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THE LONG-TERM ORIENTATION OF INSTITUTIONAL INVESTORS: AN EMPIRICAL INVESTIGATION

Abstract

In this paper we report the results of a study investigating U.S. institutional investors' myopia. Treating institutional ownership as an endogenous variable, we analyze whether institutions prefer to invest in those corporations which have a long-term orientation, as measured by their research and development expenditures to sales ratios. Our tests are conducted on a randomly-chosen cross-sectional sample of firms for the 10 year period 1980 through 1989. The results indicate that institutions do prefer to invest in firms which are long-term oriented, are robust after controlling for the impact of other possible factors which can influence institutional investment, and we find that levels of institutional investment are also positively related to the current performance levels of firms; however, the effects of R&D expenditures and performance are independent of one another. We also evaluate if period-to-period changes in the explanatory variables are associated with changes in investment levels, and find that changes in R&D expenditures do lead to changes in the proportion of institutional ownership. However, a less-stronger, though positive, effect is established between changes in performance levels and changes in institutional ownership. Our evidence does not support the notion that institutional investors are myopic, and helps to partly refute a popular assertion that corporate myopia may be the result of capital market myopia.

1. INTRODUCTION

In the last decade arguments have been made that decline in U.S. competitiveness is due to the short-term pre-occupations of managers (Hayes and Abernathy, 1980; Jacobs, 1991). Many (Ellsworth, 1985; Mitroff, 1987; Whitehouse, 1992) have attributed such declines in vigor to the short-term pressures generated by institutional investors, with these pressures having a negative effect on U.S. long-term competitiveness.[1] The views articulated are based on the assumption that capital markets are myopic. Institutions have become increasingly important in capital markets.[2] Yet, little evidence exists as to whether institutional investors are myopic.

In this paper we report evidence gathered from a study in which we evaluate the existence of institutional investors' myopia. We document whether or not institutional investors (rationally) prefer to invest in those corporations which display greater long-term orientation, and, following Jarrell, Lehn and Marr (1985), measure firms' long-term orientation by their research and development (R&D)

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[1] For example, Drucker (1986:31) has written: "everyone who has worked with American managements can testify that the need to satisfy the pension fund manager's quest for higher earnings next quarter, together with the panicky fear of the raider, constantly push top management toward decisions they know to be costly, if not suicidal, mistakes. The damage is greatest where we can least afford it: in the fast-growing middle sized high-tech or high engineering firms that need to put every available penny into tomorrow-research, product development, market development, people development--least it lose leadership for itself and the U.S. economy."

[2] It is estimated that institutions hold half the world's outstanding equities (O'Barr and Conley, 1992), and a recent estimate of institutional shareholdings in U.S. corporations puts the value of their holdings at $5 trillion (Brancato, 1990). The value of such shareholdings represent about 45 percent of all outstanding equities, and for the top 250 companies ranked by stock market value, the proportion held averages 53 percent.

spending patterns. Our primary objective in this study is to assess whether institutional ownership[3] is higher in firms incurring higher R&D expenditures, and the null hypothesis is that institutional investors prefer to invest in firm with lower R&D expenditures. We control for several secondary factors which may influence the level of institutional investments. Our analysis is structured around a sample of U.S. corporations for the years 1980 to 1989. The period studied has witnessed significant transformation within the U.S. capital market, and our results will be an empirical contribution to the on-going debate on the existence of capital market myopia.

The paper unfolds as follows. In section 2 we review various issues associated with institutional investors and capital market myopia. In section 3 we describe our research approach. In section 4 we discuss our results, and section 5 records our conclusions.

2. ISSUES RELATING TO INSTITUTIONAL INVESTORS

There are two assertions made with respect to the impact institutional investors have had on firms' long-term orientation. The first assertion made in the popular literature is that institutional investors induce corporate myopia, which, amomg other things, is reflected in a decline in firm-level R&D expenditures. One reason ascribed is the short-term time horizons of institutions. In other words, institutions themselves are myopic. Such behavioral characteristics of institutions are reflected in portfolio churning, positive-feedback trading and window dressing by fund managers, as quarterly performance monitoring motivates them to exit stock positions whenever firms' earnings reports are bad. Corporate decisions are influenced by a need to increase reported quarterly earnings, for the

[3] Throughout this paper the term institutional investor and institutional owner are inter-changeable. Also, the term encompasses pension funds, investment companies, insurance companies, non-pension bank trust and foundations.

benefit of the institutional investor community, through decreases in long-term oriented expenditures. Thereby, stock prices can be kept high (Morrow, Robinson and Dee, 1988; Raynolds, 1989).

