not report them in separate tables.

First, we re-estimate each regression by scaling expenditures for PP&E by total assets and by total sales and by scaling R&D expenditures by total assets. The sign and significance of the coefficients of institutional ownership are generally unchanged.

Second, we construct an alternative measure of portfolio turnover which normalizes the share ownership of an institution by the number of shares outstanding rather than share prices and re-estimate the regressions of Table 6. This measure of portfolio turnover turns out to be highly correlated with our earlier measure so that (not surprisingly) the sign and significance of the quintile ownership coefficients are largely unchanged. We also use the ownership of various types of institutions (such as mutual funds, pension funds, investment advisors, etc.) as independent variables, instead of the ownership of portfolio-turnover quintiles. Such categorizations are correlated with portfolio turnover in our sample; portfolio turnover is high for mutual funds and investment advisors and low for pension funds and endowments. As a result, coefficients on mutual funds and investment advisors are positive, and often statistically significant, in both PP&E and R&D regressions. Coefficients on other types of institutions are often also positive but frequently not statistically significant.

Third, we estimate all regressions with firm-level PP&E and R&D expenditures as the dependent variable and industry indicator variables as independent variables to control for industry effects (rather than using industry-adjusted PP&E and R&D). Again, the signs and significance of the institutional ownership coefficients of the various regressions are largely unchanged.

Fourth, we estimate the regressions in Table 2 with a control variable to account for compensation policy. Specifically, we use the ratio of long-term compensation to total compensation (of the CEO and all insiders) as an additional independent variable in both the PP&E and R&D regressions. While the sample sizes are smaller (1500 firm-year observations for the PP&E regression and 700 firm-year observations for the R&D regression), this compensation variable is not

statistically significant. However, the coefficient on institutional ownership retains its positive sign and statistical significance.

Finally, we also estimate regressions similar to those in Tables 2 and 3, but with institutional ownership and control variables from the prior year $(t-1)$ as independent variables. We still employ a two-stage least squares procedure, but use instruments from $t-2$ in the first stage regressions to obtain a predicted value of institutional ownership in $t-1$. The results of these regressions are qualitatively similar to those reported in Tables 2 and 3.

5. Commentary and conclusion

With a sample of approximately 2500 firms from 1988 to 1994, we show that firm-level expenditures for PP&E and R&D are positively related to the level of share ownership and trading activity of institutional investors in those firms. Our results cast doubt on the view that institutions cause corporate managers to behave myopically relative to whatever myopia may be induced by direct share ownership by individual investors. They are consistent with the perspective that institutional investors act as a buffer between firms and less patient individual investors. One of the consequences of this buffer is that it allows managers to have longer investment horizons than they would otherwise have.

This investigation was undertaken in large part in response to commentators and authors who have lamented that the structure of share ownership in the US has (at least historically) placed US firms at a competitive disadvantage relative to certain other countries, especially Japan and Germany. According to these lamentations, Japanese and German firms are endowed with patient investors who allow corporate managers to take a long-term view. In contrast, US stock market investors have been alleged to be impatient. The patience of Japanese and German investors is alleged derived from the structure of share ownership in those countries. In both cases, stock ownership is concentrated in commercial banks, which are also permitted to play a major role in the governance of the companies in which they hold stakes.

In contrast, in the US, institutional investors are largely institutional investment managers who individually typically own less than 1% of the firm's stock. These investment managers are alleged to be judged on the basis of quarterly performance, which causes them, in turn, to churn their portfolios in a constant search for the next quarter's winners. The consequence, so the lamentation goes, is that in the US, institutional investors exacerbate the natural impatience of individual investors; the end result is that corporate managers are forced to adopt a short-term horizon in which projects with long-term payoffs are sacrificed for the sake of the next quarter's earnings. The implication is that companies in which institutional investors own a substantial fraction of shares are induced to invest less in projects with long-term payoffs than companies that are not burdened with a concentration

of institutional investors among their shareholders. This view is summarized by Thurow (1993, p. 136):

> Today they (pension funds and mutual funds) own 60 to 70 percent of the shares of most publicly listed companies. As a result, the United States has organized a system that is the exact opposite of that of Germany and Japan. Those countries have organized a system (business groups) to minimize the influence and power of impatient shareholders, while the United States has organized a system (fund dominance) to maximize the influence of impatient shareholders.

Despair-laden pronouncements such as those of Thurow were often made in conjunction with a call for government-initiated ''coordinated trade and industrial policy'' — calls that sounded a lot like calls for central planning. The resurgence of the US economy during the latter part of the 1990s has muted such calls. Even so, the results of our empirical analysis do not support one of the fundamental premises that underlay those calls to action to begin with. Rather than lower levels of investment outlays, we find that expenditures for PP&E and R&D are higher in firms with a larger fraction of shares held by institutional investors and that expenditures are especially high among firms held by institutions that trade most actively.

At least two caveats are in order when interpreting our results. First, we do not address the question of whether US firms systematically underinvest relative to firms in other parts of the world. That question is, however, examined carefully by Hall and Weinstein (1996) and Lee (1997). These authors find no evidence that managers of US firms are myopic relative to managers of Japanese and German firms.

Second, we can be accused of examining the ''easiest'' investment categories to analyze, PP&E and R&D, while ignoring those in which the problem of underinvestment is likely to be most severe. Froot et al. (1992) argue that the type of underinvestment that can be engendered by myopic investors is more likely to manifest itself in difficult to observe investments such as development of human resources and the costs incurred in the development of customer loyalty. To the extent that that argument is true, we are missing the target. We can, therefore, only claim that we can find no evidence that institutional investors exacerbate underinvestment in PP&E and R&D, which may very well be different from the conclusion that institutional investors do not exacerbate underinvestment in projects with long-term payoffs.

With these caveats in mind, the data do not indicate that institutional investors cause managers to underinvest. Rather, to the contrary, share ownership by institutional investors appears to allow US corporate managers to invest more in projects with long-term payoffs than would direct share ownership by individual investors.

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