Predictability and the Earnings-Returns Relation*

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Abstract

This paper studies the effects of predictability on the earnings-returns relation for individual firms and for the aggregate. We demonstrate that prices better anticipate earnings growth at the aggregate level than at the firm level, which implies that random-walk models are inappropriate for gauging aggregate earnings expectations. Moreover, we show that the contemporaneous correlation of earnings growth and stock returns decreases with the ability to predict future earnings. Our results may therefore help explain the apparently conflicting recent evidence that the earnings-returns relation is negative at the aggregate level but positive at the firm level.

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1 Introduction

The relation between cash-flow measures and contemporaneous stock returns is based on the fundamental equality that prices are discounted cash flows. Positive earnings news generate higher expected cash flows and in turn higher prices, i.e. positive stock returns. Indeed, one of the key findings in the accounting literature, first documented by Ball and Brown (1968), is that higher earnings changes are associated with higher stock returns. This result is mostly reflected in firm-level and portfolio-level estimations, using both cross-sectional (Ball and Brown, 1968) and time-series (Teets and Wasley, 1996) analyses. While the evidence suggests a positive contemporaneous relation between earnings changes and stock returns, it also suggests that a significant portion of the earnings changes are anticipated prior to the announcement. Moreover, several studies (e.g., Collins, Kothari, and Rayburn, 1987) document that prices lead earnings and that stock returns predict earnings growth. This paper studies the implications of such predictability on the earnings-returns relation for individual firms versus the aggregate.

Using a similar methodology as in Collins, Kothari, and Rayburn (1987), we find that predictability is higher for aggregate earnings changes than for firm-level earnings changes. Specifically, we find that current market returns contain more information about future aggregate (market-level) profitability than stock returns contain about future stock profitability. This result suggests that for individual firms, earnings changes are informational; they change investors' expectations of future cash flows and therefore high earnings changes are associated with high contemporaneous returns.[1] In contrast, investors are fairly capable of predicting aggregate trends in the market and therefore aggregate earnings changes provide little or no information during the fiscal year. The predictability of aggregate earnings has significant implications for the modelling of the process of earnings growth, as it suggests that random-walk models are inappropriate for gauging expected earnings growth at the aggregate level.

Various portfolio sorts (size sorts, industry sorts, and randomly sorted portfolios) provide additional evidence supporting the hypothesis that predictability increases in the process of aggregation. In particular, we find that when we include more firms into a portfolio, the portfolio returns are better able to predict the portfolio earnings changes. Moreover, as the number of firms in the

[1] Note that investors may be able to predict earnings changes by the time of the actual earnings announcement (Ball and Brown, 1968), yet the earnings changes are mostly unpredictable prior to the beginning of the fiscal year.

portfolios increase, and earnings changes become more predictable, the contemporaneous earnings-returns relation gradually declines from a positive relation to a negative relation. These results are consistent with our hypothesis that the earnings-returns relation is affected by predictability insofar as it depends on the extent to which earnings changes are informative.

The fundamental decomposition depicted in Campbell (1991) provides the basis to understanding the relation between earnings and returns. Campbell (1991) decomposes stock market returns at time t into three components: expected returns at time t-1, (plus) changes in expected cash flows (cash-flow news) at time t, and (minus) changes in expected returns (return news) at time t.[2] Therefore, to understand the contemporaneous correlation between earnings changes and returns one could study the contemporaneous correlation between earnings changes and each of the three components of returns. Since higher earnings changes at time t should reflect higher future cash flows, we expect the earnings-returns relation to be positive (a positive relation between earnings surprises and cash-flow news). As earnings changes become more predictable, they contain less cash-flow news (contemporaneously). Thus, we hypothesize that the positive contemporaneous relation between earnings changes and stock returns declines as earnings changes become more predictable. The empirical analysis provides evidence consistent with our theory, since we find that the contemporaneous earnings-returns relation declines as we aggregate firms into larger portfolios while the portfolio earnings changes become more predictable.

The analysis above suggests that the contemporaneous earnings-returns relation should decline toward zero as earnings changes become more predictable. Yet, our findings suggest that while there is a positive contemporaneous firm-level relation between earnings changes and returns, not only is this relation weak at the aggregate, but it becomes significantly negative (see also Kothari, Lewellen, and Warner, 2006). Although the predictability of earnings may account for the weakening of the earnings-returns relation at the aggregate, the negative correlation seems surprising: If investors expect higher cash flows then stock prices should increase; yet, the empirical evidence suggests that "good" news about aggregate future cash flows result in a negative price reaction. In terms of the Campbell (1991) decomposition, to explain the negative association between earnings and returns, the following explanation must hold: earnings changes at time t are either positively correlated with expected return news at time t, and/or negatively correlated with expected returns at time t-1.

[2] See Vuolteenaho (2002) for a firm-level decomposition.

The first possible explanation, that is, earnings changes are positively associated with changes in expected returns,[3] can be explained through the following example. Assume an annuity with payments of $100 and 10% discount rate. The value of the annuity is $1,000 (=100/0.10). If the expected payment increases by $20 to $120 and at the same time the discount rate increases by 10% to 20%, the value of the annuity will decline to $600 (=120/0.20). Thus, if higher earnings changes reflect both higher future cash flows and higher expected returns, it is possible that earnings changes will be negatively correlated with *contemporaneous* stock returns. Kothari, Lewellen, and Warner (2006) and Hirshleifer, Hou, and Teoh (2007) find evidence consistent with this explanation. However, Kothari, Lewellen, and Warner (2006) assumes that, similar to firm-level earnings, aggregate earnings variation is largely unpredictable. In contrast, we demonstrate that aggregate earnings may be largely anticipated. Hence, without a correct expectation model for aggregate earnings changes the tests in Kothari, Lewellen, and Warner (2006) may be biased against finding a positive contemporaneous relation between their aggregate cash-flow news proxy and aggregate stock returns. For example, using a different expectations model based on analysts' forecasts, Chen and Zhao (2008) find a positive relation between stock returns and aggregate earnings news.

The second possible explanation, advanced here, is that earnings changes at time t and expected returns at time t-1 are negatively correlated. Such a relation can be interpreted as when investors expect high future earnings changes, they also demand a low risk premium (and therefore expected returns are low). As we show that aggregate earnings are predictable, it is reasonable to investigate this explanation. We show that a single factor, aggregate dividend-price ratio, predicts both earnings growth and returns, but in opposite directions—a high dividend-price ratio predicts both higher returns and lower earnings growth—which suggests expected returns and expected earnings are negatively correlated. We also use a specific expectation model for earnings and returns (using own lagged values, GNP growth, the dividend-price ratio, and the consumption-to-wealth ratio) and show that the negative contemporaneous earnings-returns relation is more pronounced when using expected values generated by the model than when using realized values.

Our study has several implications for asset pricing. First, our results reaffirm the importance of predictability in understanding market phenomena and in particular the relation between stock returns and current and future earnings changes. Second, we find evidence consistent with the

[3] Similarly, Yan (2007) offers an explanation based on the differences between the impacts of individual stocks and the aggregate on the pricing kernel.

predictability of aggregate variations in cash flows (Lettau and Ludvigson, 2005; and Ang and Bekaert, 2007). Third, our study implies that investors demand higher (lower) rates of returns when expected profitability is low (high). This finding is consistent with the hypothesis that expected returns vary with the business cycle. For example, in recessions, expected profits are low and at the same time investors demand high returns (see also Chen, 1991; and Ball, Sadka, and Sadka, 2008). Fourth, our study points out that the two components of prices, cash flows and returns, are not independently determined, and may be jointly driven by a single factor. Finally, our study can help explain the high volatility of stock prices (e.g., Shiller, 1981) as the two component of prices, expected cash flows (numerator) and expected discount rates (denominator), vary consistently in opposite directions.

It is important to note that although our evidence is consistent with the role of predictability in the earnings-return relation, we do not rule out the explanation that the earnings-return relation is related to a correlation between aggregate earnings changes and return news. We examine this hypothesis by noting that if expected returns vary with respect to changes in earnings, then changes in earnings should predict returns. This is especially true given the extensive evidence on return predictability during the sample period (see e.g., Fama and French, 1988, 1989; Fama, 1990; Schwert, 1990; Kothari and Shanken, 1992; Lamont, 1998). Inconsistent with the hypothesis that higher earnings changes are associated with higher expected returns, we find that earnings changes do not predict returns. Moreover, in some model specifications we find a negative correlation between earnings changes and future returns. However, a direct test of this hypothesis would require the "correct" model for expected returns such that return news can be separately identified. Unfortunately, with the absence of such a model our explanation and the one provided in Kothari, Lewellen, and Warner (2006) may be viewed as complementary as they could work simultaneously.

The remainder of the paper is organized as follows. Section 2 decomposes the earnings-returns relation and describes the empirical methodology. Section 3 provides a description of the data used in the paper. Section 4 summarizes the empirical findings. Section 5 provides some empirical evidence for the relation between expected earnings growth and expected returns, as well as a discussion of the relation of this paper to other studies. Section 6 concludes.

2 The Anatomy of the Earnings-Returns Relation

2.1 Theoretical Framework

The earnings-returns relation can be characterized as the relation between earnings and the different components of stock returns. In this context, the Campbell (1991) return decomposition is useful for illustration. Campbell decomposes returns into three components as follows:

$$\begin{aligned} R_t &= E_{t-1}[R_t] + (E_t - E_{t-1})\,[\sum_{j=0}^{\infty} \rho^j \Delta d_{t+j}] - (E_t - E_{t-1})\,[\sum_{j=1}^{\infty} \rho^{j-1} R_{t+j}] \\ &\equiv E_{t-1}[R_t] + N_{cf} - N_R, \end{aligned} \quad (1)$$

where R_t denotes stock returns (in logs) at time t, Δd_t denotes dividend growth (in logs) at time t, ρ is a deflator (the inverse of 1 plus the dividend yield), and $E(\cdot)$ is the expectation operator. Thus, the three components of returns are: expected returns, changes in expected cash flows (cash-flow news), and changes in expected returns (return news).

Since Ball and Brown (1968), the accounting literature has studied the contemporaneous earnings-returns relation and the different factors affecting it. These studies commonly estimate the term

$$cov(R_t, \Delta X_t), \quad (2)$$

where ΔX_t denotes a proxy for earnings surprises (earnings surprises are typically scaled by beginning-of-period book values or stock prices). These studies, which often employ firm-level observations (e.g., Beaver, Clarke, and Wright, 1979; and Teets and Wasley, 1996), generally document that $cov(R_t, \Delta X_t)>0$. The literature often interprets the positive correlation as evidence that prices increase (decrease) due to an increase (decrease) in expected cash flows.

Hecht and Vuolteenaho (2006) note that the relation between earnings and returns depends not only on the relation between earnings and expected cash flows, but on the relation between earnings and all three different components of returns:

$$cov(R_t, \Delta X_t) = cov(E_{t-1}[R_t], \Delta X_t) + cov(N_{cf}, \Delta X_t) - cov(N_R, \Delta X_t). \quad (3)$$

As noted above, firm-level analysis shows that there is a positive earnings-returns relation, i.e. $cov(R_t, \Delta X_t)>0$. Intuitively, this result is not surprising, because positive earnings news should result in an increase in stock price (a positive return), due to higher expected cash flows.[4] In terms

[4] Miller and Modigliani (1961) suggest that investors should be more sensitive to proxies of long-run dividendes (such as earnings) rather than actual cash flows.

of Equation (3), $cov(R_t, \Delta X_t)>0$ because $cov(N_{cf}, \Delta X_t)>0$. However, aggregate (market-level) analysis shows that this relation is negative, $cov(R_t, \Delta X_t)<0$. This result is puzzling because one would expect that positive cash-flow news would result in higher prices (positive market reaction). Kothari, Lewellen, and Warner (2006) hypothesize that the negative relation is due to changes in expected returns: $cov(N_R, \Delta X_t)>0$.