The second view holds that when institutions sell their holdings, the volume of shares they dispose of leads to destabilization of stock prices. This makes firms attractive takeover targets. To protect their own positions, managers in such firms find it necessary to increase stock prices. Thus, even if some institutional investors sell their holdings and depress prices, the decline is not enough to trigger a takeover bid. One way of increasing stock prices is by increasing current earnings through the cutting back of long-term expenditures. Thus, the presence of a large number of institutional investors is presumed to lead to an inability of firms to make long-term investments (Elicker, 1985). Yet, the evidence that institutional investors tend to destabilize stock prices is not positive (Lakonoshik, Shleifer and Vishny, 1992).

Conversely, there is nothing in the literature as to if, and why, institutions may take a long-term view. Capital markets theory holds that the various entities that constitute the financial market take a long-term view of corporate actions, and as shareholders are interested in maximizing the long-term value of the firm. This entails evaluating strategic investment decisions, for example on R&D expenditures, which may have distant pay-offs and about which information is made public by corporations. Absent information asymmetries, which may lead to high transactions costs, the market provides unbiased estimates about the impact such long-term investments will have on firm long-term value. Price-earning ratios, therefore, reflect more than just current performance (Kon and Jen, 1979; Rappaport, 1983).

In the literature there is an absence of reasons as to what may facilitate institutions in taking a long-term view. One explanation can be the following. Institutions possess scale economies in information processing. This can help to reduce information asymmetry (Barzel, 1977) and the ability of managers to exploit such asymmetries (Myers and Majluf, 1984), obviating transaction cost problems. Not only are search costs of which are the better investment opportunities likely to be reduced, but collective decision costs relating to security purchase may be reduced as well. If there is the need to police management, monitoring costs can decline, as the ability of managers to fulfill strategic promises can be ascertained. Therefore, institutional investors' decisions on stock purchases can be based on a full consideration of the underlying fundamental strategic and organizational attributes of each firm, rather than on simple heuristics, and signals about firms' long-term orientation can be carefully interpreted.

Data gathered over the past decade (Chan, Martin and Kensinger, 1990; Cockburn and Griliches, 1988; Hall, 1993; Jarrell, Lehn and Marr, 1985; McConnell and Muscarella, 1985; Pakes, 1985; Woolridge, 1988) show that the capital market, as a whole, views long-term investments favorably. However, the acquisition of such evidence has been at an aggregate level. Evidence as to whether institutional investors favor firms with a long-term orientation is absent in the literature, and the only evidence is experimental (Pound and Shiller, 1987).

3. EMPIRICAL ANALYSIS

We undertake a longitudinal examination of panel-data over a ten-year period, 1980 to 1989, for a random sample of 137 firms to evaluate the relationship between firms' long-term orientation and the incidence of institutional ownership, treating institutional ownership as an endogenous variable. For

the panel of firms we obtain data about their long-term oriented activities, measured by their R & D expenditures from the COMPUSTAT data base, as well as from hard copy of 10-K and annual reports. Data about the patterns of institutional ownership of stocks are obtained from SPECTRUM 3, published by CDA Investment Technologies, Inc. Using a model that simultaneously corrects for cross-sectional heteroscedasticity and time-wise autoregression (Kmenta, 1986), we estimate a series of pooled cross-section and time-series regression models to establish existence of the specified relationships.

The use of a panel data-set has several advantages. We have multiple observations on each firm in the sample and this gives us a large number of data points, increasing the degrees of freedom and the potential to reduce collinearity among possible explanatory variables. Second, panel data allows us to gauge the behavioral dynamics of complicated questions in more depth than purely cross-sectional or time-series models. This is particularly important for the issue we are investigating. Given the growth in institutional investment over time, a cross-sectional data-set does not permit us to draw any inferences of relationships between changes in firm-level behavior and changes in investors' preferences. However, with time-series data for a group of firms we can attempt to correlate cause and effect to ascertain if changes in firms' behavior are associated with changes in investors' behavior. Third, by utilizing information on both inter-temporal dynamics and the individuality of the entities being investigated, we are able to more naturally control for unobserved or missing variables (Hsiao, 1986).

Data

The COMPUSTAT data-base provides annual financial information of corporations listed on U.S. stock exchanges. We first generate a random sample of 500 manufacturing firms for all the years in the ten year period 1980 through 1989, both inclusive. Randomization is a process through which we can attempt to control for many unobservable factors, and we also attempt a first-order canceling out of any systemic errors or biases in the data. Thereafter, we impose the following constraints on the data. Our key explanatory variable is R&D expenditures. This variable is a proxy for long-term horizons of firms in the relevant literature (Cockburn and Griliches, 1988; Cohen and Levin, 1989; Hall, 1993; Jarrell, Lehn and Marr, 1985; Pakes, 1985). We ensure that data for all 10 time-periods is available with respect to research and development (R&D) expenditures.

