Does Greater Firm-specific Return Variation Mean More or Less Informed Stock Pricing?

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Abstract

Roll (1988) observes low R^2 statistics for common asset pricing models due to vigorous firms-specific returns variation not associated with public information. He concludes (p. 56) that this implies "either private information or else occasional frenzy unrelated to concrete information." We show that firms and industries with lower market model R^2 statistics exhibit higher association between current returns and future earnings, indicating more information about future earnings in current stock returns. This supports Roll's first interpretation – higher firms-specific returns variation as a fraction of total variation signals more information-laden stock prices and, therefore, more efficient stock markets.

1. Introduction

Stock markets can perform a vital economic role by generating prices that serve as signals for resource allocation and investment decisions. This role has two parts: if stock prices are always near their fundamental (full information) values, first, capital is priced correctly in its different uses and, second, this information provides corporate managers with meaningful feedback as stock prices change in response to their decisions. These two effects should lead to more economically efficient capital allocation, both between firms and within firms. Tobin (1982) defines the stock market as exhibiting *functional efficiency* if stock prices direct capital to its highest value uses. In other words, the stock market is functionally efficient if it causes a microeconomically efficient allocation of capital goods across firms. A necessary condition for functional stock market efficiency is that share prices track firm fundamentals closely.

Information about fundamentals is capitalized into stock prices in two ways: through a general revaluation of stock values following the release of public information, such as unemployment statistics or quarterly earnings, and through the trading activity of risk arbitrageurs who gather and possess private information. Roll (1988), in explaining the low R^2 statistics of common asset pricing models, argues that this channel is especially important in the capitalization of firm-specific information. This is because he finds that firm-specific stock price movements are generally not associated with identifiable news release, and so suggests, "the financial press misses a great deal of relevant information generated privately" (Roll, 1988, p. 564). However, he acknowledges that two explanations of his finding are actually possible when he concludes by proposing that his findings seem "to imply the existence of either private information or else occasional frenzy unrelated to concrete information" (Roll 1988, p.566).

If the former view is correct, and firm-specific price movements reflect the capitalization of private information into prices by informed risk arbitrageurs, firm-specific price fluctuations are a sign of active trading by informed arbitrageurs and thus may signal that the stock price is tracking its fundamental value quite closely. In this view, the low R^2 statistics Roll (1988) observes for popular asset pricing models are a cause for celebration, for high firm-specific returns variation reflects efficient markets.

If the latter view is correct, and firm-specific stock price movements reflect noise trading, perhaps of the forms modeled by DeLong *et al.* (1990), Shleifer and Vishny (1997) and others, then such movements might signal stock prices deviating from fundamental values. This latter view is consonant with the common usage of terms like "residual" or "error" to describe the firm-specific component of stock returns in simple asset pricing models, though these terms technically refer to statistical errors in fitting the model, not to valuation errors *per se*.

Although Black (1988) argues forcefully that it is present in all real stock markets, noise trading is at present poorly understood. In our opinion, the relative importance of the above two views as an empirical question. This paper makes a first pass at using financial data to distinguish these two possible explanations. We examine the relationship between firm-specific stock price variation and accounting measures of stock price informativeness. Operationally, we define firm-specific price variation as the portion of a firm's stock return variation unexplained by market and industry returns. We define price informativeness as how much information stock prices contain about future earnings, which we estimate from a regression of current stock returns against future earnings. Our measures of informativeness (association) are (i) the aggregated coefficients on the future earnings, and (ii) the marginal variation of current stock return explained by future earnings.

We find that firm-specific stock price variability is positively correlated with both of our measures of stock price informativeness. The positive relation is present in both simple correlations and in regression analyses that control for factors that influence stock price informativeness and are also correlated with firm-specific stock return variation. We subject our result to multiple robustness checks, including residuals diagnostic checks, perturbations in variable construction, in the data sample, and in the empirical specification of the regressions. All of this leads us to conclude that greater firm-specific price variation is associated with more informative stock prices, and supports the first conjecture of Roll (1988), that firm-specific variation reflects arbitrageurs trading on private information.

Our findings are also consistent with recent work that links greater firm-specific returns variation to better functioning stock markets. Morck, Yeung, and Yu (2000) find greater firm-specific price variation (less synchronicity of returns across firms) in economies where government better protects private property rights (including outside investors' residual claimant rights). Their interpretation is that strong property rights promote informed arbitrage, leading to the impounding of more firm-specific information and thus less co-movement in stock returns across firms. Using Morck, Yeung, and Yu's synchronicity measure, Wurgler (2000) shows that the efficiency of capital allocation across countries is negatively correlated with synchronicity in stock returns across domestically traded firms. Durnev, Morck, and Yeung (2000) show that U.S. industries and firms exhibiting larger firm-specific returns variation use more external financing and allocate capital more efficiently. They propose that higher firm-specific price variation corresponds to informed arbitrageurs focusing more attention on a stock, and that this causes stock prices to track fundamentals more closely, reducing information asymmetry problems that impede external financing and that distort capital spending decisions.

The rest of the paper is organized as follows. Section 2 first reports our basic data sources and sample. It then discusses our measures of the focal variables: firm-specific stock return variability and stock price informativeness. In addition, the section also includes a discussion of our overall regression design and two sub-specifications: an industry matched empirical design and a cross-industry empirical design. Section 3 discusses our industry matched empirical design, our control variables, and our regression model. Section 4 presents the results and robustness issues. Section 5 describes our cross-industry empirical design and its results. Section 6 presents the regression relationship between our informativeness measures and firm-specific return variability from 1975 to 1995. Section 7 concludes.

2. Data and Sample Selection, Variable Measures, and Basic Empirical Design

In this section, we report our basic data sources and sample, the basic constructs of our focal variables, "informativeness" and "firm-specific stock return variations," and the overall empirical framework.

2.1 Data and Sample Selection

Our empirical investigation relies on constructing variables from firm-level data on returns as well as accounting data. We obtain stock price and returns from CRSP and firm-level accounting data from Standard and Poor's Annual COMPUSTAT. We begin with all companies listed in CRSP for each year from 1975 to 1995. Our sample period stops in 1995 because, in some of our variable constructions, we need data up to 1998, the last year of data available to us when we started the current research effort. We discard duplicate entries for preferred stock, class B stock, and the like by deleting entries whose CUSIP identifiers in CRSP append a number other than 10. We match the remaining companies with those listed in COMPUSTAT. Because CRSP and COMPUSTAT occasionally assign the same firm different CUSIP identifiers, we visually inspect the lists of unmatched firms in both. Where matches, or near matches, by company name are evident, we check the CRSP permanent identification number, ticker symbols and stock prices to reject false matches.

In our investigation, we must assign each firm to an industry. We identify a firm's industry each year by the primary Standard Industrial Classification (SIC) code of its largest business segment, ranked by sales, that year. Since accounting figures for firms in finance and banking (SIC codes from 6000 through 6999) are not comparable to those of other firms, we exclude these firms. Regulated utilities (SIC 4900 through 4999) are arguably subject to different investment constraints than unregulated firms, though liberalization in the 1980s may have mitigated this difference to some extent. We therefore drop firms of utilities industries, although keeping them in our sample does not change our primary findings qualitatively.

Our intension is to understand the relationship between firm-specific stock returns and stock price informativeness as measured by how current stock return is linked to future earnings. We exclude firms that do not have a full year of uninterrupted returns (weekly) data. This is because disruptions in trading can be due to initial public offerings (IPOs), delistings, or trading halts. IPOs are unusual information events, and we wish to explore the information content of stocks under normal operating circumstances. Similarly, trading halts generally correspond to unusual events like takeover bids, bankruptcy filings, or legal irregularities.

2.2 Firm-Specific Stock Return Variation Measure

We describe in this sub-section the basic estimates for the two focal variables in this study: firm-specific stock return variability and stock price informativeness.

Firm-specific stock return variation is obtained from the regression:

$$r_{j,w,t} = \alpha_{j,t} + \beta_{j,t} r_{m,w,t} + \gamma_{j,t} r_{i_2,w,t} + \varepsilon_{j,w,t} \tag{1}$$

of firm j total returns, $r_{j,w,t}$, on a market return, $r_{m,w,t}$, and a broad (two-digit) industry return, $r_{i2,w,t}$. Returns are measured across w weekly time periods in each year t. We use weekly returns because CRSP daily returns data reports a zero return when a stock is not traded on a given day. Although some small stocks may not trade for a day or more, they generally trade at least once every few days. Weekly returns are therefore less likely to be affected by such 'thin trading' problems. Both the market return and broad industry return in (1) are value-weighted averages excluding the firm in question. This exclusion prevents any spurious correlations between firm returns and industry returns in industries that contain few firms. Thus,

$$r_{i_2,w,t} = \frac{\sum_{k \in i_2} W_{k,w,t} r_{k,w,t} - W_{j,w,t} r_{j,w,t}}{J_{i_2} - 1} \tag{2}$$

with $W_{k,w,t}$ the value-weight of firm k in industry i_2 in week w and J_{i_2} the number of firms in industry i_2.

Regression (1) resembles standard asset pricing models. Note, however, that (1) contains an industry index as well as a market index. This is because we wish the residual, $\varepsilon_{i,w,t}$, to be as analogous as possible to the 'abnormal returns' typically used in event studies, and industry benchmarks are often used in such studies. Roll (1988) also excludes industry-related variation from his measure of firm-specific returns variation.

We scale the variance of $\varepsilon_{j,w,t}$ by the total variance of the dependent variable in (1), obtaining

$$\Psi_{j,t} \equiv \frac{\sum_{w \in t} \varepsilon_{j,w,t}^2}{\sum_{w \in t} (r_{j,w,t} - \bar{r}_{j,t})^2} \tag{3}$$

Note that $\psi_{j,t}$ is precisely one minus the R^2 of (1). We construct $\Psi_{j,t}$ scaling by the total variation in $r_{j,w,t}$ because some business activities are more subject to economy- and industry-wide shocks than others, and firm-specific events in these industries may be correspondingly more intense. Given our sample, we can estimate (1) for each firm-year from 1975 to 1995. The resulting $\Psi_{j,t}$ are estimates of the firm-specific return variability for each firm j in each year t relative to total variability. We can also obtain a weighted average of $\Psi_{j,t}$ for a group of firms { j } by summing the firms' numerators and denominators in equation 3 and then forming the ratio. We refer to Ψ as *relative firm-specific stock return variation.*

Under the efficient markets hypothesis, a high value of $\Psi_{j,t}$ indicates that a high intensity stream of firm-specific information is being capitalized into a stock price by informed traders. Alternatively, a high value of $\Psi_{j,t}$ might indicate a noisy, or low information, stock price. Consequently, our objective is to estimate the correlation between $\Psi_{j,t}$ and our earnings informativeness measures, discussed below, which should be higher when stock prices contain more information.

2.3 *Measures of Stock Price Informativeness*

Our stock price informativeness measures (how much information about future earnings is capitalized into price) are based on Collins *et al.* (1994). They assume revisions in expected dividends to be correlated with revisions in expected earnings.[2] This allows them to express current stock returns as a function of the current period's unexpected earnings and changes in expected

[2] In choosing "controls" in our subsequent regression analyses, we pay attention to the possibility that the correlation

future earnings. A key problem in estimating this relationship is that unexpected earnings and changes in expected future earnings are unobservable. We follow Collins *et al.* (1994) and proxy for current unexpected earnings using current change in earnings, and for changes in expected future earnings using changes in reported future earnings. The function we estimate is thus a regression of current annual stock returns, r_t on current and future annual earnings:

$$r_t = a + b_0 \Delta E_t + \sum_\tau b_\tau \Delta E_{t+\tau} + \sum_\tau c_\tau r_{t+\tau} + u_t \qquad (4)$$

where $\Delta E_{t+\tau}$ is the earnings per share change τ periods ahead, scaled by the price at the beginning of the current year.[3] Collins *et al.* (1994) recommend including future stock returns, $r_{t+\tau}$, as control variables.[4] Based on Kothari and Sloan (1992) and Collins *et al.* (1994), we include three future years of earnings changes and returns in (4).[4]

Our first future earnings response measure is the 'future earnings response coefficient', the sum of the coefficients on future earnings, which we define as

$$FERC \equiv \sum_\tau b_\tau \qquad (5)$$

Our second future earnings response measure is "future earnings incremental explanatory power", the increase in the R^2 of regression (4), associated with including the terms $\sum_\tau b_\tau \Delta E_{t+\tau}$ (the incremental explanatory power of future earnings, given that current unexpected earnings is already in the model). Thus, we define

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between revision in dividends and in earnings varies among firms.

[3] If the deflator is beginning-of-period earnings, the independent variable is undefined when the denominator is negative or zero. To avoid having to delete firms with negative or zero earnings, we scale by beginning of year price P_{t-1}.

[4] Collins et al. (1994) argue that using the actual future earnings introduces an error in variables problem in (4), since the theoretically correct regressor is the unobservable change in expected future earnings. This measurement error problem biases downward estimates of both the future earnings coefficients and the incremental explanatory power of the future earnings variables. To correct for this bias, they argue that future returns should be included as control variables and that the coefficient of $r_{t+\tau}$ is negative. We find the aggregate coefficient on future returns to be negative in 42 of our 51 two-digit industry regressions; it is significant in 19 out of 51 cases. We follow this standard practice in the accounting literature, however dropping future returns from (4) does not affect our findings.

[5] In related papers, Warfield and Wild (1992) also examine the relation between current returns and future earnings, and Kothari and Shanken (1992) analyze the relation between aggregate stock returns and future dividends.

$$FINC \equiv R^2_{r_t=a+b_0\Delta E_t+\Sigma_\tau b_\tau \Delta E_{t+\tau}+\Sigma_\tau c_\tau r_{t+\tau}+u_t} - R^2_{a+b_0\Delta E_t+u_t}.^5 \quad (6)$$

The variables *FERC* and *FINC* are both 'informativeness' measures that capture how well current stock prices predict future earnings. Given adequate controls, higher values of either indicate that current returns capitalize more information about future earnings.

The stock returns in (4), r_t, are total annual stock returns, defined as capital gain plus dividend yield, and are calculated from data reported in COMPUSTAT, following Collins *et al.* (1994).[6] The change in earnings variables in (4), ΔE_t, are changes in "Earnings Before Interest, Taxes, Depreciation, and Amortization" (EBITDA) divided by the market value of common equity at the beginning of the firm's fiscal year. These variables are taken from COMPUSTAT.[7] Since interest, taxes, depreciation, and amortization are among the components of income most vulnerable to differences in accounting measurement, and since EBITDA is not sensitive to differences in capital structure, it is more appropriate for our purposes than net income.

Thus, we use two measures of informativeness, *FERC* and *FINC*, both of which should be higher when more information about future earnings is impounded into the stock price. [8]

2.4 Empirical Framework

Our empirical objective is to examine the relationship between the informativeness measures (the earning responses, *FERC* and *FINC*, as in equations 5 and 6, respectively) and "relative firm-

[5] Collins *et al.* (1994) recommend including future stock returns, $r_{t+\tau}$, as control variables only when future earnings changes, $\Delta E_{t+\tau}$, are included.
[6] The fiscal year-end share price, Annual Compustat item #199, plus the dividends adjusted for stock splits etc. during the year, item #26/#27, all divided by the price at the end of the previous fiscal year, also adjusted for splits and the like, #199(-1)/#27. Compustat item #27 is an adjustment factor reflecting all stock splits and dividends that occurred during the fiscal year.
[7] The reported earnings, Compustat item #13, minus the reported earnings the previous year, #13(-1)/#27 all divided by the firm value at the beginning of the fiscal year. The latter is the previous year's fiscal year-end price #199(1)/#27 times the number of shares outstanding, #2.
[8] Lundholm and Myers (2000) derive a regression of returns on future earnings based on the residual income valuation model (Ohlson [1995]). Note that using earnings levels is econometrically equivalent to using changes.

specific stock return variation" ($\Psi_{j,t}$ as in equation 3). This entails regressing the informativeness measures on $\Psi_{j,t}$ and appropriate control variables. Our assumption is that, after including appropriate controls, the informativeness measures are higher when stock returns better incorporate firm-specific information. Thus, a positive relationship between "informativeness" and $\Psi_{j,t}$ suggests that greater $\Psi_{j,t}$ indicates more informed stock pricing while a negative relationship suggests the opposite.

Operationalizing this empirical plan depends on obtaining reliable estimates for *FERC*, *FINC* and $\Psi_{j,t}$. We can readily obtain reliable estimates of $\Psi_{j,t,}$ for either a firm, or a group of firms on an industry-level. Calculating *FERC* and *FINC* is more difficult. These difficulties drive our operationalization design.

To calculate *FERC* and *FINC*, we can either pool many years of data for each firm to estimate time-average earnings responses for individual firms or we can use a cross-section of similar firms, such as all firms in an industry, to estimate cross-firm average earnings responses at a point in time. The individual firm approach is problematic because changes in the macroeconomic environment, industry conditions, the firm's business, institutional constraints, accounting rules, and financial regulations can all cause inter-temporal shifts in our earnings response measures. The result could be unreliable and unstable estimates for *FERC* and *FINC*. The cross-sectional approach avoids this problem and has an additional advantage: since we can measure the firm-specific stock return variation for each firm annually, we can employ a year by year window to examine the evolution of the variables' relationship over time.

The industry-level cross-sectional approach, however, requires that firms pooled together for the estimation of their common informativeness measures be as homogeneous as possible. While pooling firms in the same industry is a natural first step in this direction, there could still be factors that affect both the informativeness measures' intrinsic value and their estimation precision. One approach is to explicitly include these factors as control variables in regressions of informativeness on $\Psi_{j,t}$. Another approach is to control for these factors implicitly by matching firms on these factors. Each pair of matched firms contains a high $\Psi_{j,t}$ firm and a low $\Psi_{j,t}$ firm that are similar in other critical dimensions. If the *FERC* and *FINC* estimate of the collected high $\Psi_{j,t}$ firms differs significantly from that of the low $\Psi_{j,t}$, we can conclude that differences in $\Psi_{j,t}$ correlate with differences in *FERC* and *FINC*.

It is not obvious which method is superior. Match pairing is appropriate to the extent that the matching criterion is an effective control for the omitted factors. If we match firms by industry, for example, we can only control for the portion of the omitted factors that is common to an industry. Including control variables is appropriate to the extent that we can construct adequate empirical proxies for the omitted factors. Since each approach has its costs and benefits, we use two aggregation methods: the first matches pairs of high and low Ψ firms by industry, and so focuses on *intra-industry* variation in earnings responses; the second forms industry portfolios, and so explains *cross-industry* variation in earnings responses with Ψ and controls.

