Bringing the Future Forward: The Effect of Disclosure on the Returns-Earnings Relation

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ABSTRACT

This paper studies how firm disclosure activity affects the relation between current annual stock returns, contemporaneous annual earnings and future earnings. Our results show that firms with relatively more informative disclosures “bring the future forward” so that current returns reflect more future earnings news. We also find that changes in disclosure activity are positively related to changes in the importance of future earnings news for current returns. These results suggest that a firm’s disclosure activity reveals credible, relevant information not in current earnings, and that this information is incorporated into the current stock price.

1. Introduction

In this paper we examine how a firm’s disclosures affect the mix of earnings information reflected in its annual stock return. The return over the year is partly due to the unexpected portion of the current year’s earnings realization and partly due to changes in expectations about future earnings. We hypothesize that a firm’s disclosure activity can “bring the future forward”...
forward” by revealing information in the current period that changes expectations about future earnings. By revealing this information, a firm changes the mix of current versus future information that is reflected in the current stock return.

We find a significant positive relation between a firm’s disclosure activity, as measured by the AIMR ratings of corporate disclosures, and the amount of future earnings news reflected in the current annual return. We also find that changes in a firm’s disclosure activity are positively related to changes in the amount of future earnings news reflected in current returns. In particular, the incremental $R^2$ contributed by future earnings news increases for firms that increase their disclosure and decreases for firms that decrease their disclosure. Thus, in both cross-sectional tests and in time-series tests we find that increased disclosure activity “brings the future forward” into current stock returns.

We also examine how disclosure activity affects the relation between current earnings and current returns (given future earnings news). Contrary to our expectations, we find no decline in the relevance of current earnings as disclosure activity reveals more future earnings news. We do find, however, that the prior year’s earnings is a relevant benchmark for firms with low levels of disclosure but not for firms with high levels of disclosure.

Our finding that disclosure activity brings future earnings news forward into current returns remains significant after controlling for a number of factors known to influence the earnings response coefficient in a simple regression of returns on current earnings. Further, we show that the relation between disclosure activity and the importance of future earnings news is strongest in industries with relatively longer accounting recognition lags. Since it is likely that the amount of future earnings news that can be conveyed by firm disclosures is greater in industries with longer accounting recognition lags, these findings further corroborate our main results. Finally, we show that our time-series results are not caused by pre-existing differences between disclosure increasers and disclosure decreasers, nor are they caused by a temporary change in the firm’s disclosure activity.

Accounting earnings has recently become the focus of much attention. Practitioners argue that, while historical accounting may have worked well in the industrial era, it does not provide useful measures in the new information economy (Elliott and Jacobson [1991], Jenkins [1994], and Rimerman [1990]). Accounting academics cite as evidence a declining relation between annual stock returns and contemporaneous annual earnings (see, for example, Lev and Zarowin [1999]). But, if current earnings has lost some of its relevance, it is possible that firms have compensated by increasing their disclosure activity.\(^1\) If such an increase in disclosure has occurred,

\(^1\)While we do not have an economy-wide measure of voluntary disclosure, there is anecdotal evidence that firms’ disclosure activity has generally increased over time. For example, in 1969 the National Investor Relations Institute was established as a professional association for investor relations professionals with a first-year membership of 110. Its current membership
then our results suggest that disclosure is not just window-dressing, but that it reveals value-relevant information. To the extent that the relevance of current earnings is declining, it is possible that a corresponding increase in disclosure activity is filling the gap by revealing information about future earnings.

This paper proceeds as follows. In section 2, we describe the relation to prior literature. Section 3 presents a description of our hypotheses and tests, and section 4 describes our data. Our cross-sectional results and time-series results are described in sections 5 and 6, respectively. Section 7 presents our specification checks and we conclude in section 8.

2. Relation to Prior Literature

Our approach to measuring the mix of current and future earnings news in current returns follows the work of Collins, Kothari, Shanken, and Sloan [1994] and Warfield and Wild [1992]. Based on the observation that accounting recognition generally lags stock returns in measuring value creation, these papers add future years’ earnings into the regression of current annual returns on current annual earnings. Collins et al. [1994] note that this addition increases the explanatory power of the regression three to six times as compared to a regression of returns on current earnings alone. They conclude that it is the accounting system’s lack of timeliness, rather than random noise, that gives rise to the low association between returns and contemporaneous earnings. Warfield and Wild [1992] also examine the relation between returns, contemporaneous earnings and future earnings, conditioning on the length of the reporting period and on the severity of the industry’s accounting recognition lag. They find that the importance of future earnings in the returns-earnings relation increases as the reporting period shortens, or as the accounting recognition rules for the industry become less timely. We add to this literature by studying how the level of firm disclosure activity affects the explanatory power of future earnings in the returns-earnings regression generally, and how the strength of this relation varies over industries with different accounting recognition lags.2

Healy, Hutton, and Palepu [1999] examine how large increases in disclosure activity affect market participants. They find, among other things, that firms with large increases in disclosure activity also experience an increase in the coefficient on current earnings in a regression of current annual returns on current annual earnings. Note, however, that without future earnings in the regression, the coefficient on current earnings must capture

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stands at 4,500 and has been growing by more than 10 percent annually for the past three years (National Investor Relations Institute [1999]). Further, a recent survey conducted by the Association for Investment Management and Research (AIMR) revealed that 69 percent of investment professionals believe that the overall quality of financial or corporate information disclosed by most publicly-traded companies has improved in recent years (AIMR [2000]).

2 In concurrent work, Gelb and Zarowin [2000] also study the relation between disclosure activity and the degree to which future earnings news is reflected in current stock returns.
changing expectations about future earnings (e.g., higher expected future earnings growth will result in a larger coefficient). In contrast to their work, we include a proxy for changing expectations about future earnings in the returns regression and study how disclosure activity reveals this information to the market. We find that once a proxy for revealed future earnings news is included in the regression, the coefficient on current earnings no longer varies with disclosure activity.

Francis, Schipper, and Vincent [1999] investigate the relevance of earnings versus analyst reports for returns within the fiscal year. For a subset of the data they also examine the association between the market reactions to management disclosures and to earnings announcements, and find some evidence that management disclosures and earnings announcements have become substitutes in recent years. While their results are generally consistent with our findings, note that they find that disclosure reduces the impact of earnings within the fiscal year, whereas in our research design firm disclosure activity matters only if it changes expectations about future years’ earnings.3

Miller and Piotroski [2000] study the disclosure activity of high book-to-market firms experiencing a turnaround in the stock market. They find that when these firms include forward-looking statements in their quarterly earnings announcements, the announcement-period returns are more highly associated with the next quarter’s earnings information. This result is basically a within-the-year version of our findings; disclosure activity brings next quarter’s earnings news into the current earnings announcement period.

3. Hypotheses and Tests

We begin by characterizing the current annual stock return as the sum of three components:

\[ R_t = \beta_0 + \beta_1 UX_t + \sum_{i=1}^{\infty} \beta_{2i} \Delta E_i(X_{t+i}) + \varepsilon_t, \]

where

- \( R_t \) is the annual stock return,
- \( UX_t \) is the unexpected earnings for the period, defined as the annual earnings \( X_t \) less the prior period’s expectation \( E_{t-1}(X_t) \),
- \( \Delta E_i(X_{t+i}) \) is the change in expectations between time \( t-1 \) and time \( t \) about future earnings in year \( t+i \), and
- \( \varepsilon_t \) is random noise, unrelated to current or future earnings.