The primary elimination of firms from the sample is based on R&D data availability for 10 years. A major problem that has beset firm-level studies where R&D expenditure is a key variable is the availability of data. While firms do report R&D data in the hard copy of their annual reports and 10-K statements, such data are not always input into the COMPUSTAT data-base, and a review of the data-base reveals many blank entries for R&D numbers. This problem is especially acute for the earlier years of our study. Even in contemporary COMPUSTAT files (say, for the last five years) there are many instances of R&D expenditure being unrecorded, though firms have to disclose them in their financial statements.

Towards building a panel of firms with R&D data, we eliminate all firms for which we do not have at least five years' R&D data input into COMPUSTAT from our initial sample of 500 firms. Thereafter, for the remaining firms we try to obtain data from the hard copy of 10-K and annual reports of R&D expenditures. For our final sample, we discard all firms for which we do not have the ten year

R&D data series. We have had to eliminate both large and small firms for which data had not been input into the COMPUSTAT files. For example, there are several large FORTUNE 500 companies in respect of which R&D expenditure data are uniformly not input into the COMPUSTAT tapes, and we have had to discard these firms from our sample. We adopt this strategy because we use a panel data set, and randomly missing data within the panel can cause estimation problems (Hsiao, 1986).

The second key piece of information relates to the percentage of institutional ownership in the stocks of these firms. We obtain this data, as earlier mentioned, from SPECTRUM 3, and again ensure that we have data on all firms for all time periods. Where this is not possible, we obtain institutional ownership data from Standard and Poor's quarterly stock report. If we perceive that there is a likely conflict in the pattern of the institutional ownership proportions between SPECTRUM 3 and Standard and Poor's records in any year, we eliminate the firm from our data-base of observations. The final result of our data collection efforts is a data-set of 137 firms, on which we have all the data noted in this and the preceding paragraphs for each year between 1980 and 1989. Data for other variables are more easily available from the COMPUSTAT data-base.

A review of the key descriptive statistics for our randomly-selected sample of 137 firms shows that significant variation exists in our data. Descriptive statistics for the sample of companies studied are given in Table 1.

[Insert Table 1 Here]

In keeping with the overall trend in the rise of institutional investment in the U.S. economy, within our sample of firms the average percentage of institutional ownership rises from 27 percent in 1980 to 48 percent in 1989. The rise is steady and monotonic. The biggest jumps in the percentage of

institutional ownership are noticed between 1980 and 1981 and 1985 and 1986. Correspondingly, the standard deviation is stable at around 19 percent, and the coefficient of variation drops from 0.72 in 1980 to 0.39 in 1989, as a result of the increases in average holdings. The minimum institutional ownership percentage is negligible, while the maximum has ranged between 77 percent and 90 percent in the ten year period.

R&D spending by firms, as a proportion of sales, also rises between 1980 and 1989, though not as steeply as the rise in institutional investment. The proportion of R&D expenditures as a proportion of sales ranges from .027 (or 2.7 percent of sales) in 1980 to .042 (or 4.2 percent of sales) in 1988, though it drops to .038 in 1989. However, the firm-level variation is high. The coefficient of variation is also relatively stable at around 1 for almost all the years. Minimum R&D spending as a percentage of sales is almost zero, and maximum spending is substantially above average levels. These trends point to substantial variation in the primary variables of our study. Additionally, we have shown how institutional investments have been increasing. If the presence of institutions is likely to have induced corporate myopia, then a trend we would have noted in our data is a decline in R&D spending relative to sales. However, this rises from under 3 percent of sales in 1980 to around 4 percent of sales by 1989. This is preliminary evidence that short-termism may not be as widely prevalent as assumed.

Average sales range from $2.8 billion in 1980 to $3.9 billion in 1989, and the standard deviation ranges between $7 billion and $10 billion. There is a slight decline in the coefficient of variation, however, because average sales are rising over time. In our sample we have included firms ranging in size from those with sales of a few million dollars a year to those whose sales approach $100 billion. The minimum sales value rises from $6.5 million to $44 million over the ten year period, while

the maximum value is around $100 billion. The sample is a representative cross-section of the corporate sector, and we cover twenty-two industry categories.