3. Industry-Matched Pairs Methodology

As the first step in our matched pairs procedure, we select the two firms with the highest firm-specific returns variation and the two firms with the lowest firm-specific returns variation each year in each four-digit industry, i_4. Thus, we maximize the difference in firm-specific stock return variation within each industry. We use two high Ψ firms and two low Ψ firms in each four-digit industry to mitigate any distortion of the metric due to outlier errors.

Our second step is to pool all the pairs of high Ψ firms within each two-digit industry, i_2. We call this subsample of firms H_{i_2}. We similarly pool all the pairs of low Ψ firms within each two-digit industry, i_2, and call the resulting subsample of firms L_{i_2}. Thus, for a two-digit industry i_2 containing n_{i_2} four-digit industries, H_{i_2} and L_{i_2} each contains $2n_{i_2}$ firms.

We match firms by industry, because many of the determinants of *FERC*, *FINC*, and Ψ are industry-specific, and can thus be controlled for using this industry matching procedure. Such determinants include both real business activities and accounting methods, which can determine both the magnitude and frequency of information arrival and the lag between the impact of an information event on stock returns and its recognition in earnings. To the extent that it controls for these industry factors, the matched industry-pair design lets us reliably isolate the relation between stock price variability and informativeness.

3.1 Differential Earnings Response and Relative Firm-Specific Stock Return Variation Measures

In each two-digit SIC industry i_2, we use the $2n_{i_2}$ firms in H_{i_2} to estimate earnings response coefficients $FERC^H_{i_2,t}$ and $FINC^H_{i_2,t}$ for each year t. We then use the $2n_{i_2}$ firms in L_{i_2} to estimate earnings response measures $FERC^L_{i_2,t}$ and $FINC^L_{i_2,t}$. We take the difference in earnings response measures between high and low firm-specific returns variation firms in each two-digit industry as

$$\Delta FERC_{i_2,t} \equiv FERC^H_{i_2 t} - FERC^L_{i_2 t} \tag{7}$$

and

$$\Delta FINC_{i_2,t} \equiv FINC^H_{i_2 t} - FINC^L_{i_2 t} \tag{8}$$

We refer to $\Delta FERC_{i_2,t}$ and $\Delta FINC_{i_2,t}$ as *differential future earnings response measures.*

We then construct weighted-average relative firm-specific stock return variation estimates for all the firms in H_{i_2} and L_{i_2} respectively. These are:

$$\Psi^{H}_{i_2,t} \equiv \frac{\sum_{j\in H_{i_2}}\sum_{w\in t}\varepsilon^2_{j,w,t}}{\sum_{j\in H_{i_2}}\sum_{w\in t}(r_{j,w,t}-\bar{r}_{j,w,t})^2} \tag{9}$$

and

$$\Psi^{L}_{i_2,t} \equiv \frac{\sum_{j\in L_{i_2}}\sum_{w\in t}\varepsilon^2_{j,w,t}}{\sum_{j\in L_{i_2}}\sum_{w\in t}(r_{j,w,t}-\bar{r}_{j,w,t})^2} \tag{10}$$

We denote the difference between the relative firm-specific returns variation estimates for our high and low Ψ firms as

$$\Delta\Psi_{i_2,t} \equiv \Psi^{H}_{i_2,t} - \Psi^{L}_{i_2,t} \tag{11}$$

That is, for each two-digit industry i_2, $\Delta\Psi_{i_2,t}$ is a weighted average of the highest two firm Ψ estimates in each four-digit industry in i_2 minus a weighted average of the lowest two firm Ψ estimates in each four-digit sub-industry in i_2. We refer to $\Delta\Psi_{i_2,t}$ as our *differential relative firm-specific return variation measure.*

We then test for a relationship between our differential earnings response measures and our differential relative firm-specific returns variation measure, either between $\Delta FERC_{i_2,t}$ and $\Delta\Psi_{i_2,t}$ or between $\Delta FINC_{i_2,t}$ and $\Delta\Psi_{i_2,t}$. *Ceteris paribus*, a positive relationship indicates that greater firm-specific stock price variability is associated with greater price informativeness, while a negative relationship indicates the opposite.

3.2 Control Variables

The simple correlations between $\Delta FERC_{i_2,t}$ and $\Delta\Psi_{i_2,t}$ or between $\Delta FINC_{i_2,t}$ and $\Delta\Psi_{i_2,t}$ are of interest. However, our tests are best performed using multiple regressions, because, while industry matching is an important control, other factors might also cause the information content of earnings numbers to vary - even between firms in the same narrow industry. We group such factors into three categories.

The first category controls for problems in variable construction; i.e., how precisely we can estimate *FERC* and *FINC*. Different degrees of estimation error cause statistical problems such as heteroskedasticity. To deal with estimation errors for *FERC* and *FINC*, we include controls that proxy for likely estimation imprecision. These variables include the number of firms in the industry pool, as well as the average diversification and average size of the firms in the pool.

The second category includes factors that have intrinsic effects on *FERC* and *FINC*. These include earnings volatility, beta volatility, the explanatory power of current earnings in predicting future dividends, and institutional ownership.

The third category consists of controls for the effects of earnings timeliness on *FERC* and *FINC*. While we can include timeliness in the second category, we separate it due to its importance. Some firms' or industries' earnings are more timely than those of others, and timeliness is a primary determinant of *FERC* and *FINC*. In this category we include research and development expenditures (R&D), and the industry's current (value weighted) stock return.

We now describe and explain in greater detail our control variables in each category.

Controlling for problems in variable construction

We might be able to estimate $\Delta FERC$ and $\Delta FINC$ more accurately (i.e., with less measurement error) for some industry pools than for others. Differential measurement error in $\Delta FERC$ and $\Delta FINC$ can cause econometric problems. To prevent this, we include the number of firms in the industry pool, and the average diversification and average size of the firms in the pool as control variables.

If a two-digit industry contains many four-digit industries, the future earnings response variables can be more accurately estimated because more firms are utilized in obtaining the estimates. This means the differential future earning response variables are also more accurately estimated. To control for such differences, we include the square root of the number of firms utilized in estimating the future earnings response variables as an additional explanatory variable. We refer to this as our *industry structure measure*, which we define as[9]

$$I_{i_2,t} \equiv \sqrt{2n_{i_2,t}} \quad (12)$$

where n_{i_2} is the number of four-digit industries in the two-digit industry i_2 in year t.

Earnings responses might be related to firm size and firm diversification. Larger firms and more diversified firms are more complicated, and so are harder to analyze. But more analysts might also follow them. We therefore control for the difference (between high and low Ψ firms in industry i_2) in average level of firm diversification, and average firm size.

To measure firm-level diversification, we obtain the total number of distinct three-digit lines of business, $s_{j,t}$, each firm reports each year from COMPUSTAT. We then compute an asset-

[9]We are also concerned that using more firms to construct the H_{i2} and L_{i2} subsamples in some industries than in others may affect our $\Delta FERC_{i_2,t}$, $\Delta FINC_{i_2,t}$ and $\Delta\Psi_{i_2,t}$ measures. In subsequent robustness check, we include the number of firms in the industry as an additional control variable.

weighted average diversification index for the pool of highest relative firm-specific returns variation firms, H_{i_2}, in industry i_2,

$$D^{H}_{i_2,t} = \frac{\sum_{j \in H_{i_2}} A_{j,t} s_{j,t}}{\sum_{j \in H_{i_2}} A_{j,t}} \tag{13}$$

where A_j is the total assets of firm j in year t. We construct an analogous index for the pool of lowest relative firm-specific returns variation firms, L_{i_2}, in industry i_2,

$$D^{L}_{i_2,t} = \frac{\sum_{j \in L_{i_2}} A_{j,t} s_{j,t}}{\sum_{j \in L_{i_2}} A_{j,t}} \tag{14}$$

We then construct a differential diversification measure for each two-digit industry,

$$\Delta D_{i_2,t} \equiv D^{H}_{i_2,t} - D^{L}_{i_2,t} \tag{15}$$

This measure is the average diversification level of the pool of high Ψ firms in the four-digit industry minus the average diversification level of the set of low Ψ firms in that industry. We refer to $\Delta D_{i_2,t}$ as our *differential diversification measure.*

Earnings numbers might convey more information about large firms than about small firms. Freeman (1987), Collins, Kothari, and Rayburn (1987) and Collins and Kothari (1989) find that the returns of larger firms impound earnings news on a timelier basis than the returns of smaller firms. Also, smaller firms are more likely to be 'growth firms', whose earnings realizations are farther in the future than are those of larger (established) firms. This effect could induce a negative correlation between firm size and our earnings response measures *FERC* and *FINC*. Alternatively, small firms' earnings could be more variable, and hence harder to forecast, than large firms' earnings, which would induce a negative correlation with *FERC* and *FINC*. [11]

[11] Durnev et al. (2000) find that larger firms have smaller firm-specific returns variations.

To measure the size of firm j in year t, we use its total assets, $A_{j,t}$, obtained from COMPUSTAT. We adjust these figures for inflation using the seasonally adjusted producer price index, π_i, for finished goods published by the U.S. Department of Labor, Bureau of Labor Statistics. We then gauge the average size of firms in the pool of highest firm-specific returns variation firms, H_{i_2} in industry i_2 as

$$S^H_{i_2,t} = \frac{\sum_{j \in H_{i_2}} \ln(\pi_t A_t)}{2n_{i_2,t}} \tag{16}$$

where $n_{i_2,t}$ is the number of four digit industries in the two-digit industry i_2 in year t, and hence half the number of firms j in H_{i_2} in that year. We construct an analogous index for the pool of lowest firm-specific returns variation firms, L_{i_2}, in industry i_2,

$$S^L_{i_2,t} = \frac{\sum_{j \in L_{i_2}} \ln(\pi_t A_t)}{2n_{i_2,t}} \tag{17}$$

We then construct a *differential average firm size* measure for each two-digit industry,

$$\Delta S_{i_2,t} \equiv S^H_{i_2,t} - S^L_{i_2,t} \tag{18}$$

This measure is the average size of firms in the pool of high Ψ firms in the industry minus the average size of firms in the pool of low Ψ firms in that industry. We refer to $\Delta S_{i_2,t}$ as our *differential firm size measure.*[12]

To summarize, our controls for problems in variable construction are (differential) diversification and firm size (between high and low variability firms in the same industry) and the square root of the number of four-digit industries in a two-digit industry.

[12] Note that $2n_{i_2}$ is the number of firms contained in each of the high and low return firm-specific returns variation subsamples, H_{i_2} and L_{i_2}, and $4n_{i_2}$ is thus the number of firm observations used to calculate our differential variables,

Controlling for factors having an intrinsic effect on informativeness

Variables other than informativeness may affect the relation between current returns and future earnings. Prime candidates include earnings volatility, beta volatility, the explanatory power of current earnings for future dividends, and institutional ownership.

Earnings that are more volatile may be intrinsically harder to forecast. Thus firms with more variable earnings should, *ceteris paribus*, exhibit a weaker relation between current stock returns and future earnings (i.e., lower *FERC* and *FINC*). To control for this, we first calculate its past earnings volatility of each firm over the previous 5 years, $\text{var}(\Delta EPS_t / P_{t-1})$. We then average the $\text{var}(\Delta EPS_t / P_{t-1})$ for each of the high and low Ψ pools in each i_2 industry, and denote these averages VE^H and VE^L respectively. The difference, $\Delta VE = VE^H - VE^L$, is our *differential earnings volatility measure*.

The level of systematic risk in a firm's business activities can change, and this could conceivably change the predictability of its future earnings. To capture this effect, we introduce the difference in the average volatility of market model beta as a control.

To compute the variance of beta, we first estimate beta for each firm in each month using the capital asset pricing model and daily data. The daily T-bill rate, calculated from the 30-day T-bill rate, is used as the risk free rate. For each firm, we then compute the variance of beta using the twelve estimated betas. Then, for each year, we compute the average variance across firms in the highest and lowest Ψ firm pools of each two-digit industry.

$\Delta FERC_{i_2 t}, \Delta FINC_{i_2 t}, \Delta\Psi_{i_2 t}, \Delta D_{i_2 t}$, and $\Delta S_{i_2,t}$.

Investors value dividends, not earnings. We interpret earnings as signals of expected future dividends. However, high current earnings need not translate into high future dividends if agency problems separate shareholders from managers. We include two variables to control for this.

The first is the R^2 from a regression of current earnings changes on current and future dividend changes: $\Delta E_t = a + b_0 \Delta DIV_t + \Sigma_\tau b_\tau \Delta DIV_{t+\tau} + \varepsilon_t$. We refer to this as *future dividends explanatory power*, denoted FD^H (FD^L) for the high (low) relative firm-specific return variability firms with ΔFD the *differential future dividends explanatory power*, FD^H -FD^L.[13]

The second variable is *institutional ownership*, which we interpret as indicative of shareholder monitoring and therefore reduced agency problems. We refer to institutional ownership of the high (low) return variability firms as INS^H (INS^L) and ΔINS is the *differential institutional ownership*, INS^H - INS^L.

To summarize, the controls for factors other than informativeness that affect *FERC* and *FINC* are: earnings variability, beta variability, future dividends explanatory power, and institutional ownership.

Controlling for the effects of earnings timeliness on *FERC* and *FINC*

Firms with less timely earnings have a weaker association between returns and current earnings, but a stronger relation between returns and future earnings, and thus may have higher future earnings response measures, all else equal. While our industry matching pair technique may mitigate these problems, some timeliness effects may remain as an exogenous determinant of our future earnings response measures, *FERC* and *FINC*. To control for this, we include the (industry value weighted) average current stock return and R&D expenditures divided by total assets.

[13] If a firm neither pays dividends nor repurchaces stock, we set ΔDIV to zero. As a robustness check, we suppress observations with zero dividends, and find qualitatively similar results.

Given the myriad accounting methods, estimates, and choices (many of which are not disclosed) that affect a firm's reported earnings, it is virtually impossible to control for timeliness directly. However, Basu (1997) shows that the sign of the current annual stock return can be used as a proxy for whether the firm is releasing good news or bad news, and that GAAP's conservatism principle implies that bad news is impounded into earnings in a more timely fashion than good news (he also shows that the earnings of bad news firms are more variable, and therefore less predictable). His results imply that the sign of a firm's current annual stock return can be used as a proxy for the timeliness (and predictability) of its earnings. His results also imply that since the recognition of good news in earnings is delayed, (and the earnings of good news firms are more predictable), 'good news firms' should have a stronger relation between current returns and future earnings than 'bad news firms'.[6]

To see if our industry matching technique controls for differences in earnings timeliness, we compared the current stock returns distributions of our high and low firm-specific return variation subsamples of firms. The null hypothesis that the two distributions have identical means cannot be rejected (t statistic = -1.29, probability level = 0.37), and the null hypothesis that the two distributions are identical cannot be rejected by a Kolmogorov Smirnov test (D = 0.046, probability level = 0.614). The identical returns distribution of the high and low relative firm-specific return variation firms suggests that our matched pair technique controls adequately for earnings timeliness.

Nevertheless, as a further check, we include the difference in the value-weighted average current stock return (r^H and r^L for the high and low return variability firms in each two-digit industry, respectively) as an additional control variable.

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6 In a corporate governance context, Bushman *et al.* (2000) also base their timeliness metrics on good versus bad news. The use of financial accounting information in this context is reviewed in Bushman and Smith (2001).

Timeliness should also be affected by growth. Growing firms are presumably investing in projects that will generate earnings in the future, whereas mature firms are maintaining a steady state pattern of earnings. Thus, a growing firm might exhibit a stronger relationship between current returns and future earnings, all else equal, than would a mature firm.

Thus, as a further check, we include a measure of firm growth opportunities, the industry weighted average research and development spending (R&D) over total assets ($R\&D^H$ and $R\&D^L$ for the high and low return variability firms in each 2 digit industry, respectively) as an additional control variable.[14] Again, the actual control is the difference in the $R\&D^H$ and $R\&D^L$ variable between the high and low Ψ groups.

To summarize, our controls for timeliness are industry-weighted averages of current stock returns and R&D expenditures divided by total assets.

3.3 Regression Framework

Our regressions are thus of the form either:

$$\Delta FERC_{i_2,t} = \alpha + \beta \Delta \Psi_{i_2,t} + \sum_k \gamma_k Z_k + e_{i_2,t} \qquad (19)$$

or

$$\Delta FINC_{i_2,t} = \alpha + \beta \Delta \Psi_{i_2,t} + \sum_k \gamma_k Z_k + e_{i_2,t} \qquad (20)$$

estimated across two-digit industries, indexed by i_2, for year t where Z_k is a vector of the control variables discussed above. Table 1 lists the variables we shall use in our main results along with their definitions.

[14] We also used two other proxies for growth opportunities: industry-weighted market to book ratios and past assets growth. We obtained similar results.

We run year-by-year regressions as well as a panel regression using a time-random effects model. The virtue of year-by-year runs is that they automatically account for time-varying factors likely to affect earnings, such as changes in macroeconomic volatility, the institutional environment, accounting disclosure rules and industry-specific real business factors (e.g., the length of investment-return cycles). Another virtue of year-by-year runs is that they allow us to estimate earnings response measures annually, rather than over a long time window. In the current context, this is important because both the quality of earnings numbers and the intensity of informed trading may change over time. Annual industry-level estimates of these variables are therefore of more use in this context than a cross section of firm-level time series averages.

4. Empirical Findings from the Industry-Matched Pairs Study

In this section, we report the empirical findings from the industry-matched pairs study. We report univariate statistics, simple correlations, multiple regression results and robustness checks.

4.1 Univariate Statistics

Table 2 shows simple univariate statistics for the variables described above for 1995, the most recent year in our sample. The mean of the differential future earnings response measures, $\Delta FERC$ and $\Delta FINC$ are both positive. Also, the fraction positive of $\Delta FERC$ is 50/51 and of $\Delta FINC$ is 48/51; with both statistically significantly different from being random. Since the differences are calculated as the figure for the high relative firm-specific return variability group minus the figure for the low relative firm-specific return variability group, these positive differences mean that the future earnings response measures for high relative firm-specific stock return variability firms are almost always higher than those for low variability firms in the same industry. This suggests that high relative firm-specific return variation is associated with greater information being impounded into stock prices.

4.2 Simple Correlations

Table 3 shows simple correlation coefficients of our main variables with each other for 1995. Panel A contains correlations for variables constructed using data for the high relative firm-specific return variability subset of firms. Panel B displays the same correlations across the low variability firms. Panel C presents correlations of the differences in our key variables between industry-matched pairs of firms grouped by high and low relative firm-specific return variability. All of these correlations are estimated across our sample of two-digit industries for 1995.

First, Panels A and B show that both future earnings response measures are positively correlated with relative firm-specific return variability in both the high and low return variability samples. Panel C shows that differential return variability is also positively correlated with differential future earnings response measures. These results suggest that higher relative firm-specific return variability is correlated with more information-laden stock prices, not with noisier stock prices.