In this paper, we hypothesize that the earnings-returns relation is affected by predictability. We first decompose earnings changes into expected and unexpected changes as follows:

$$\begin{aligned} \Delta X_t &= E_{t-1}[\Delta X_t] + (E_t - E_{t-1})[\Delta X_t] \\ &\equiv E_{t-1}[\Delta X_t] + UE_X. \end{aligned} \tag{4}$$

Next, since expected earnings cannot be correlated with either cash-flow news or return news, and since expected returns cannot be correlated with earnings surprises, Equation (3) can be rewritten as:

$$cov(R_t, \Delta X_t) = cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t]) + cov(N_{cf}, UE_X) - cov(N_R, UE_X). \tag{5}$$

Equation (5) emphasizes the implications of predictability for the earnings-returns relation. For example, if earnings are unpredictable, say they follow a random walk, then $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])=0$, and the earnings-returns relation is determined by $cov(N_{cf}, UE_X) - cov(N_R, UE_X)$. If, however, investors are capable of forecasting both earnings and returns, the relation might also be affected by $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])$.

It is important to note that the purpose of this paper is not to offer the "correct" model for estimating $E_{t-1}[\Delta X_t]$ and $E_{t-1}[R_t]$ (and the covariance between them). Rather, it points out that if such predictability exists then it might affect the interpretation of $cov(R_t, \Delta X_t)$. The fact that using annual data for the past few decades the econometrician cannot reject a random walk for earnings changes does not necessarily imply that they are not predictable using a different model.

2.2 Empirical Methodology

In theory, given the correct expectation models for earnings and returns, one can estimate the covariances in Equation (5). Unfortunately, the profession has not been able to produce such a model. Therefore, the literature includes several different benchmarks for expected earnings: lag earnings (Ball and Watts, 1972; Collins, Kothari, and Rayburn, 1987), a market model for earnings

(Ball and Brown, 1968; Beaver, Clarke, and Wright, 1979), and analysts' forecasts (Brown and Rozeff, 1978). Yet, it is likely that none of these benchmarks provides accurate proxies for earnings expectations. In addition, it is not possible to precisely estimate expected returns. While the VAR models in the literature, enable the identification of the right-hand side terms in Equation (5), the results and conclusions may highly depend on model specification, as these models are typically associated with low fit levels. Thus, it is not possible to directly and reliably estimate the coefficients in Equation (5). We therefore utilize the following empirical methodology to draw inferences about the implications of predictability on the earnings-returns relation.

To proxy for expected earnings changes, we use the following property under market efficiency: $E_{t-1}(\Delta X_t) = \Delta X_t + \eta_t$, where $\eta_t \sim (0, \Sigma)$. This assumption simply states that the realized value is an unbiased estimate of its expected value. Indeed, should one assume in contrast that $E_{t-1}(\Delta X_t) = a + \Delta X_t + \eta_t$, where $a \neq 0$, this would mean that investors consistently under or over forecast earnings growth, which contrasts market efficiency. Thus, under the efficient market hypothesis one can use actual realizations to proxy for expectations.

To test for predictability, we run the following regression (for the aggregate as well as individual firms):

$$R_t = \alpha + \beta \cdot \Delta X_{t+1} + \varepsilon_t. \tag{6}$$

As predictability improves, Σ declines because ΔX_{t+1} proxies for $E_t[\Delta X_{t+1}]$ with less error. If investors perfectly predict earnings changes then Σ=0. At the same time, since errors bias β towards zero, β increases as Σ declines (the "errors-in-variables" problem). Notice, as the goal here is to test whether changes in future earnings are predicted by current returns, the natural regression would be the inverse of Regression (6), where earnings changes are used as the depended variable. However, the coefficient obtained in the inverse regression would not be influenced by the error in predicting earnings changes, Σ, an effect that is of interest to us (see Brown, Griffin, Hagerman, and Zmijewski, 1987). We also employ the R^2 of Regression (6), which is equal to the R^2 of the reverse regression. As predictability improves, current returns will better reflect the change in future earnings (higher R^2).

We estimate the contemporaneous earnings-returns relation using a similar regression model:

$$R_t = \alpha + \beta \cdot \Delta X_t + \varepsilon_t. \tag{7}$$

We use β in Equation (7) to infer the sign of $cov(R_t, \Delta X_t)$ (Equation (2)). Note that the sign of β

is equal to the sign of $cov(R_t, \Delta X_t)$. To avoid scaling issues and facilitate proper comparison across stocks, we scale earnings changes in Equations (6) and (7) by beginning-of-period price and book value.

We believe that $cov(N_{cf}, UE_X)>0$, because a positive unexpected earnings surprise should result in higher future cash flows. For this relation to be negative, a positive shock to earnings must indicate a significant future decline in profits, yet there is no evidence to suggest this is the case. For example, unreported tests show no indication for autocorrelation in aggregate earnings. The first lag autocorrelation in aggregate earnings is positive (between 0.09 and 0.16, depending on the definition of aggregate earnings), though statistically insignificant, suggesting that higher earnings are associated with higher future earnings. The second lag autocorrelation changes signs for different measures of aggregate earnings and is not statistically significant as well. These results are consistent with the notion that high earnings changes do not signal a decline in future earnings.

While we expect that $cov(N_{cf}, UE_X)>0$, the relation between cash-flow news and earnings changes—$cov(N_{cf}, \Delta X_t)$—depends on predictability. Note that assuming complete foresight suggests that there is no relation between earnings changes and cash-flow news as UE_X=0. Therefore, all else equal, we expect the contemporaneous earnings-returns relation to decline as predictability improves. In terms of Equations (6) and (7), we expect that as the slope and R^2 of Equation (6) increase, the slope in Equation (7) will decline toward zero.

3 Data

The sample contains all firm-year data in the CRSP monthly and COMPUSTAT annual databases for the period 1965-2000 for firms with December fiscal year-end. The December fiscal year-end requirement avoids temporal misspecifications due to different reporting and different cumulation periods of annual earnings. The return data are extracted from the CRSP monthly data set. Earnings are extracted from the COMPUSTAT industrial annual file. The earnings item used is the earnings before extraordinary items. The book value is defined as common equity or COMPUSTAT data 60. Earnings and returns are measured annually. The annual returns are measured from April of year t until March of year $t+1$.

We use two measures for earnings changes, one scaled by beginning-of-period price ($\Delta X_{i,t}/P_{i,t-1}$)

and the other by beginning-of-period book value ($\Delta X_{i,t}/BE_{i,t-1}$). The latter measure, which uses scaling by book values, is important because it alleviates concerns that the results using the former measure are primarily driven by the denominator, stock price. For aggregate- and portfolio-level estimates of earnings change, we use both equal-weighted and value-weighted cross-sectional averages of individual stock earnings changes (value weights are calculated as the beginning-of-period market capitalization). An additional measure of earnings change at the aggregate and portfolio levels is defined as the change in total earnings (cross-sectional sum) of the firms in the market and the portfolio, respectively, divided by the cross-sectional sum of book values at the beginning of the period.

We include firms with available earnings, lagged earnings, lagged book values, as well as available price and return data. In each period we exclude observations with beginning-of-period price below \$1. Also, we exclude the top and bottom 1% of the sample based on the distribution of $\Delta X_{i,t}/P_{i,t-1}$ (each year). At the aggregate and portfolio levels, only firms with non-missing earnings values at adjacent periods are used for calculating earnings changes (to avoid the impact of new listings and de-listings from one period to the next).[5]

4 Aggregation and Predictability: Empirical Evidence

In this section, we report firm-, aggregate-, and portfolio-level results of estimation of Equations (6) and (7). All regressions are time-series regressions. Since aggregate-level results can only be obtained using a single time-series regression, firm-level and portfolio-level results are obtained in the same manner to allow for comparability.

It is important to stress that our focus on firm-level time-series regressions of returns on earnings is in contrast to the cross-sectional regression methodology commonly used in this literature, such as in Ball and Brown (1968), Beaver, Clarke, and Wright (1979), Bernard and Thomas (1989), and Fama and French (2000). Notably, these studies and our paper have different focuses. Since we are interested in comparing time-series effects of predictability for the aggregate and for individual firms, it is necessary to use time-series regressions to allow for better comparison between individual firms and the aggregate (where there is only a single time-series). As Teets and Wasley (1996) points

[5] The aggregate level results are robust to calculating equal-weighted returns and earnings using the entire CRSP universe regardless of whether a firms has returns but not earnings and vice-versa.

out, the interpretations of time-series and cross-sectional regression results are quite different. A positive time-series earnings-returns relation suggests that a firm that experiences a period with an earnings change higher than its unconditional time-series average exhibits a higher-than-average return during that period. A positive cross-sectional earnings-returns relation suggests that firms with higher earnings changes than the cross-sectional average have higher returns than the average market returns. Since aggregate tests are time-series by nature, we should compare them with firm-level time-series tests to preserve a common interpretation.

4.1 Firm-level Regressions

We begin the analysis by replicating a well known result of a positive contemporaneous correlation between earnings and returns at the firm level. The results reported in Table 1 reaffirm the positive contemporaneous relation between earnings and returns. For example, for $\Delta X_{i,t}/P_{i,t-1}$ the median slope coefficient is 1.26 and the 25 percentile is also positive, 0.37. The median R^2 is 9%. For $\Delta X_{i,t}/BE_{i,t-1}$, the median slope coefficient is 0.92 and the median R^2 is 7%.[6] These results are consistent with the intuition that positive (negative) earnings news are associated with higher (lower) expected cash flows and thus higher (lower) stock prices. These results are also consistent with the pooled and cross-sectional results commonly reported in the literature. Figure 1 plots the slope coefficient of the firm-level regressions of Equation (7). The figure shows that only a small fraction of the firms (10.7%) have a negative contemporaneous earnings-returns relation. The vast majority of the coefficients (79.9%) are between 0 and 6.

We continue the firm-level analysis by replicating another well known result that prices lead (anticipate) earnings. Table 1 reports summary statistics (mean and standard deviation, as well as the 5, 25, 50, 75, and 95 percentiles) for the cross-section of the estimation results for regressions with 20 or more degrees of freedom (1,111 firms). The results in Table 1 are consistent with the notion that investors are able to anticipate future earnings changes, and/or current economic activities are reflected in next period's profits. The slope coefficient of returns on future earnings changes is mostly positive, i.e. β in Equation (6) is positive. This positive coefficient suggests

[6] As the medians and equal-weighted averages reported in Table 1 may be prone to a small-firm bias, we also value weight the regression statistics, where the weight of each firm is its average market value over the period for which it is included in our sample. Consistent with our equal-weighted results, the value-weighted relation between returns and both contemporaneous and future earnings changes remains positive.

that when investors expect higher earnings changes in the next period, prices respond (increase) in the current period. Figure 2 plots the distribution of the slope coefficients of the firm-level regressions (Equation (6)), where $\Delta X_{i,t}/P_{i,t-1}$ is the independent variable. The results suggest that the coefficient is mostly positive (for 60% of the firms). These results are consistent with Kothari and Sloan (1992), which documents that past returns reflect information about current earnings.

While the coefficient is positive, which supports predictability, the explanatory power does not seem to be very high. Figure 2, Panel B, show that the relation between returns and next year's earnings change is mostly not statistically significant. The vast majority of the t-statistics (91%) are below 1.96. In sum, the market seems to be able to predict some of the firm-level earnings growth, yet it seems that most of the growth in earnings is unanticipated prior to the fiscal year. In addition, Figure 3 plots the R^2 results of the firm-level regression for the estimation of Equation (6), where $\Delta X_{i,t}/P_{i,t-1}$ is the independent variable. The R^2 is generally very low. In sum, current stock returns seem to incorporate information about future earnings changes, but variations in returns explain only a small portion of the variation in future earnings changes.