Model and Estimation

To test whether institutional investors are positively attracted to firms that are more long-term oriented, we regress the proportion of institutional ownership in firm *i* in time *t* on a measure capturing firms' long-term orientation which is R&D expenditures. We estimate regression models where the data are both contemporaneous and lagged, and regressions in first-difference to evaluate if changes in firms' behavior are associated with changes in institutional behavior. The model estimated is: $INSTOWN_{it} = f (\beta_1 RNDSLS_{it}, \beta_2 NISLS_{it}, \beta_3 CAPEXSLS_{it}, \beta_4 DIVNI_{it})$, where: $INSTOWN_{it}$ = Percent of institutional investment in the i^{th} firm in time t; $RNDSLS_{it}$ = Proportion of R&D expenditures to sales incurred the i^{th} firm in time t; $NISLS_{it}$ = Net income earned by the i^{th} firm in time t expressed as a proportion of sales; $CAPEXSLS_{it}$ = Proportion of capital expenditures to sales incurred by the i^{th} firm in time t; $DIVNI_{it}$ = Proportion of net income paid out as dividend by the i^{th} firm in time t, and ε_{it} = an error term

The R&D spending variable, and net income and capital expenditures are scaled by sales, to control for size effects. Firm size is a necessary factor we need to control for in estimating our regressions for two reasons. Size is a key determinant of R&D activity (Cohen and Levin, 1989), though contemporary evidence (Acs and Audretsch, 1991) is inconclusive about the ability of larger firms to either spend more on R&D, or gain greater benefits from such spending. Also, institutions are noted to be attracted towards larger firms, and have a greater proportion of their portfolios comprising of large-company stocks (Lakonoshik, Shleifer and Vishny, 1992).

A firm-level effect that we control for is performance. Superior current performance is a factor likely to influence investment by institutions (Lakonishok, Shleifer, Thaler and Vishny, 1991); therefore, β_2 will be positive and significant. Relatively superior performance also implies that firms are likely to have greater amounts of discretionary funds available for R&D. We control for performance effects by including *NISLS* as a variable in the regression. One other advantage of including *NISLS* as a co-variate is that it proxies for several other firm-specific factors that may influence institutional ownership. For example, market power or other sources of profitability can influence profitability (Hall, 1993). If a firm is able to exercise market power, it will be reflected in a higher NISLS ratio. Also, apart from incurring R&D expenditures, a firm can adopt various operating strategies, often unobservable, likely to impact on performance. The inclusion of *NISLS* as a variable enables us to incorporate a first-order control of various other firm-specific characteristics which are likely to influence institutional investors.

We also control for the likely effects of capital expenditures incurred by firms. Hall (1993) suggests that capital expenditures are more likely to yield pay-offs in the short-term, unlike R&D expenditures the impacts of which are felt in the longer-run. Finally, dividend policies are presumed to have a bearing on how investors evaluate firms. From the firm's perspective, a high dividend pay-out ratio is also assumed to be a way of increasing stock prices (Litzenberger and Ramaswamy, 1982); however, such payments occur at the sacrifice of long-term expenditures, and high dividend pay-out policies by firms have also generated concern among regulatory authorities such as the Bank of England (Marsh, 1990).

Miles (1993) suggests that the market as a whole is likely to favor short-term cash flows generated by firms which are actually paid out as dividends. Such an assumption about market behavior can be evaluated by reviewing the coefficient of the dividend payout ratio, expressed as the proportion of dividends to net income, which is introduced as a control variable. If the stated assumptions in the literature are correct, then the coefficients for *CAPEXSLS*, β_3, and *DIVNI*, β_4, are likely to be significant, while the coefficient of RNDSLS, β_1, will be insignificant. Conversely, if the long-term orientation hypothesis is valid, then β_1 will be significant, after including *CAPEXSLS* and *DIVNI* as controls in the full model. The use of the *DIVNI* variable as a co-variate also assumes importance because a high payout ratio means that a lesser amount of discretionary cash flow is available for spending on items such as R&D. See Cohen and Levin (1989) for a literature review of the determinants of firm-level R&D.If institutions are long-term oriented, we expect that β_4 will be insignificant; in the best possible circumstance β_4 will be negative, since firms will be perceived to be able to spend less on discretionary expenditures.

For estimation purposes, we pool the cross-section and time-series observations, where the data are represented by observations on 137 cross-sectional units over 10 periods of time, which are the years 1980 to 1989 both inclusive. There are 1370 observations. Such a model helps us capture time and individual observation effects, but the relationship between the disturbances of two firms at one point in time may be different than that between the disturbances of a specific firm over different time-periods. Following Kmenta (1986), because we initially pool all the heterogenous observations from a randomly-obtained sample, and several industry or firm-specific factors may be at play, our model combines assumptions about cross-sectional observations, that disturbances are mutually-

independent but heteroscedastic, with assumptions about time-series observations, that disturbances are autoregressive though not necessarily heteroscedastic, and estimate a cross-sectionally heteroscedastic and time-wise auto-regressive model. The model simultaneously eliminates biases due to heteroscedasticity and autocorrelation. The specific version used is contained in the SHAZAM computer program (White, Wong, Whistler and Haun, 1990).