In words, the current return is determined by unexpected current earnings, the cumulative change in expectations about future earnings and noise. To

3 Similarly, Kross and Kim [1999] and Landsman and Maydew [2001] examine how the reaction to earnings news within the fiscal year has changed over time. Their tests are based on volume and stock market reactions during short windows around earnings announcements.
gain some intuition for this decomposition of returns, consider a firm with a two-period life and a discount rate of zero. Denote book value by $BV_t$, earnings by $X_t$ and net dividends by $D_t$. Using the residual income valuation model (see Ohlson [1995]), price at time 0 and time 1 can be expressed as

$$P_0 = BV_0 + E_0(X_1) + E_0(X_2) \quad \text{and} \quad P_1 = BV_1 + E_1(X_2).$$

Assuming a clean surplus accounting system, we can substitute $BV_0 + X_1 - D_1$ for $BV_1$, to get

$$P_1 = BV_0 + X_1 - D_1 + E_1(X_2).$$

With this we can calculate

$$P_1 + D_1 - P_0 = X_1 - E_0(X_1) + E_1(X_2) - E_0(X_2), \quad \text{or}$$

$$P_1 + D_1 - P_0 = UX_1 + \Delta E_1(X_2). \quad (2)$$

If we scale all variables by $P_0$, the left hand side of (2) is equal to the annual return and the right hand side is the sum of the unexpected earnings for year 1 and the change in expectations during year 1 about earnings in year 2, both scaled by $P_0$ (as in our regressions). The regression coefficients ($\beta_1$ and $\beta_2$) in the more general model in (1) allow for many complications not present in the simple example shown in (2), such as time value, risk, and the precision of the proxies used to measure unexpected current earnings and changes in expected future earnings.

Because the independent variables in (1) are not directly observable, we proxy for $UX_t$ using the level of $X_t$ and $X_{t-1}$. By including the past year’s earnings we allow the regression to find the best representation of the prior expectation for current earnings: if the coefficient on $X_{t-1}$ is of similar magnitude but opposite sign as the coefficient on $X_t$ then earnings is being treated by the market as if it follows a random walk; if the coefficient on $X_{t-1}$ is approximately zero then earnings is being treated as a white noise process. We do not use analyst forecast errors because analyst forecasts are affected by firms’ disclosures, along with other sources of information, and would therefore misrepresent the information content of current earnings itself. For the same reason, the value-relevance literature has also used only current and past earnings as its proxy for $UX_t$ (see, for example, Francis and Schipper [1999] and Lev and Zarowin [1999]).

The proxy for changes in expected future earnings, $\Delta E_t(X_{t+i})$, is central to this paper. Beaver, Lambert, and Morse [1980] and Warfield and Wild [1992] proxy for $\Delta E_t(X_{t+i})$ with realized future earnings, but realized future earnings has expected and unexpected components, so this proxy contains measurement error. Collins et al. [1994] control for the unexpected component of future earnings with future returns. The idea behind this is that an unexpected shock to future earnings is measurement error when using the realized future earnings to proxy for expected future earnings at year $t$. That is, $E_t(X_{t+i}) = X_{t+i} + UE_{t+i}(X_{t+i})$, where $UE_{t+i}(X_{t+i})$ is the unexpected component of future earnings, which is measurement error when using the realized $X_{t+i}$ to proxy for $E_t(X_{t+i})$. Since an unexpected shock to future earnings should also generate future returns, $R_{t+i}$ controls for this
measurement error. Thus, including both \(X_{t+i}\) and \(R_{t+i}\) together allows us to isolate expected future earnings at year \(t\). Further, future returns should be uncorrelated with current returns in a regression excluding future earnings and should be negatively correlated with current returns in a regression including future earnings.\(^4\) We show later that this is the case. Finally, since we are attempting to measure the change in expectations of future earnings, we need a proxy for the prior belief: \(E_{t-1}(X_{t+i})\). We rely on \(X_{t-1}\) and \(X_t\), which are already in the regression, to capture this information.\(^5\)

In addition to using future earnings and future returns, we measure \(\Delta E_t(X_{t+i})\) in another way. We hypothesize that a significant source of changing expectations about a firm’s future performance is disclosure activity by the firm itself. If a firm reveals news relevant to its future earnings through its disclosure activity, then realized future earnings will be reflected in current returns, although still with some measurement error. In this case, the coefficient on future earnings will be positive in the returns regression. On the other hand, if a firm does not disclose its news about future earnings, then the news will not be revealed to the market, so the coefficient on future earnings will be closer to zero. In short, high levels of disclosure activity “bring the future forward” by revealing relevant news about future earnings while low levels of disclosure do not. This implies that there is an interaction effect between future earnings and the level of a firm’s disclosure activity. We label this interaction term “revealed future earnings.” This leads to our first hypothesis.

H1: Current returns are increasing in “revealed future earnings,” as measured by the interaction between the level of disclosure and the realized future earnings.

We test this hypothesis with variations on the following regression:

\[
R_t = b_0 + b_1 X_{t-1} + b_2 X_t + \sum_{i=1}^3 (b_{3i} X_{t+i} + b_{4i} R_{t+i}) + b_5 D_t \\
+ b_6 D_t \ast X_t + b_7 D_t \ast X_{t-1} + \sum_{i=1}^3 (b_{8i} D_t \ast X_{t+i} + b_{9i} D_t \ast R_{t+i}) + \varepsilon_t
\]

\(^4\) Collins et al. [1994] also include the prior year’s earnings/price ratio and the growth in book value of assets in their firm-level regressions as proxies for the expected \(X_t\) at time \(t - 1\) and for the expected future earnings at time \(t\). Since these controls are intended to effect both the proxy for \(UX_t\) and for \(\Delta E_t(X_{t+i})\), we exclude them.

\(^5\) Collins et al. [1994] use changes in future earnings and Warfield and Wild [1992] use the level of future earnings to proxy for the change in expected future earnings. The former implies a prior expectation that earnings follow a random walk process and the latter implies an expectation that earnings follow a white noise process. By using the level of earnings in the past, current and future years, our regression model allows either of these as a special case of a more general autoregressive expectation model. Further, it is equivalent to using the level of past earnings and the change in current and future earnings; the regression has the same information in either case. We thank Richard Sloan for this suggestion.
where

\( R_t \) is the buy-and-hold return for year \( t \), measured over the 12-month period ending three months after the firm’s fiscal year-end,

\( X_t \) is income available to common shareholders before extraordinary items in year \( t \); all current and future \( X_t \) are deflated by market value of equity three months after the year \( t-1 \) fiscal year-end (i.e., at the start of the returns measurement period), and

\( D_t \) is the AIMR rating of the firm’s disclosure activity for the fiscal year \( t \), expressed as a percentile within the firm’s industry (detailed discussion of this measure appears in section 4).

We use only three years of future earnings and returns because prior research has shown that amounts further out in time add little explanatory power (Collins et al. [1994]).\(^6\) Consistent with prior literature, we expect the coefficient on \( X_{t-1} \) to be negative and the coefficient on \( X_t \) to be positive, reflecting the mean-reverting nature of earnings. We also expect the coefficients on the \( X_{t+i} \)’s to be positive, and the coefficients on the \( R_{t+i} \)’s to be negative. The second line of (3) interacts the variables in the first line with the disclosure measure \( D_t \). Hypothesis 1 predicts that the coefficients on \( D_t \times X_{t+i} \) (revealed future earnings) will be positive. We have no prediction for the coefficient on \( D_t \) itself, but we include it in the regression because it is part of the interaction terms \( D_t \times X_{t+i} \); if we excluded \( D_t \), the interaction terms could inadvertently proxy for the level of disclosure. Similarly, we have no predictions for the coefficients on \( D_t \times R_{t+i} \). However, since \( X_{t+i} \) and \( R_{t+i} \) together measure the change in expectations about future earnings, it seems reasonable that both sets of variables should be interacted with \( D_t \) to proxy for the revelation of future earnings news through disclosure. Finally, note that \( D_t \times X_{t+i} \) proxies for the future earnings news that is revealed by the firm’s disclosures, whereas \( X_{t+i} \) and \( R_{t+i} \) proxy for all future earnings news, regardless of the source.

There are 17 independent variables in (3). In the interest of parsimony, especially because we add further controls and interactions to the model, we also estimate a condensed version of the same model. In particular, we define

\( X3_t \) as the sum of income available to common shareholders before extraordinary items for the three years following year \( t \), all deflated by market value of equity three months after the \( t-1 \) fiscal year-end (i.e., at the start of the returns measurement period), and

\( R3_t \) as the buy-and-hold return for the three-year period following year \( t \), starting three months after the year \( t \) fiscal year-end,

\(^6\) As a specification check we added years \( t+4 \) and \( t+5 \) where data was available and re-estimated the regressions. The significance of these additional years is weak and the coefficient estimates are much lower than the estimates on years \( t+1 \) through \( t+3 \). Further, the results with respect to disclosure are not significantly altered.
and estimate

\[ R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_3t + b_4 R3t + b_5 Dt \\
+ b_6 Dt \ast X_{t-1} + b_7 Dt \ast X_t + b_8 Dt \ast X_3t + b_9 Dt \ast R3t + \epsilon_t \]  

(4)

By combining three years of data into one aggregate variable we effectively
force each year to have the same coefficient estimate, but we eliminate eight
variables from the regression. As we show later, the reduced model in (4)
yields very similar conclusions to the more detailed model in (3), so we use
it as the primary model in our analyses that follow.