For completeness, we also regress earnings changes on contemporaneous and lagged returns. The results are consistent with the estimation of Equations (6) and (7). The median slope coefficients for contemporaneous and lagged returns are both positive. Also, more than 75% of the firm-level regressions produce a positive contemporaneous relation between earnings changes and stock returns.

4.2 Aggregate (Market-Level) Results

We now turn to study the earnings-returns relation for the aggregate. Table 2 reports the results of estimation of Equations (6) and (7) for the aggregate and the regression of earnings changes on contemporaneous and lagged returns. The results in Table 2 highlight the contrast between firm-level and aggregate-level earnings-returns relation. For example, when earnings changes are regressed on current and lagged returns, the coefficient on current returns is negative in contrast to the positive coefficient apparent in firm-level regressions. Nevertheless, lagged returns exhibit a positive correlation with contemporaneous earnings changes, consistent with our firm-level regressions.

These results are also apparent in the univariate regressions of Equations (6) and (7). When regressing stock returns on contemporaneous earnings changes, the coefficient is negative (apart from a single specification of equal-weighted returns regressed on equal-weighted $\Delta X_{i,t}/P_{i,t-1}$). The negative coefficient varies from -0.34 to -1.87 with the R^2 varying from 0% to 5%. These results suggest that $cov(R_t, \Delta X_t)<0$, as opposed to firm-level regressions where $cov(R_{i,t}, \Delta X_{i,t})>0$ for most firms. Note that the aggregate-level coefficient is statistically different from that of the average firm.

With respect to predictability, we find evidence consistent with the hypothesis that investors are better able to predict aggregate trends than firm-level outcomes. For example, in Table 2 when estimating Equation (6) on the aggregate level, the slope coefficient is consistently positive and statistically significant. The coefficient varies from 1.97 to 5.04 and the R^2 varies from 9% to 12%. These results support the hypothesis that investors are able to predict aggregate trends in earnings. Compared to the results in Table 1, the results in Table 2 also indicate that the market is more efficient in predicting aggregate earnings changes than firm-level earnings changes. The estimated slope coefficient, β, for the aggregate-level regression is higher than the 75 percentile of the distribution of the firm-level regression estimates.

Figures 2 and 3 provide additional support for the hypothesis that investors are better in predicting market-wide trends than firm-level earnings changes. The distribution of the R^2 plotted in Figure 3, Panel B, indicates that the aggregate-level R^2 (about 11%) is on the right end of the distribution of the firm-level regression results. The figure indicates that the aggregate-level explanatory power is unlikely to be the same as a random draw from the firm-level distribution. A similar conclusion can be deduced from Figure 2. The aggregate-level slope coefficients reported in Table 2 are on the right end of the distribution of the firm-level results.

4.3 Additional Tests

In addition to firm-level and aggregate-level tests, we also employ portfolio-level tests. In particular, we form portfolios based on size and industry, as well as random stock sortings. These tests allow us to observe the effects of aggregation on the regression results for Equations (6) and (7). In addition, we also employ quarterly data to test for the effects of predictability at the quarterly frequency, and discuss post-2000 results.

4.3.1 Size-Sorted Portfolios

We first sort the firms in our sample into size portfolios (each year), where size is defined as the beginning-of-period market value. We independently sort our sample into 70 portfolios based on size. Portfolio-level returns and earnings changes are calculated as explained in Section 3. For every portfolio we run portfolio-level regressions. The estimates of slope coefficients for Equations (6) and (7) are plotted in Figure 4.

In addition to aggregation, the earnings-returns relation varies across size portfolios. In fact, Collins, Kothari, and Rayburn (1987) find that prices better predict earnings changes for large firms than for small firms. Figure 4 provides evidence consistent with those findings. The figure plots the portfolio-level slope coefficients for returns regressed on contemporaneous earnings changes and future earnings changes (value-weighted $\Delta X_{i,t}/P_{i,t-1}$). Panel A of Figure 4 shows similar patterns to those shown in Collins, Kothari, and Rayburn (1987). As we increase the average size of the firms in a portfolio, the coefficient of returns on future earnings increases. At the same time, Panel B of Figure 4 shows that the contemporaneous earnings-returns relation declines with the average size of the firms in a portfolio. The contemporaneous earnings-returns relation becomes negative for the largest portfolios.

4.3.2 Industry-Sorted Portfolios

In addition to size, we also sort portfolios based on industry classifications. In particular, we sort firms by their 4-, 3-, and 2-digit SIC code, which results with 273, 188, and 52 portfolios, respectively. In addition, we use the Moskowitz and Grinblatt (1999) industry classification to allow for additional aggregation (20 portfolios). Portfolio-level returns and earnings changes are calculated as explained in Section 3. For every portfolio in every sorting we run portfolio-level regressions. The median estimates are reported in Table 3. For example, the first row in Table 3 reports the median slope coefficients of portfolio-level estimation of Equations (6) and (7), and the median R^2 of Equation (6).

The results for industry-sorted portfolios show that there is fairly little predictability at the industry level. In other words, industry-level earnings are more difficult to predict than aggregate-level earnings. The R^2 is very low (mostly below 5%). However, as expected, we find that as we aggregate stocks into larger portfolios, the predictability improves. Correspondingly, the contemporaneous earnings-returns relation declines. These results imply that while aggregate earnings are somewhat predictable, it is difficult to predict which industry will earn more/less of these aggregate earnings.

4.3.3 Randomly Sorted Portfolios

Given the results in Tables 1 and 2, one would expect that any aggregation procedure should result with more predictability and lower contemporaneous earnings-returns correlation. However, it is unclear how much aggregation is necessary to obtain results similar to the aggregate-level results, reported in Table 2. We therefore add additional tests based on repeated random sorts. Specifically, we apply the following procedure. Every year we randomly divide the entire cross-section of stocks (with available relevant data on earnings changes, returns, and lag returns) into a predetermined number of portfolios. Portfolio-level returns and earnings changes are calculated as explained in Section 3. We then use the time series of each portfolio to estimate Equations (6) and (7), and we record the median regression estimates. For every predetermined number of portfolios we repeat this process 1,000 times, and report the averages (of the medians) in Table 4. The number of portfolios vary from 5 to 200.

The results are consistent with our hypotheses. For example, Table 4, Panel A, shows that the earnings-returns relation monotonically drops from 1.05 to -1.06 while moving from 200 portfolios to 5 portfolios (using value-weighted earnings changes). Concurrently, the average regression coefficient corresponding to the predictability of earnings changes by lagged returns monotonically increases from 0.51 to 2.74 (the regression R^2 increases from 2% to 8%). These results are also plotted in Figure 5, where the gradual monotonic trends are clearly illustrated. Compared to the results of the size- and industry-sorted portfolios, the random portfolio sorts exhibit smoother patterns of the variables of interest as we divide the cross-section of firms into less portfolios. Overall, the results for both equal- and value-weighted portfolio returns and for the various ways of calculating earnings changes are all consistent with the notion that the earnings-returns relation decreases while predictability increases in the process of aggregation. The results indicate that the contemporaneous earnings-returns relation becomes negative when the firms are sorted into 20 portfolios or less.

4.3.4 Quarterly Data

For additional robustness, we repeat some of our tests using quarterly data. Our findings are consistent with those reported above using annual earnings and returns. Our earnings data includes all available firms in the COMPUSTAT quarterly database during the period 1970-2000. Following Kothari, Lewellen, and Warner (2006), we use the CRSP index returns (both equal-weighted and value-weighted returns) as the measure for aggregate returns. The quarterly returns are estimated from one month prior to the fiscal quarter-end until two months after the fiscal quarter-end. The change in earnings variable is measured as the difference between the earnings in a given quarter and the earnings in the same quarter the previous year.

Table 5 estimates Equation (7) using firm-level quarterly data. The table reports summary statistics of regressions with more than 40 degrees of freedom (1,869 firms). The mean and median results are positive when using both $\Delta X_{i,t}/P_{i,t-1}$ (the average slope is 1.40 and the median slope is 0.79) and $\Delta X_{i,t}/BE_{i,t-1}$ (the average slope is 0.90 and the median slope is 0.55). The results in Table 5 suggest that the contemporaneous earnings-returns relation is positive for the majority of the firms in our sample. These results are consistent with the annual data results reported in Table 1. The results indicate that the market unravels some of the information about the quarterly earnings during the quarter.

Table 6 reports the results for aggregate (market-level) regressions, similar to those performed in Table 2. The contemporaneous earnings-returns results in Table 6 are consistent with the annual results reported in Table 2. In contrast to the positive firm-level contemporaneous earnings-returns relation, the contemporaneous earnings-returns relation is negative for the aggregate. The slope coefficient in Equation (7) is negative and statistically significant for all model specifications. For example, when using value-weighted returns with value-weighted $\Delta X_{i,t}/P_{i,t-1}$ as the dependent variable, the slope coefficient is -5.46 with a t-statistic of -2.55. The R^2 ranges from 5% to 9%.

In addition to the contemporaneous earnings-returns relation, we also test for differences in predictability in quarterly data. We use the following regression model to test for predictability of earnings changes:

$$\Delta X_{i,t}/P_{i,t-1} = \alpha + \beta_0 \cdot R_{i,t} + \beta_1 \cdot R_{i,t-1} + \beta_2 \cdot R_{i,t-2} + \beta_3 \cdot R_{i,t-3} + \beta_4 \cdot R_{i,t-4} + \beta_5 \cdot R_{i,t-5} + \epsilon_{i,t}. \quad (8)$$

Figure 6 plots the slope coefficients (β_0 through β_5). The figure plots the median firm-level coefficient for the firm-level regressions and the estimate for the aggregate-level regressions. Note that for the firm-level regressions, the estimated coefficients decline with the lag. In other words, much of the information about quarterly earnings is unravelled during the 12 months prior to the disclosure. In contrast, for the aggregate-level results the coefficients increase with the lag. These results indicate that investors are able to anticipate the aggregate-quarterly earnings change more than a year in advance.

In sum, the quarterly data results are consistent with the annual data results insofar as both show that investors are better at predicting earnings changes at the aggregate level. Also, the results indicate that the aggregate contemporaneous earnings-returns relation is negative in contrast to the firm-level positive relation.

4.3.5 The Post-2000 Period

In the previous sections, we run our tests over the period of 1965-2000 to align our results with prior studies. We re-apply the same tests over the extended period ending in 2005. The aggregate-level results of estimation of regressions (6) and (7) are reported in Table 7, Panel A. The results suggest that during the post-2000 period the contemporaneous earnings-returns relation becomes positive (γ_1>0 and $|\gamma_1|$>$|\beta_1|$). For example, when regressing the value-weighted returns on contemporaneous equal-weighted $\Delta X_{i,t}/P_{i,t-1}$, the coefficient changes from -0.34 in the 1965-2000 period to 0.75 for the full sample period. This general result is consistent across the different earnings changes measures and for equal- and value-weighted returns.

As noted by Jorgensen, Li, and Sadka (2008), the change in the aggregate earnings-returns relation is likely due to SFAS 142, which changed the treatment of goodwill. When the standard was first adopted in 2001, many firms wrote-off a substantial portion of their goodwill. Therefore, the standard resulted in a short-run negative shock to earnings during 2001 and 2002 and a large "reversal" in 2003. In order to partially tease out the effects of SFAS 142, we use operating income instead of net income in Panel B of Table 7. The results show that when operating income is used rather than net income, the earnings-returns relation remains fairly constant over our sample period. The contemporaneous earnings-returns relation is negative and significantly different than the firm-level estimates reported in Table 1.