Second, firm diversification is negatively correlated with both future earnings response measures and with firm-specific return variations, though the former correlations are insignificant. Note that the correlations of differential diversification with the differential future earnings response measures are also insignificant. Differential firm size is negatively and significantly correlated with both differential future earnings response measures, indicating that firm size differences remain important within industries. Industry structure is intermittently significant, with a negative sign.

Institutional ownership, *INS*, is significantly positively correlated with Ψ, *FINC*, and *FERC*. If greater institutional ownership is indeed associated with reduced agency problems, the correlation indicates that reduced agency problems are associated with more informativeness and more relative firm-specific return variation. However, informativeness and the extent to which future dividends explain current variation in earnings are not correlated.

The correlations between informativeness and both earnings volatility and beta volatility are insignificant. R&D intensity and current stock return are negatively correlated with *FERC* and *FINC*. The fact that some of the cross-correlations in panel C remain significantly different from zero indicates that the industry matching procedure does not fully nullify the impact of these controls on *FERC* and *FINC*. This shows the importance of explicitly including these controls in the regression.

Graphs 1a and 1b plot, respectively, $\Delta FINC$ versus $\Delta\Psi$ and $\Delta FERC$ versus $\Delta\Psi$ using 1995 data. Both graphs show a clear positive relationship. Overall, these findings suggest that greater firm-specific stock return variation is associated with more capitalization of firm-specific information about earnings into stock prices.

4.3 Regressions

Table 4 shows results of regressions (19) and (20) using 1995 two-digit industry observations. We regress our differential earnings response, measured using either $\Delta FERC_{i_2,t}$ or $\Delta FINC_{i_2,t}$, on differential relative firm-specific stock return variation, $\Delta\Psi_{i_2,t}$, and some or all of our control variables. To safeguard against heteroskedasticity due to missing variables and general misspecification problems, we use Newey-West standard errors to calculate significance levels.

All reported probability values are based on two-tailed tests. To conserve space, we report two combinations: first, $\Delta\Psi$ with the first set of variables that control for problems in variable construction (ΔD, differential firm-level diversification, ΔS, differential firm size, and I, industry structure); and second, $\Delta\Psi$ with all the control variables. $\Delta\Psi$ is positively statistically significantly related to both of future earnings response measures in all specifications.

We also pool the years of annual data and run a time random effects panel regression model. The results are reported in Table 5. We first pool all years from 1975 to 1995. The results, reported in panel A, are similar to those reported in Table 4. To the extent that the panel regressions utilize data more extensively, and if there are no severe misspecification problems, the panel regressions are more efficient and the high statistical significance of the independent variables is meaningful.

We then break the panel into two periods, 1975 through 1987 and 1988 through 1995, and repeat the time random effects panel regressions. Some may argue that 1987 was an exceptional year because of the high volatility in October of that year. Our results remain whether we include or exclude that year of data. The regression coefficient for $\Delta\Psi$ remains highly statistically significantly positive in the 1988 to 1995 panel (reported in Table 5, panel C). In the 1975 to 1987 panel (reported in Table 5 panel B), the regression coefficient for $\Delta\Psi$ remains positive but is less significant. In the cases where ΔFERC is the dependent variable, the regression coefficient for $\Delta\Psi$ becomes statistically insignificant in the earlier period.

4.4. Robustness

The results in Tables 4 and 5 are highly robust. Reasonable specification changes and alternative statistical procedures generate qualitatively similar results, by which we mean that the pattern of signs and statistical significance shown for the differential relative firm-specific stock return variation measure, $\Delta\Psi$, in Table 4 (and 5) is preserved. To examine the robustness of our results, we conducted the following tests.

4.4.1 Outliers

We test for outliers in two ways. Hadi's (1992, 1994) method, with a five percent cut-off, detects no outliers. Likewise, using critical values of one, Cook's D statistics indicate no significant outlier problems.

4.4.2 Industry Population Size

The difference between the two firms with the highest relative firm-specific stock return variation and the two with the lowest relative firm-specific stock return variation is likely to be greater in industries containing more firms. To ensure that our findings are not an artifact of this effect, we add the average number of firms in the four-digit industries contained in each two-digit industry as an additional control variable. This generates qualitatively similar results to those shown. So does adding the total number of firms in each two-digit industry as an additional control. We conclude that differences in industry population size are not generating our findings.

4.4.3 Length of forecast horizon and the specification in estimating future earnings response measures

Our estimation of future earnings response variables is based on regressing current stock returns on three years of future earnings changes as in equation 4. This is based on the recommendations of Kothari and Sloan (1992) and Collins *et al.* (1994). Including one more or one less year of future earnings changes in equation 4 does not qualitatively affect our results. Neither does using levels rather than changes. Finally, including both changes and levels of future earnings on the right hand side of equation 4 causes no qualitative changes in our results either.

4.4.4 Pure Play Firms

We are concerned that our control for diversification might not fully nullify the impact of firm diversification, which tends to reduce both the future earnings response measures, *FERC* and *FINC*, and also the relative firm-specific return variation measure, Ψ. Note, however, the negative impact of diversification on future earnings response measures and relative firm-specific stock return variation is not strictly a variable construction problem, it is also an economic problem because a managerial action, namely the decision to diversify, affects stock price informativeness. Completely eliminating diversified firms may therefore amount to throwing out information useful to our understanding of stock price information content.

Nevertheless, we drop from our 1995 sample all firms that report segments outside of their reported main two-digit industry segment. We lose 278 (out of 1435) firms and six (out of 51) 2-digit industries due to inadequate sample sizes for estimating *FERC* and *FINC*. We then repeat the procedure reported in Section 3 to run the regressions reported in Tables 4 and 5. Our results are qualitatively unchanged: $\Delta\Psi$ attracts a highly statistically significant positive regression coefficient.[15]

4.4.5 Fiscal and Calendar Year-ends

We must match our earnings response measures, which are necessarily estimated as of fiscal year-ends, and our return variability estimates, which are measured over calendar years to allow comparability. We want to evaluate the behavior of all firms' stock returns in an identical macroeconomic environment, so we need to have the same window in generating all of our $\Delta\Psi_{i_2,t}$

[15] These unreported results are available upon request.

measures. We estimate return variability from January 1st to December 31st because this is the most common firm fiscal year.[17] Clearly, some of our sample firms have mismatched fiscal year and calendar year windows.

One solution to this problem is to drop all firms whose fiscal years end on dates other than December 31st. Unfortunately, this causes us to lose approximately 2,000 of our 7,033 firms - primarily because many four-digit industries end up containing too few firms. This leads to our losing too many two-digit industries (16 are lost, leaving only 36) because they do not contain enough four-digit industries to be usable. We therefore retain all observations and accept asynchronicity in fiscal and calendar year ends.

Such asynchronous timing clearly adds noise to our estimation of the relationship between earnings responses and relative firm-specific stock return variation. However, this need not create a systematic bias. We examine the distribution of fiscal year ends for our sets of high and low return variability firms, H_{i_2} and L_{i_2} respectively. A Kolmogorov-Smirnov test rejects the hypothesis that the two distributions are different.[18] Furthermore, the hypothesis that the probability of a firm's fiscal year ending on December 31st is different for firms in H_{i_2} and firms in L_{i_2} is also rejected. These tests lead us to conclude that asynchronous fiscal and calendar years may add noise to our differential variables, but that they probably do not bias our tests.

5. Cross Industry Tests

Up to this point, all of our results have been based on our matched pairing method. A criticism of this technique is that we pool firms in different four-digit industries to estimate future earnings response measures, the *FERC* and *FINC* in equations (5) and (6), respectively. This

[17] For example, in 1995, 70% of firms in our COMPUSTAT sample have a Dec. 31 fiscal year end.

approach might control for industry-specific impacts on *FERC* and *FINC* poorly if the four-digit industries within a two-digit industry are heterogeneous. To ascertain the robustness of our empirical results, we also estimate *FERC* and *FINC* for all firms in a given four-digit SIC industry, i_4, as stipulated in equations (5) and (6), and then regress these industry average future earnings response measures on industry (weighted) average firm-specific stock return variation measures, $\Psi_{i_4,t}$, defined as

$$\Psi_{i_4,t} \equiv \frac{\sum_{j \in i_4} \sum_{w \in t} \varepsilon^2_{j,w,t}}{\sum_{j \in i_4} \sum_{w \in t} (r_{j,w,t} - \bar{r}_{j,w,t})^2} \tag{21}$$

and our control variables. Note that (21) is analogous to the construction of $\Psi^H_{i_2,t}$ and $\Psi^L_{i_2,t}$ in equations 9 and 10.

The list of control variables required here might be longer than that used in Tables 4 and 5 because we are no longer controlling for industry differences by using matched pairs. To the control variables used above, we therefore add property, plant and equipment (PP&E) over total assets (a measure of capital intensity) and PP&E over current depreciation (a measure of the average age of the industry's fixed capital) because these variables differ greatly across industries and are related to earnings timeliness (Beaver and Ryan, 1993) and volatility. The economic content and behavior of these variables are similar to the earnings volatility variable. Since adding them does not change our results, we suppress them to reduce collinearity, to improve efficiency, and to keep the current empirical specification directly comparable to those reported earlier. Our base year remains 1995 so as to be consistent with results reported earlier. Our 1995 sample includes 1,969 firms in ninety-three four-digit industries.

[18] The D-statistics is 0.1343, corresponding to a p-value of 0.291, and so does not meet standard criteria for statistical significance.

Table 6 reports the univariate statistics. Table 7 reports the simple correlations among the future earning response variables, *FERC* and *FINC*, the relative firm-specific return variation, Ψ, and all the control variables. In general, these cross-industry correlations are consistent with the cross-industry correlations in panels A and B of Table 3. In particular, *FERC* and *FINC* are positively significantly correlated with Ψ.

Graphs 2a and 2b plot, respectively, *FINC* versus Ψ and *FERC* versus Ψ using 1995 data. Both graphs show a clear positive relationship, although the plots are more scattered than their counterparts in Graphs 1a and 1b. Overall, these findings suggest that, based on simple industry aggregation, greater firm-specific stock return variation is associated with more capitalization of firm-specific information about earnings into stock prices.

Table 8 displays 1995 data regressions of industry-average future earnings response measures (*FERC* and *FINC*) on industry-average relative firm-specific stock return variation, $\Psi_{i_4,t}$, and the control variables discussed above. As in the previous set of regressions, we use Newey-West standard errors to calculate the t-statistics to safeguard against heteroskedasticity due to missing variables and general misspecification problems. Also, to further control for differences among industries, we include one-digit industry fixed effects. (We do not use two-digit industry fixed effects to conserve degrees of freedom.) Consistent with the matched pair results in Table 4, firm-specific stock return variation attracts a positive and significant coefficient across all specifications.

Finally, we pool years of annual data from 1975 to 1995 and use a four-digit industry fixed effects and time random effects regression model. Again, we conduct three sets of regression runs based on the 1975 to 1995 panel, the 1975 to 1987 panel, and the 1988 to 1995 panel, respectively. We obtain results similar to those in panel A in Table 5. Again, the results in the 1975 to 1987 regression, which uses *FERC* as the dependent variable, are statistically slightly less significant than the rest.

As robustness checks, we also conduct the cross-industry analyses in the following ways: (1) using only pure-play firms (i.e., discarding all firms that have business segments outside of their main 4-digit industry); (2) using only firms with a December 31st fiscal year end[7]; and (3) using three-digit industry groupings. In all cases, relative firm-specific stock return variation attracts a positive and statistically significant coefficient regardless of whether *FERC* or *FINC* is the dependent variable and whether the control variables are included or not.

6 Changes in the Relationship from 1975 to 1995

All our reported results are statistically more significant if we run time random effects panel regressions by pooling the years of data. To be conservative, however, we conduct year-by-year regression runs. In the above discussion, we report runs only for the latest year of data, 1995. In this section, we report the results of year-by-year regressions for all the years.

The left panel in Table 10 displays the regression coefficients on differential relative firm-specific stock return variation, $\Delta\Psi$, in regressions explaining differential future earnings response coefficients, $\Delta FERC$, and differential future earnings increase in explanatory power $\Delta FINC$. The regressions are analogous to equations 4.4 and 4.8 in Table 4, but are run separately for each year from 1975 to 1995. Differential relative firm-specific stock return variation attracts a positive coefficient in every year. Note that the coefficients' statistical significance seems quite stable. In addition, in the regression using $\Delta FERC$ as the dependent variable, the regression coefficient rises over time.

[7] Unlike when we use the industry-matched pairing approach, we do not lose too many four-digit industries when we discard firms whose fiscal year end is not on Dec 31. Hence, we can conduct this robustness check.

Graphs 3a and 3b plot the coefficient of $\Delta\Psi$, constructed using the matched pair technique, in regressions explaining Δ*FINC* and Δ*FERC*, respectively, against time. They show that the regression coefficient of $\Delta\Psi$ when the dependent variable is Δ*FINC* is visibly smaller in the 1970s than in the 1980s and 1990s. We interpret the result as suggesting that firm-specific stock returns variation is a more reliable indicator of stock price informativeness in the eighties and nineties. However, when the dependent variable is Δ*FERC*, $\Delta\Psi$ attracts a regression coefficient that shows no obvious time trend.

The right panel in Table 10 displays the regressions coefficients on four-digit industry-average firm-specific stock return variation, Ψ, in regressions explaining four-digit industry average *FERC* and *FINC*. The regressions are analogous to those in Table 8. The results reported in Table 8 are qualitatively replicated in almost every year.

Graphs 4a and 4b show that the regression coefficients of Ψ when the dependent variable is *FINC* and *FERC*, respectively. An interesting observation is that the regression coefficient of Ψ is visibly smaller in recession years (e.g., 1980, 1990) and in years when there the market is more turbulent (e.g., 1987). We speculate that, in these years, *FERC*, *FINC* or both may be estimated less precisely; or that a high Ψ is indicative of highly informed stock prices.

7. Discussion and Conclusion

Roll (1988) finds that a large part of the variation in U.S. stock returns is firm-specific, as opposed to market- or industry-related). He acknowledges that his findings seem "to imply the existence of either private information or else occasional frenzy unrelated to concrete information" (Roll 1988, p.566). The results in this paper support the former interpretation.

We measure the information content of stock prices using the methodology of Collins *et al.* (1994), that is, we say stock prices are more informative if current returns better predict future earnings changes. We find that greater firm-specific stock return variation, measured relative to total variation, is associated with more informative stock prices. This result is highly robust and highly statistically significant.

We conclude that the importance of firm-specific variation in U.S. stock returns most likely reflects the capitalization of firm-specific information about fundamentals into stock prices, and thus reflects an efficient stock market, rather than a noisy one. Higher firm-specific return variation appears to indicate stock prices closer to fundamentals, not farther from them.

This finding is economically important. Tobin (1982) argues that stock market efficiency matters because the stock market is a device for allocating capital. If stock prices are always near their fundamental values, capital is priced correctly in its different uses and corporate managers receive meaningful feedback when stock prices move. Both of these effects should lead to more economically efficient capital allocation, both between and within firms. Tobin defines the stock market as exhibiting functional efficiency if stock prices lead to an economically efficient microeconomic allocation of capital.

Our findings contribute to the literature on the functional form of the efficient markets hypothesis in that they are consistent with previous cross-country studies that, taken together, suggest that higher firm-specific stock returns variation reflects more informationally efficient stock prices. Morck, Yeung, and Yu (2000) show that systematic returns variation falls and firm-specific returns variation rises across countries as public investors= property rights as residual claimants are better legally protected. They suggest that better property rights protection makes share prices more predictable to arbitrageurs who invest in information gathering and processing, that better investor protection encourages informed arbitrageurs to trade more intensely, and that both of these effects raise observed levels of firm-specific returns variation. Wurgler (2000) finds that Morck, Yeung, and Yu's synchronicity measure is negatively correlated with his measure of the quality of capital allocation.

Our findings also suggest that higher firm-specific stock returns may also reflect more informationally efficient stock prices in the United States. In this, they support Durnev *et al.* (2000), who show that industries and firms for which firm-specific stock price variation is larger use more external financing and allocate capital more efficiently.

In summary, our findings are consistent with the view that greater firm-specific price variation is associated with more informative stock prices. This ultimately attests to the role of stock prices as efficient signals for resource allocation, and thus to the functional efficiency of the stock market.