Our second hypothesis focuses on how disclosure can affect the impor-
tance of current earnings news. If increases in disclosure activity cause re-
turns to depend more heavily on future earnings news, current earnings
news might become less relevant. That is, for firms with relatively poor dis-
losure practices, current earnings may appear to be value-relevant because
current earnings proxies for changes in expectations about future earn-
ings, but for firms with relatively good disclosure practices, future earnings
news may be revealed directly so that this news is impounded directly into
current returns. Thus, disclosure may cause a substitution away from cur-
rent earnings and toward future earnings. Our second hypothesis captures
this idea.

H2: Current returns are increasing in current earnings, but at a decreas-
ing rate as disclosure increases.

We test this hypothesis with the interaction term \( D_t \ast X_t \) in (4) and by testing
the joint signiﬁcance of \( D_t \ast X_{t-1} \) and \( D_t \ast X_t \). Note that even if H1 is true,
H2 may be false—it is possible that as disclosure increases, returns reﬂect
more future earnings news but no less current earnings news.

Our last hypothesis relates to changes in the returns-future earnings re-
lation due to changes in disclosure activity. If the level of disclosure activity
inﬂuences the degree to which future earnings are reﬂected in current re-
turns, then the amount of variation in current returns that is due to future
earnings news should also be increasing in the level of disclosure.

Using (1), the variation in returns can be expressed as

\[
Var(R_t) = Var(\beta_1 UX_t) + 2 Cov(\beta_1 UX_t, \sum \beta_2i \Delta E_t(X_{t+i})) \\
+ Var(\sum \beta_2i \Delta E_t(X_{t+i})) + Var(\epsilon_t). 
\]

(5)

Variation in \( UX_t \) explains variation in \( R_t \) directly through the first term
in (5) and indirectly through its relation with \( \Delta E_t(X_{t+i}) \), as shown in the
second term. The incremental variation in returns due to future earnings
news appears in the third term, \( Var(\sum \beta_2i \Delta E_t(X_{t+i})) \). If increased disclosure
activity reveals information about future earnings news then it will increase
the variation in the third term. This leads to our third hypothesis.
H3: Changes in firm disclosure activity are positively related to changes in the proportion of variation in current returns caused by the variation in expected future earnings.

To measure the different sources of variation in returns, we decompose the variation in \( R_t \) in the following regression:

\[
R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_3t + b_4 R3t + \varepsilon_t, \tag{6}
\]

where the variables are as defined previously. As discussed earlier, the first two independent variables measure \( UX_t \) and the second two independent variables measure \( \Delta E_t(X_{t+i}) \). The decomposed sum of squares from this regression is

\[
SSTO = SSR(X_{t-1}, X_t) + SSR(X3_t, R3t | X_{t-1}, X_t) + SSE(X_{t-1}, X_t, X3_t, R3t), \tag{7}
\]

where

- \( SSTO \) is the total variation in \( R_t \) and corresponds to \( \text{Var}(R_t) \),
- \( SSR(X_{t-1}, X_t) \) is the variation in \( R_t \) explained by \( X_{t-1} \) and \( X_t \) and corresponds to \( \text{Var}(\beta_1 UX_t) + 2 \text{Cov}(\beta_1 UX_t, \sum \beta_2i \Delta E_t(X_{t+i})) \),
- \( SSR(X3_t, R3t | X_{t-1}, X_t) \) is the variation in \( R_t \) explained by \( X3_t \) and \( R3t \) after controlling for \( X_{t-1} \) and \( X_t \), and corresponds to \( \text{Var}(\sum \beta_2i \Delta E_t(X_{t+i})) \), and
- \( SSE(X_{t-1}, X_t, X3_t, R3t) \) is the remaining unexplained variation in \( R_t \) and corresponds to \( \text{Var}(\varepsilon_t) \).

The unadjusted \( R^2 \) from the regression in (6) can then be decomposed as follows:

\[
\frac{SSR(X3_t, R3t, X_{t-1}, X_t)}{SSTO} = \frac{SSR(X_{t-1}, X_t)}{SSTO} + \frac{SSR(X3_t, R3t | X_{t-1}, X_t)}{SSTO}, \quad \text{or}
\]

full model \( R^2 = \text{current earnings } R^2 + \text{incremental } R^2 \text{ due to future earnings.} \)

The current earnings \( R^2 \) is the unadjusted \( R^2 \) from the regression

\[
R_t = b_0 + b_1 X_{t-1} + b_2 X_t + \varepsilon_t. \tag{8}
\]

The incremental \( R^2 \) is the difference between the full model \( R^2 \) and the current earnings \( R^2 \); it measures the incremental contribution to the full model \( R^2 \) that comes from adding \( X3_t \) and \( R3t \) to the regression in (8). Hypothesis 3 predicts that the incremental \( R^2 \) increases as a firm’s disclosure activity increases and decreases as a firm’s disclosure activity decreases.

To examine this hypothesis, we select the first year and the last year that a firm is in our AIMR disclosure dataset. Lev and Zarowin [1999] document
numerous short-term deviations from the general downward trend in the relation between current returns and current earnings, so we measure the effect of changes in disclosure activity over the largest possible time span given our data. The average length of time between the first year and last year is approximately seven years. We then sort the firms into “disclosure increasers” and “disclosure decreasers” based on the change in their ranking relative to other firms in their industry. For these two subsamples, we estimate the incremental $R^2$ (as previously described) in the first year and in the last year. If firm disclosures are bringing the future earnings information forward into current returns, then this measure should increase for the disclosure increasers. Making a prediction for the disclosure decreasers is more difficult, however. While the disclosure activity of this subsample has deteriorated relative to their industry peers, if there has been an economy-wide increase in disclosure then the incremental $R^2$ could increase for this group as well. Therefore, to control for an economy-wide change in disclosure activity, we predict that the change in the incremental $R^2$ for the increaser subsample will be greater than the change in the incremental $R^2$ for the decreaser subsample.

4. The Data

Our proxy for the informativeness of a firm’s disclosure is based on ratings published in the Report of the Association for Investment Management and Research (AIMR) for the years 1980 to 1994, inclusive. Briefly, committees of analysts, organized by industry, consider the quality of a firm’s annual published information, quarterly and other published information, and investor relations in assigning these ratings. The result is a ranking of disclosure activity in the industry for that year. Because the number of firms varies by industry, we convert the AIMR rankings to percentiles: $(\text{rank} - 1)/(\text{number of firms in the industry} - 1)$. This yields the percentile of a firm’s rank within its industry-year, where the percentiles range from 0 (for the lowest-ranking firm) to 1 (for the highest-ranking firm). Because the AIMR data is constructed as a within industry-year comparison of firms’ disclosure quality, it does not measure trends in disclosure quality over time, nor is it likely to be affected by changes in mandatory disclosure requirements. We can,

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7 These ratings have been used as a measure of a firm’s voluntary disclosure activity in a number of studies, including Botosan [1997], Botosan and Plumlee [2002], Bushee and Noe [2000], Healy et al. [1999], Lang and Lundholm [1993, 1996], Sengupta [1998], and Welker [1995]. Furthermore, Lang and Lundholm [1996] show that the AIMR scores are positively associated with analyst forecast accuracy and negatively related to analyst forecast dispersion, suggesting that the scores represent disclosure activity that conveys useful information. Finally, Botosan [1997] shows that the AIMR scores are significantly correlated with an independently-constructed measure of the informativeness of annual report disclosures.

8 While we view the AIMR score as predominantly measuring a firm’s voluntary disclosure choices, a mandatory change in disclosure requirements may affect an individual firm’s AIMR score if, for example, a firm had poor voluntary disclosure on some dimension and the mandatory change made all firms equal on this dimension.
however, use a firm’s change in ranking to measure the change in its relative disclosure quality over time.