5 The Negative Aggregate Contemporaneous Earnings-Returns Relation

In the prior sections, we demonstrate that when we include more firms in a portfolio the aggregated earnings of the portfolio become more predictable. In addition, we find that as the earnings becomes more predictable the contemporaneous earnings-returns relation declines and ultimately becomes negative. Although the predictability of earnings may account for the weakening of the earnings-returns relation for the aggregate, the negative correlation seems surprising: If investors expect higher cash flows then stock prices should increase; yet, the empirical evidence suggests that "good" news about aggregate future cash flows result in a negative price reaction. In terms of Equation (5), this result suggests that either $cov(N_R, UE_X)$ is positive and/or $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])$ is negative (because $cov(N_{cf}, UE_X){>}0$). Intuitively, the results suggest that either (1) investors become more risk averse when aggregate earnings change is high, and demand a sufficiently high risk premium that more than offsets the "good" news contained in the high earnings change; and/or (2) investors are able to predict aggregate earnings change and as they predict higher future earnings they demand lower risk premia (expected earnings are negatively correlation with expected returns). While both explanations are consistent with market efficiency, their interpretations are fundamentally different. The first suggests that earnings changes are informational, i.e., earnings changes cause investors to change their expected cash flows and expected returns. The second explanation suggests that earnings changes are mostly non-informational, i.e., they merely confirm investors' expectations of earnings changes and provide little or no new information. The latter explanation is consistent with accounting conservatism insofar as accounting income represents the accounting recognition of prior economic activity, and therefore should be predictable.

The first explanation above is promoted in Kothari, Lewellen, and Warner (2006), while we raise the possibility of the second explanation. In what follows, we first discuss the explanation in Kothari, Lewellen, and Warner (2006). Then, we provide theoretical background and some empirical evidence supporting our explanation, along with a discussion of the relation of our work to other studies.

5.1 Can Earnings Predict Aggregate Stock Returns?

The first possible explanation, suggested by Kothari, Lewellen, and Warner (2006), for the negative contemporaneous earnings-returns relation is changes in risk premia. This would suggest that the contemporaneous earnings-returns relation is negative because, in terms of Equation (3), $cov(N_R, \Delta X_t)>0$. We note that if risk premia increase when earnings increase, then earnings increases should predict higher returns (e.g., Lettau and Ludvigson, 2001; and Cochrane, 1991, 2001, Lettau and Van Nieuwerburgh, 2006). This is particularly true during our sample period over which returns are shown to be predictable (Keim and Stambaugh, 1986; Fama and French, 1988, 1989; Campbell and Shiller 1988a, 1988b; Lamont, 1998; Lewellen, 2004; and Ang and Bekaert, 2007), and hence, one would expect that earnings changes would predict returns, assuming $cov(N_R, \Delta X_t)$ is positive. Therefore, we test whether aggregate earnings changes predict aggregate stock returns. In particular, we regress returns on lag earnings changes. The results are reported in Table 8.

We fail to find evidence in support of the hypothesis that earnings changes predict returns. The Kothari, Lewellen and Warner (2006) explanation suggests that positive earnings changes should predict an increase in expected returns that would offset the "good" earnings news, i.e. positive slope coefficient. However, the slope coefficient changes signs for different model specifications (the coefficient varies from -1.52 to 3.50). Also, the R^2 is below 4%. In addition, the highest R^2 is obtained when the slope is negative.[7] In addition, the results in Table 6 are also consistent with the results in Table 8 insofar as the current quarterly earnings change is negatively correlated with future stock returns. However, this relation is not statistically significant. Nevertheless, we cannot reject the hypothesis that $cov(N_R, \Delta X_t) \leq 0$ as future returns may be a poor proxy for return news, N_R.

5.2 Expected Returns and Expected Earnings

We hypothesize that expected aggregate earnings changes are negatively correlated with expected stock returns. We base our theory on asset-pricing models that relate asset prices (and returns) to the state of the economy (e.g., Lucas, 1978; and Cox, Ingersoll, and Ross, 1985). If the economy is in a recession, i.e. it experiences a drop in output (reflecting low expected earnings), consumption will tend to be low; at the same time, the level of risk aversion and the risk premia tend to be high

[7] Our findings are also consistent with Lamont (1998), which finds that higher earnings predict lower future returns.

(under, for example, the commonly accepted assumption of decreasing absolute risk aversion). In other words, more wealth results in lower risk aversion, while a reduction in wealth results in higher risk aversion.

Chen (1991) studies the relation between market returns and macroeconomic variables. Chen reaches a similar conclusion to ours: "*The risk aversion implicit in the pricing of financial securities, and hence the expected market premium, are negatively correlated with a measure of the relative health of the current economy, such as the recent growth of the aggregate economy.*" In addition, Chen finds that stock returns are negatively correlated with expected GNP growth. Put differently, investors take into account expected growth rates when assessing the health of the economy, and a healthier economy results in lower risk aversion and lower risk premia. Intuitively, using expected earnings to proxy for the health of the economy, our hypothesis states that higher expected earnings suggests higher perceived wealth and therefore lower risk premia (lower expected returns).

5.3 Model Specification

To provide further evidence for our theory, we specify expectation models for both returns and earnings. We employ the dividend-price ratio and the consumption-to-wealth ratio used in Lettau and Ludvigson (2001). These ratios have been shown to predict returns (e.g., Fama and French, 1998; and Lettau and Ludvigson, 2001). Sadka (2007) finds that the dividend-price ratio predicts earnings as well. The intuition of our test is simple: if a single variable predicts both returns and earnings, but with different signs, then expected earnings and expected returns are negatively correlated. To keep our data consistent with the previous sections, we use earnings and returns up to 2000.

Our test employs the following regression models:

$$\begin{aligned} x_{t+j} - x_t &= a_1 + b_1 \cdot (d-p)_t + c_1 \cdot cay_t + \varsigma_{1,t+j} \\ r_{t\to t+j} &= a_2 + b_2 \cdot (d-p)_t + c_2 \cdot cay_t + \varsigma_{2,t+j}, \end{aligned} \tag{9}$$

where $x_{t+j} - x_t$ denotes the log earnings growth from year t until year $t+j$, $r_{t\to t+j}$ denotes the log stock returns from April of year t until march of year $t+j+1$, $d - p_t$ and cay_t denote the log dividend-price ratio and consumption-to-wealth ratio, respectively, and $\varsigma_{1,t+j}$ and $\varsigma_{2,t+j}$ are the error terms. If $sign\,(b_1) = -sign\,(b_2)$ then the results suggest that expected earnings and expected returns are negatively correlated. Table 9 reports results for $j = \{1, 5\}$.

The results are consistent with our interpretation of the negative contemporaneous aggregate earnings-returns relation. The regression estimates of b_1 is negative and statistically significant, while our estimate of b_2 is positive and statistically significant. These results suggest that $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])$ is negative. With regards to the consumption-to-wealth ratio, while c_2 is positive and statistically significant, c_1 is statistically insignificant and changes signs for different horizons.

To further test the relation between expected earnings growth and expected returns we use the following expectation models:

$$\begin{array}{lcccccc} E_{t-1}(R_t) = & \kappa_0 + & \kappa_1 \cdot R_{t-1} + & \kappa_2 \cdot X_{t-1}/X_{t-2} + & \kappa_3 \cdot \Delta GNP_{t-1} + & \kappa_4 \cdot (d-p)_{t-1} + & \kappa_5 \cdot cay_{t-1} \\ & 0.03 & -0.20 & 0.13 & -1.25 & -2.09 & 7.87 \\ & [0.18] & [-1.27] & [0.91] & [-1.50] & [-1.17] & [4.08] \end{array} \quad (10)$$

and

$$\begin{array}{lcccccc} E_{t-1}(X_t/X_{t-1}) = & \kappa_0 + & \kappa_1 \cdot R_{t-1} + & \kappa_2 \cdot X_{t-1}/X_{t-2} + & \kappa_3 \cdot \Delta GNP_{t-1} + & \kappa_4 \cdot (d-p)_{t-1} + & \kappa_5 \cdot cay_{t-1}, \\ & 0.85 & 0.09 & 0.13 & 3.49 & 1.98 & -1.62 \\ & [5.54] & [0.63] & [0.97] & [4.47] & [1.18] & [-0.90] \end{array} \quad (11)$$

where ΔGNP_t is the real GNP growth in period t. The first row below each equation above reports the coefficient estimates and the second row reports the t-statistics. Panel C of Table 9 reports the results of OLS regressions of returns and expected returns on earnings growth and expected earnings growth. The expected values of returns and earnings growth are the fitted values of regressions (10) and (11), respectively.

The results in Panel C are consistent with our hypothesis. The R^2 of returns on contemporaneous earnings growth is 10%. When we regress expected returns on expected earnings growth (based on Equations (10) and (11)), the R^2 more than doubles to 25%. This R^2 suggests that the correlation between expected earnings and expected returns is approximately 50%. We caution the reader that our results depend on the particular expectation model used and it is possible that other expectation models will yield different results. However, unreported analysis proves the results are robust to several alternative model specifications.

5.4 Predictability and the Difference between Firm- and Aggregate-Level Results

How can predictability contribute to the understanding of why $cov(R_t, \Delta X_t)$ is negative for the market but positive for individual stocks? As noted the contemporaneous relation between earnings changes and stock returns depends on the relation between earnings changes (predictable and unpredictable components) and the three component of returns: expected returns, return news, and cash-flow news (i.e. the terms $cov(N_{cf}, UE_X)$, $cov(N_R, UE_X)$ and $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])$). Therefore, assuming firm-level returns are mostly unpredictable, the firm-level earnings-returns relation is determined mostly by the relation between the unexpected component of earnings changes and cash-flow news. Put differently, the firm-level earnings-returns relation is positive because higher (lower) earnings changes increases (reduces) expected cash flows. In contrast, since aggregate earnings changes are predictable, earnings changes provide little new information and therefore do not change expected cash flows or expected returns. Consequently, the aggregate earnings-returns relation is determined by the relation between expected earnings and expected returns. If $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])$ is negative, as we argue above, it could explain why $cov(R_t, \Delta X_t)$ is negative for the aggregate and positive for individual stocks. Predictability therefore provides a rational explanation for the empirical evidence.

5.5 Relation to Other Studies

As noted above, there may be three different reasons for a negative earnings-returns relation: either $cov(N_{cf}, UE_X) < 0$, and/or $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t]) < 0$, and/or $cov(N_R, UE_X) > 0$. Because it is unlikely that higher earnings signal lower future cash flows, the literature focuses on the two remaining reasons. Kothari, Lewellen, and Warner (2006) hypothesize that $cov(N_R, UE_X) > 0$. That is, investors raise their required rate of return in period of high aggregate earnings. Hirshleifer, Hou, and Teoh (2007) find evidence consistent with the latter hypothesis. Specifically, they document that aggregate accruals are strongly positively associated with future aggregate stock returns.[8] Since high accruals are likely to be associated with high earnings, these findings suggest that high earnings are associated with high expected returns. In addition, Cready and Gurun (2008) find

[8] This result is in contrast to cross-sectional firm-level results, where accruals are negatively associated with future stock returns (Sloan, 1996).

that earnings changes are positively associated with future stock returns during 1986-2005, when inflation is relatively low and earnings changes are a better measure of earnings surprises and cash-flow news (see also Nissim and Penman, 2003).