In general, this model allows the value of the parameter ρ_i, the autocorrelation coefficient, to vary from one cross-sectional unit to another. However, ρ_i can also be restricted to be the same for all cross-sectional units. For estimating the contemporaneous and lagged estimates we adopt this procedure. In the contemporaneous case we are using the same time-frame to assess the impact of the independent variables on the dependent variable (Kmenta 1986: Eq. 12.32). Therefore, the time-specific effects that exist are assumed to impact all firms alike in each period.

4. RESULTS

In this section we highlight the results obtained, and discuss their implications. Table 2 presents our main results based on contemporaneous estimates. We regress *INSTOWN* on *RNDSLS*, as well as on several other co-variates: *NISLS, CAPEXSLS and DIVNI.*

[Insert Table 2 Here]

Contemporaneous Regression Estimates

Equation (a) shows results for the full model, where we regress *INSTOWN* on *RNDSLS* after also including the other co-variates. The *RNDSLS* coefficient is positive and significant ($p < .01$). We also estimate a model where both variables are expressed in their natural logarithms. The results are highly significant under such a specification ($t = 8.4$). The results of equation (a) prima-facie support

the long-term orientation hypothesis of institutional investors. While β_2 the coeeficient for *NISLS* is also significant in equation (a), and the coefficients for *CAPEXSLS* and *DIVNI* are respectively insignificant. In equation (b) *RNDSLS* is used alone as a regressor, and the results are very similar to those obtained in equation (a). In equation (c), β_2, the coefficient for *NISLS* is positive and significant ($p < .05$). The results in the full model, equation (a), are the strongest with respect to the impact of *RNDSLS* on *INSTOWN*.

We also estimate the model given in equation (a) with the addition of dummy variables to control for industry-specific effects. First, as Cohen and Levin (1989) have noted, there are specific industry-level influences on the level of R&D firms undertake. Second, Brancato (1990) has noted that average institutional ownership levels vary by industry. The inclusion of industry dummies controls for industry-level effects, and the results are still robust. The coefficient for *RNDSLS* is significant ($p < .01$); *NISLS* is still significant ($p < .10$) while the other variables remain insignificant. The Buse R^2 with industry effects added in is now .143. We next discuss the implications of the results that we have obtained so far.

If constituents of capital markets are short-sighted, they will systematically favor firms' actions that ensure short-term profitability and payouts. Therefore, the coefficients of *CAPEXSLS* and *DIVNI* are likely to be positive and significant. These turn out to be non-significant. The *NISLS* variable is positive and significant ($p < .05$) in equations (a) and (c) respectively. While such a finding is in keeping with prior evidence (Lakonoshik, Shleifer, Thaler and Vishny, 1991) that institutional investors seek to take positions in superior performing firms, *RNDSLS* when regressed alone, or regressed in conjunction with other co-variates, remains significant. Thus, institutional investors may look for

evidence of performance in firms they are likely to invest in, but in their investment decisions do consider R&D spending as a salient feature of firms.

There are several implications about the observed significance of the *NISLS* variable. An assumption is that R&D expenditures can be incurred because of the availability of cash flows, which in themselves are a function of the net income of the firm. If positive net income is unavailable, then discretionary cash balances available for funding R&D expenditures also reduce. Hence, institutional investors will prefer to invest in firms with higher *NISLS* ratios, because these firms have the necessary resources to fund long-term oriented expenditures. If this assumption is true, then *NISLS* will be significant when it is used as an individual regressor.

However, *NISLS* can also proxy for many other fundamental factors underlying a firm's performance. These factors can be market power, advertising effectiveness, or the possession of other idiosyncratic assets. As a result, *NISLS* can independently influence institutional investors decision to take positions in various firms. Our results establish that institutional investors do make their investment decisions based on firms' R&D expenditure patterns independently of firms' profitability. Profitability does matter, because the *NISLS* variable can capture the impact of other effects which institutional investors are also likely to take into account. They simultaneously evaluate a firms' long-term intentions as revealed by R&D spending patterns; but, also in consonance with the arguments in the literature (Beaver, 1968; Rappaport, 1983), institutions are likely to see long-term implications in reported earnings and use the data to assess the viability of firms as suitable investment vehicles.

Lagged Regression Estimates

So far we assume that investors base their decisions on contemporaneous data. Studies of capital market efficiency (Beaver, 1968) show that markets adjust rapidly to new information generated by firms. Also, given the present sophistication of information technology, there is considerable infrastructure in place which makes the reporting and dissemination of performance data rapid. However, investors are likely to be concerned that R&D expenditure patterns are stable. In other words, investment decisions are not likely to be made on the basis of one blip in R&D spending which may be anomalous, and which may be signalled by current levels of R&D expenditures. To evaluate if investors take past patterns of spending on R&D investments into account when they make their ownership decisions, we also estimate a model where each of the explanatory variables, as used in equation (1), are lagged one period.