To gain some intuition for the disclosure activities characterized by a high or increasing AIMR score, consider the results in table 3 of Healy et al. [1999]. In an examination of 85 firms that experienced a large increase in their AIMR rating between 1980 and 1990, they find that the most frequent reasons for the improvement are i) improved segment reporting in the annual and quarterly financial statements, ii) improved discussion of operating results, and iii) improved frequency and quality of analyst meetings. Some specific examples of disclosure increases taken from our sample are as follows. The AIMR Electrical Equipment subcommittee increased Whirlpool’s ranking from 7th (out of 11) in 1991 to 3rd (out of 13) in 1994. The subcommittee noted

“Whirlpool’s investor communications program has steadily improved and is now one of the best in the industry. The annual report provided significant industry and company discussions, especially relating to international markets. The company’s quarterly earnings conference calls included a candid dialogue with top management.”

The 1994–1995 AIMR Report for the Paper and Forest Products subcommittee noted the measurable improvement in the ranking of Willamette Industries, moving from 9th in 1992 (out of 25) to 2nd in 1994 (out of 27). In its discussion of the annual report comparisons, the subcommittee wrote

“Given the rapid escalation in key cost elements—specifically wastepaper, pulp, and virgin fiber—the industry is criticized for offering only limited discussion of its exposure to these important cost items. . . . and Willamette are commended for addressing these concerns.”

Finally, Sears moved from 12th (out of 25) up to 2nd (out of 26) between 1991 and 1994. The AIMR Retail subcommittee noted this improvement

“reflects the outstanding job the company has done in explaining its continuing strategy to restructure merchandise operations and spin off its ownership in Allstate Insurance Company.”

Insofar as some disclosures considered by the analysts constructing the AIMR data are about events that will affect the current year’s earnings while other disclosures are relevant to earnings in the future, this proxy measures the disclosure quality of both. Note, however, that disclosure activity that merely preempts earnings news within the current fiscal year will have no effect on the relation between annual returns and contemporaneous annual earnings. In our study, the AIMR ranking is used as a measure of the disclosures relevant to future years’ earnings; variation in the measure that is due to disclosures about the current year’s earnings is noise for our purposes.

While a long-range management earnings forecast is an obvious type of disclosure that corresponds to our notion of “revealed future earnings,”

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9 For a more detailed discussion of the AIMR scores, see Lang and Lundholm [1993, 1996] and Healy et al. [1999].
many other types of disclosures also fit this construct. For example, a firm could provide disclosures about its investment plans, which could change investor expectations about future earnings, and the AIMR analyst committee could award the firm with a high disclosure ranking in the year because of these disclosures. Similarly, disclosing plans for a new product line, for closing a plant or for refinancing debt are all examples of disclosures that are relevant to future earnings, and that are likely to be considered by the AIMR analysts in their report. While an alternative measure of disclosure would be the presence or absence of a management earnings forecast, we chose not to use this measure because earnings forecasts comprise an extremely small portion of the value-relevant disclosures provided by firms over the course of a year.\footnote{For example, in a study of the disclosure activity of small firms around seasoned equity offerings, Lang and Lundholm [2000] find an average of 13 separate published disclosures per firm-year, but only .5 of these are long-term forward-looking statements. Further, note that the AIMR ratings are probably a poor measure of management earnings forecasts since there is no mention of them in the documentation of the AIMR scoring system and the AIMR has opposed any requirement that management forecast earnings (AIMR [1993]). Nonetheless, Bamber and Cheon [1998] find that firms providing a point estimate management earnings forecasts are rated significantly higher in the AIMR data than are firms that provide only a range, open-ended, or qualitative estimate.}

We calculate stock returns using data from the Center for Research in Security Prices (CRSP). Returns for firm $i$ at time $t$ ($R_t$) are the buy-and-hold returns for the 12-month period starting three months after the firm’s prior fiscal year-end. We incorporate the three month lag to ensure that the financial statements have been released in the current year. Future returns ($R_{3t}$) are the buy-and-hold returns for the three-year period, starting three months after the firm’s current fiscal year-end. As such, the future returns window does not overlap with the current returns window.

We collect annual financial statement data from Compustat. We define earnings ($X_t$) as income before extraordinary items available to common (annual data item 237) in year $t$. We scale earnings in all periods by the market value of equity three months after the year $t−1$ fiscal year-end (i.e., at the start of the returns measurement period). We calculate the market value of equity as the closing price times the number of shares outstanding at this date using data from CRSP.

Our potential sample (4530 firm-years) is comprised of all firms with AIMR ratings from 1980 to 1994, inclusive, for which we could find CRSP and Compustat data. We sequentially delete observations with absolute earnings or a change in earnings greater than the market value of equity (42 observations), observations with future earnings greater than 300 percent of market value (3 observations) and special items greater than 50 percent of market value (7 observations). This yields a final sample of 4478 firm-years representing 724 firms in 33 industries.

Table 1 presents summary statistics for our sample. The median annual stock return is 13.1 percent and the median earnings/market value is
This table presents descriptive statistics for the raw data (i.e., returns and earnings are not industry-adjusted). Current returns ($R_t$) for year $t$ are the buy-and-hold returns for the 12-month period starting three months after year $t - 1$ fiscal year-end. Current earnings ($X_t$) for year $t$ is income before extraordinary items—available to common, scaled by market value three months after year $t - 1$ fiscal year-end. Future earnings ($X_{3t}$) is the sum of income before extraordinary items—available to common for the three years following the current year (i.e., for years $t + 1$, $t + 2$ and $t + 3$). Market value (closing price x the number of shares outstanding) is measured three months after year $t - 1$ fiscal year-end. Future returns ($R_{3t}$) are the buy-and-hold returns for the three-year period following the current year (i.e., starting three months after the current fiscal year-end). Disclosure ranking ($D_t$) is calculated by converting the firm’s annual AIMR industry ranking to a percentile as follows: $D_t = (\text{rank} - 1)/(\text{number of firms in the industry} - 1)$.

7.9 percent. Median future earnings and returns are roughly three times the median current earnings and returns, so structural changes in these variables over the sample time period are not evident. The median firm is rather large, with $1.3$ billion in market value, as compared to a median of only $81$ million for the entire Compustat and CRSP population over the same time period. Thus, our results may not generalize to a broader sample. There is, however, considerable variation in the size of our sample firms, with a market value of $494$ million for the first quartile and more than $3$ billion for the third quartile. Thus, our findings are not based only on extremely large firms.\(^{11}\)

We conduct our analysis both on raw levels of earnings and returns and on industry-adjusted values, where the industry composition is as given in the AIMR report. A case can be made for each. Insofar as earnings and returns are both measures of firm performance, it is natural to associate a firm’s raw earnings with its raw returns in a study of value-relevance, as done in Warfield and Wild [1992] and Lev and Zarowin [1999]. However, the AIMR data measures a firm’s disclosure activity relative to other firms in its industry. Therefore, to provide a consistent measure of the impact of disclosure on the value-relevance of earnings, we industry-adjust the returns and earnings variables. The industry-adjusted variables subtract from each earnings variable and each return variable the industry average for that variable in the corresponding year.

Table 2 presents Pearson correlations for the raw variables (shown above the diagonal) and for the industry-adjusted variables (shown below the diagonal). As expected, the correlations between the current returns and the earnings variables are generally significantly positive, for both the raw and

\(^{11}\) Surprisingly, our sample is slightly younger than the population, with a median age of 8 years as compared to 9 years for the entire population over the same time period.
5. Cross-sectional Results

Table 3 provides regression estimates for variations of equation (3), where each year of future earnings and future returns enters the regression separately. We defer the interpretation of individual coefficient estimates until Table 4, where we estimate the simplified version of the model given in equation (4).