In contrast, Chen and Zhao (2008) use analysts' forecast errors to construct aggregate earnings surprises. They find that cash-flow news are positively associated with stock returns, which is consistent with firm-level findings and is inconsistent with the conclusion of Kothari, Lewellen, and Warner (2006) that earnings surprises are negatively associated with contemporaneous stock returns. Chen and Zhao (2008) suggest that the negative relation is a manifestation of a poorly specified expectation model for earnings, but they do not address the question of why the contemporaneous earnings-returns relation is in fact negative during the sample period. In addition, they do not find evidence that cash-flow news are positively associated with returns news, i.e. they do not find evidence consistent with $cov(N_R, UE_X)>0$.[9]

Finally, we would like to comment on the amount of predictability required for the two explanations for the negative contemporaneous earnings-returns relation at the aggregate level, i.e. the one in Kothari, Lewellen, and Warner (2006), $cov(N_R, UE_X)>0$, and ours, $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])<0$. While the two explanations are different, both rely on some level of return predictability. Assume, in contrast, that returns are unpredictable. Then, $E_{t-1}[R_t]$ equals a constant and it follows that N_R=0. This is because N_R is simply the change in expectation of future returns, and if expected returns are constant then there is no change in expected returns. It then follows that if returns are unpredictable, the earnings-returns relation is determined by $cov(N_{cf}, UE_X)$, which we believe to be non-negative. Therefore, it is not possible to explain the negative contemporaneous earnings-returns relation without any return predictability at all.

While both explanations require return predictability, $cov(N_R, UE_X)>0$ requires returns to be highly predictable. Since $cov(N_{cf}, UE_X)$ is believed to be positive, $cov(N_R, UE_X)$ has to be sufficiently positive to overturn the positive effect of earnings news on stock prices (e.g., Chen and Zhao, 2008). Therefore, returns must be both highly predictable and highly variable, i.e. the expected risk premium has to change significantly and in a predictable fashion for $cov(N_R, UE_X)$ to be both positive and sufficiently large to dominate the contemporaneous earnings-returns relation.

[9] Chen and Zhao (2008) finds evidence of a positive relation between cash-flow news and aggregate stock returns, but it fails to find evidence that cash-flow news are positively associated with return *news*. Chen and Zhao further stress that such a finding is "counter-intuitive and puzzling."

Conversely, the explanation that $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t]) < 0$ requires only some level of return predictability as long as earnings changes are highly predictable. If earnings changes are highly predictable then both $cov(N_R, UE_X)$ and $cov(N_{cf}, UE_X)$ are approximately zero because earnings changes do not contain much news ($UE_X \approx 0$). In this case the aggregate earnings-returns relation will be determined by the remaining term, $cov(E_{t-1}[R_t], E_{t-1}[\Delta X_t])$. Therefore, if the latter term is negative, even with little predictability of return, the contemporaneous earnings-returns relation will be highly affected by this negative covariance, and may even turn negative. In sum, the explanation in Kothari, Lewellen, and Warner (2006) requires high return predictability while our explanation requires high earnings predictability.

5.6 Analysts' Forecasts

Our explanation for the negative earnings-returns relation at the aggregate level is based on the ability of investors to predict aggregate earnings. We argue that aggregate earnings changes, in contrast to those of individual firms, are largely predictable and cannot be considered as news. Unfortunately, as we mention earlier, there is no well-proven expectation model for aggregate earnings. One possible way to gauge earnings expectation is to use analysts' forecasts.[10] In this section, we describe some results using analyst data.

We use the mean outstanding earnings per share forecasts for the S&P 500 index, available from the I/B/E/S database for the period 1982-2000 (18 annual observations). Using analysts' forecasts to measure expected and unexpected aggregate earnings growth yields three main results: (1) a positive and statistically significant relation between expected earnings growth and contemporaneous returns; (2) a negative, albeit statistically insignificant, relation between expected earnings growth and one-year-ahead returns; and (3) a positive, albeit statistically insignificant, relation between unexpected earnings growth and contemporaneous returns. These results are consistent with the theme of this paper that once accounting for the expected aggregate earnings growth, the price reaction to news is positive, i.e. the aggregate earnings-returns relation becomes positive.

We note that while analysts' forecasts may provide a better expectation model than the random walk, it is unclear whether analysts' forecasts are an appropriate measure for investors' expectation of aggregate earnings. In fact, the forecasts may also be biased due to the influence of analysts'

[10] Another possible proxy for expected earnings growth is management forecasts, e.g., Anilowski, Feng, and Skinner (2007) and Shivakumar (2007).

incentives and it is not straightforward to assess the potential impacts of this effect. Moreover, analyst coverage data is only available for about half our sample period. Therefore, although the results using analysts' forecasts appear consistent with our hypotheses, they should be interpreted with caution.

6 Conclusion

This paper studies the effects of predictability on the earnings-returns relation. This paper focuses on the differences between the firm-level and aggregate-level earnings-returns relations. Specifically, we document that aggregate earnings changes are significantly more predictable than firm-level earnings changes, suggesting that aggregate earnings provide little new information to a diversified investor. In addition, prior studies document that the contemporaneous earnings-returns relation is positive for individual firms and negative for the market portfolio. Prior studies interpret these findings as suggesting that aggregate earnings changes are positively associated with return news. In this study, we provide an alternative *complementary* interpretation. We hypothesize and provide consistent evidence that the contemporaneous earnings-returns relation is positive for individual firms because earnings changes are mostly unpredictable and therefore inform investors of higher future cash flows. In contrast, aggregate earnings changes are more predictable and the negative relation between expected earnings and expected returns may determine the contemporaneous earnings-returns relation.

Our study has several important implications. First, although the random-walk model seems to perform well for firm-level observations, it is not likely the correct model for the aggregate. In fact, including prior stock returns will probably not suffice, because investors may anticipate the earnings several periods in advance. Second, our results indicate that earnings changes are informative on a firm-by-firm basis, however, they provide little or no new information to a diversified investor holding the market portfolio. To clarify, the results do not suggest that unexpected earnings shocks do not affect the market portfolio, but rather that the unexpected variation in earnings changes is relatively small compared to the variation in expected earnings changes. Related to this point and in comparison with Ball and Brown (1968), while the latter study shows that most of the information about earnings is revealed throughout the fiscal year, before earnings are announced, we find that much information about aggregate earnings is already known in the prior year.

Finally, our results have some implications for asset pricing. The price of an asset is equal to its expected discounted cash flows. Our results suggest that the two factors affecting prices (cash flows and discount rates) are jointly determined—when investors expect higher earnings they demand a lower rate of return. This result therefore implies that the variation in stocks prices could be driven by a single factor.

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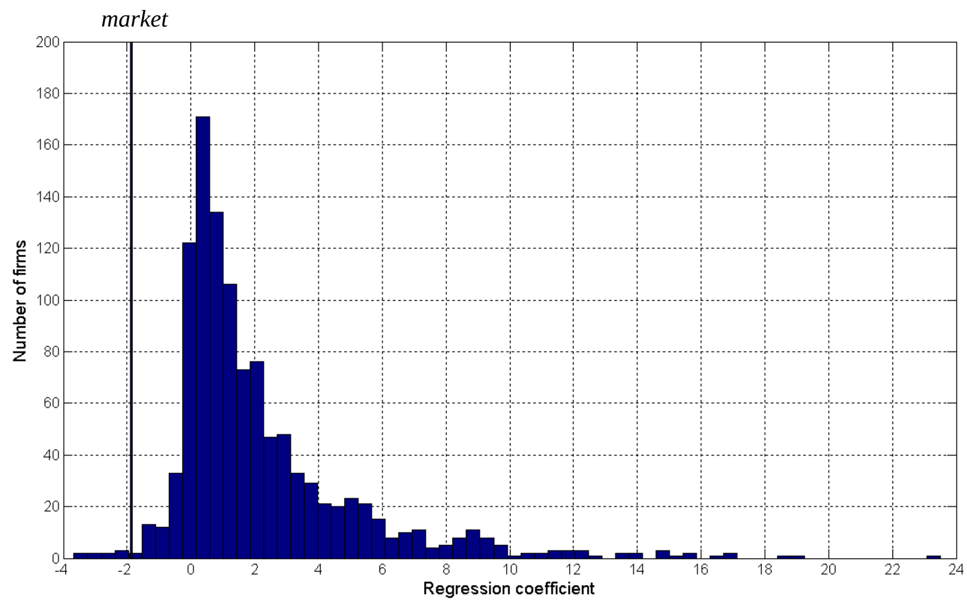
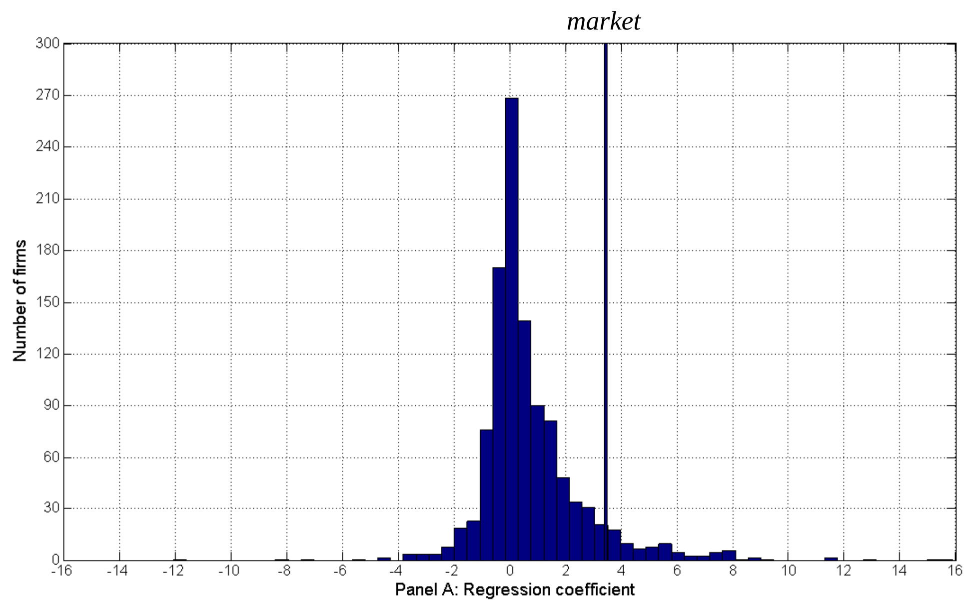


Figure 1: This figure plots the histogram of the coefficients calculated from individual firm time-series regressions. The annual returns of firm *i* at year *t*, $R_{i,t}$, is the cumulative return from April of year *t* until March of year *t*+1. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1. The stock price of firm *i* at the end of March of year *t* is denoted $P_{i,t-1}$. For each firm the following regression is calculated $R_{i,t} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$. In addition, the same regression model is calculated for the market portfolio. Portfolio returns are value-weighted and the change in earnings is calculated as the value-weighted change in earnings scaled by beginning-of-period price. The data includes the results of all regressions with at least 20 degrees of freedom (1,111 firms) of December fiscal year-end firms for the period 1965-2000.