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Table 1: Definitions of Main Variables. All Variables Are Constructed Using Industry Match Pairing Approach

Variable		Definition
Panel A. Future Earnings Response Measures		
Future earnings return coefficient of high Ψ firms	$FERC^H$	Sum of coefficients on future change in earnings $\Sigma_\tau b_\tau$ (τ=1,2,3) of high 4-digit industry Ψ firms in the regression: $r_t = a + b_0\Delta E_t + \Sigma_\tau b_\tau \Delta E_{t+\tau} + \Sigma_\tau d_\tau r_{t+\tau} + u_t$ (τ=1,2,3), where r is annual return and E is earnings per share (operating income before depreciation over common shares outstanding). Each regression is run on the cross-section of 4-digit industry high Ψ firms for each 2-digit industry. Change in earnings per share, ΔE_t, is scaled by previous year price, P_{t-1}.
Future earnings return coefficient of low Ψ firms	$FERC^L$	Same as $FERC^H$ using the low 4-digit industry Ψ firms sample.
Future earnings explanatory power increase of high Ψ firms	$FINC^H$	Increase in the coefficient of determination of the model: $r_t = a + b_0\Delta E_t + \Sigma_\tau b_\tau \Delta E_{t+\tau} + \Sigma_\tau d_\tau r_{t+\tau} + u_t$ (τ=1,2,3) relative to the base model: $r_t = a + b_0\Delta E_t + \eta_t$ of high Ψ firms, where r is annual return and E is earnings per share (operating income before depreciation over common shares outstanding). Each regression is run on the cross-section of 4-digit industry high Ψ firms for each 2-digit industry. Change in earnings per share, ΔE_t, is scaled by previous year price, P_{t-1}.
Future earnings explanatory power increase of low Ψ firms	$FINC^L$	Same as $FINC^H$ using low 4-digit industry Ψ firms sample.
Differential future earnings return coefficient	$\Delta FERC$	Difference between future earnings return coefficient of high and low 4-digit industry Ψ firms, $FERC^H$- $FERC^L$.
Differential explanatory power increase	$\Delta FINC$	Difference between future earnings explanatory power increase of high and low 4-digit industry Ψ firms, $FINF^H$- $FINF^L$.
Panel B. Relative Firm-specific Return Variation Measures		
Relative firm-specific return variation of high Ψ firms	Ψ^H	2-digit industry aggregate of firm-specific rel. to systematic return variation of high Ψ firms. It is calculated as the ratio of residual sum of squares to total sum of squares (residual plus explained sum of squares) from the regressions of firm return on market and 2-digit industry value-weighted indexes (constructed excluding own return) run on weekly data using firms in 4-digit industry. High Ψ firms are identified from individual regressions described above.
Relative firm-specific return variation of low Ψ firms	Ψ^L	Same as Ψ^H for low 4-digit industry Ψ firms.
Differential relative firm-specific return variation	$\Delta\Psi$	The difference between Ψ of high and low 4-digit industry firms, Ψ^H- Ψ^L.
Panel C. Control variables		
	I	Square root of the aggregate number of firms in 2-digit industry used to construct future earnings response and return variation measures.
Size of high Ψ firms	S^H	Log of average of total assets in 2-digit industry using the sample of 4-digit industry high Ψ firms.
Size of low Ψ firms	S^L	Log of average of total assets in 2-digit industry using the sample of low 4-digit industry Ψ firms.
Differential firm size	ΔS	Difference between log of average total assets of high and low 4-digit industry Ψ firms, S^H- S^L.
Diversification of high Ψ firms	D^H	Total assets weighted average number of 3-digit industries a firm operates in the sample of high 4-digit industry Ψ firms.
Diversification of low Ψ firms	D^L	Total assets weighted average number of 3-digit industries a firm operates in the sample of low 4-digit industry Ψ firms.
Differential diversification	ΔD	The difference between log of diversification of high and low 4-digit industry Ψ firms, D^H- D^L.
Past earnings volatility of high Ψ firms	VE^H	Two-digit average volatility of past change in earnings, ΔE_t using the sample of high 4-digit industry Ψ firms where E is earnings per share (operating income before depreciation over common shares outstanding). Firm-level volatility is constructed using 5 years of data. Change in earnings, ΔE_t, is scaled by previous year price, P_{t-1}.
Past earnings volatility of low Ψ firms	VE^L	Same as VE^H using low 4-digit industry Ψ firms sample.
Differential past earnings volatility	ΔVE	The difference between past earnings volatility of high and low 4-digit industry Ψ firms., VE^H- VE^L.
Volatility of beta of high Ψ firms	$V\beta^H$	Two-digit industry volatility of beta constructed using the sample of high 4-digit industry Ψ firms. Volatility of beta is calculated as a simple average of the variances of monthly firms' betas belonging to the corresponding 4-digit industries. Beta is defined from the regression: $(r_t - r_{f,t}) = \alpha + \beta(r_t - r_{m,t}) + k_t$ using daily data. r_t is firm's daily return; $r_{f,t}$ is daily 30-day T-bill rate; r_m is value-weighted market return.
Volatility of beta of low Ψ firms	$V\beta^L$	Same as using the sample of low 4-digit industry Ψ firms.
Differential volatility of beta	$\Delta V\beta$	The difference between volatility of beta of high and low 4-digit industry Ψ firms, $V\beta^H$- $V\beta^L$.
Future dividends explanatory power of high Ψ firms	FD^H	The coefficient of determination of the model: $\Delta E_t = a + b_0\Delta DIV_t + \Sigma_\tau b_\tau \Delta DIV_{t+\tau} + \varepsilon_t$ (τ=1,2,3) of high 4-digit industry Ψ firms, where E is earnings per share (operating income before depreciation over common shares outstanding) and DIV is dividends per share plus the value of stock repurchase over common shares outstanding. Each regression is run on the cross-section of high 4-digit industry Ψ firms for each 2-digit industry.
Future dividends explanatory power of low Ψ firms	FD^L	Same as FD^H using the low 4-digit industry Ψ firms.

Differential future dividends explanatory power	ΔFD	The difference between future dividends explanatory power of high and low 4-digit industry Ψ firms, $FD^H - FD^L$.
Institutional ownership of high Ψ firms	INS^H	Two-digit industry total assets weighted institutional ownership constructed using the sample of high 4-digit industry Ψ firms. Annual institutional ownership is calculated as simple average of quarterly data.
Institutional ownership of low Ψ firms	INS^L	Same as INS^L using the low 4-digit industry Ψ firms.
Differential institutional ownership	ΔINS	The difference between institutional ownership of high and low 4-digit industry Ψ firms, $INS^H - INS^L$.
Research & development expenses of high Ψ firms	$R\&D^H$	Two-digit industry total assets weighted ratio of *R&D* expenditures to total sales constructed using the sample of high 4-digit industry Ψ firms.
Research & development expenses of low Ψ firms	$R\&D^L$	Same as $R\&D^H$ using the low 4-digit industry Ψ firms sample.
Differential research & development expenses	$\Delta R\&D$	The difference between research & development expenses of high and low 4-digit industry Ψ firms, $R\&D^H - R\&D^L$.
Past industry return of high Ψ firms	r^H	Two-digit industry value-weighted return in *t-1* using the sample of high 4-digit industry Ψ firms.
Past industry return of low Ψ firms	r^L	Same as r^H using the sample of low 4-digit industry Ψ firms.
Differential past industry return	Δr	Differential past industry return of high and low 4-digit industry Ψ firms, $r^H - r^L$.

Note for Table 1: this table reports definitions of variables constructed using industry match pairing approach. Four-digit cross-industry variables are calculated analogously using the sample of firms in 4-digit industry. They include: future earnings explanatory power, **FINC**; future earnings return coefficient, **FERC**; relative firm-specific return variation, **Ψ**; industry structure, **I**; size, **S**; diversification, **D**; past earnings volatility, **VE**; volatility of beta, **V*β***, future dividends explanatory power, **FD**; institutional ownership, **INS**; research and development expenses, **R&D**; and past industry return, **r**.

Table 2: Univariate Statistics of Main Variables. All Variables Are Constructed Using Industry Match Pairing Approach, 1995 Data.

Variable		*mean*	*standard deviation*	*minimum*	*maximum*
Panel A. Future Earnings Response Measures					
Future earnings return coefficient of high Ψ firms	$FERC^H$	0.760	1.220	-1.096	1.112
Future earnings return coefficient of low Ψ firms	$FERC^L$	0.340	1.075	-1.872	1.033
Future earnings explanatory power increase of high Ψ firms	$FINC^H$	0.478	0.255	0.006	0.833
Future earnings explanatory power increase of low Ψ firms	$FINC^L$	0.385	0.201	0.008	0.886
Differential future earnings return coefficient	$\Delta FERC$	0.420	0.469	-1.007	1.382
Differential explanatory power increase	$\Delta FINC$	0.093	0.106	-0.009	0.571
Panel B. Relative Firm-specific Return Variation Measures					
Relative firm-specific return variation of high Ψ firms	Ψ^H	0.934	0.026	0.869	0.974
Relative firm-specific return variation of low Ψ firms	Ψ^L	0.549	0.101	0.388	0.751
Differential return variation	$\Delta\Psi$	0.385	0.093	0.176	0.528
Panel C. Control variables					
Industry structure	I	5.196	8.291	4.472	11.314
Size of high Ψ firms	S^H	6.487	0.966	4.889	8.199
Size of low Ψ firms	S^L	6.919	1.201	4.597	9.519
Differential firm size	ΔS	-0.432	0.945	-2.681	1.238
Diversification of high Ψ firms	D^H	1.407	0.697	1.000	2.409
Diversification of low Ψ firms	D^L	1.723	0.875	1.000	2.017
Differential corporate diversification	ΔD	-0.315	0.476	-2.113	2.333
Past earnings volatility of high Ψ firms	VE^H	0.082	0.180	0.002	0.937
Past earnings volatility of low Ψ firms	VE^L	0.104	0.189	0.002	1.069
Differential past earnings volatility	ΔVE	-0.022	0.091	-0.001	0.870
Volatility of beta of high Ψ firms	$V\beta^H$	1.530	1.304	0.380	6.131
Volatility of beta of low Ψ firms	$V\beta^L$	1.962	1.303	0.420	9.232
Differential volatility of beta	$\Delta V\beta$	-0.432	1.101	-0.013	2.114
Future dividends explanatory power of high Ψ firms	FD^H	0.077	0.116	0.002	0.535
Future dividends explanatory power of low Ψ firms	FD^L	0.036	0.110	0.000	0.616
Differential future dividends explanatory power	ΔFD	0.041	0.202	0.001	0.483
Institutional ownership of high Ψ firms	INS^H	0.515	0.093	0.225	0.746
Institutional ownership of low Ψ firms	INS^L	0.218	0.080	0.113	0.533
Differential institutional ownership	ΔINS	0.297	0.106	0.112	0.414
Research & development expenses of high Ψ firms	$R\&D^H$	0.006	0.022	0.000	0.071
Research & development expenses of low Ψ firms	$R\&D^L$	0.012	0.024	0.000	0.090
Differential research & development expenses	$\Delta R\&D$	-0.006	0.033	-0.015	0.071
Past industry return of high Ψ firms	r^H	0.188	0.243	-0.202	0.907
Past industry return of low Ψ firms	r^L	0.142	0.290	-0.006	0.857
Differential past industry return	Δr	-0.046	0.211	-0.296	0.503

Note for Table 2: the sample consists of 51 two-digit industries in 1995 constructed using 1,428 firms for all variables except **FD^H**, **FD^L**, and **ΔFD**. **FD^H**, **FD^L**, and **ΔFD** are constructed using 1,400 firms in 50 industries. Finance and Utility industries (SIC codes 6000 – 6999 and 4000-4999) are omitted. The fraction of positive **ΔINF** is 0.98; the fraction of positive **ΔERC** is 0.94. Refer to Table 1 for variables definitions.

Table 3a: Simple Correlation Coefficients. All Variables Are Constructed Using Industry Match Pairing Approach for the Sample of High Ψ Firms, 1995 Data.

Panel A: Correlation Matrix of Future Earnings Response Measures with Relative Firm-specific Return Variation Measures, and Control Variables

	$FERC^H$	Ψ^H	I^H	S^H	D^H	VE^H	$V\beta^H$	FD^H	INS^H	$R\&D^H$	r^H		
$FINC^H$	**0.222**	**0.242**	**-0.322**	-0.140	-0.169	-0.041	-0.109	0.143	**0.336**	**-0.414**	**-0.339**	$FINC^H$	*Future earnings explanatory power increase of high Ψ firms*
	(0.04)	(0.05)	(0.00)	(0.26)	(0.23)	(0.77)	(0.44)	(0.31)	(0.01)	(0.00)	(0.01)		
$FERC^H$		0.143	**-0.338**	-0.175	-0.141	-0.137	-0.064	0.188	**0.369**	**-0.452**	**-0.351**	$FERC^H$	*Future earnings return coefficient of high Ψ firms*
		(0.31)	(0.00)	(0.22)	(0.32)	(0.33)	(0.65)	(0.18)	(0.00)	(0.00)	(0.01)		

Panel B: Correlation Matrix of Control Variables with Relative Firm-specific Return Variation Measures and Each Other

	I^H	S^H	D^H	VE^H	$V\beta^H$	FD^H	INS^H	$R\&D^H$	r^H		
Ψ^H	-0.070	-0.188	**-0.281**	-0.055	-0.044	**0.277**	**0.267**	-0.016	0.045	Ψ^H	*Relative firm-specific return variation of high Ψ firms*
	(0.62)	(0.16)	(0.05)	(0.70)	(0.75)	(0.04)	(0.05)	(0.91)	(0.75)		
I^H		0.010	-0.076	0.019	0.040	0.001	**-0.346**	-0.125	**-0.240**	I^H	*Industry structure*
		(0.55)	(0.58)	(0.89)	(0.77)	(0.99)	(0.01)	(0.38)	(0.09)		
S^H			**0.400**	-0.157	-0.137	**0.310**	0.059	-0.070	-0.083	S^H	*Size of high Ψ firms*
			(0.00)	(0.27)	(0.33)	(0.02)	(0.66)	(0.62)	(0.56)		
D^H				0.184	0.031	0.034	-0.080	0.073	-0.071	D^H	*Diversification of high Ψ firms*
				(0.19)	(0.83)	(0.81)	(0.57)	(0.61)	(0.61)		
VE^H					-0.024	-0.147	-0.064	0.119	**0.310**	VE^H	*Past earnings volatility of high Ψ firms*
					(0.86)	(0.30)	(0.64)	(0.40)	(0.02)		
$V\beta^H$						0.098	-0.051	-0.107	-0.139	$V\beta^H$	*Volatility of beta of high Ψ firms*
						(0.49)	(0.71)	(0.45)	(0.33)		
FD^H							0.075	-0.016	0.045	FD^H	*Future dividends explanatory power of high Ψ firms*
							(0.58)	(0.91)	(0.75)		
INS^H								-0.1301	0.129	INS^H	*Institutional ownership of high Ψ firms*
								(0.34)	(0.35)		
$R\&D^H$									**-0.339**	$R\&D^H$	*Research and development expenses of high Ψ firms*
									(0.01)		

Table 3b: Simple Correlation Coefficients. All Variables Are Constructed Using Industry Match Pairing Approach for the Sample of Low Ψ Firms, 1995 Data.

Panel A: Correlation Matrix of Future Earnings Response Measures with Relative Firm-specific Return Variation Measures, and Control Variables

	$FERC^L$	Ψ^L	I	S^L	D^L	VE^L	$V\beta^L$	FD^L	INS^L	$R\&D^L$	r^L
	0.233	**0.261**	**-0.338**	-0.019	-0.140	-0.020	-0.089	0.155	**0.340**	**-0.391**	**-0.322**
	(0.03)	(0.05)	(0.00)	(0.38)	(0.30)	(0.77)	(0.43)	(0.32)	(0.00)	(0.02)	(0.01)
		0.409	**-0.332**	-0.125	-0.128	-0.141	-0.063	0.168	**0.351**	**-0.427**	**-0.357**
		(0.00)	(0.00)	(0.20)	(0.35)	(0.31)	(0.63)	(0.17)	(0.01)	(0.00)	(0.01)

Panel B: Correlation Matrix of Control Variables with Relative Firm-specific Return Variation Measures and Each Other

	I^L	S^L	D^L	VE^L	$V\beta^L$	FD^L	INS^L	$R\&D^L$	r^L
	-0.050	-0.202	**-0.286**	-0.073	-0.020	**0.287**	**0.277**	-0.036	0.048
	(0.71)	(0.12)	(0.04)	(0.70)	(0.77)	(0.05)	(0.04)	(0.93)	(0.73)
		0.025	-0.053	0.033	0.026	-0.013	**-0.368**	-0.148	**-0.256**
		(0.79)	(0.70)	(0.88)	(0.78)	(0.98)	(0.00)	(0.38)	(0.08)
			0.360	-0.166	-0.132	**0.300**	0.060	-0.087	-0.060
			(0.00)	(0.26)	(0.34)	(0.00)	(0.64)	(0.60)	(0.55)
				0.115	0.054	0.182	-0.102	0.065	-0.193
				(0.42)	(0.71)	(0.21)	(0.48)	(0.65)	(0.74)
					0.001	-0.167	-0.076	0.122	**0.328**
					(0.88)	(0.31)	(0.66)	(0.41)	(0.03)
						0.073	-0.041	-0.098	-0.159
						(0.48)	(0.72)	(0.44)	(0.34)
							0.085	-0.032	0.035
							(0.56)	(0.91)	(0.74)
								-0.130	0.150
								(0.35)	(0.34)
									-0.363
									(0.02)

Variable	Definition
$FINC^L$	*Future earnings explanatory power increase of low Ψ firms*
$FERC^L$	*Future earnings return coefficient of high Ψ firms*
Ψ^L	*Relative firm-specific return variation of low Ψ firms*
I	*Industry structure*
S^L	*Size of low Ψ firms*
D^L	*Diversification of low Ψ firms*
VE^L	*Past earnings volatility of low Ψ firms*
$V\beta^L$	*Volatility of beta of low Ψ firms*
FD^L	*Future dividends explanatory power of low Ψ firms*
INS^L	*Institutional ownership of low Ψ firms*
$R\&D^L$	*Research and development expenses of low Ψ firms*

Table 3c: Simple Correlation Coefficients. All Variables Are Constructed Using Industry Match Pairing Approach for the Difference between the High and Low Ψ Firms Samples, 1995 Data.

Panel A: Correlation Matrix of Future Earnings Response Measures with Relative Firm-specific Return Variation Measures, and Control Variables

ΔERC	*ΔΨ*	*I*	*ΔS*	*ΔD*	*ΔVE*	*ΔVβ*	*ΔFD*	*ΔINS*	*ΔR&D*	*Δr*		
0.192	**0.288**	**-0.221**	-0.220	-0.189	-0.025	-0.121	0.139	**0.355**	**-0.395**	**-0.331**	*ΔFINC*	*Future earnings explanatory power increase of high Ψ firms*
(0.15)	(0.00)	(0.08)	(0.11)	(0.18)	(0.74)	(0.41)	(0.33)	(0.00)	(0.00)	(0.00)		
	0.299	**-0.474**	**-0.231**	-0.155	-0.117	-0.061	0.212	**0.377**	**-0.450**	**-0.347**	*ΔFERC*	*Future earnings return coefficient of high Ψ firms*
	(0.00)	(0.00)	(0.05)	(0.27)	(0.32)	(0.63)	(0.17)	(0.02)	(0.01)	(0.02)		

Panel B: Correlation Matrix of Control Variables with Relative Firm-specific Return Variation Measures and Each Other

ΔI	*ΔS*	*ΔD*	*ΔVE*	*ΔVβ*	*ΔFD*	*ΔINS*	*ΔR&D*	*Δr*		
0.260	-0.186	-0.177	-0.078	-0.019	**0.291**	**0.275**	-0.002	0.055	*ΔΨ*	*Relative firm-specific return variation of high Ψ firms*
(0.06)	(0.16)	(0.19)	(0.72)	(0.72)	(0.02)	(0.05)	(0.89)	(0.73)		
	-0.240	-0.155	0.039	0.057	-0.012	**-0.330**	-0.130	-0.242	*I*	*Industry structure*
	(0.00)	(0.27)	(0.88)	(0.77)	(0.98)	(0.00)	(0.36)	(0.11)		
		0.210	-0.151	-0.132	0.312	0.046	-0.086	-0.103	*ΔS*	*Size of high Ψ firms*
		(0.14)	(0.27)	(0.31)	(0.04)	(0.65)	(0.61)	(0.53)		
			0.172	0.063	0.187	-0.141	0.023	-0.036	*ΔD*	*Diversification of high Ψ firms*
			(0.23)	(0.66)	(0.19)	(0.32)	(0.87)	(0.80)		
				-0.010	-0.136	-0.062	0.125	**0.305**	*ΔVE*	*Past earnings volatility of high Ψ firms*
				(0.86)	(0.28)	(0.65)	(0.40)	(0.00)		
					0.103	-0.066	-0.101	-0.147	*ΔVβ*	*Volatility of beta of high Ψ firms*
					(0.50)	(0.68)	(0.43)	(0.33)		
						0.080	-0.001	0.024	*ΔFD*	*Future dividends explanatory power of high Ψ firms*
						(0.56)	(0.89)	(0.73)		
							-0.153	0.112	*ΔINS*	*Institutional ownership of high Ψ firms*
							(0.36)	(0.35)		
								-0.316	*ΔR&D*	*Research and development expenses of high Ψ firms*
								(0.02)		

Note for Table 3: the sample consists of 51 two-digit industries in 1995 constructed using 1,428 firms for all variables except $\mathbf{FD^H}$, $\mathbf{FD^L}$, and **ΔFD**. $\mathbf{FD^H}$, $\mathbf{FD^L}$, and **ΔFD** are constructed using 1,400 firms in 50 industries. Finance and Utilities industries (SIC codes 6000 – 6999 and 4000-4999) are omitted. Numbers in parentheses are probability levels at which the null hypothesis of zero correlation is rejected. Coefficients significant at 10% or better (2-tailed test) are in boldface. Refer to Table 1 for variables definition.