Model 1 in Table 3 provides a benchmark for the later results. For both the raw and industry-adjusted data, current returns are significantly increasing in all three years of future earnings and significantly decreasing in at least two of the three years of future returns. The positive coefficients on future earnings demonstrate that future earnings news is impounded in current earnings. Further, consistent with prior disclosure research, the disclosure measure $D_t$ is significantly positively related to current returns and the earnings variables, suggesting that firms with better news disclose more actively (see Lang and Lundholm [1993]). Finally, the future returns measure $(R_3)$ is not significantly correlated with the current returns but is significantly correlated with future earnings $(X_{3t})$, consistent with Collins et al. [1994]. Therefore, future returns should not influence the regression results except through their role as a proxy for the measurement error in future earnings.
TABLE 3
Regressions of Current Returns on Disaggregated Current and Future Earnings
and Interactions with Disclosure

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Industry-Adjusted Data</th>
<th>Raw Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>Intercept</td>
<td>−0.0017</td>
<td>−0.0104</td>
</tr>
<tr>
<td></td>
<td>(0.5921)</td>
<td>(0.1381)</td>
</tr>
<tr>
<td>$X_{t-1}$</td>
<td>−0.6295</td>
<td>−0.8224</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$X_{i}$</td>
<td>0.6049</td>
<td>0.5848</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$X_{t+1}$</td>
<td>0.5117</td>
<td>0.3724</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$X_{t+2}$</td>
<td>0.3683</td>
<td>0.4494</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$X_{t+3}$</td>
<td>0.3041</td>
<td>0.2147</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0003)</td>
</tr>
<tr>
<td>$R_{i+1}$</td>
<td>−0.1305</td>
<td>−0.1835</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$R_{i+2}$</td>
<td>−0.0496</td>
<td>−0.0700</td>
</tr>
<tr>
<td></td>
<td>(0.0004)</td>
<td>(0.0103)</td>
</tr>
<tr>
<td>$R_{i+3}$</td>
<td>−0.0566</td>
<td>−0.0399</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.1165)</td>
</tr>
<tr>
<td>$D_t$</td>
<td>0.0133</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.2598)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times X_{t-1}$</td>
<td>0.3880</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0275)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times X_t$</td>
<td>0.0871</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.6602)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times X_{t+1}$</td>
<td>0.3456</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0167)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times X_{t+2}$</td>
<td>−0.1922</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.1741)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times X_{t+3}$</td>
<td>0.2057</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0628)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times R_{t+1}$</td>
<td>0.1049</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0346)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times R_{t+2}$</td>
<td>0.0407</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.3937)</td>
<td></td>
</tr>
<tr>
<td>$D_t \times R_{t+3}$</td>
<td>−0.0381</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.4068)</td>
<td></td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.2029</td>
<td>0.2076</td>
</tr>
<tr>
<td>$F$ statistic on combined</td>
<td>3.56</td>
<td></td>
</tr>
<tr>
<td>$D_t \times X_{t+j}$ and $D_t \times R_{t+j}, i = 1, 2, 3$</td>
<td>(.0016)</td>
<td></td>
</tr>
</tbody>
</table>

Current returns ($R_t$) for year $t$ are the buy-and-hold returns for the 12-month period starting three months after year $t - 1$ fiscal year-end. Current earnings ($X_t$) for year $t$ is income before extraordinary items—available to common, scaled by market value three months after year $t - 1$ fiscal year-end. Future earnings ($X_{t+j}$) are the income before extraordinary items—available to common for the three years following the current year (i.e., for years $t + 1, t + 2$ and $t + 3$). Market value (closing price $\times$ the number of shares outstanding) is measured three months after year $t - 1$ fiscal year-end. Future returns ($R_{t+j}$) are the annual buy-and-hold returns for the three years following the current year (i.e., starting three months after the current fiscal year-end). Disclosure ranking ($D_t$) is calculated by converting the firm’s annual AIMR industry ranking to a percentile as follows: $D_t = (\text{rank} - 1) / (\text{number of firms in the industry} - 1)$. $P$-values for two-tailed tests are in parentheses.
returns; the negative coefficients on future returns demonstrate that realized future earnings contains measurement error that future returns removes. These results are consistent with the conclusions in Collins et al. [1994]. In addition, before we condition the regression on disclosure activity, market participants appear to treat current earnings as if it follows a random walk; the coefficients on $X_{t-1}$ and $X_t$ are roughly the same magnitude but are opposite in sign.¹²

The results for model 2 show that revealed future earnings is significantly related to current returns. As seen in model 1, $D_t \times X_{t+1}$ is significant in two of

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¹² When interpreting the regression coefficient on current earnings, it must be noted that when future earnings are also in the regression, the current earnings variable also proxies for the market’s prior expectation about future earnings. This may confound the traditional interpretation of an earnings response coefficient.

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### TABLE 4
Regressions of Current Returns on Aggregated Current and Future Earnings and Interactions with Disclosure

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Industry-Adjusted Data</th>
<th>Raw Data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model 1</td>
<td>Model 2</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0021</td>
<td>−0.0073</td>
</tr>
<tr>
<td></td>
<td>(0.5676)</td>
<td>(0.3024)</td>
</tr>
<tr>
<td>$X_{t-1}$</td>
<td>−0.6287</td>
<td>−0.8250</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$X_t$</td>
<td>0.6957</td>
<td>0.6935</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$X_{3t}$</td>
<td>0.3612</td>
<td>0.2975</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$R_{3t}$</td>
<td>−0.0687</td>
<td>−0.0886</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$D_t$</td>
<td>0.0157</td>
<td>0.0186</td>
</tr>
<tr>
<td></td>
<td>(0.1496)</td>
<td>(0.0196)</td>
</tr>
<tr>
<td>$D_t \times X_{t-1}$</td>
<td>0.4110</td>
<td>0.3453</td>
</tr>
<tr>
<td></td>
<td>(0.0926)</td>
<td>(0.0196)</td>
</tr>
<tr>
<td>$D_t \times X_t$</td>
<td>0.0412</td>
<td>0.0412</td>
</tr>
<tr>
<td></td>
<td>(0.0039)</td>
<td>(0.0019)</td>
</tr>
<tr>
<td>$D_t \times X_{3t}$</td>
<td>0.1493</td>
<td>0.1493</td>
</tr>
<tr>
<td></td>
<td>(0.0039)</td>
<td>(0.0019)</td>
</tr>
<tr>
<td>$D_t \times R_{3t}$</td>
<td>0.0350</td>
<td>0.0350</td>
</tr>
<tr>
<td></td>
<td>(0.1989)</td>
<td>(0.1989)</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.1960</td>
<td>0.2004</td>
</tr>
<tr>
<td>$F$ statistic on combined</td>
<td>7.92</td>
<td>6.57</td>
</tr>
<tr>
<td>$D_t \times X_{3t}$ and $D_t \times R_{3t}$</td>
<td>(0.0004)</td>
<td>(0.0014)</td>
</tr>
</tbody>
</table>

Current returns ($R_t$) for year $t$ are the buy-and-hold returns for the 12-month period starting three months after year $t − 1$ fiscal year-end. Current earnings ($X_t$) for year $t$ is income before extraordinary items—available to common, scaled by market value three months after year $t − 1$ fiscal year-end. Future earnings ($X_{3t}$) is the sum of income before extraordinary items—available to common for the three years following the current year (i.e., for years $t + 1, t + 2$ and $t + 3$). Market value (closing price × the number of shares outstanding) is measured three months after year $t − 1$ fiscal year-end. Future returns ($R_{3t}$) are the buy-and-hold returns for the three-year period following the current year (i.e., starting three months after the current fiscal year-end). Disclosure ranking ($D_t$) is calculated by converting the firm’s annual AIMR industry ranking to a percentile as follows: $D_t = (\text{rank} − 1)/(\text{number of firms in the industry} − 1)$. P-values for two-tailed tests are given in parentheses.
the three future years for both the raw and industry-adjusted data, indicating that current returns are increasing in future earnings at an increasing rate as disclosure increases. Further, because $D_t \times X_{t+1}$ and $D_t \times R_{t+1}$ together proxy for the revealed future earnings, and because the individual years of future earnings are highly correlated, a more powerful test examines the joint significance of $D_t \times X_{t+i}$ and $D_t \times R_{t+i}$. The partial $F$-tests of the joint significance of these variables have $p$-values of .0001 and .0016 for the raw and industry-adjusted data, respectively. These results are consistent with our first hypothesis that disclosure activity reveals future earnings news that “brings the future forward” into current returns.