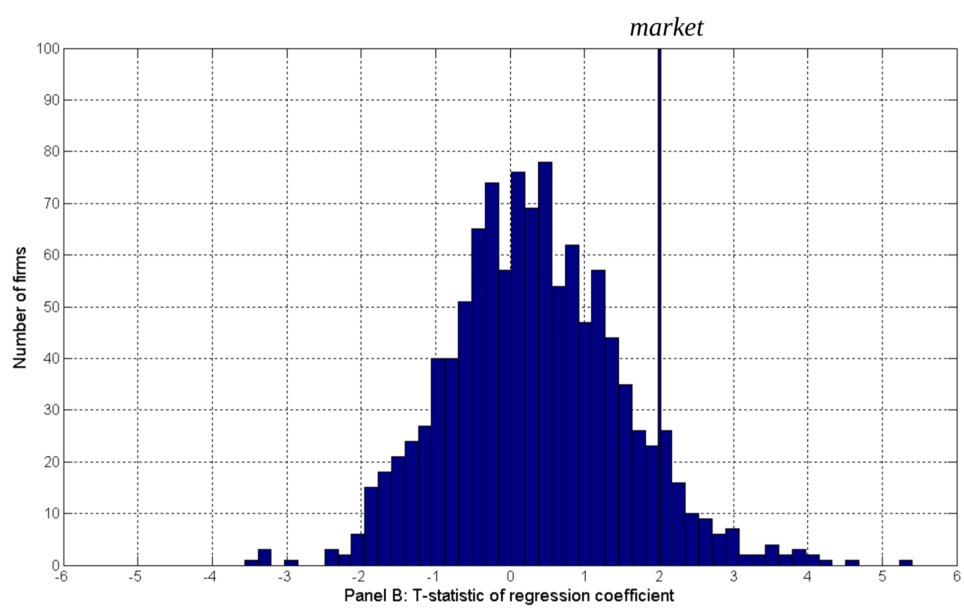


Figure 2: This figure plots the histograms of the coefficients and *t*-statistics calculated from individual firm time-series regressions. The annual returns of firm *i* at year *t*, $R_{i,t}$, is the cumulative return from April of year *t* until March of year *t*+1. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1. The stock price of firm *i* at the end of March of year *t* is denoted $P_{i,t-1}$. For each firm the following regression is calculated $R_{i,t-1} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$. In addition, the same regression model is calculated for the market portfolio. Portfolio returns are value-weighted and the change in earnings is calculated as the value-weighted change in earnings scaled by beginning-of-period price. The data includes the results of all regressions with at least 20 degrees of freedom (1,111 firms) of December fiscal year-end firms for the period 1965-2000.

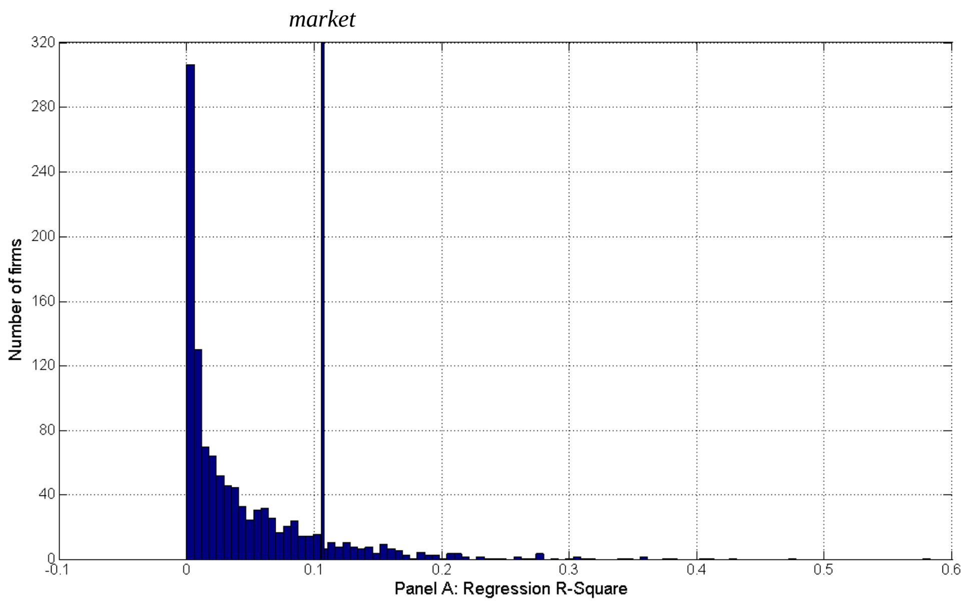
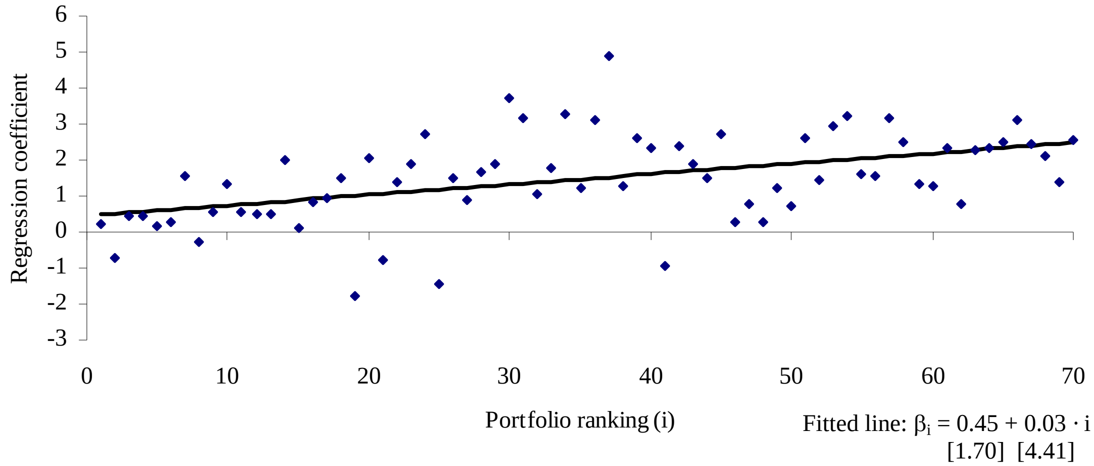
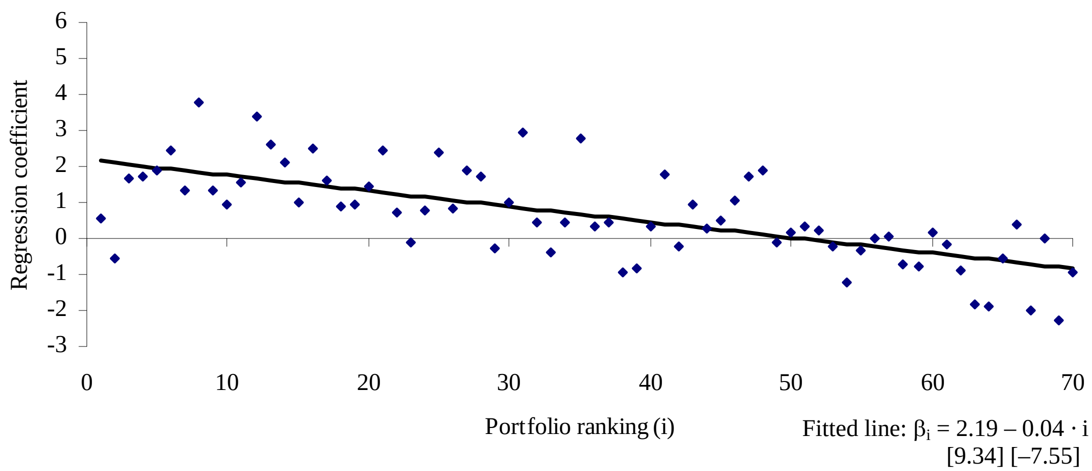


Figure 3: This figure plots the histograms of R^2 of individual firm time-series regressions. The annual returns of firm *i* at year *t*, $R_{i,t}$, is the cumulative return from April of year *t* until March of year *t*+1. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1. The stock price of firm *i* at the end of March of year *t* is denoted $P_{i,t-1}$. For each firm the following regression is calculated $R_{i,t-1} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$. In addition, the same regression model is calculated for the market portfolio. Portfolio returns are value-weighted and the change in earnings is calculated as the value-weighted change in earnings scaled by beginning-of-period price. The data includes the results of all regressions with at least 20 degrees of freedom (1,111 firms) of December fiscal year-end firms for the period 1965-2000.



Panel A: $R_{i,t-1} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$



Panel B: $R_{i,t} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$

Figure 4: This figure plots slope coefficients of portfolio-level (size-sorted portfolios) regressions. The annual returns of firm *i* at year *t*, $R_{i,t}$, is the cumulative return from April of year *t* until March of year *t*+1. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1. The stock price of firm *i* at the end of March of year *t* is denoted $P_{i,t-1}$. Portfolio returns are value-weighted and the change in earnings is calculated as the value-weighted change in earnings scaled by beginning-of-period price. The data includes the results of all regressions with at least 20 degrees of freedom (1,111 firms) of December fiscal year-end firms for the period 1965-2000.

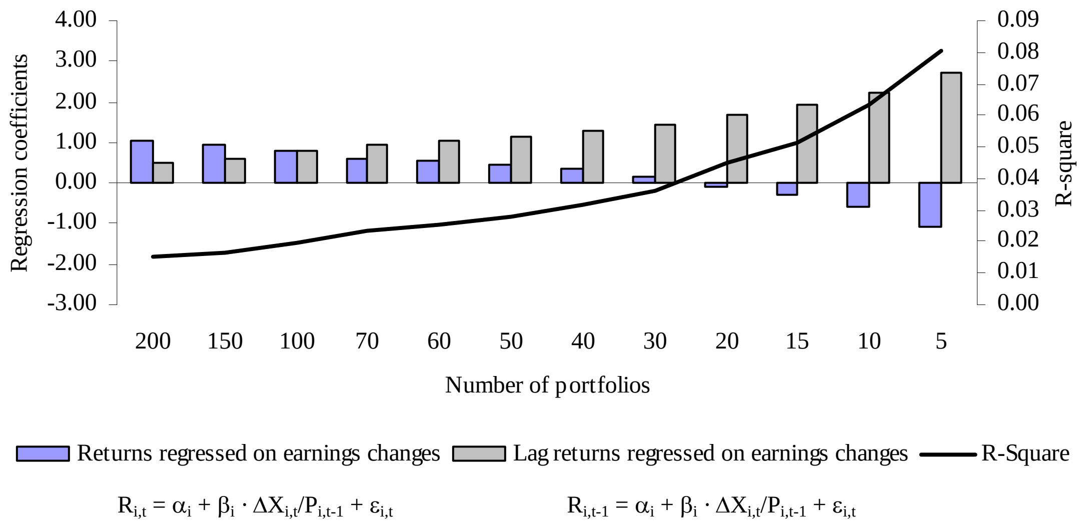
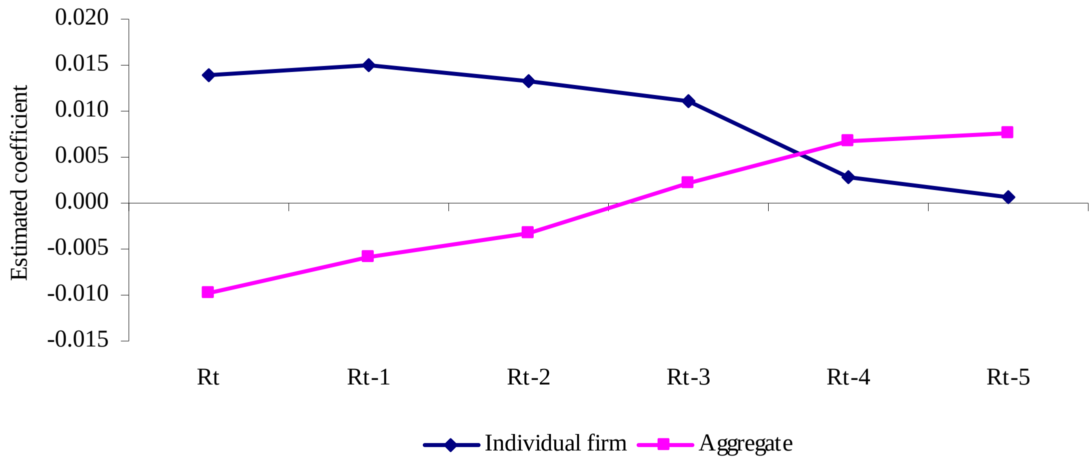


Figure 5: This figure plots the average of 1,000 cross-sectional medians of portfolio-level (randomly sorted portfolios) regression results. Every year we randomly divide the entire cross-section of stocks (with available relevant data on earnings changes, returns, and lag returns) into a predetermined number of portfolios. The time series of earnings changes and returns of each portfolio are used for estimating regressions, and the median regression estimates across portfolios is recorded. This procedure is repeated 1,000 times for every predetermined number of portfolios, and the average (of the medians) is plotted above. The annual returns of firm *i* at year *t*, $R_{i,t}$, is the cumulative return from April of year *t* until March of year *t*+1. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1. The stock price of firm *i* at the end of March of year *t* is denoted $P_{i,t-1}$. Two regressions are analyzed: returns regressed on earning changes and lagged returns regressed on earnings changes. The R^2 of the latter regression is also plotted. Portfolio returns are value-weighted and the change in earnings is calculated as the value-weighted change in earnings scaled by beginning-of-period price. The data includes December fiscal year-end firms for the period 1965-2000.



$$\Delta X_{i,t}/P_{i,t-1} = \alpha_i + \beta_{i,0} \cdot R_{i,t} + \beta_{i,1} \cdot R_{i,t-1} + \beta_{i,2} \cdot R_{i,t-2} + \beta_{i,3} \cdot R_{i,t-3} + \beta_{i,4} \cdot R_{i,t-4} + \beta_{i,5} \cdot R_{i,t-5} + \varepsilon_{i,t}$$

Figure 6: This figure plots slope coefficient of the median firm-level and aggregate-level regressions. The quarterly returns of firm *i* at quarter *t*, $R_{i,t}$, is the cumulative return from one month prior to the fiscal-quarter end until two months after the fiscal-quarter end. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from quarter *t* and *t*-4. The stock price of firm *i* at the end of the fiscal quarter *t* is denoted $P_{i,t-1}$. The aggregate returns are value-weighted and include all firms available on CRSP. The data includes the results of all regressions with at least 40 degrees of freedom (1,869 firms) of December fiscal year-end firms for the period 1970-2000.