To evaluate lag effects in institutions' decision-making we separately regress *INSTOWN* on lagged values of the explanatory variables, as well as on the lagged and current values of the variables. The regression results are shown in Table 3.

[Insert Table 3 Here]

In equation (d) *RNDSLS*, *NISLS* and *NISLS* lagged are significant (all at $p < .01$) and the magnitude of the *RNDSLS* is broadly similar to the estimates reported in Table 2. Lagged *RNDSLS* is not significant, while both lagged and current values of *CAPEXSLS* and *DIVNI* turn out to be non-significant. In equation (e) the explanatory variables are *RNDSLS* and *RNDSLS* lagged one period, and we evaluate the impact of lagged R&D spending after controlling for the impact of current R&D spending. Lagged R&D spending is insignificant; however, current R&D spending still remains positive

and significant ($p < .05$). The magnitude of the estimated coefficient for *RNDSLS* is also similar to all earlier estimates.

To evaluate the robustness of *NISLS* as an explanatory variable we estimate a model in which both *NISLS* and *NISLS* lagged one period are regressed on institutional ownership. The estimates given in equation (f) reveal that both current and immediate-past performance trends are evaluated significantly by institutional investors, with *NISLS* and *NISLS* lagged being significant ($p < .01$).

The results analyzed thus far reveal that institutional investors do prefer to invest in long-term oriented firms. However, current R&D spending levels are significant in influencing investment decisions, compared with past levels of R&D spending. Two conclusions emerge from the data analysis. First, institutional investors seem to be more interested in the current-period flows of R&D expenditures as a better indicator of long-term intent. Second, past-period expenditures will have been added to R&D capital stock; investors may feel that R&D capital depreciates rather rapidly, as Hall (1993) also establishes. As a lesser emphasis is placed on the past-period spending *RNDSLS* lagged turns out to be insignificant.

Regression Estimates of Changes in Variables

The regressions in levels, whether contemporaneous or lagged, help us to establish the existence of a direct and significant relationship between R&D spending patterns and the extent of institutional ownership. However, such estimates do not establish if higher levels of R&D actually induce higher levels of institutional ownership. We, next, estimate models where ownership changes are regressed on changes in R&D expenditures. As data in Table 1 show, in the 10-year period that we study, there has been a steady and significant increase in the average percentage of institutional

ownership. Simultaneously, there has been an increase in average R&D expenditures as a proportion of sales, though it has not been so steep. In spite of the rising trend in both our key variables, the rise in one may not necessarily be associated with a rise in the other. Second, it is quite possible that our regression results in levels are spurious. To evaluate if changes in institutional ownership are likely to be induced by changes in R&D expenditures, a set of regressions in first-differences are estimated.

The existence of an inducement mechanism between R&D expenditures and institutional investments is investigated by examining if period-to-period changes in institutional ownership can be explained by period-to-period changes in R&D expenditures. If institutional investors are attracted to firms which increase their R&D spending, then we expect to observe a positive coefficient for the *_RNDSLS* variable. There are two advantages of estimating regressions on changes in variables. First, regression errors will be much less auto-correlated. Second, though in our regression in levels we have controlled for other factors, if the *_RNDSLS* variable is positive, then it is less likely that the relationship between *RNDSLS* and *INSTOWN* is spurious, or may have been induced by other covariates. The results are displayed in Table 4.

[Insert Table 4 Here]

In Table 4, we report regression results where period-to-period changes in *INSTOWN* are regressed on corresponding period-to-period changes in the values of R&D expenditures in the absolute (Δ *RND*), as well as scaled by sales (Δ *RNDSLS*). If changes in absolute R&D spending show an increasing trend, this can denote a long-term orientation by firms. Our results indicate that institutions do respond by increasing ownership stakes in firms which increase their absolute levels of R&D expenditures. This evidence also supports an argument we make earlier, that institutional

investors are likely to be interested in the current-period flows of R&D expenditures. Changes in the period-to-period dollar values of R&D spending represent current R&D flows of firms, and these serve as inducements towards higher institutional ownership. In equation (g) the Δ *RND* variable is significant ($p < .01$). Simultaneosuly, changes in net income *(Δ NI)* is also significant, albeit at a lower level of significance. Δ *CAPEX* and Δ *DIV* are not significant in the changes model, while Δ *SALES*, introduced as a control for possible volume effects in influencing levels of R&D expenditures, is not signficant.

A more powerful test is to evaluate if changes in relative R&D intensity induce changes in institutional ownership. Equation (h) in Table 4 reports results when Δ *INSTOWN* is regressed on Δ *RNDSLS*. In all three equations, (o), (p) and (q), the expected relationship between Δ *RNDSLS* variable and Δ *INSTOWN* is found to be positive and significant, though at a lower level ($p < .10$). These results add support to those obtained in our previous estimates, and also support the view that increasing R&D spending does serve as an inducement for institutions in increasing the size of their holdings.