Table 4: OLS Regressions of Future Earnings Response Measures on Relative Firm-specific Return Variation Measures and Control Variables. All Variables Are Constructed Using Industry Match Pairing Approach, 1995 Data.

Specification		*4.1*	*4.2*	*4.3*	*4.4*	*4.5*	*4.6*	*4.7*	*4.8*
Dependent variable		*Differential explanatory power increase, ΔFINC*				*Differential future earnings return coefficient, ΔFERC*			
Differential relative firm-specific return variation	$\Delta\Psi$	**0.444**	**0.476**	**0.446**	**0.434**	**1.360**	**1.424**	**1.443**	**1.365**
		(0.06)	(0.03)	(0.06)	(0.08)	(0.10)	(0.10)	(0.08)	(0.08)
Industry structure	I	**-0.070**	**-0.080**	**-0.090**	**-0.092**	**-0.088**	**-0.074**	**-0.086**	**-0.093**
		(0.02)	(0.04)	(0.00)	(0.05)	(0.00)	(0.00)	(0.00)	(0.00)
Differential size	ΔS	**0.057**	**0.062**	**0.062**	**0.071**	**0.023**	0.028	0.029	**0.033**
		(0.02)	(0.03)	(0.03)	(0.03)	(0.08)	(0.18)	(0.22)	(0.10)
Differential diversification	ΔD	**-0.081**	**-0.100**	-0.075	-0.074	-0.090	-0.077	-0.059	-0.067
		(0.03)	(0.10)	(0.15)	(0.18)	(0.21)	(0.20)	(0.25)	(0.20)
Differential past earnings volatility	ΔVE	-	**0.112**	0.118	**0.109**	-	0.015	0.014	0.009
			(0.07)	(0.12)	(0.05)		(0.68)	(0.73)	(0.82)
Differential volatility of beta	$\Delta V\beta$	-	-0.006	-0.011	-0.006	-	0.006	0.001	0.003
			(0.43)	(0.21)	(0.20)		(0.69)	(0.51)	(0.59)
Differential institutional ownership	ΔINS	-	0.022	0.025	-	-	0.193	0.178	-
			(0.86)	(0.92)			(0.46)	(0.48)	
Differential future dividends explanatory power	ΔFD	-	-	-	-0.030	-	-	-	-0.024
					(0.81)				(0.84)
Differential research & development	$\Delta R\&D$	-	-	0.790	0.873	-	-	0.567	0.578
				(0.27)	(0.26)			(0.49)	(0.50)
Differential industry return	Δr	-	-	0.107	0.092	-	-	0.039	0.028
				(0.44)	(0.52)			(0.73)	(0.76)
	F-statistics	**34.758**	**14.830**	**11.091**	**12.735**	**23.303**	**12.221**	**9.866**	**10.016**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	Regression R^2	0.375	0.392	0.414	0.418	0.338	0.343	0.447	0.456
	Sample Size		51		50		51		50

Note for Table 4: the sample consists of 51 two-digit industries in 1995 constructed using 1,428 firms for all variables except **FD^H**, **FD^L**, and **ΔFD**. **FD^H**, **FD^L**, and **ΔFD** are constructed using 1,400 firms in 50 industries. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Numbers in parentheses are probability levels based on Newey-West standard errors at which the null hypothesis of a zero coefficient can be rejected. Coefficients significant at 10% or better (2-tailed test) are in boldface. Dependent variables are differential explanatory power increase, **ΔFINC** in specifications 4.1, 4.2, 4.3, and 4.4 and future differential earnings return coefficient, **ΔFERC** in specifications 4.5, 4.6, 4.7, and 4.8. Specifications' 4.1 and 4.5 independent variables are: differential relative firm-specific return variation, **ΔΨ**; industry structure, **I**; differential size, **ΔS**; and differential diversification, **ΔD**. Specifications' 4a.2 and 4a.6 independent variables are: differential firm-specific return variation, **ΔΨ**; industry structure, **I**; differential size, **ΔS**; differential diversification, **ΔD**; differential past earnings volatility, **ΔVE**; differential volatility of beta, **ΔVβ**; and differential institutional ownership, **ΔINS**. Specifications' 4.3 and 4.7 independent variables also include differential research & development expenses, **ΔR&D** and differential industry return, **Δr**. In specifications 4.4 and 4.8 differential future dividends explanatory power, **ΔFD** is used instead of differential institutional ownership, **ΔINS**. Specifications' 4.1, 4.2, 4.3, 4.5, 4.6, and 4.7 sample size is 51 two-digit industries (1,428 firms). Specifications' 4.5 and 4.8 sample size is 50 two-digit industries (1,400 firms). Refer to Table 1 for variables definition.

Table 5: 1975-1995 Time-Random Effect Panel Regressions of Future Earnings Response Measures on Differential Relative Firm-specific Return Variation and Control Variables. All Variables Are Constructed Using Industry Match Pairing Approach.

		Panel A							
		5a.1	*5a.2*	*5a.3*	*5a.4*	*5a.5*	*5a.6*	*5a.7*	*5a.8*
Time Period		*1975-1995*							
Dependent Variable		*Differential explanatory power increase, ΔFINC*				*Differential future earnings return coefficient, ΔFERC*			
Differential relative firm-specific return variation	$\Delta\Psi$	**0.267**	**0.272**	**0.259**	**0.220**	**1.167**	**1.176**	**1.173**	**1.194**
		(0.10)	(0.02)	(0.03)	(0.03)	(0.04)	(0.00)	(0.00)	(0.00)
Industry structure	I	**-0.037**	**-0.042**	**-0.039**	**-0.067**	**-0.062**	**-0.053**	**-0.057**	**-0.067**
		(0.03)	(0.04)	(0.05)	(0.03)	(0.00)	(0.00)	(0.00)	(0.00)
Differential size	ΔS	0.028	0.030	0.027	0.035	0.033	0.026	0.017	0.001
		(0.23)	(0.13)	(0.18)	(0.16)	(0.13)	(0.36)	(0.44)	(0.92)
Differential diversification	ΔD	-0.022	-0.052	-0.024	-0.022	-0.031	-0.019	-0.035	-0.038
		(0.11)	(0.15)	(0.16)	(0.23)	(0.33)	(0.16)	(0.20)	(0.25)
Differential past earnings volatility	ΔVE	-	**0.077**	**0.074**	**0.105**	-	**-0.074**	**-0.069**	**-0.075**
			(0.08)	(0.00)	(0.08)		(0.05)	(0.10)	(0.05)
Differential volatility of beta	$\Delta V\beta$	-	0.003	0.004	-0.003	-	-0.010	-0.015	-0.009
			(0.90)	(0.98)	(0.76)		(0.29)	(0.33)	(0.43)
Differential institutional ownership	ΔINS	-	-0.010	0.001	-	-	0.025	0.018	-
			(0.79)	(0.90)			(0.45)	(0.61)	
Differential future dividends explanatory power	ΔFD	-	-	-	**0.251**	-	-	-	0.066
					(0.04)				(0.12)
Differential research & development	$\Delta R\&D$	-	-	**-0.098**	**-0.160**	-	-	0.032	0.063
				(0.08)	(0.01)			(0.30)	(0.19)
Differential industry return	Δr	-	-	0.032	**0.093**	-	-	**-0.064**	**-0.025**
				(0.34)	(0.03)			(0.09)	(0.04)
F-statistic		**20.478**	**25.022**	**31.658**	**92.536**	**45.463**	**51.948**	**56.038**	**66.872**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.370	0.384	0.416	0.461	0.339	0.377	0.381	0.448
Number of observations			589		579		589		579

Table 5 (Continued)

		Panel B							
		5b.1	*5b.2*	*5b.3*	*5b.4*	*5b.5*	*5b.6*	*5b.7*	*5b.8*
Time Period		*1975-1987*							
Dependent Variable		*Differential explanatory power increase, ΔFINC*				*Differential future earnings return coefficient, ΔFERC*			
Differential relative firm-specific return variation	*ΔΨ*	0.218	0.233	0.224	0.298	**1.099**	1.092	**1.077**	**1.175**
		(0.15)	(0.17)	(0.20)	(0.25)	(0.01)	(0.13)	(0.24)	(0.06)
Industry structure	*I*	**-0.074**	**-0.075**	**-0.079**	**-0.086**	**-0.075**	**-0.069**	**-0.074**	**-0.071**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Differential size	*ΔS*	**0.039**	**0.041**	**0.049**	**0.047**	**0.059**	**0.054**	**0.057**	**0.036**
		(0.10)	(0.09)	(0.06)	(0.05)	(0.01)	(0.02)	(0.07)	(0.04)
Differential diversification	*ΔD*	-0.071	-0.078	-0.073	-0.065	-0.076	-0.068	-0.051	-0.050
		(0.12)	(0.15)	(0.15)	(0.17)	(0.35)	(0.40)	(0.38)	(0.57)
Differential past earnings volatility	*ΔVE*	-	**0.156**	**0.142**	**0.175**	-	-0.013	-0.012	0.017
			(0.01)	(0.04)	(0.05)		(0.71)	(0.89)	(0.73)
Differential volatility of beta	*ΔVβ*	-	-0.001	-0.004	-0.005	-	-0.008	-0.007	-0.005
			(0.99)	(0.67)	(0.68)		(0.45)	(0.55)	(0.61)
Differential institutional ownership	*ΔINS*	-	0.084	0.088	-	-	0.046	0.042	-
			(0.12)	(0.11)			(0.39)	(0.47)	
Differential future dividends explanatory power	*ΔFD*	-	-	-	**0.214**	-	-	-	**0.108**
					(0.05)				(0.10)
Differential research & development	*ΔR&D*	-	-	-0.021	-0.042	-	-	0.085	0.029
				(0.60)	(0.59)			(0.11)	(0.60)
Differential past industry return	*Δr*	-	-	**0.136**	**0.223**	-	-	-0.070	-0.078
				(0.09)	(0.01)			(0.15)	(0.18)
Chi-squared statistics		**14.705**	**17.577**	**40.990**	**44.317**	**51.624**	**56.709**	**58.922**	**58.960**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.378	0.348	0.323	0.451	0.259	0.304	0.308	0.481
Number of observations		288		282			288		282

Table 5 (Continued)

		5c.1	*5c.2*	*5c.3*	*5c.4*	*5c.5*	*5c.6*	*5c.7*	*5c.8*
		Panel C							
Time Period		*1988-1905*							
Dependent Variable		*Differential explanatory power increase, ΔFINC*				*Differential future earnings return coefficient, ΔFERC*			
Differential relative firm-specific return variation	*ΔΨ*	**0.215**	**0.224**	**0.235**	0.290	**1.247**	**1.250**	**1.269**	**1.291**
		(0.07)	(0.05)	(0.10)	(0.15)	(0.04)	(0.03)	(0.01)	(0.03)
Industry structure	*I*	**-0.047**	**-0.040**	**-0.053**	**-0.070**	**-0.079**	**-0.079**	**-0.073**	**-0.076**
		(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Differential size	*ΔS*	**0.037**	0.043	0.032	**0.051**	-0.005	-0.012	-0.019	-0.023
		(0.10)	(0.15)	(0.22)	(0.09)	(0.90)	(0.66)	(0.59)	(0.58)
Differential diversification	*ΔD*	**-0.053**	-0.057	-0.059	-0.052	-0.030	-0.031	-0.034	-0.033
		(0.10)	(0.14)	(0.18)	(0.28)	(0.14)	(0.21)	(0.20)	(0.23)
Differential past earnings volatility	*ΔVE*	-	0.029	0.017	0.070	-	-0.077	**-0.075**	**-0.109**
			(0.49)	(0.65)	(0.12)		(0.17)	(0.01)	(0.09)
Differential volatility of beta	*ΔVβ*	-	0.001	0.003	0.007	-	-0.018	-0.010	-0.011
			(0.81)	(0.73)	(0.45)		(0.32)	(0.49)	(0.22)
Differential institutional ownership	*ΔINS*	-	**0.091**	0.062	-	-	0.073	0.074	-
			(0.04)	(0.20)			(0.15)	(0.17)	
Differential future dividends explanatory power	*ΔFD*	-		-	0.067	-	-	-	0.017
					(0.17)				(0.73)
Differential research & development	*ΔR&D*	-	-	**-0.214**	**-0.230**	-	-	-0.044	-0.034
				(0.01)	(0.04)			(0.37)	(0.60)
Differential industry return	*Δr*	-	-	0.007	0.031	-	-	-0.060	-0.050
				(0.80)	(0.51)			(0.14)	(0.31)
Chi-squared statistic		**49.777**	**59.333**	**65.130**	**92.462**	**46.629**	**48.059**	**50.787**	**50.355**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.494	0.469	0.488	0.500	0.430	0.448	0.440	0.390
Number of observations			301		397		301		297

Note for Table 5: This table presents estimates of the regression $\mathbf{Y}_{I,t} = \alpha + \beta\Delta\Psi_{I,t} + \gamma\mathbf{Z}_{I,t} + \varepsilon_{I,t}$ with $E[\varepsilon_{I,t}] = 0$ and $E[\varepsilon_{I,t}\,\varepsilon_{I,s}] \neq 0\ \forall$ s, t and where α is constant (not reported), $\mathbf{Y}_{I,t}$ is earnings response measure (**ΔFINC** or **ΔFERC**), $\Delta\Psi_{I,t}$ is return differential firm-specific variation measure, and $\mathbf{Z}_{I,t}$ is a vector of control parameters. The vector of control parameters includes: industry structure, **I**; differential size, **ΔS**; differential diversification, **ΔD**; differential past earnings volatility, **ΔVE**; differential volatility of beta, **ΔVβ**; differential institutional ownership, **ΔINS**; differential future dividends explanatory power, **ΔFD**; differential research & development expenses, **ΔR&D,** and differential industry return, **Δr** . Refer to Table 1 for variables definition. All regressions include time-random effect and are estimated by GLS estimation approach. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Coefficients significant at 10% or better (2-tailed test) are in boldface. Numbers in parentheses are probability levels based on Newey-West standard errors at which the null hypothesis of a zero coefficient can be rejected. Sample consists of 589 two-digit industry-year observations constructed using 14,123 firms spanning 21 years (Panel A, specifications 5a.1, 5a.2, 5a.3, 5a.5, 5a.6, and 5a.7), 288 two-digit industry-year observations constructed using 6,9812 firms spanning 13 years (Panel B, specifications 5b.1, 5b.2, 5b.3, 5b.5, 5b.6 and 5b.7), and 301 two-digit industry-year observation constructed using 7,211 firms spanning 8 years (Panel C specifications 5c.1, 5c.2, 5c.3, 5c.5, 5c.6, and 5c.7). Sample consists of 579 two digit industry-year observations constructed using 13,883 firms spanning 21 years (Panel A, specifications 5a.4 and 5a.8), 282 two-digit industry-year observations constructed using 6,7868 firms spanning 13 years (Panel B, specifications 5b.4 and 5b.8), and 297 two-digit industry-year observation constructed using 7,116 firms spanning 8 years (Panel C, specifications 5c.4 and 5c.8).

Table 6: Univariate Statistics of Main Variables. All Variables Are Constructed Using 4-digit Cross Industry Approach, 1995 Data.

Variable		*mean*	*standard deviation*	*minimum*	*maximum*
Panel A. Future Earnings Response Measures					
Future earnings return coefficient	*FERC*	0.499	0.409	-1.560	1.210
Future earnings explanatory power increase	*FINC*	0.371	0.262	0.022	0.973
Panel B. Relative Firm-specific Return Variation Measure					
Relative firm-specific return variation	Ψ	0.750	0.077	0.400	0.897
Panel C. Control variables					
Industry structure	*I*	4.576	1.774	3.162	11.874
Size	*S*	6.505	1.350	3.588	9.953
Diversification	*D*	1.810	0.666	1.000	3.418
Past earnings volatility	*VE*	0.103	0.403	0.000	3.447
Volatility of beta	$V\beta$	2.155	1.715	0.175	13.178
Future dividends explanatory power	*FD*	0.048	0.114	0.001	0.514
Institutional ownership	*INS*	0.495	0.137	0.014	0.777
Research and development expenses	*R&D*	0.022	0.077	0.000	0.476
Past industry return	*r*	0.265	0.359	-0.172	1.729

*Note for Table 6: the sample consists of 93 four-digit industries in 1995 constructed using 1,696 firms for all variables except **FD**. **FD** is constructed using 1,905 firms in 90 industries. Finance and Utility industries (SIC codes 6000 – 6999 and 4000-4999) are omitted. Refer to Table 1 and its note for variables definitions.*

Table 7: Simple Correlation Coefficients. All Variables Are Constructed Using 4-digit Cross Industry Approach, 1995 Data.