Table 1
Firm-Level Regressions

This table reports summary statistics of the cross-section of firm-level time-series regression results. The annual returns of firm *i* at year *t*, $R_{i,t}$, is the cumulative return from April of year *t* until March of year *t*+1. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1. The stock price and the book value of equity of firm *i* at the end of the fiscal year *t*-1 are denoted $P_{i,t-1}$ and $BE_{i,t-1}$, respectively. The data includes the results of all regressions with at least 20 degrees of freedom (1,111 firms for univariate regressions) of December fiscal year-end firms for the period 1965-2000.

	Mean	Std	5%	25%	Median	75%	95%
$R_{i,t} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$							
β_i	2.26	3.21	-0.40	0.37	1.26	3.03	8.67
t-statistic	1.73	1.57	-0.51	0.69	1.59	2.62	4.38
R^2	0.13	0.14	0.00	0.02	0.09	0.20	0.42
$R_{i,t} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/BE_{i,t-1} + \varepsilon_{i,t}$							
β_i	1.43	1.76	-0.28	0.18	0.92	2.26	4.99
t-statistic	1.48	1.52	-0.73	0.45	1.40	2.30	4.26
R^2	0.12	0.13	0.00	0.02	0.07	0.17	0.41
$R_{i,t-1} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$							
β_i	0.71	2.22	-1.31	-0.23	0.22	1.30	4.45
t-statistic	0.33	1.18	-1.54	-0.44	0.28	1.10	2.29
R^2	0.05	0.07	0.00	0.00	0.02	0.06	0.17
$R_{i,t-1} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/BE_{i,t-1} + \varepsilon_{i,t}$							
β_i	0.82	1.57	-0.93	-0.07	0.35	1.43	4.19
t-statistic	0.63	1.28	-1.41	-0.25	0.56	1.43	2.73
R^2	0.06	0.08	0.00	0.01	0.03	0.09	0.22
$\Delta X_{i,t}/P_{i,t-1} = \alpha_i + \beta_i \cdot R_{i,t} + \gamma_i \cdot R_{i,t-1} + \varepsilon_{i,t}$							
β_i	0.15	1.62	-0.02	0.02	0.05	0.11	0.37
t-statistic	1.73	1.56	-0.46	0.67	1.57	2.63	4.39
γ_i	-0.04	0.82	-0.23	-0.02	0.01	0.03	0.11
t-statistic	0.36	1.20	-1.48	-0.44	0.33	1.13	2.31
R^2	0.18	0.14	0.02	0.07	0.14	0.26	0.46
$\Delta X_{i,t}/BE_{i,t-1} = \alpha_i + \beta_i \cdot R_{i,t} + \gamma_i \cdot R_{i,t-1} + \varepsilon_{i,t}$							
β_i	-0.08	1.11	-0.09	0.02	0.05	0.10	0.37
t-statistic	1.47	1.52	-0.72	0.48	1.39	2.31	4.22
γ_i	0.02	0.80	-0.22	-0.01	0.02	0.06	0.21
t-statistic	0.66	1.29	-1.35	-0.21	0.61	1.48	2.78
R^2	0.20	0.14	0.01	0.06	0.14	0.24	0.46

Table 2
Aggregate-Level Regressions

This table reports time-series regression results at the aggregate level. The annual market returns at year *t*, R_t, is the cumulative value- or equal-weighted returns from April of year *t* until March of year *t*+1 (value weights are based on beginning-of-period market capitalization). $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1 for firm *i*. The stock price and the book value of equity of firm *i* at the end of the fiscal year *t*-1 are denoted $P_{i,t-1}$ and $BE_{i,t-1}$, respectively. The aggregate ratio $\Delta X_{i,t}/P_{i,t-1}$ is calculated as the value- or equal-weighted cross-sectional average. The aggregate ratio $\Delta X_{i,t}/BE_{i,t-1}$ is defined as the change in the cross-sectional sum of earnings divided by the cross-sectional sum of beginning-of-period book value. The aggregate ratios at time *t* are calculated using only firms with existing relevant data in the previous period. The *t*-statistics are reported in square brackets. The data includes December fiscal year-end firms for the period 1965-2000.

Panel A: Value-weighted returns				
Dependent variable	Independent variables			R^2
	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	
R_t	-0.34 [-0.26]			0.00
R_t		-1.87 [-1.04]		0.03
R_t			-1.46 [-1.31]	0.05
R_{t-1}	2.30 [1.88]			0.09
R_{t-1}		3.42 [2.01]		0.11
R_{t-1}			1.97 [1.83]	0.09
Dependent variables	Independent variables			R^2
	R_t	R_{t-1}		
$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	0.00 [-0.01]	0.04 [1.83]		0.09
$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	-0.01 [-0.80]	0.03 [1.87]		0.12
$\Delta X_{i,t}/BE_{i,t-1}$	-0.03 [-1.09]	0.04 [1.66]		0.12

Panel B: Equal-weighted returns				
Dependent variable	Independent variables			R^2
	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	
R_t	1.27 [0.67]			0.01
R_t		-1.37 [-0.52]		0.01
R_t			-1.20 [-0.72]	0.01
R_{t-1}	3.86 [2.18]			0.12
R_{t-1}		5.04 [2.02]		0.11
R_{t-1}			3.00 [1.90]	0.10
Dependent variables	Independent variables			R^2
	R_t	R_{t-1}		
$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	0.01 [0.87]	0.03 [2.23]		0.14
$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	0.00 [-0.39]	0.02 [1.96]		0.11
$\Delta X_{i,t}/BE_{i,t-1}$	-0.01 [-0.60]	0.03 [1.83]		0.11

Table 3
Industry-Sorted Portfolios

This table reports the cross-sectional median of regressions of industry-sorted portfolios. The industry classifications are defined using the 4-digit, 3-digit, and 2-digit SIC codes. We also use the Moskowitz and Grinblatt (1999) classification (noted as MG). The annual return of portfolio *i* at year *t*, $R_{i,t}$, is the value- or equal-weighted cumulative return of firms in the portfolio from April of year *t* until March of year *t*+1 (value weights are based on beginning-of-year market capitalization). The ratios $\Delta X_{i,t}/P_{i,t-1}$ and $\Delta X_{i,t}/BE_{i,t-1}$ denote the value- or equal-weighted change in earnings before extraordinary items from years *t* and *t*-1 scaled by the stock price and the book value of equity, respectively, for the firms in portfolio *i*. The aggregate ratio $\Delta X_{i,t}/BE_{i,t-1}$ is defined as the change in the sum of earnings of firms in portfolio *i* divided by the sum of beginning-of-period book value. The data includes December fiscal year-end firms for the period 1965-2000.

Panel A: Value-weighted returns

	$R_{i,t} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$			$R_{i,t-1} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$					
$Y_{i,t}$ =	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$
Number of Portfolios		β_i			β_i			R^2	
4 Digit SIC - 273	0.37	1.15	0.77	0.05	0.46	0.44	0.02	0.02	0.02
3 Digit SIC - 188	0.36	1.18	0.77	0.04	0.54	0.47	0.02	0.02	0.02
2 Digit SIC - 52	0.18	1.54	0.78	0.10	1.11	0.97	0.01	0.03	0.03
MG - 20	0.18	0.66	0.37	0.18	1.88	1.19	0.01	0.04	0.03

Panel B: Equal-weighted returns

	$R_{i,t} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$			$R_{i,t-1} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$					
$Y_{i,t}$ =	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$
Number of Portfolios		β_i			β_i			R^2	
4 Digit SIC - 273	0.62	1.10	0.72	0.02	0.41	0.35	0.02	0.02	0.02
3 Digit SIC - 188	0.64	1.09	0.60	0.01	0.46	0.33	0.02	0.02	0.02
2 Digit SIC - 52	0.58	1.42	0.52	0.00	1.19	0.53	0.01	0.03	0.03
MG - 20	0.33	0.43	0.01	0.24	2.09	1.25	0.01	0.05	0.03

Table 4
Randomly Sorted Portfolios

This table reports the average of 1,000 cross-sectional medians of regression estimates using randomly sorted portfolios. Every year we randomly divide the entire cross-section of stocks (with available relevant data on earnings changes, returns, and lag returns) into a predetermined number of portfolios. The time series of earnings changes and returns of each portfolio are used for estimating regressions, and the median regression estimates across portfolios is recorded. This procedure is repeated 1,000 times for every predetermined number of portfolios, and the average (of the medians) are reported below. The annual return of portfolio *i* at year *t*, $R_{i,t}$, is the value- or equal-weighted cumulative return of firms in the portfolio from April of year *t* until March of year *t*+1 (value weights are based on beginning-of-year market capitalization). The ratios $\Delta X_{i,t}/P_{i,t-1}$ and $\Delta X_{i,t}/BE_{i,t-1}$ denote the value- or equal-weighted change in earnings before extraordinary items from years *t* and *t*-1 scaled by the stock price and the book value of equity, respectively, for the firms in portfolio *i*. The aggregate ratio $\Delta X_{i,t}/BE_{i,t-1}$ is defined as the change in the sum of earnings of firms in portfolio *i* divided by the sum of beginning-of-period book value. The data includes December fiscal year-end firms for the period 1965-2000.