Evidence on how disclosure activity affects the relation between current earnings and current returns is mixed, but none is consistent with our second hypothesis that the effect of current earnings is decreasing in disclosure activity. For the raw data, neither $D_t \times X_{t-1}$ nor $D_t \times X_t$ are significant, nor is the partial $F$-test (not reported) of their joint significance. For the industry-adjusted data, $D_t \times X_t$ is insignificant but $D_t \times X_{t-1}$ is significantly positive. This latter result will be discussed in more detail when we estimate the simplified model in table 4.

To allow a clearer interpretation of the coefficients and to simplify the specification checks that follow in section 7, table 4 presents the results for the more parsimonious model given in equation (4). The overall results for model 1 are very similar to those shown in table 3. Going from the detailed to the simplified model reduces the $R^2$ from .2288 to .2047 for the raw data and from .2029 to .1960 for the industry-adjusted data. As before, current returns are significantly increasing in future earnings and significantly decreasing in future returns.13

Model 2 in table 4 also yields similar results to those found in table 3. For both the raw and industry-adjusted data, current returns are increasing in future earnings at an increasing rate as disclosure activity increases. Further, $D_t \times X_3$ and $D_t \times R_3$, are jointly significant with $p$-values of .0014 and .0004 for the raw and industry-adjusted data, respectively. To interpret the size of the effect, recall that $D_t$ ranges between 0 (for the firm with the lowest ranking in its industry-year) and 1 (for the firm with the highest ranking in its industry-year). For the raw data, the coefficient on future earnings is .3641 for the firm with the worst disclosure in the industry-year ($D_t = 0$), and .5415 ($.3641 + .1774$) for the firm with the best disclosure in the industry-year ($D_t = 1$); an increase of 49 percent. Similarly, when the industry-adjusted data is analyzed, the coefficient on future earnings for the firm with the best disclosure is 50 percent greater than the coefficient on future earnings for the firm with the worst disclosure. Clearly, the level of a firm’s disclosure

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13 As a comparison, we estimate model 1 of table 4 on the entire population of firms with available CRSP and COMPUSTAT data for the same time period. The estimates are similar to those reported in table 4, with a somewhat higher coefficient on current earnings and a somewhat lower coefficient on future earnings, and all coefficients highly significant.
plays an important role in determining the size of the relation between future earnings and current returns, consistent with our first hypothesis.

The results from table 4 do not support our second hypothesis; the effect of current earnings on current returns does not appear to depend on the disclosure level. However, examining the relation between disclosure and the prior year’s earnings reveals some interesting findings. For the raw data, the coefficients on $X_{t-1}$ and $X_t$ are almost equal but of opposite sign, indicating that when $D_t = 0$ market participants treat current earnings as if it follows a random walk process. That is, if we assumed that earnings was autoregressive, so that unexpected earnings took the form of $X_t - \gamma X_{t-1}$, then the regression results for these two variables can be re-written as $0.5987(X_t - 0.9921X_{t-1})$ when $D_t = 0$ (noting that $0.9921$ times $0.5987$ yields the estimated coefficient of $0.5940$ on $X_{t-1}$). Thus, the implied auto-regressive parameter is very close to one. However, when $D_t = 1$ the regression results are $(0.5987 - 0.0440)X_t - (0.5940 - 0.3453)X_{t-1}$, which can be re-written as $0.5547(X_t - 0.4484X_{t-1})$. Here the implied autoregressive parameter is considerably less than one, and the significance of $D_t \times X_{t-1}$ implies that it is significantly so. In short, past earnings is considerably more important in interpreting current earnings for low disclosure firms than for high disclosure firms, as if higher levels of disclosure activity render past earnings relatively unimportant in interpreting current earnings news. Similar results hold for the industry-adjusted data. The coefficient on $X_t$ is unaffected by the disclosure level, but the coefficient on $X_{t-1}$ is significantly negative and the coefficient on $D_t \times X_{t-1}$ is significantly positive, indicating that prior earnings news is a more relevant benchmark for low disclosure firms.

The disclosure variable $D_t$ is effectively chosen by management and, whenever an independent variable in a regression is the result of a choice, it raises the possibility of an endogenous relation between the dependent variable and the chosen independent variable. The econometric concern is that residual error in the returns regression is correlated with the independent variable $D_t$, resulting in inconsistent estimates. In our case, we believe that any inconsistency due to endogeneity is quite minor and that attempting to remove it would result in even greater errors. First, some of the principle determinants of $D_t$ from prior literature, namely current and future performance, are already in the regression, so the residual error is already orthogonal to these sources of variation in $D_t$.\footnote{The relation between $D_t$ and performance, measured either as earnings or returns, while statistically significant, is relatively weak. Using either the raw or industry-adjusted data, a regression of $D_t$ on $X_{t-1}$, $X_t$, and $R_t$ yields an unadjusted $R^2$ of less than .01, and only the coefficient on $X_t$ is significant. See Miller [2002] for an extended discussion of the relation between disclosure and performance. $D_t$ has also been shown to be significantly related to the number of analysts following the firm (Lang and Lundholm [1996]). However, while the relation is statistically significant, it is not the case that the disclosure score is powerful proxy for analyst following. For the sample in Lang and Lundholm, the $R^2$ of a regression of the ranked number of analysts on the ranked total disclosure score is only 11 percent, and the incremental $R^2$ of disclosure after controlling for firm size is only 2 percent.} Second, another documented
determinant of \( D_t \) is firm size, but as shown in table 9, including the natural log of market value in the regressions yields almost identical results. Finally, to actually control for the endogeneity would require a well-fitting model of \( D_t \) that does not involve any of the variables in the returns regression, and whose own residual error is uncorrelated with the residual error from the returns regression. After eliminating current earnings, future earnings, current returns and future returns, the existing disclosure literature offers no other strong candidates for variables that would provide a good model of \( D_t \).

To summarize our cross-sectional results, we find that disclosure activity “brings the future forward” by revealing news about future earnings that is reflected in current returns. While this effect does not appear to diminish the importance of current earnings news, we find that disclosure activity does affect how important the prior year’s earnings are as a benchmark for current earnings.\(^{15} \) In section 7 we add to these results by conditioning the disclosure-future earnings relation on the length of the accounting recognition lag in the firm’s industry, and by controlling for a number of other variables that might influence the relation.

6. Time-Series Analysis

To complement the cross-sectional results in tables 3 and 4 we examine how changes in disclosure change the relation between current returns and future earnings. If our hypothesis is correct, firms that increase their disclosures should cause more future earnings news to be reflected in current stock returns, while firms that decrease their disclosures should cause less future earnings news to be reflected in current stock returns. As described earlier, we consider the first year and the last year that a firm is included in our AIMR data. We then divide this sample into firms with increasing relative disclosure rankings and firms with decreasing relative disclosure rankings over this period.\(^{16} \) The distribution across years for each subsample is given in table 5. For each subsample, we compute the incremental contribution of \( X_{3t} \) and \( R_{3t} \) (i.e., expected future earnings) to the full model \( R^2 \) in the first year and in the last year. Table 6 presents our calculations of the incremental \( R^2 \) values and figure 1 plots the results.

\(^{15} \) As a specification check for the regressions in table 4, we also estimate the regressions year-by-year and then compute the Fama-McBeth \( t \)-statistic from the fifteen yearly coefficients, adjusting for serial correlation in the yearly estimates (see Bernard [1987]). The resulting estimates are very similar to the ones reported in the tables and generally remain significant at conventional levels. While the Fama-McBeth \( t \)-statistics control for cross-sectional correlation in the residuals, they are inefficient, particularly in a sample like ours where the firm composition changes significantly from year to year. We also included yearly indicator variables in the regressions; the resulting coefficient estimates are slightly more significant than those reported in table 4.

\(^{16} \) There are 6.83 years between the first year and the last year, on average. The 303 increasers improved their relative ranking by 0.277 while the 290 decreasers reduced their relative ranking by 0.287, on average.
FIG. 1.—The effect of disclosure changes on the incremental $R^2$ of future earnings news. The Incremental $R^2$ is the difference between the unadjusted $R^2$s from the full model regression $R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_3 + b_4 R^3_t + \epsilon_t$ and the current earnings model regression $R_t = b_0 + b_1 X_{t-1} + b_2 X_t + \epsilon_t$. The sample consists of the first and last year that each firm appeared in the AIMR data, and is sorted into subsamples of disclosure Increasers and disclosure Decreasers.