Panel A: Correlation Matrix of Future Earnings Response Measures with Relative Firm-specific Return Variation Measures, and Control Variables

	FERC	*Ψ*	*I*	*S*	*D*	*VE*	*Vβ*	*FD*	*INS*	*R&D*	*r*		
	0.358	**0.180**	**-0.570**	0.130	**-0.246**	-0.020	**-0.212**	0.136	-0.012	**-0.262**	**-0.256**	*FINC*	*Future earnings explanatory power increase*
	(0.00)	(0.06)	(0.00)	(0.17)	(0.01)	(0.83)	(0.02)	(0.18)	(0.90)	(0.00)	(0.00)		
		0.181	**-0.566**	0.046	-0.158	0.005	-0.149	**0.180**	-0.057	**-0.244**	**-0.267**	*FERC*	*Future earnings return coefficient industries*
		(0.06)	(0.00)	(0.63)	(0.13)	(0.95)	(0.12)	(0.07)	(0.55)	(0.01)	(0.00)		

Panel B: Correlation Matrix of Control Variables with Relative Firm-specific Return Variation Measures and Each Other

	I	*S*	*D*	*VE*	*Vβ*	*FD*	*INS*	*R&D*	*r*		
	-0.135	**-0.240**	**-0.180**	-0.066	0.006	0.120	0.150	-0.007	0.042	*Ψ*	*Relative firm-specific return variation*
	(0.16)	(0.01)	(0.08)	(0.51)	(0.95)	(0.23)	(0.14)	(0.94)	(0.68)		
		0.215	-0.096	-0.017	-0.052	**-0.277**	-0.046	**0.234**	0.139	*I*	*Industry structure*
		(0.02)	(0.32)	(0.85)	(0.60)	(0.00)	(0.63)	(0.01)	(0.14)		
			0.322	-0.126	**-0.286**	-0.013	0.147	**-0.285**	**-0.186**	*S*	*Average industry size*
			(0.00)	(0.21)	(0.00)	(0.89)	(0.15)	(0.00)	(0.06)		
				0.102	0.126	0.086	-0.055	0.073	-0.087	*D*	*Average industry diversification*
				(0.32)	(0.23)	(0.40)	(0.59)	(0.61)	(0.40)		
					0.131	-0.038	0.028	0.109	0.118	*VE*	*Past earnings volatility*
					(0.19)	(0.71)	(0.78)	(0.28)	(0.24)		
						0.032	-0.023	**0.445**	**0.252**	*Vβ[I]*	*Volatility of beta*
						(0.74)	(0.82)	(0.00)	(0.01)		
								-0.210	-0.158	*FD*	*Future dividends explanatory power*
								(0.03)	(0.11)		
								0.140	0.004	*INS*	*Institutional ownership*
								(0.16)	(0.96)		
									0.623	*R&D*	*Research and development expenses*
									(0.00)		

Note for Table 7: the sample consists of 93 four-digit industries in 1995 constructed using 1,969 firms for all variables except **FD**. **FD** is constructed using 1,905 firms in 90 industries. Finance and Utilities industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Numbers in parentheses are probability levels at which the null hypothesis of zero correlation is rejected. Coefficients significant at 10% or better (2-tailed test) are in boldface. Refer to Table 1 and its notes for variables definition.

Table 8: OLS Regressions of Future Earnings Response Measures on Relative Firm-specific Return Variation and Control Variables. All Variables Are Constructed Using 4-digit Cross Industry Approach, 1995 Data.

Specification		*8.1*	*8.2*	*8.3*	*8.4*	*8.5*	*8.6*	*8.7*	*8.8*
Dependent Variable		*Explanatory power increase, FINC*				*Future earnings return coefficient, FERC*			
Relative firm-specific return variation	Ψ	**0.555**	**0.517**	**0.519**	**0.556**	**1.513**	**1.474**	**1.473**	**1.501**
		(0.07)	(0.01)	(0.07)	(0.03)	(0.02)	(0.09)	(0.07)	(0.01)
Industry Structure	*I*	**-0.077**	**-0.084**	**-0.080**	**-0.087**	**-0.081**	**-0.087**	**-0.080**	**-0.086**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size	*S*	**0.051**	**0.040**	**0.045**	**0.049**	**0.037**	**0.036**	**0.033**	**0.039**
		(0.03)	(0.05)	(0.00)	(0.07)	(0.04)	(0.06)	(0.07)	(0.03)
Diversification	*D*	**-0.144**	**-0.167**	**-0.164**	**-0.180**	**-0.125**	**-0.124**	**-0.088**	**-0.168**
		(0.01)	(0.00)	(0.03)	(0.01)	(0.10)	(0.10)	(0.10)	(0.05)
Past earnings volatility	*VE*	-	0.027	0.032	0.046	-	0.037	0.043	0.044
			(0.48)	(0.29)	(0.16)		(0.35)	(0.11)	(0.14)
Volatility of beta	$V\beta^{II}$	-	**-0.026**	**-0.027**	**-0.023**	-	**-0.019**	**-0.012**	-0.013
			(0.06)	(0.09)	(0.05)		(0.10)	(0.02)	(0.13)
Institutional ownership	*INS*	-	-0.089	-0.111	-	-	-0.164	-0.174	-
			(0.43)	(0.30)			(0.12)	(0.10)	
Future dividends explanatory power	*FD*	-	-	-	-0.008	-	-	-	-0.087
					(0.90)				(0.43)
Research & development expenses	*R&D*	-	-	0.311	0.320	-	-	0.323	0.300
				(0.13)	(0.39)			(0.22)	(0.33)
Industry return	*r*	-	-	**-0.087**	-0.074	-	-	**-0.132**	**-0.094**
				(0.10)	(0.32)			(0.09)	(0.10)
F-statistics		**30.562**	**17.670**	**14.010**	**13.400**	**25.155**	**15.829**	**12.670**	**11.230**
		(0.04)	(0.00)	(0.00)	(0.00)	(0.03)	(0.00)	(0.00)	(0.00)
Regression R^2		0.428	0.456	0.475	0.473	0.385	0.403	0.422	0.445
Number of observations			93		90		93		90

Note for Table 8: the sample consists of 93 four-digit industries in 1995 constructed using 1,696 firms for all variables except **FD**. **FD** is constructed using 1,905 firms in 90 industries. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Numbers in parentheses are probability levels based on Newey-West standard errors at which the null hypothesis of a zero coefficient can be rejected. Coefficients significant at 10% or better (2-tailed test) are in boldface. Dependent variables are explanatory power increase, **FINC** in specifications 8.1, 8.2, 8.3, and 8.4; and future earnings return coefficient, **FERC** in specifications 8.5, 8.6, 8.7, and 8.8. Specifications' 8.1 and 8.5 independent variables are: relative firm-specific return variation, **Ψ**; industry structure, **I**; size, **S**, and diversification, **D**. Specifications' 8.2 and 8.6 independent variables are: relative firm-specific return variation, **Ψ**; industry structure, **I**; size, **S**; diversification, **D**; past earnings volatility, **VE**; volatility of beta, **Vβ**; and institutional ownership, **INS**. Specifications' 8.3 and 8.7 independent variables also include research & development expenses, **R&D**, and industry return, **r**. In specifications 8.4 and 8..8 future dividends explanatory power, **FD** is used instead of institutional ownership, **INS**. Specifications' 8.1, 8.2, 8.3, 8.5, 8.6, and 8.7 sample size is 93 four-digit industries (1,696 firms). Specifications' 8.4 and 8.8 sample size is 90 two-digit industries (1,905 firms). Refer to Table 1 and its note for variables definition. All regressions include nine one-digit dummies (not reported).

Table 9: 1975-1995 Industry-Fixed, Time-Random Panel Regressions of Future Earnings Response Measures on Relative Firm-specific Return Variation and Control Variables. All Variables Are Constructed Using 4-digit Cross Industry Approach

		Panel A							
		9a.1	*9a.2*	*9a.3*	*9a.4*	*9a.5*	*9a.6*	*9a.7*	*9a.8*
Time Period		1975-1995							
Dependent Variable		*Differential explanatory power increase, FINC*				*Differential future earnings return coefficient, FERC*			
Relative firm-specific return variation	*Ψ*	**0.056**	**0.048**	**0.042**	**0.079**	1.073	**1.077**	**1.061**	1.032
		(0.08)	(0.05)	(0.08)	(0.05)	(0.24)	(0.09)	(0.01)	(0.30)
Industry structure	*I*	**0.120**	**0.127**	**0.125**	**0.166**	-0.013	-0.003	-0.008	-0.031
		(0.05)	(0.00)	(0.03)	(0.01)	(0.68)	(0.88)	(0.87)	(0.20)
Size	*S*	**0.056**	**0.062**	**0.065**	0.011	-0.026	-0.033	-0.030	-0.042
		(0.03)	(0.03)	(0.04)	(0.78)	(0.38)	(0.38)	(0.30)	(0.22)
Diversification	*D*	**-0.096**	**-0.103**	**-0.178**	**-0.121**	**-0.147**	**-0.094**	**-0.179**	**-0.099**
		(0.08)	(0.01)	(0.06)	(0.05)	(0.04)	(0.06)	(0.03)	(0.01)
Past earnings volatility	*VE*	-	0.099	0.096	0.092	-	0.038	0.047	0.045
			(0.25)	(0.21)	(0.23)		(0.11)	(0.14)	(0.25)
Volatility of beta	*Vβ*	-	**0.065**	**0.061**	**0.073**	-	0.027	0.020	0.042
			(0.09)	(0.10)	(0.05)		(0.44)	(0.53)	(0.38)
Institutional ownership	*INS*	-	**0.055**	**0.077**	-	-	0.021	0.042	-
			(0.05)	(0.00)			(0.54)	(0.33)	
Future dividends explanatory power	*FD*	-	-	-	**0.062**	-	-	-	-0.017
					(0.10)				(0.83)
Research & development	*R&D*	-	-	**-0.108**	**-0.091**	-	-	**-0.051**	-0.022
				(0.10)	(0.05)			(0.10)	(0.20)
Past industry return	*r*	-	-	**-0.051**	**-0.033**	-	-	-0.037	-0.066
				(0.10)	(0.05)			(0.30)	(0.28)
Chi-squared statistics		**10837.04**	**10690.22**	**10699.81**	**7690.842**	**13608.44**	**13578.10**	**13899.09**	**9077.999**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.690	0.687	0.690	0.770	0.633	0.637	0.647	0.680
Number of observations			901		888		901		888

Table 9 (Continued)

		Panel B							
		9b.1	*9b.2*	*9b.3*	*9b.4*	*9b.5*	*9b.6*	*9b.7*	*9b.8*
Time Period		*1975-1987*							
Dependent Variable		*Differential explanatory power increase, FINC*				*Differential future earnings return coefficient, FERC*			
Relative firm-specific return variation	*Ψ*	**0.072**	**0.066**	**0.073**	0.059	**1.033**	1.028	1.033	**1.007**
		(0.00)	(0.02)	(0.09)	(0.13)	(0.03)	(0.17)	(0.23)	(0.02)
Industry structure	*I*	0.042	0.038	0.036	0.074	0.002	-0.001	-0.002	0.026
		(0.21)	(0.37)	(0.35)	(0.16)	(0.96)	(0.90)	(0.80)	(0.44)
Size	*S*	**0.079**	**0.071**	**0.074**	0.027	**-0.075**	**-0.080**	**-0.085**	**-0.179**
		(0.09)	(0.06)	(0.03)	(0.55)	(0.09)	(0.02)	(0.02)	(0.05)
Diversification	*D*	**-0.127**	**-0.171**	**-0.119**	**-0.092**	**-0.161**	-0.087	**-0.162**	-0.181
		(0.06)	(0.05)	(0.06)	(0.03)	(0.04)	(0.17)	(0.10)	(0.11)
Past earnings volatility	*VE*	-	0.058	0.057	0.008	-	0.013	0.014	-0.074
			(0.25)	(0.21)	(0.25)		(0.70)	(0.73)	(0.23)
Volatility of beta	*Vβ*	-	**0.065**	**0.061**	0.073	-	0.027	0.020	0.042
			(0.09)	(0.10)	(0.11)		(0.44)	(0.53)	(0.38)
Institutional ownership	*INS*	-	0.055	**0.073**	-	-	0.023	0.042	-
			(0.17)	(0.04)			(0.54)	(0.33)	
Future dividends explanatory power	*FD*	-	-	-	0.062	-	-	-	-0.017
					(0.28)				(0.70)
Research & development	*R&D*	-	-	**-0.108**	-0.030	-	-	-0.066	-0.025
				(0.09)	(0.40)			(0.12)	(0.71)
Past industry return	*r*	-	-	0.016	-0.037	-	-	0.039	-0.065
				(0.74)	(0.50)			(0.30)	(0.11)
Chi-squared statistics		**4344.344**	**4478.389**	**4473.999**	**3783.390**	**5572.063**	**5583.993**	**5573.287**	**4012.000**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.611	0.588	0.591	0.611	0.590	0.599	0.610	0.616
Number of observations			410		400		410		400

Table 9 (Continued)

		Panel C							
		9c.1	*9c.2*	*9c.3*	*9c.4*	*9c.5*	*9c.6*	*9c.7*	*9c.8*
Time Period		*1988-1995*							
Dependent Variable		*Differential explanatory power increase, FINC*				*Differential future earnings return coefficient, FERC*			
Relative firm-specific return variation	*Ψ*	**0.053**	**0.036**	**0.021**	**0.024**	**1.097**	**1.113**	**1.124**	**1.045**
		(0.00)	(0.07)	(0.03)	(0.01)	(0.03)	(0.00)	(0.10)	(0.02)
Industry structure	*I*	0.236	0.085	0.040	0.084	0.004	0.005	0.037	0.149
		(0.11)	(0.35)	(0.42)	(0.17)	(0.85)	(0.81)	(0.20)	(0.17)
Size	*S*	**0.108**	**0.101**	**0.084**	**0.091**	0.016	0.018	0.015	0.025
		(0.10)	(0.05)	(0.00)	(0.10)	(0.12)	(0.12)	(0.15)	(0.18)
Diversification	*D*	**-0.166**	-0.088	**-0.143**	-0.081	**-0.103**	**-0.152**	-0.092	-0.098
		(0.10)	(0.15)	(0.10)	(0.20)	(0.03)	(0.10)	(0.11)	(0.15)
Past earnings volatility	*VE*	-	0.193	0.193	0.127		0.030	0.042	-0.017
			(0.20)	(0.20)	(0.30)		(0.60)	(0.62)	(0.75)
Volatility of beta	*Vβ*	-	0.081	0.089	0.081	-	0.104	0.065	**0.113**
			(0.20)	(0.21)	(0.30)		(0.11)	(0.18)	(0.04)
Institutional ownership	*INS*	-	**0.108**	**0.105**	-	-	0.016	0.002	-
			(0.09)	(0.10)			(0.25)	(0.21)	
Future dividends explanatory power	*FD*	-	-	-	-0.052	-	-	-	0.080
					(0.17)				(0.18)
Research & development	*R&D*	-	-	-0.018	-0.029	-	-	-0.014	-0.015
				(0.15)	(0.34)			(0.68)	(0.41)
Past industry return	*r*	-	-	-0.015	0.029	-	-	0.029	0.086
				(0.62)	(0.89)			(0.28)	(0.14)
Chi-squared statistics		**9526.281**	**9586.456**	**9668.128**	**6183.518**	**11861.49**	**11822.56**	**11846.5**	**8409.19**
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Regression R^2		0.645	0.645	0.646	0.646	0.655	0.655	0.655	0.660
Number of observations			491		488		491		488

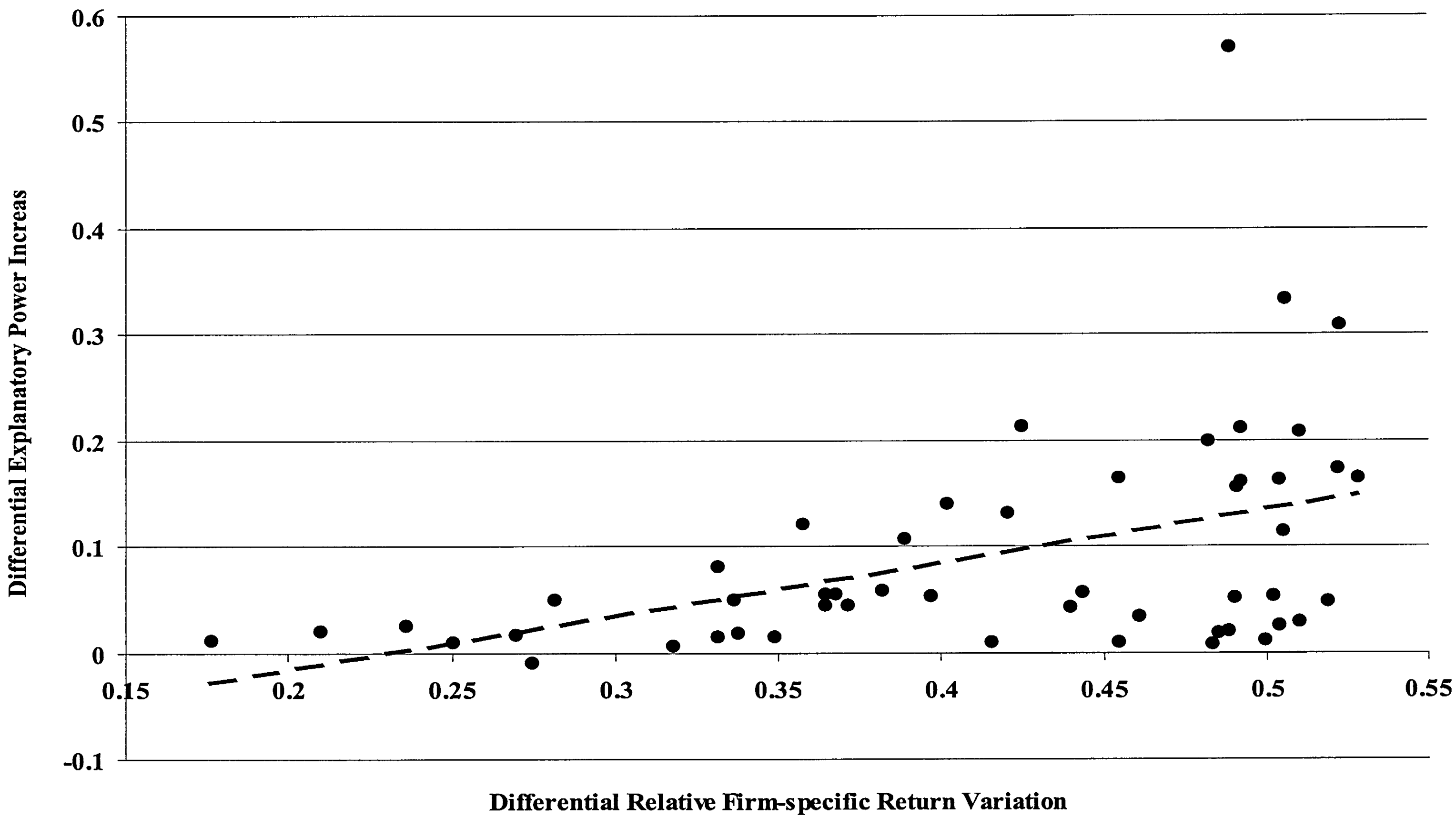
Notes for Table 9: This table presents estimates of the regression $\mathbf{Y}_{I,t} = I_{I,t} + \alpha\Psi_{I,t} + \beta\mathbf{Z}_{I,t} + \varepsilon_{I,t}$ with $E[\varepsilon_{I,t}] = 0$ and $E[\varepsilon_{I,t}\,\varepsilon_{I,s}] \neq 0 \;\forall$ s, t where $\mathbf{I}_I$ is four-digit industry fixed effect (not reported), $\mathbf{Y}_{I,t}$ is earnings response measure (**FINC** or **FERC**), $\Psi_{I,t}$ is relative firm-specific return variation measure, and $\mathbf{Z}_{I,t}$ is a vector of control parameters. The vector of control parameters includes: industry structure, **I**; size, **S**; diversification, **D**; past earnings volatility, **VE**; volatility of beta, **Vβ**; institutional ownership, **INS**; future dividends explanatory power, **FD**; research & development expenses, **R&D**; and industry return, **r**. Refer to Table 1 and its notes for variables definition. All regressions include four-digit industry fixed and time-random effect and are estimated by GLS estimation approach. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Coefficients significant at 10% or better (2-tailed test) are in boldface. Numbers in parentheses are probability levels based on Newey-West standard errors at which the null hypothesis of a zero coefficient can be rejected. Sample consists of 901 four-digit industry-year observations constructed using 26,132 firms spanning 21 years (Panel A, specifications 9a.1, 9a.2, 9a.3, 9a.5, 9a.6, and 9a.7), 410 four-digit industry-year observations constructed using 12,435 firms spanning 13 years (Panel B, specifications 9b.1, 9b.2, 9b.3, 9b.5, 9b.6 and 9b.7), and 491 four-digit industry-year observation constructed using 13,689 firms spanning 8 years (Panel C specifications 9c.1, 9c.2, 9c.3, 9c.5, 9c.6, and 9c.7). Sample consists of 888 four-digit industry-year observations constructed using 15,755 firms spanning 21 years (Panel A, specifications 9a.4 and 9a.8), 488 four-digit industry-year observations constructed using 13,605 firms spanning 13 years (Panel B, specifications 9b.4 and 9b.8), and 400 four-digit industry-year observation constructed using 12,132 firms spanning 8 years (Panel C specifications 9c.4 and 9c.8).