With respect to the impact of the other variables in the changes model, Δ *NI* is weakly significant ($p < .10$) in equation (g), and Δ *NISLS* is also positive but insignificant, as equation (h) shows. The popular assertion is that institutions indulge in positive-feedback trading (De Long, Shleifer, Summers and Waldman, 1990). In other words, they sell shares in the face of earnings declines in firms. Our evidence provides no support, or at best weak support, that institutions make changes in their portfolios based on short-term earnings changes. Similarly, Lakonoshik, Shleifer and Vishny (1992) have found little evidence of positive-feedback trading in the stocks of the larger firms,

comprising the bulk of most institutional holdings, or correlation between changes in institutional holdings and contemporaneous excess returns. While current and prior-period earnings numbers do carry information which institutions base their investment decisions on, institutions do not respond strongly to earnings changes. While the evidence generated shows that positive earnings changes do not induce a significant rise in the percentage of stock held by institutions, negative earnings changes are also unlikely to trigger sell-offs.

Next, the strategy of positive-feedback trading, which is supposed to characterize institutional behavior, also assumes that institutions can sell their holdings without too much trouble. However, the economics of modern stock ownership imply that institutions may not be able to sell at all without severely impacting prices in the wrong direction. A 1 percent holder of stocks may have great difficulty in selling; a 40 percent aggregate holding by the pension fund community may mean that they cannot sell at all (Drucker, 1991; Ruder, 1989). Hence, even if earning declines are noted for firms in which institutions have invested, "exit" decisions may be impractical for institutions to take.

5. CONCLUDING DISCUSSION

Our results, obtained on the basis of an analysis of a randomly-selected sample of 137 U.S. corporations for the ten years 1980 through 1989, refute the contention that institutional investors are myopic. Rather, institutional investors do take a long-term view, by taking investment positions in firms spending relatively more on research and development. Our study also provides support for prior pieces which find that the capital market does look favorably upon companies emphasizing the long-term. This study, we believe, is the first which has specifically looked at the long-term orientations of institutional investors. Jarrell, Lehn and Marr (1985) have noted that the evidence they generated

seemed to point out that institutional investors actually preferred R&D intensive firms; however, evidence which has clearly indicated this aspect of capital market behavior had hitherto been lacking.

Other factors may, however, affect institutional ownership decisions. While a limitation of our study is that we do not consider other possible factors which can determine investment decisions by institutional investors,[4] our study provides evidence on some aspects of institutional investors' behavior, and the results challenge some of the assumptions underlying contemporary writings. Admittedly, we have bundled together different types of institutional investors. Thus, further work could be carried out on the differences in behavioral predilections between different types of institutional investors.

A key factor influencing the display of a long-term orientation by institutions may be their present-day composition. Today, pension funds are the single-largest category of institutional investors. According to recent estimates (O'Barr and Conley, 1992), pension funds now own more than half of all institutionally-owned stock. In value terms, this amounts to $ 2 trillion. This amounts to owning almost thirty percent of all corporate stock outstanding in the United States. The second largest category is insurance companies. Pension funds' time horizons are necessarily long-term, since they are interested in the value of their holdings at a future time when a beneficiary paying into the fund becomes a pensioner. This means that the time over which a pension fund can wait for returns to accrue is often fifteen to twenty years, rather than three or six months (Drucker, 1991).

For example, O'Barr and Conley (1992: 164) document the views of several pension-fund executives: one pension executive is reported as saying "What's my horizon? My horizon here is very long-term. We are funding benefits now that I will pay out 70 years from now;" another executive

[4] O'Brien and Bhushan (1990) document some of these factors.

states "we're not market timers, we're not trying to determine what rates are going to be six months, or three years, or four years from now." Similar sentiments are likely to be evoked by insurance company executives, who collect premiums today but may have to pay claims well into future periods.

The evidence we have reported adds to the cumulative body of evidence in existence which generally disproves capital market myopia. Yet U.S. corporations are presumed to be losing the competitive battle as a result of myopia. That such myopia might exist, which has caused a decline in U.S. competitiveness, is popularly acknowledged (Jacobs, 1991). One possible explanation may lie in managerial myopia, which Jensen (1986) asserts exists but of which there is little empirical evidence, and theoretical reasons for the existence of which have been advanced by Narayanan (1985).

A second factor can be the existence of managerial capitalism (Marsh, 1990). Given the intensity of current debate about managerial compensation, such issues are being recognized as a factor which may have much to do with competitiveness. Yet, given the structure of today's capital market, the notion of divergence of ownership and control is also undergoing a change. Hence, there may be checks to managerial expense-preference behavior brought about by the presence of institutional investors. Therefore, evidence on managerial myopia or what influence institutional investors have on the behavior of the firms they own, is important to acquire as it will shed further light on the issue of corporate myopia and U.S. long-term competitiveness.