Figure 1 shows that the ability of future earnings news to explain current returns, controlling for current unexpected earnings, increased dramatically for the subsample of firms that increased their disclosure. Using the industry-adjusted data, the incremental $R^2$ increases from .0665 in the first year to .1906 in the last year. Similarly, using the raw data, the incremental $R^2$ increases from .0908 in the first year to .2952 in the last year. In contrast, for the disclosure decreasers, the change in the incremental contribution of future earnings is negative for the industry-adjusted data, falling from .1593 to .1149, and close to zero for the raw data, changing from .1299 to .1314.

To test hypothesis 3, we determine whether the change in the incremental $R^2$ for the disclosure increasers is significantly greater than the change in the incremental $R^2$ for the disclosure decreasers. Table 6 presents the computation of our test statistic (the difference in the change in the incremental $R^2$). Because the distribution of this test statistic is unknown, we use
approximate randomization tests to assess the significance of the difference in the change in the incremental $R^2$ between the two subsamples.

The approximate randomization test proceeds as follows. First, we calculate the test statistic of .1685 for the industry-adjusted data. We then randomly assign firms to the increaser and decreaser subsamples and re-estimate the test statistic. We repeat this random assignment and re-estimation 999 times. This yields a distribution of test statistics under the null hypothesis of no association between subsample membership and the magnitude of the change in the incremental $R^2$. The significance level of the test statistic is $(NGE + 1)/1000$, where $NGE$ is the number of test statistics at least as large as .1685. As seen in panel A of table 6, the test is significant at the .0230 level. We conclude that the disclosure increasers caused a significantly larger portion of expected future earnings to be brought forward into current returns than did the disclosure discreasers. Panel B of table 6 shows very similar results for the raw data. The difference in the change in the incremental $R^2$ is .2029, which is significant at the .0110 level. The results from table 6 clearly show that improved disclosure brings more of the news in future earnings forward into current returns, consistent with our third hypothesis.

7. Specification Checks

In this section we consider some variations on our main model. For the time-series tests we examine the possibility that pre-existing conditions or temporary changes in disclosure are causing the results, and for the cross-sectional tests we condition the returns-earnings relation on the length of the firm’s accounting recognition lag, and we add a number of previously-identified determinants of earnings response coefficients. All results remain consistent with our prior conclusions.

7.1 PRE-EXISTING DIFFERENCES BETWEEN THE DISCLOSURE INCREASERS AND DECREASERS

As seen in figure 1, much of the difference in the change in the incremental $R^2$s between the disclosure increasers and decreasers is due to the increaser subsample. As noted previously, an economy-wide increase in disclosure activity would push the incremental $R^2$ up for all firms, so our tests are based on the relative change between the disclosure increasers and the decreasers. Nonetheless, it is possible that the results shown in figure 1 are being driven by a pre-existing difference between the increaser and decreaser subsamples that is merely mean-reverting over time. We believe this explanation to be unlikely for the following reasons. First, the distribution over calendar years and industries for the first-year increasers and first-year

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17 For a more thorough discussion of approximate randomization techniques, see Noreen [1989].
decreasers is remarkably similar. For both samples, 32 percent of the observations are from 1980 (the first year we had AIMR data), 49 percent of the observations are between 1980–82, 12 percent of the observations come from 1988, and none of the remaining years contribute more than 7 percent (see table 5). Both samples include firms from 32 different industries, each with 15 percent from the banking industry (which mirrors the representation in the larger AIMR database), 8 percent from software, and no other industry contributing more than 7 percent of the observations. Second, there is no significant difference in performance measures for the first-year disclosure increasers and decreasers. Only 2.6 percent of the increaser observations are losses, as compared to 3.1 percent for the decreasers and 7.2 percent for the full sample, so it is not the case that the increasers’ first-year incremental $R^2$ is artificially low due to more loss observations. Further, there is no significant difference in the mean current earnings, future earnings, current returns, or special items (which would capture restructuring charges), all scaled by market value at the beginning of the period, with the lowest $p$-value from two-sample $t$-tests being .32. Also, there is no significant difference in the annualized earnings growth rates between the first and last year for the two sub-samples. Third, when we re-estimate model 2 in table 4 omitting the 303 first-year increaser observations to see if they are driving the cross-sectional results, the results are virtually identical to those reported. Using the industry-adjusted data the coefficient on $D_t \times X_{3t}$ is .1471 (versus .1493 for the full sample), with a $p$-value of .0051 (versus

<table>
<thead>
<tr>
<th>Year</th>
<th>first-year Increasers percent</th>
<th>first-year Decreasers percent</th>
<th>last-year Increasers percent</th>
<th>last-year Decreasers percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>32.67</td>
<td>32.41</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1981</td>
<td>3.63</td>
<td>14.14</td>
<td>1.63</td>
<td>2.07</td>
</tr>
<tr>
<td>1982</td>
<td>12.21</td>
<td>4.83</td>
<td>2.31</td>
<td>2.41</td>
</tr>
<tr>
<td>1983</td>
<td>4.95</td>
<td>5.17</td>
<td>2.31</td>
<td>2.07</td>
</tr>
<tr>
<td>1984</td>
<td>3.63</td>
<td>4.83</td>
<td>2.97</td>
<td>3.10</td>
</tr>
<tr>
<td>1985</td>
<td>4.62</td>
<td>4.51</td>
<td>1.98</td>
<td>2.76</td>
</tr>
<tr>
<td>1986</td>
<td>2.97</td>
<td>4.14</td>
<td>0.99</td>
<td>0.34</td>
</tr>
<tr>
<td>1987</td>
<td>6.27</td>
<td>4.83</td>
<td>1.65</td>
<td>2.76</td>
</tr>
<tr>
<td>1988</td>
<td>12.54</td>
<td>12.07</td>
<td>2.31</td>
<td>2.76</td>
</tr>
<tr>
<td>1989</td>
<td>7.26</td>
<td>4.14</td>
<td>4.95</td>
<td>6.21</td>
</tr>
<tr>
<td>1990</td>
<td>4.62</td>
<td>5.86</td>
<td>4.29</td>
<td>5.86</td>
</tr>
<tr>
<td>1991</td>
<td>1.03</td>
<td>1.03</td>
<td>21.12</td>
<td>20.34</td>
</tr>
<tr>
<td>1992</td>
<td>2.64</td>
<td>3.10</td>
<td>13.20</td>
<td>11.38</td>
</tr>
<tr>
<td>1993</td>
<td>0.33</td>
<td>2.41</td>
<td>7.92</td>
<td>7.59</td>
</tr>
<tr>
<td>1994</td>
<td>0.00</td>
<td>0.00</td>
<td>32.34</td>
<td>30.34</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td># of observations</td>
<td>303</td>
<td>290</td>
<td>303</td>
<td>290</td>
</tr>
</tbody>
</table>

First-year (last-year) is the first year (last year) that the firm appeared in the sample. Firms are sorted into disclosure increasers and decreasers based on the change in their disclosure rank over the time they are in the sample.
BRINGING THE FUTURE FORWARD

.0039 for the full sample). Using the raw data the coefficient on $D_t \ast X_3t$ is .2038 (versus .1774 for the full sample), with a $p$-value of .0004 (versus .0018 for the full sample).