Table 10: Annual Regressions of Future Earnings Response Measures on Relative Firm-specific Return Variation and Control Variables

	Panel A: All Variables Are Constructed Using Industry Match Pairing Approach		*Panel B: All Variables Are Constructed Using Firms in Four-digit industries*	
Year	*Differential explanatory power increase, ΔFINC*	*Differential future earnings return coefficient, ΔFERC*	*Explanatory power increase, FINC*	*Future earnings return coefficient, FERC*
1975	**0.297**	1.102	**0.533**	1.100
	(0.10)	(0.15)	(0.00)	(0.11)
1976	0.122	**1.400**	0.346	**1.490**
	(0.23)	(0.05)	(0.26)	(0.00)
1977	0.140	1.134	**0.456**	**1.445**
	(0.32)	(0.20)	(0.10)	(0.10)
1978	0.158	**1.432**	0.242	**1.440**
	(0.11)	(0.10)	(0.20)	(0.10)
1979	**0.390**	0.512	**0.545**	1.005
	(0.00)	(0.25)	(0.10)	(0.20)
1980	0.077	**1.483**	0.190	**1.585**
	(0.49)	(0.40)	(0.39)	(0.00)
1981	**0.331**	**1.845**	**0.533**	0.932
	(0.00)	(0.00)	(0.10)	(0.35)
1982	**0.465**	**1.365**	**0.590**	**1.434**
	(0.10)	(0.00)	(0.01)	(0.01)
1983	**0.467**	**1.332**	0.512	**1.387**
	(0.10)	(0.00)	(0.11)	(0.10)
1984	**0.414**	0.897	**0.517**	1.096
	(0.10)	(0.25)	(0.10)	(0.22)
1985	0.144	0.744	0.389	1.030
	(0.40)	(0.15)	(0.20)	(0.20)
1986	0.165	0.984	0.407	**1.189**
	(0.20)	(0.15)	(0.25)	(0.10)
1987	**0.443**	0.595	0.119	0.737
	(0.10)	(0.33)	(0.33)	(0.43)
1988	**0.455**	**1.828**	**0.543**	**1.555**
	(0.00)	(0.05)	(0.00)	(0.05)
1989	**0.346**	**1.456**	**0.529**	**1.436**
	(0.05)	(0.01)	(0.05)	(0.00)
1990	**0.422**	0.831	0.328	0.935
	(0.05)	(0.15)	(0.25)	(0.10)
1991	**0.410**	**1.456**	**0.519**	**1.402**
	(0.10)	(0.07)	(0.10)	(0.10)
1992	0.238	**1.769**	**0.500**	**1.567**
	(0.34)	(0.00)	(0.05)	(0.00)
1993	**0.409**	**1.355**	**0.570**	1.097
	(0.01)	(0.01)	(0.01)	(0.20)
1994	**0.490**	**1.400**	**0.543**	**1.422**
	(0.01)	(0.00)	(0.05)	(0.05)
1995	**0.434**	**1.365**	**0.556**	**1.501**
	(0.08)	(0.08)	(0.03)	(0.01)

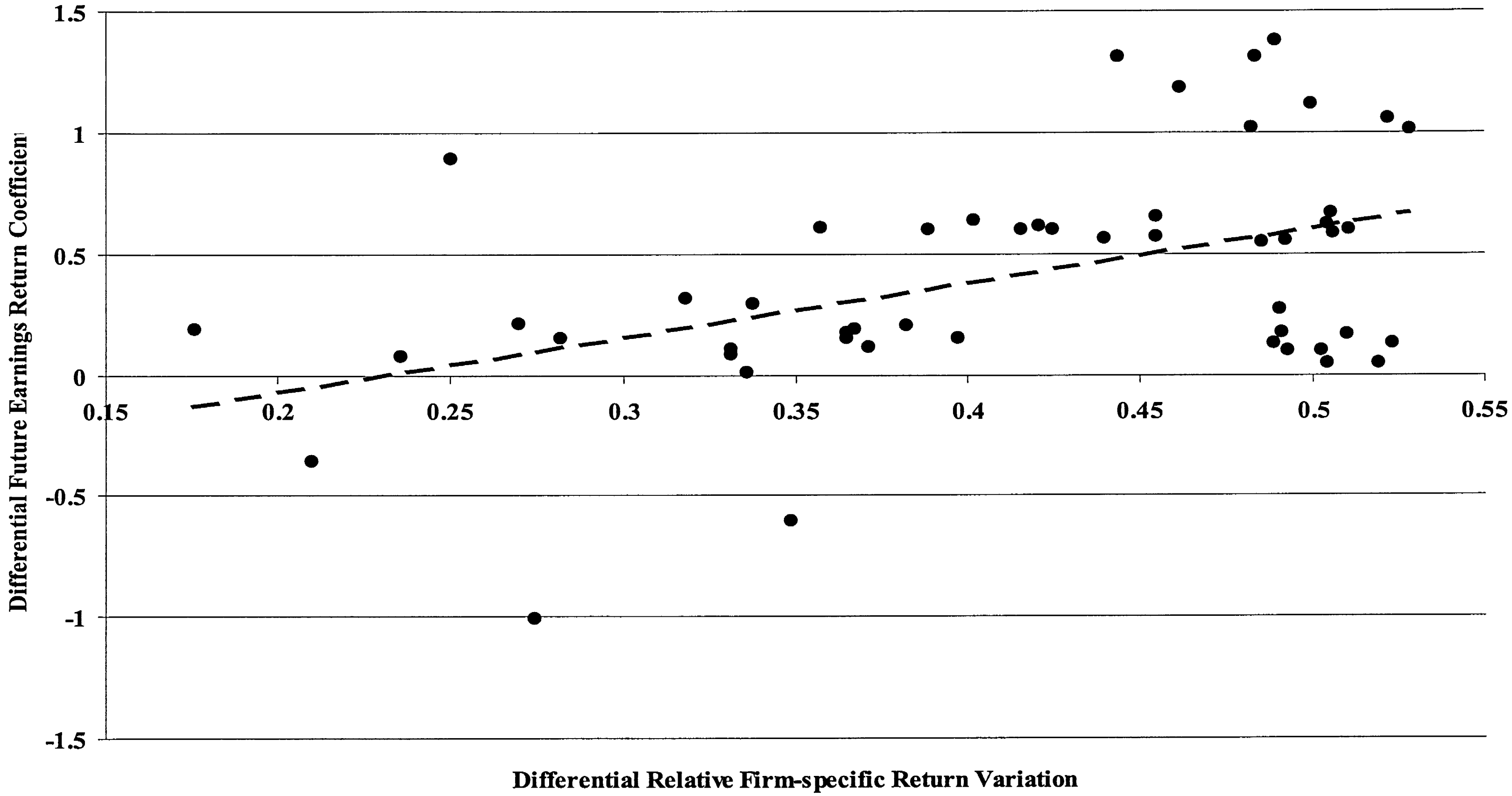
Note for Table 10 This table presents estimates and p-values of the relative firm-specific return variation coefficient, ΔΨ (panel A) and Ψ (panel B) of the regression $Y_{I,t} = I_{i,t} + \alpha\Psi_{I,t} + \beta Z_{i,t} + \varepsilon_{I,t}$ where Y_t is one of the earnings response measures (Panel A: **ΔFINC**, **ΔFERC**; Panel B: **FINC, FERC**), I_i is one-digit industry dummy (only in panel A), X_i is relative firm-specific return variation measure (Panel A: ΔΨ; Panel B: Ψ), and Z_i is a vector of control parameters. Panel A control variables are: industry structure, **I**; differential size, **S**; differential diversification, **D**; differential past earnings volatility, **VE**; differential volatility of beta, **Vβ**; differential institutional ownership, **INS**; differential research & development expenses, **R&D**, and differential industry return, **r**. Panel B controls are variables are: industry structure, **I**; size, **S**; diversification, **D**; past earnings volatility, **VE**; volatility of beta, **Vβ**; institutional ownership, **INS**; research & development expenses, **R&D**; and industry return, **r**. Sample years are 1975-1995. All equations are estimated by OLS. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Coefficients significant at 10% or better (2-tailed test) are in boldface. Numbers in parentheses are probability levels based on Newey-West standard errors at which the null hypothesis of a zero coefficient can be rejected. Panel A 1975-1995 sample consists of 589 two-digit industries-year observation constructed using 14,123 firms. Panel B 1975-1995 sample consists of 901 four-digit industry-year observations constructed using 26,132 firms. Refer to Table 1 and its note for variables definition.

Graph 1a: Differential Explanatory Power Increase (ΔFINC) vs. Differential Relative Firm-specific Return Variation (ΔΨ), 1995 data. All Variables Are Constructed Using Industry Match Pairing Approach



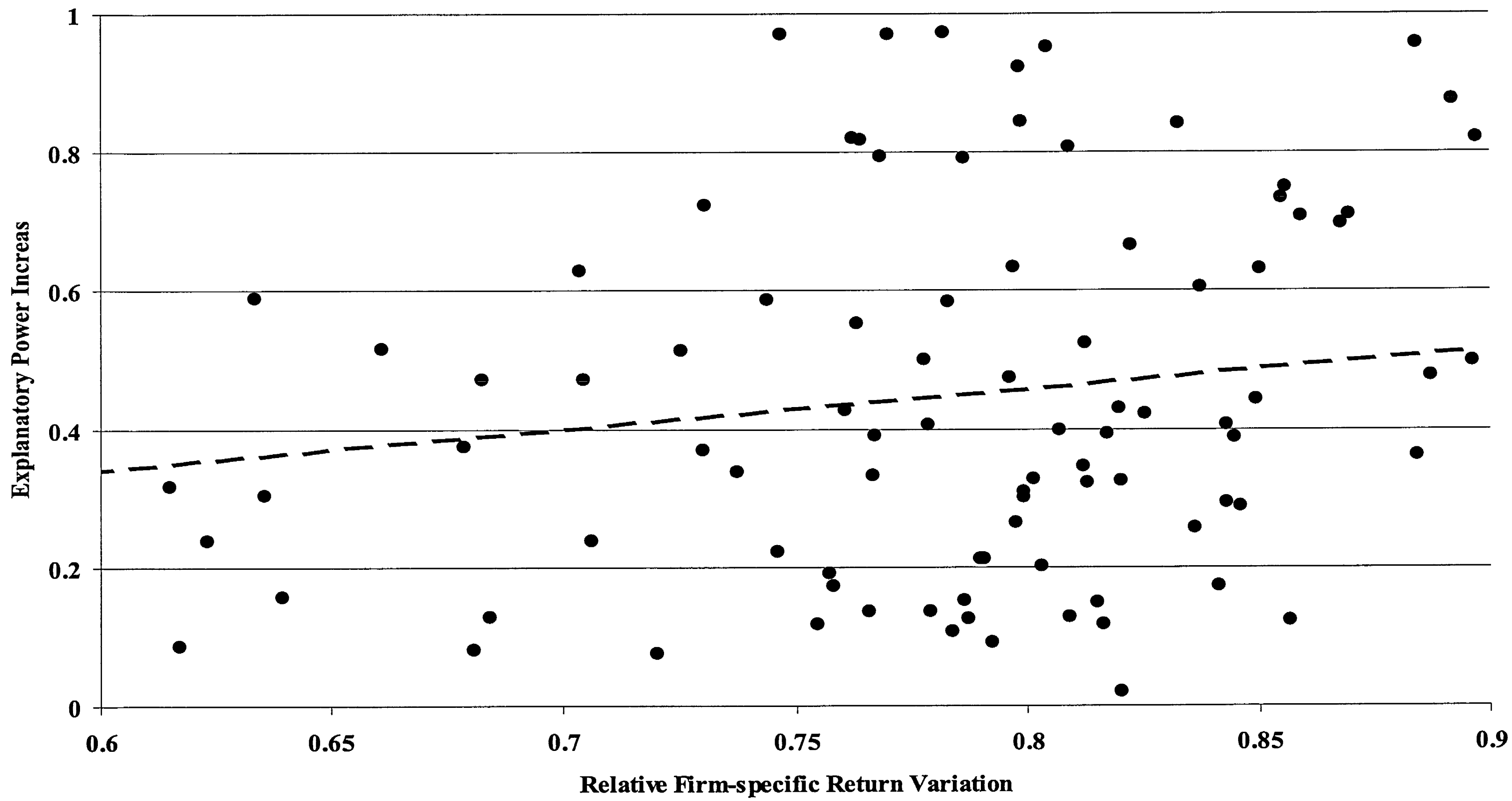
Note for Graph 1a: the sample is 51 two-digit SIC industries constructed using 1,428 firms for all variables. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Refer to Table 1 for variables definition. Dotted line has slope β and intercept α calculated from the regression $\Delta FINC = \alpha + \beta\Delta\Psi + \varepsilon$.

Graph 1b: Differential Future Earnings Return Coefficient (ΔFERC) vs. Differential Relative Firm-specific Return Variation (ΔΨ), 1995 data. All Variables Are Constructed Using Industry Match Pairing Approach



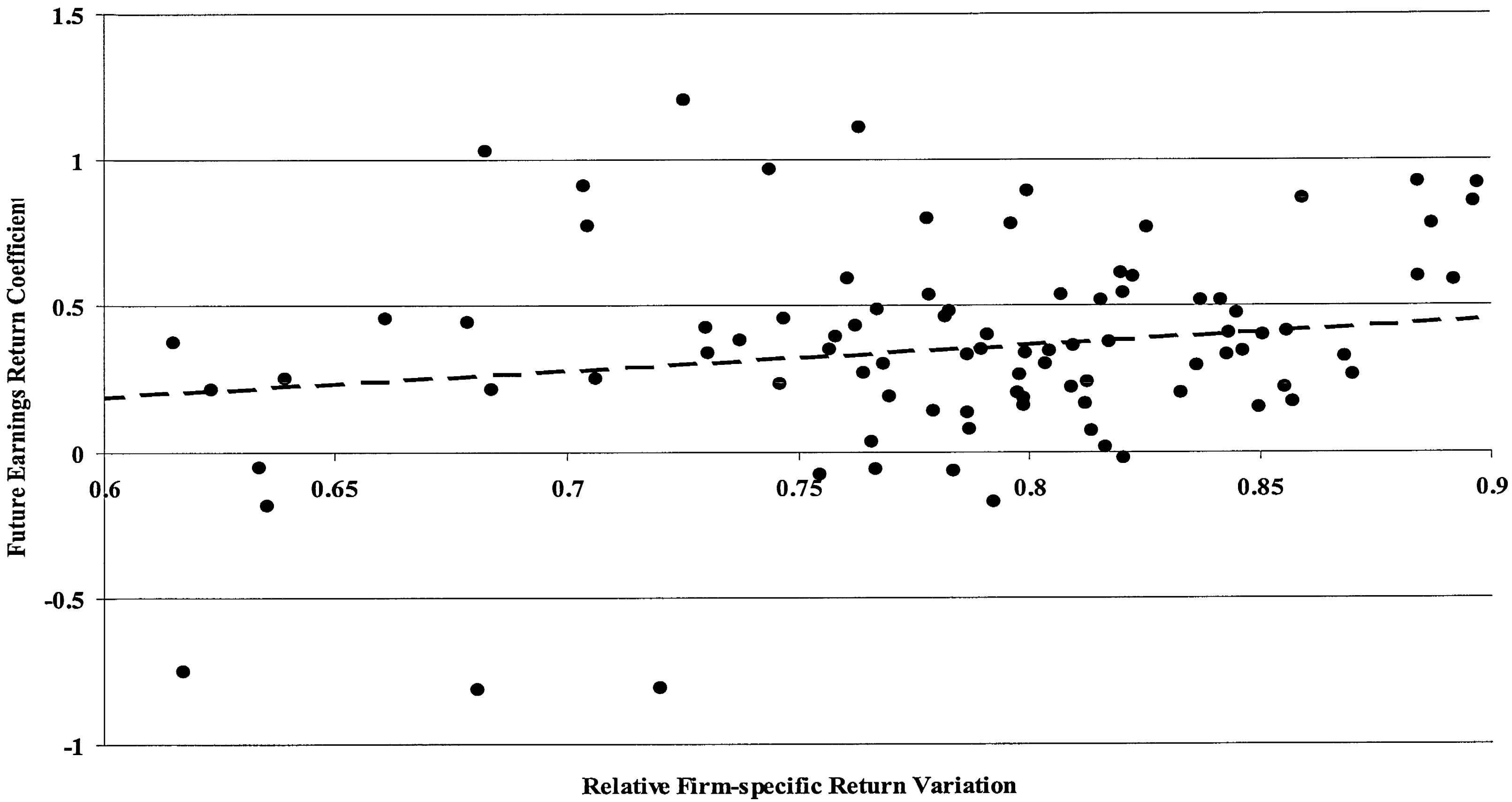
Note for Graph 1b: the sample is 51 two-digit SIC industries constructed using 1,428 firms for all variables. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Refer to Table 1 and its notes for variables definition. Dotted line has slope β and intercept α calculated from the regression $\Delta FERC = \alpha + \beta \Delta\Psi + \varepsilon$.