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Table 1: Descriptive Statistics for the Key Variables

Variables	Years Analyzed 1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
INSTITUTIONAL INVESTMENT (Percentage)										
Mean	26.86	31.57	33.71	37.38	38.82	40.45	43.12	45.94	47.41	47.92
Standard Deviation	19.25	19.59	19.13	19.40	19.01	19.52	19.19	19.23	19.70	18.92
Coefficient of Variation	0.72	0.62	0.56	0.52	0.49	0.48	0.44	0.42	0.42	0.39
Minimum	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Maximum	76.90	84.40	82.00	90.00	77.50	76.00	77.00	79.00	83.00	81.00
R&D EXPENDITURES AS A PROPORTION OF SALES										
Mean	0.027	0.029	0.034	0.036	0.037	0.040	0.039	0.039	0.042	0.038
Standard Deviation	0.027	0.029	0.032	0.034	0.037	0.043	0.041	0.040	0.068	0.042
Coefficient of Variation	0.97	1.00	0.96	0.94	0.98	1.08	1.04	1.04	1.61	1.10
Minimum	0.00	0.002	0.001	0.002	0.001	0.001	0.001	0.001	0.00	0.00
Maximum	0.11	0.16	0.19	0.17	0.18	0.15	0.27	0.25	0.68	0.20
SALES (in $ million)										
Mean	2845.30	3090.10	2892.80	2877.10	3118.70	3138.80	2961.50	3241.90	3640.70	3860.80
Standard Deviation	10189.00	10780.00	9792.10	8997.40	9313.30	9243.00	7469.20	8279.40	9248.10	10098.00
Coefficient of Variation	3.58	3.49	3.39	3.13	2.99	2.94	2.52	2.55	2.54	2.62
Minimum	6.45	9.65	12.80	16.92	21.97	29.41	28.13	32.56	42.71	44.15
Maximum	10314.00	108110.00	97173.00	88561.00	90854.00	86673.00	69888.00	76416.00	88503.00	96285.00

Table 2: Analysis of Contemporaneous Relationships
Between Institutional Ownership and R&D Expenditures

Dependent Variable: Percent of Insitutional Ownership			
	(a)	(b)	(c)
RNDSLS	25.874***	21.912 ***	
	(2.85)	(2.54)	
NISLS	5.939***		5.200 **
	(1.93)		(1.75)
CAPEXSLS	1.776		
	(0.32)		
DIVNI	.088		
	(0.63)		
Constant	38.780	39.310	39.800
	(38.28)	(37.38)	(41.80)
Buse R^2	.010	.005	.002
N	1370	1370	1370

t -statistics in parentheses
*** p<.01
** p<.05

Table 3: Analysis of Lagged Relationship Between Institutional Ownershipand R&D Expenditures

Dependent Variable: Percent of Institutional Ownership			
	(d)	(e)	(f)
RNDSLS	23.053 *	20.379 *	
	(2.44)	(2.23)	
$RNDSLS_{t-1}$	11.905	7.520	
	(1.08)	(0.69)	
NISLS	7.977 **		7.240**
	(2.82)		(2.63)
$NISLS_{t-1}$	9.338 ***		8.900***
	(3.28)		(3.21)
CAPEXSLS	-0.907		
	(0.17)		
$CAPEXSLS_{t-1}$	-1.560		
	(0.28)		
DIVNI	0.031		
	(0.21)		
$DIVNI_{t-1}$	-0.145		
	(0.95)		
Constant	40.600	41.840	41.750
	(34.55)	(37.16)	(43.45)
Buse R^2	.018	.004	.009
N	1233	1233	1233

t -statistics in parentheses
*** p<.001
** p<.01
* p<.05

Table 4: Analysis of Changes in R&D Expenditures and Changes in Institutional Ownership

Dependent Variables: Changes in Percentage of Institutional Ownership

Panel A: R&D Expenditures Expressed in Absolute Terms

	(g)
ΔRND	0.022 **
	(2.43)
ΔNI	0.002
	(1.54) **
ΔCAPEX	0.000
	(0.73)
ΔDIV	-0.010
	(0.91)
ΔSALES	0.000
	(0.02)
R^2	.007
N	1233

Panel B: R&D Expenditures Expressed in Relative Terms

	(h)
ΔRNDSLS	12.643 **
	(1.61)
ΔNISLS	2.660
	(1.16)
ΔCAPEXSLS	-0.431
	(0.09)
ΔDIVNI	0.026
	(0.26)
R^2	.003
N	1233

t -statistics in parentheses

*** p<.01

** p<.10