Panel A: Value-weighted returns

	$R_{i,t} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$			$R_{i,t-1} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$					
$Y_{i,t}$ =	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$
Number of Portfolios		β_i			β_i			R^2	
200	0.44	1.05	0.60	0.43	0.51	0.21	0.02	0.02	0.01
150	0.38	0.95	0.56	0.53	0.62	0.27	0.02	0.02	0.01
100	0.27	0.77	0.46	0.70	0.79	0.37	0.02	0.02	0.01
70	0.18	0.61	0.37	0.87	0.97	0.46	0.03	0.02	0.02
60	0.14	0.54	0.33	0.95	1.05	0.50	0.03	0.03	0.02
50	0.10	0.46	0.27	1.06	1.14	0.56	0.03	0.03	0.02
40	0.03	0.34	0.20	1.18	1.28	0.63	0.04	0.03	0.02
30	-0.04	0.17	0.09	1.37	1.45	0.73	0.04	0.04	0.02
20	-0.15	-0.08	-0.08	1.61	1.70	0.86	0.05	0.04	0.03
15	-0.23	-0.28	-0.21	1.78	1.91	0.98	0.06	0.05	0.04
10	-0.32	-0.59	-0.42	1.97	2.23	1.14	0.07	0.06	0.04
5	-0.45	-1.06	-0.77	2.25	2.74	1.47	0.09	0.08	0.06

Panel B: Equal-weighted returns

	$R_{i,t} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$			$R_{i,t-1} = \alpha_i + \beta_i \cdot Y_{i,t} + \varepsilon_{i,t}$					
$Y_{i,t}$ =	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	$\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$
Number of Portfolios		β_i			β_i			R^2	
200	1.11	0.41	0.23	0.60	0.68	0.28	0.02	0.02	0.01
150	1.13	0.27	0.16	0.78	0.85	0.36	0.02	0.02	0.01
100	1.14	0.04	0.04	1.08	1.12	0.50	0.03	0.02	0.02
70	1.13	-0.15	-0.07	1.41	1.41	0.64	0.04	0.03	0.02
60	1.12	-0.21	-0.10	1.52	1.52	0.70	0.05	0.03	0.02
50	1.11	-0.31	-0.16	1.76	1.68	0.78	0.05	0.04	0.02
40	1.10	-0.40	-0.23	2.01	1.87	0.88	0.06	0.04	0.02
30	1.09	-0.51	-0.30	2.34	2.14	1.02	0.08	0.05	0.03
20	1.08	-0.66	-0.40	2.54	2.54	1.24	0.09	0.06	0.04
15	1.06	-0.76	-0.48	3.10	2.85	1.40	0.11	0.06	0.04
10	1.05	-0.90	-0.59	3.47	3.29	1.67	0.12	0.07	0.05
5	1.03	-1.09	-0.75	3.95	4.00	2.11	0.14	0.09	0.06

Table 5
Quarterly Firm-Level Regressions

This table reports summary statistics of firm-level. The quarterly returns of firm *i* at quarter *t*, $R_{i,t}$, is the cumulative return from one month prior to the fiscal-quarter end until two months after the fiscal-quarter end. $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from quarter *t* and *t*-4. The stock price and the book value of equity of firm *i* at the end of the fiscal quarter *t* are denoted $P_{i,t-1}$ and $BE_{i,t-1}$, respectively. The data includes the results of all regressions with at least 40 degrees of freedom (1,869 firms) of December fiscal year-end firms for the period 1970-2000.

$$R_{i,t} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/P_{i,t-1} + \varepsilon_{i,t}$$

	Mean	Std	5%	25%	Median	75%	95%
β_i	1.40	3.01	-1.07	0.13	0.79	1.75	5.62
t-statistic	1.08	1.36	-1.10	0.22	1.02	1.92	3.39
R^2	0.04	0.06	0.00	0.00	0.02	0.05	0.15

$$R_{i,t} = \alpha_i + \beta_i \cdot \Delta X_{i,t}/BE_{i,t-1} + \varepsilon_{i,t}$$

	Mean	Std	5%	25%	Median	75%	95%
β_i	0.90	1.48	-0.70	0.03	0.55	1.42	3.65
t-statistic	0.99	1.34	-1.10	0.11	0.95	1.78	3.27
R^2	0.04	0.05	0.00	0.00	0.02	0.05	0.15

Table 6
Aggregate-Level Quarterly Regressions

This table reports time-series regression results at the aggregate level. The market returns at quarter *t*, $R_{i,t}$, is the cumulative value- or equal-weighted returns from one month prior to the fiscal-quarter end until two months after the fiscal-quarter end (value weights are based on beginning-of-period market capitalization). $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from quarter *t* and *t*-4 for firm *i*. The stock price and the book value of equity of firm *i* at the end of the fiscal quarter *t* are denoted $P_{i,t-1}$ and $BE_{i,t-1}$, respectively. The aggregate ratio $\Delta X_{i,t}/P_{i,t-1}$ is calculated as the value- or equal-weighted cross-sectional average. The aggregate ratio $\Delta X_{i,t}/BE_{i,t-1}$ is defined as the change in the cross-sectional sum of earnings divided by the cross-sectional sum of beginning-of-period book value. The aggregate ratios at time *t* are calculated using only firms with existing relevant data in the previous period. The *t*-statistics are reported in square brackets. The data includes December fiscal year-end firms for the period 1970-2000.

Panel A: Value-weighted returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_t	-4.36 [-3.56]			0.09
R_t		-5.46 [-2.55]		0.05
R_t			-3.44 [-2.40]	0.05
R_{t+1}	-2.44 [-1.92]			0.03
R_{t+1}		-1.75 [-0.80]		0.01
R_{t+1}			-0.96 [-0.65]	0.00

Panel B: Equal-weighted returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_t	-4.89 [-2.72]			0.06
R_t		-6.77 [-2.18]		0.04
R_t			-4.10 [-1.98]	0.03
R_{t+1}	-3.43 [-1.87]			0.03
R_{t+1}		-2.82 [-0.89]		0.01
R_{t+1}			-1.98 [-0.94]	0.01

Table 7
Aggregate-Level Regressions (1965 - 2005)

This table reports time-series regression results at the aggregate level. The annual market returns at year *t*, R_t, is the cumulative value- or equal-weighted returns from April of year *t* until March of year *t*+1 (value weights are based on beginning-of-period market capitalization). $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items in Panel A and operating income (data13 – data14) in Panel B from years *t* and *t*-1 for firm *i*. The stock price and the book value of equity of firm *i* at the end of the fiscal year *t*-1 are denoted $P_{i,t-1}$ and $BE_{i,t-1}$, respectively. The aggregate ratio $\Delta X_{i,t}/P_{i,t-1}$ is calculated as the value- or equal-weighted cross-sectional average. The aggregate ratio $\Delta X_{i,t}/BE_{i,t-1}$ is defined as the change in the cross-sectional sum of earnings before extraordinary items in Panel A and operating income (data13 – data14) in Panel B divided by the cross-sectional sum of beginning-of-period book value. The aggregate ratios at time *t* are calculated using only firms with existing relevant data in the previous period. The *t*-statistics are reported in square brackets. The data includes December fiscal year-end firms for the period 1965-2005.

Panel A: Earnings Before Extraordinary Items

Value-weighted returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_t	-0.15 [-0.13]			0.00
R_t		-0.37 [-0.21]		0.00
R_t			0.15 [0.18]	0.00
R_{t-1}	0.94 [0.87]			0.02
R_{t-1}		2.80 [1.66]		0.07
R_{t-1}			1.07 [1.26]	0.04

Equal-weighted returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_t	0.75 [0.47]			0.01
R_t		0.09 [0.03]		0.00
R_t			0.14 [0.11]	0.00
R_{t-1}	3.02 [1.97]			0.09
R_{t-1}		4.97 [2.05]		0.10
R_{t-1}			2.35 [1.94]	0.09

Panel B: Operating Income

Value-weighted returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_t	-0.77 [-0.83]			0.02
R_t		-1.00 [-0.81]		0.02
R_t			-0.27 [-0.40]	0.00
R_{t-1}	1.74 [1.92]			0.09
R_{t-1}		1.62 [1.33]		0.04
R_{t-1}			0.95 [1.43]	0.05

Equal-weighted returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_t	-0.31 [-0.22]			0.00
R_t		-0.93 [-0.51]		0.01
R_t			-0.49 [-0.50]	0.01
R_{t-1}	3.25 [2.55]			0.14
R_{t-1}		2.47 [1.39]		0.05
R_{t-1}			1.79 [1.88]	0.08

Table 8
Regression of Returns on Laggted Earnings (Aggregate Level)

This table reports time-series regression results at the aggregate level. The annual market returns at year *t*, R_t, is the cumulative value- or equal-weighted returns from April of year *t* until March of year *t*+1 (value weights are based on beginning-of-period market capitalization). $\Delta X_{i,t}$ denotes the change in earnings before extraordinary items from years *t* and *t*-1 for firm *i*. The stock price and the book value of equity of firm *i* at the end of the fiscal year *t*-1 are denoted $P_{i,t-1}$ and $BE_{i,t-1}$, respectively. The aggregate ratio $\Delta X_{i,t}/P_{i,t-1}$ is calculated as the value- or equal-weighted cross-sectional average. The aggregate ratio $\Delta X_{i,t}/BE_{i,t-1}$ is defined as the change in the cross-sectional sum of earnings divided by the cross-sectional sum of beginning-of-period book value. The aggregate ratios at time *t* are calculated using only firms with existing relevant data in the previous period. The *t*-statistics are reported in square brackets. The data includes December fiscal year-end firms for the period 1965-2000.

Panel A: Value-Weighted Returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_{t+1}	-1.524 [-1.18]			0.039
R_{t+1}		0.350 [0.19]		0.001
R_{t+1}			-0.020 [-0.02]	0.000

Panel B: Equal-Weighted Returns

Dependent variable	Independent variables: $\Delta X_{i,t}/P_{i,t-1}$ [equal-weighted]	$\Delta X_{i,t}/P_{i,t-1}$ [value-weighted]	$\Delta X_{i,t}/BE_{i,t-1}$	R^2
R_{t+1}	-1.143 [-0.59]			0.010
R_{t+1}		-0.664 [-0.25]		0.002
R_{t+1}			-0.982 [-0.58]	0.010

Table 9

Predicting Earnings and Returns with the Dividend-Price and Consumption-to-Wealth Ratios

This table reports time-series regression results at the aggregate level. The annual market returns at year t, $r_{t \to t+j}$, is the log cumulative value-weighted returns from April of year t until March of year $t+j$ (value weights are based on beginning-of-period market capitalization). The sample includes all firms in the CRSP and COMPUSTAT annual databases during the period 1950-2000 with December fiscal year-end (note that since we use five-year-ahead earnings growth the effective sample is until 1995). The variable $d\text{-}p_t$ is the dividend-price ratio (value-weighted) at time t. The variable cay_t is the consumption-to-wealth ratio at time t used in Lettau and Ludvigson (2001). Standard errors are Newey-West corrected using 4 lags (t-statistics are reported in square brackets). Panels A and B report time-series regressions at the aggregate level. Panel C uses the fitted values of regression models for expected returns and the expected earnings growth based on lagged earnings, lagged returns, $d\text{-}p_t$, cay_t, and lagged real GNP growth.

Panel A: The Dividend-Price Ratio

Independent Variable	Dependent Variable			
	$r_{t \to t+1}$	$r_{t \to t+5}$	$(x_{t+1} - x_t)$	$(x_{t+5} - x_t)$
$d\text{-}p_t$	0.18	0.58	-0.16	-0.41
	[2.45]	[2.20]	[-2.68]	[-2.52]
R^2	0.12	0.29	0.10	0.18

Panel B: The Dividend-Price Ratio and the Consumption-to-Wealth Ratio

Independent Variables	Dependent Variable			
	$r_{t \to t+1}$	$r_{t \to t+5}$	$(x_{t+1} - x_t)$	$(x_{t+5} - x_t)$
$d\text{-}p_t$	0.14	0.51	-0.15	-0.43
	[2.35]	[2.67]	[-2.45]	[-2.53]
cay_t	5.74	11.34	-0.82	3.69
	[5.01]	[3.18]	[-0.50]	[1.35]
R^2	0.38	0.52	0.10	0.21

Panel C: The Relation between Fitted Earnings and Stock Returns

Independent Variables	Dependent Variable			
	R_t	R_t	$E_{t-1}(R_t)$	$E_{t-1}(R_t)$
X_t/X_{t-1}	-0.33		-0.21	
	[-2.19]		[-2.21]	
$E_{t-1}(X_t/X_{t-1})$		-0.52		-0.52
		[-2.17]		[-3.77]
R^2	0.10	0.10	0.10	0.25