Graph 2a: Future Earnings Explanatory Power Increase (FINC) vs. Relative Firm-specific Return Variation (Ψ), 1995 data. All Variables Are Constructed Using 4-digit Cross-Industry Approach



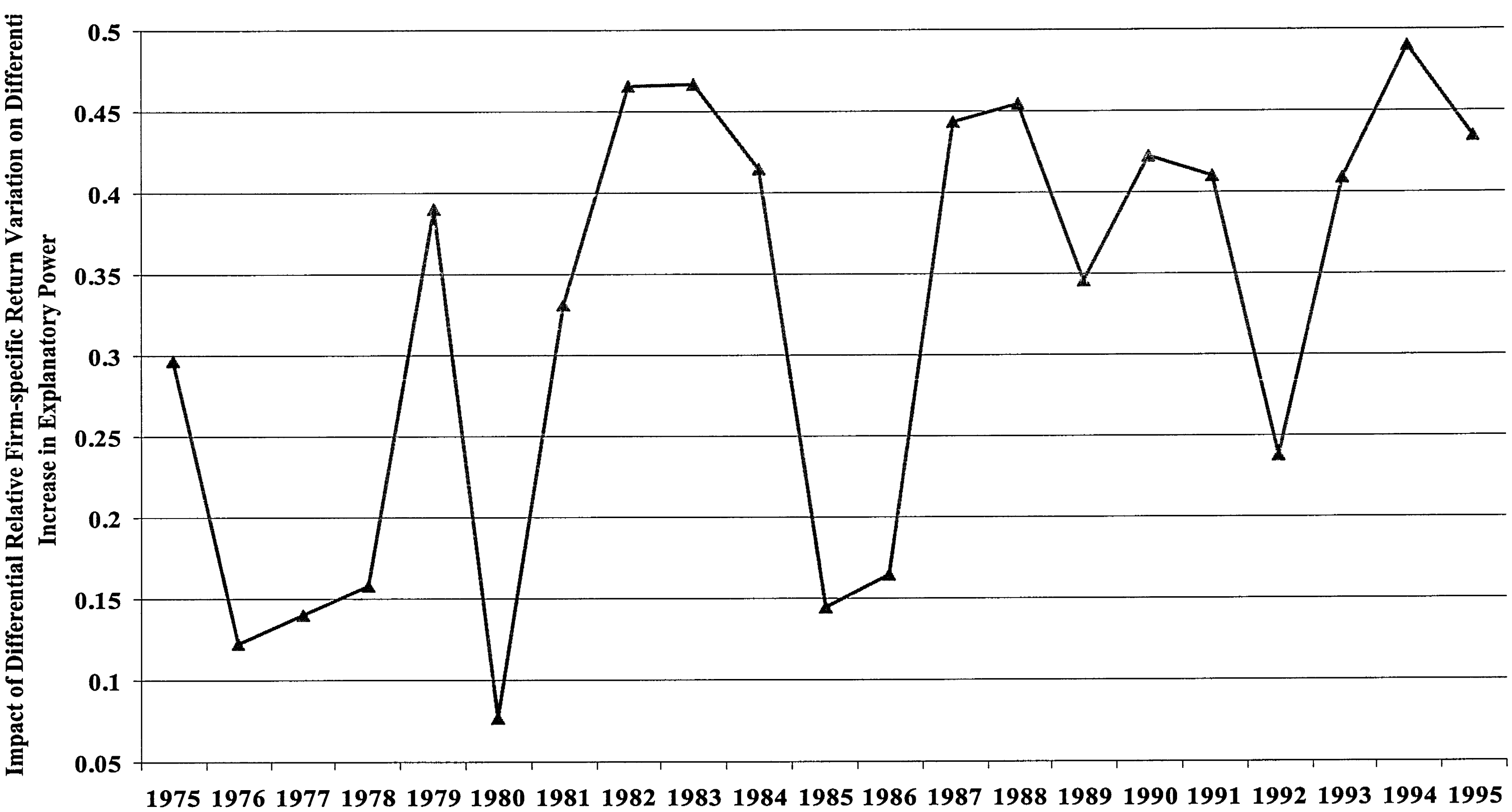
Note for Graph 2a: the sample consists of 93 four-digit industries (1,969 firms). Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Refer to Table 1 and its notes for variables definition. Dotted line has slope β and intercept α calculated from the regression $\Delta FINC = \alpha + \beta\Delta\Psi + \varepsilon$.

Graph 2b: Future Earnings Return Coefficient (FERC) vs. Relative Firm-specific Return Variation (Ψ), 1995 data. All Variables Are Constructed Using 4-digit Industries Cross-Industry Approach



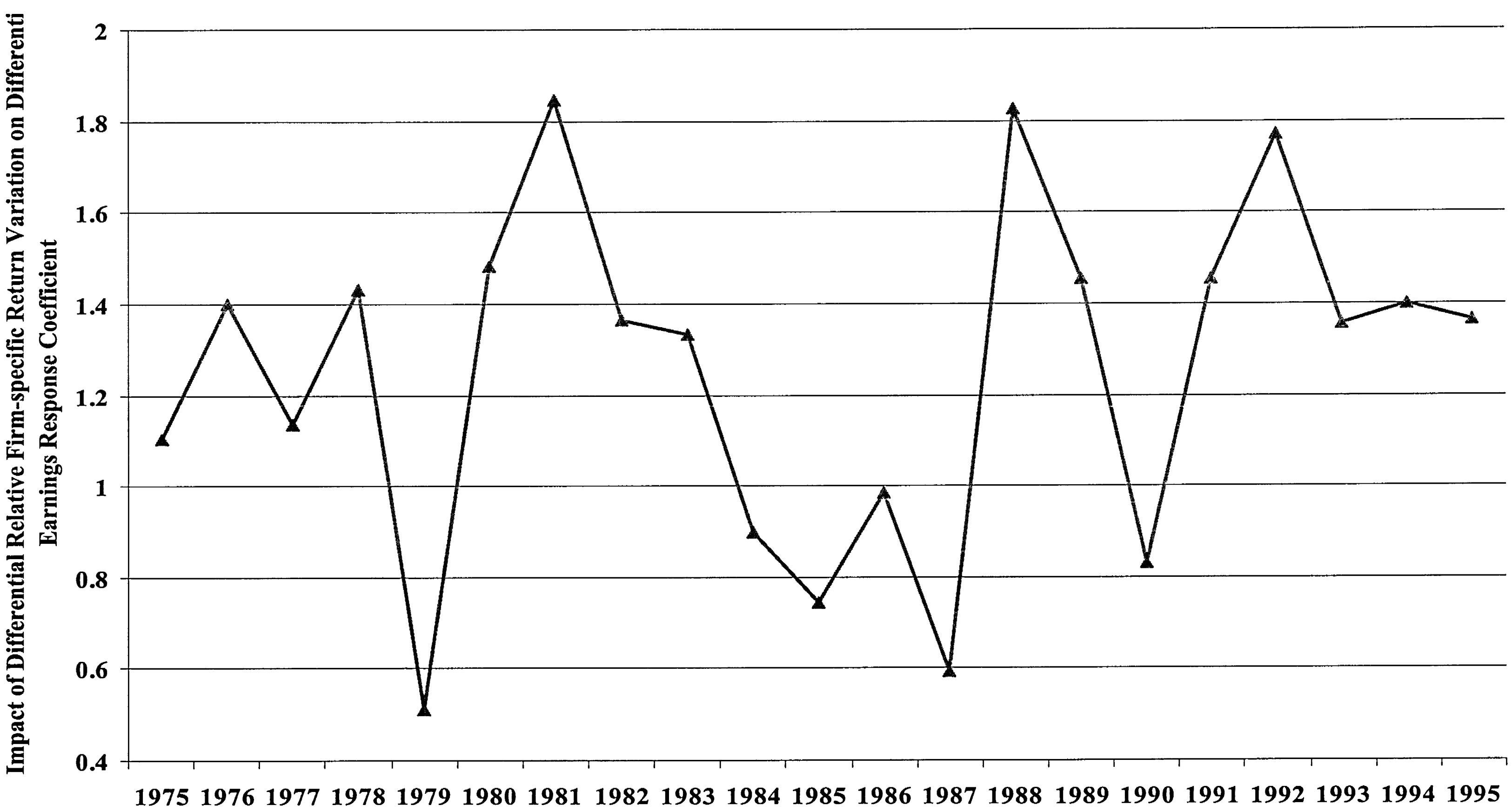
Note for Graph 2b: the sample consists of 93 four-digit industries (1,969 firms). Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. Refer to Table 1 and its notes for variables definition. Dotted line has slope β and intercept α calculated from the regression $\Delta FERC = \alpha + \beta\Delta\Psi + \varepsilon$.

Graph 3a: Impact of Differential Relative Firm-specific Return Variation ($\Delta\Psi$) on Differential Future Earnings Explanatory Power Increase (ΔFINC) Based On Year-by-year Regressions of Differential Future Earnings Response Measures on Differential Relative Firm-specific Return Variation and Control Variables



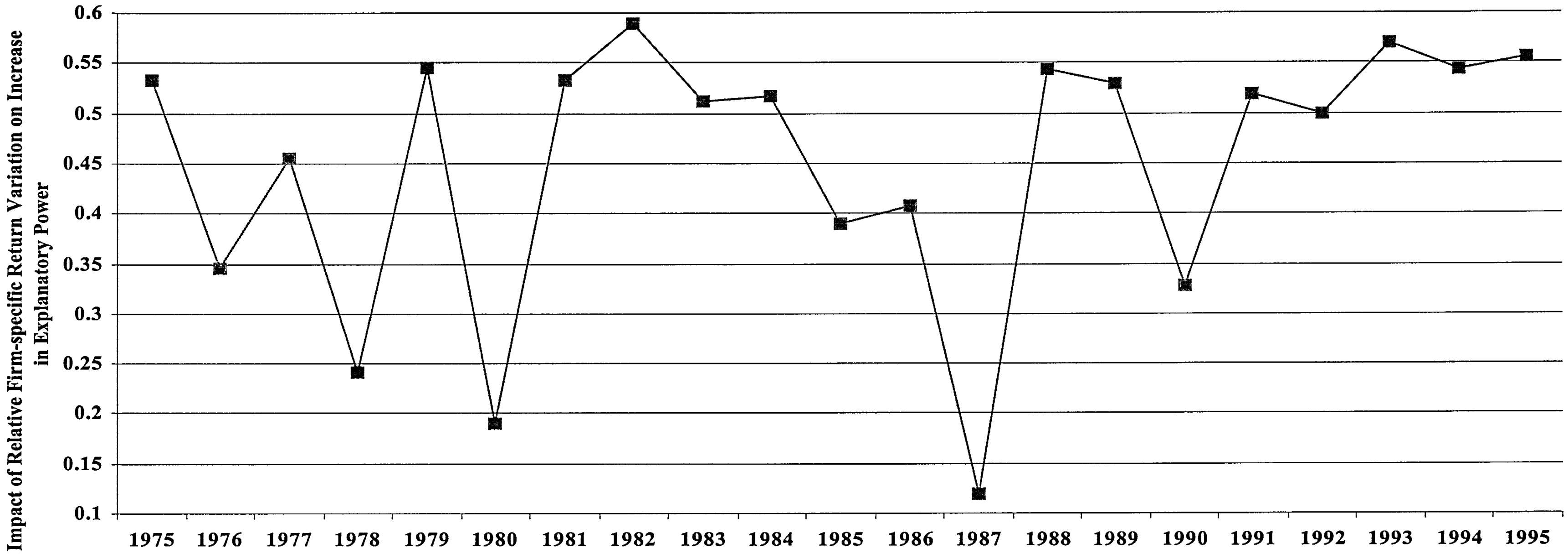
Notes for Graph3a: this graph presents the estimates of the differential relative firm-specific return variation coefficient, $\Delta\Psi$ of the regression $\Delta FINC = \alpha + \beta\Delta\Psi + \gamma \mathbf{Z} + \varepsilon$, where **$\Delta$FINC** is differential future earnings explanatory power increase, α is constant, $\Delta\Psi$ is differential relative firm-specific return variation measure, and $\mathbf{Z}_i$ is a vector of control parameters. Control variables are: industry structure, **I**; differential size, **ΔS**; differential diversification, **ΔD**; differential past earnings volatility, **ΔVE**; differential volatility of beta, **ΔVβ**; differential institutional ownership, **ΔINS**; differential research & development expenses, **ΔR&D**, and differential industry return, **Δr**. Sample years are 1975-1995. All equations are estimated by OLS. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. The sample consists of 589 two-digit industries-year observation constructed using 14,123 firms.

Graph 3b: Impact of Differential Relative Firm-specific Return Variation ($\Delta\Psi$) on Differential Future Earnings Return Coefficient (ΔFERC) Based On Year-by-year Regressions of Future Earnings Response Measures on Differential Relative Firm-specific Return Variation and Control Variables



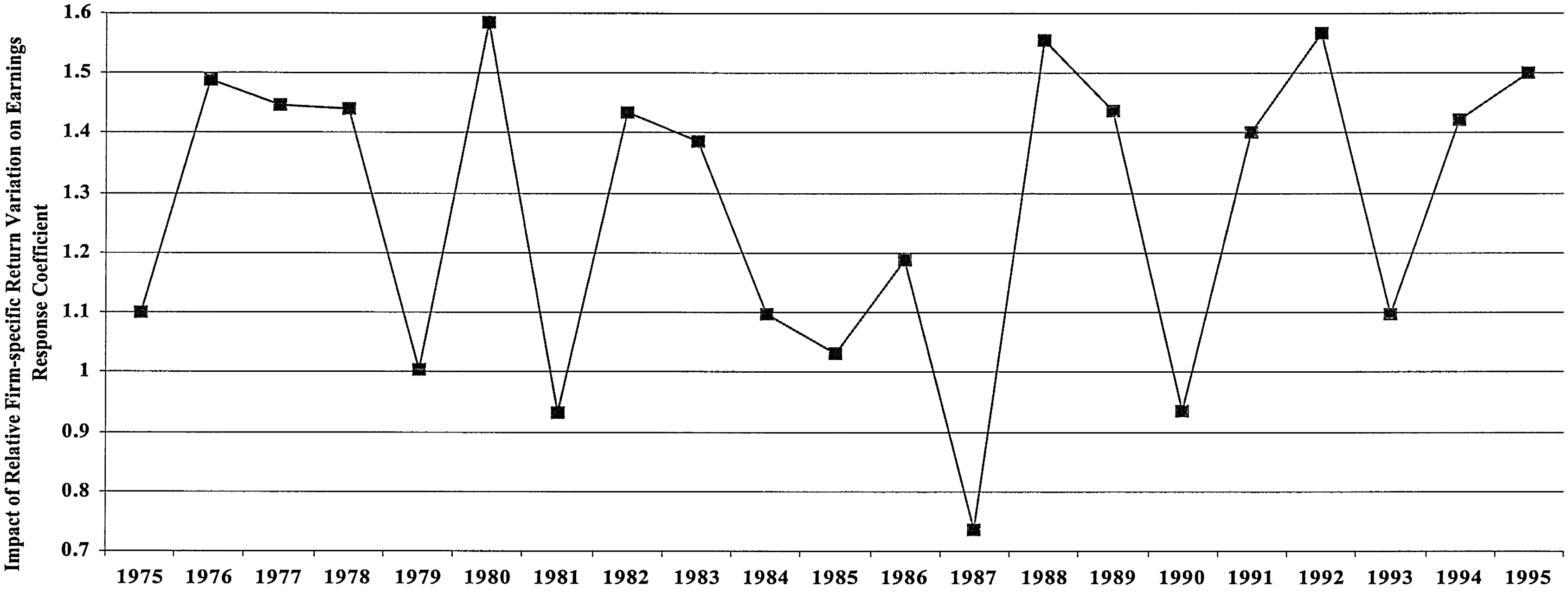
Notes for Graph 3b: this graph presents estimates of the differential relative firm-specific return variation coefficient, $\Delta\Psi$ of the regression $\Delta FERC = \alpha + \beta\Delta\Psi + \gamma \mathbf{Z} + \varepsilon$, where **$\Delta$FERC** is differential future earnings return coefficient, α is constant, $\Delta\Psi$ is differential relative firm-specific return variation measure, and $\mathbf{Z}_i$ is a vector of control parameters. Control variables are: industry structure, **I**; differential size, **ΔS**; differential diversification, **ΔD**; differential past earnings volatility, **ΔVE**; differential volatility of beta, **ΔVβ**; differential institutional ownership, **ΔINS**; differential research & development expenses, **ΔR&D**, and differential industry return, **Δr**. Sample years are 1975-1995. All equations are estimated by OLS. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. The sample consists of 589 two-digit industries-year observation constructed using 14,123 firms.

Graph 4a: Impact of Relative Firm-specific Return Variation (Ψ) on Future Earnings Explanatory Power Increase (FINC) Based On Year-by-year Regressions of Future Earnings Response Measures on Relative Firm-specific Return Variation and Control Variables



Notes for Graph 4a: this graph presents estimates of the relative firm-specific variation coefficient, Ψ of the regression $FINC = \alpha + \beta\Psi + \gamma \mathbf{Z} + \varepsilon$, where **FINC** is future earnings explanatory power increase, α is constant, Ψ is relative firm-specific return variation measure, and $\mathbf{Z}_i$ is a vector of control parameters. Control variables are: industry structure, **I**; size, **S**; diversification, **D**; past earnings volatility, **VE**; volatility of beta, **Vβ**; institutional ownership, **INS**; research & development expenses, **R&D**, and industry return, **Δr**. Sample years are 1975-1995. All equations are estimated by OLS. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. The sample consists of 901 four-digit industries-year observation constructed using 26,132 firms.

Graph 4b: Impact of Relative Firm-specific Return Variation (Ψ) on Future Earnings Return Coefficient (FERC) Based On Year-by-year Regressions of Future Earnings Response Measures on Differential Relative Firm-specific Return Variation and Control Variables



Notes for Graph 3b: this graph presents estimates of the relative firm-specific return variation coefficient, Ψ of the regression $FERC = \alpha + \beta\Psi + \gamma \mathbf{Z} + \varepsilon$, where **FERC** is future earnings return coefficient, α is constant, Ψ is relative firm-specific return variation measure, and $\mathbf{Z}_i$ is a vector of control parameters. Control variables are: industry structure, **I**; size, **S**; diversification, **D**; past earnings volatility, **VE**; volatility of beta, **Vβ**; institutional ownership, **INS**; research & development expenses, **R&D**, and industry return, **r**. Sample years are 1975-1995. All equations are estimated by OLS. Finance and Utility industries (SIC code 6000 – 6999 and 4000-4999) are omitted. The sample consists of 901 four-digit industries-year observation constructed using 26,132 firms.