We conduct two final robustness checks. First, we re-define a disclosure increaser or decreaser based on the change in the average disclosure percentile over the first two years and last two years the firm is in the sample (as opposed to one year). By using the average over two years it is less likely that the firm’s change in disclosure score is due to a one-time event. The results are very similar to those reported in table 6. For the industry-adjusted data, the incremental $R^2$ due to future earnings increases .1044 for the disclosure increasers and decreases .0166 for the disclosure decreasers; the $p$-value for the approximate randomization test is .0730. For the raw data, the

| TABLE 6
Approximate Randomization Test Results |
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsample</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td><strong>Panel A: Industry-Adjusted Data</strong></td>
</tr>
<tr>
<td>$D_t$ Increasers</td>
</tr>
<tr>
<td>$n = 303$</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>$D_t$ Decreasers</td>
</tr>
<tr>
<td>$n = 290$</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Difference in $\Delta$ incremental $R^2$ ($= \text{the test statistic}$)</td>
</tr>
<tr>
<td>$p$-value</td>
</tr>
</tbody>
</table>

| **Panel B: Raw Data** | | | |
| $D_t$ Increasers | Full model $R^2$ | 0.1744 | 0.3412 |
| $n = 303$ | Current earnings $R^2$ | 0.0836 | 0.0460 |
| | $= \text{Incremental } R^2 \text{ due to Future earnings}$ | 0.0908 | 0.2952 |
| $D_t$ Decreasers | Full model $R^2$ | 0.2544 | 0.2512 |
| $n = 290$ | Current earnings $R^2$ | 0.1245 | 0.1198 |
| | $= \text{Incremental } R^2 \text{ due to Future earnings}$ | 0.1299 | 0.1314 |
| Difference in $\Delta$ incremental $R^2$ ($= \text{the test statistic}$) | 0.2029 | |
| $p$-value | 0.0110 | |

The Full model is $R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_3t + b_4 R_3t + \epsilon_t$. Current returns ($R_t$) for year $t$ are the buy-and-hold returns for the 12-month period starting three months after year $t - 1$ fiscal year-end. Current earnings ($X_t$) for year $t$ is income before extraordinary items—available to common, scaled by market value three months after year $t - 1$ fiscal year-end. Future earnings ($X_3t$) is the sum of income before extraordinary items—available to common for the three years following the current year (i.e., for years $t+1, t+2$ and $t+3$). Market value (closing price times the number of shares outstanding) is measured three months after year $t - 1$ fiscal year-end. Future returns ($R_3t$) are the buy-and-hold returns for the three-year period following the current year (i.e., starting three months after the current fiscal year-end). Disclosure ranking ($D_t$) is calculated by converting the firm’s annual AIMR industry ranking to a percentile as follows: $D_t = (\text{rank} - 1)/(\text{number of firms in the industry} - 1)$. The sample consists of the first and last year that each firm appeared in our AIMR data; it is sorted into subsamples that either increased or decreased their relative disclosure ranking over the sample period. The incremental $R^2$ measures the amount of future earnings information, as proxied by $X_3t$ and $R_3t$, that is impounded in the current return, after controlling for the current earnings news. The test statistic measures the amount by which the disclosure increasers caused more future earnings news to be impounded in returns than did the disclosure decreasers. $P$-values are computed using approximate randomization tests.
incremental $R^2$ increases .2315 for the disclosure increasers and decreases .0335 for the disclosure decreasers; the $p$-value for the approximate randomization test is .0020. Second, we remove from the increaser/decreaser samples any observation that was in the top or bottom decile of disclosure scores in the first year, eliminating 100 observations. This removes any mechanical mean reversion in $D_t$ caused by the constraint that the highest and lowest ranking firms can only change their relative rank in one direction. The results for this reduced sample are stronger than those reported in table 6. For the industry-adjusted data, the difference in the change in incremental $R^2$ due to future earnings between the increasers and decreasers (i.e., the test statistic) is .2552, with a $p$-value of .002. For the raw data, the difference in the change in incremental $R^2$ is .2195, with a $p$-value of .006.

7.2 THE ACCOUNTING RECOGNITION LAG

Warfield and Wild [1992] document that the amount of future earnings news that is reflected in current returns varies directly with the length of the accounting recognition lag in the firm’s industry. The idea is that current earnings is a relatively better measure of value creation in industries with shorter operating cycles, and correspondingly, future earnings news is relatively less relevant for these industries. The logical extension of this idea is that firm disclosures are more effective in revealing value-relevant future earnings news in industries with longer operating cycles, since firms in these industries have more relevant future news to disclose. Consequently, we expect that current returns are increasing in “revealed future earnings” at a greater rate for firms with relatively longer accounting recognition lags than for firms with shorter accounting recognition lags.

To examine this idea we classify an industry’s accounting recognition lag following Warfield and Wild [1992] who label mining, construction and manufacturing (one-digit SIC codes 1, 2, and 3) as longer accounting lags and all other industries as shorter accounting lags.18 We then estimate (4) separately for the longer and shorter accounting lag subsamples. The results appear in table 7.

Panel A of table 7 provides an approximate replication of Warfield and Wild [1992] based on our design. Note that, as in Warfield and Wild, the inclusion of future earnings increases the $R^2$ of the regressions more for firms with longer accounting lags.19 As seen in the panel B of table 7, our prior result that the amount of future earnings news reflected in current returns increases with increasing accounting lags.

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18 Warfield and Wild [1992] actually create three categories of accounting recognition lags, but for our sample there were relatively few observations in the “short” lag category (one-digit SIC codes 5, 7, and 8), so we combine them with the “middle” category, yielding “longer lag” and “shorter lag” categories with approximately the same number of observations.

19 Besides a different sample period and a slightly different definition of a “long” accounting lag, our design differs from Warfield and Wild [1992] in that we include future returns to control for unexpected future earnings and we include the prior year’s earnings to capture the effect of the change in earnings.
TABLE 7

Regressions of Current Returns on Aggregated Current and Future Earnings and Interactions with Disclosure by the Length of the Accounting Recognition Lag

<table>
<thead>
<tr>
<th>Model:</th>
<th>Longer Recognition Lag</th>
<th>Shorter Recognition Lag</th>
<th>Longer Recognition Lag</th>
<th>Shorter Recognition Lag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Without the Disclosure Interaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$N$</td>
<td>2299</td>
<td>2179</td>
<td>2299</td>
<td>2179</td>
</tr>
<tr>
<td>Intercept</td>
<td>$-0.0018$</td>
<td>$0.0060$</td>
<td>$0.1041$</td>
<td>$0.0856$</td>
</tr>
<tr>
<td>($0.0903$)</td>
<td>($0.3084$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
</tr>
<tr>
<td>$X_{t-1}$</td>
<td>$-0.4310$</td>
<td>$-0.8226$</td>
<td>$-0.1552$</td>
<td>$-0.6601$</td>
</tr>
<tr>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0491$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
</tr>
<tr>
<td>$X_t$</td>
<td>$0.5961$</td>
<td>$0.7489$</td>
<td>$0.2656$</td>
<td>$0.7765$</td>
</tr>
<tr>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
</tr>
<tr>
<td>$X_3t$</td>
<td>$0.3579$</td>
<td>$0.3714$</td>
<td>$0.4815$</td>
<td>$0.4292$</td>
</tr>
<tr>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
</tr>
<tr>
<td>$R_3t$</td>
<td>$-0.0882$</td>
<td>$-0.0604$</td>
<td>$-0.0999$</td>
<td>$-0.0564$</td>
</tr>
<tr>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
<td>($0.0001$)</td>
</tr>
<tr>
<td>Adj $R^2$</td>
<td>$0.1890$</td>
<td>$0.2049$</td>
<td>$0.1970$</td>
<td>$0.2162$</td>
</tr>
<tr>
<td>Adj $R^2$ with only $X_{t-1}$ and $X_t$ in reg.</td>
<td>$0.0854$</td>
<td>$0.1061$</td>
<td>$0.0610$</td>
<td>$0.1049$</td>
</tr>
<tr>
<td>Increase in Adj $R^2$ due to future earnings and returns</td>
<td>.1036</td>
<td>.0988</td>
<td>.1360</td>
<td>.1113</td>
</tr>
</tbody>
</table>

Panel B: With the Disclosure Interaction

| $N$    | 2299                    | 2179                    | 2299                    | 2179                    |
| Intercept | $-0.0699$             | $-0.0063$              | $0.1349$              | $0.1107$              |
| ($0.2432$) | ($0.5835$)             | ($0.0001$)             | ($0.0001$)             | ($0.0001$)             |
| $X_{t-1}$ | $-0.5880$             | $-1.2054$              | $-0.3183$              | $-0.0692$              |
| ($0.0001$) | ($0.0001$)             | ($0.0228$)             | ($0.0001$)             | ($0.0001$)             |
| $X_t$    | $0.7517$               | $0.5571$                | $0.4661$                | $0.6312$                |
| ($0.0001$) | ($0.0002$)             | ($0.0047$)             | ($0.0001$)             | ($0.0001$)             |
| $X_3t$   | $0.2186$               | $0.3922$                | $0.3221$                | $0.4401$                |
| ($0.0001$) | ($0.0001$)             | ($0.0001$)             | ($0.0001$)             | ($0.0001$)             |
| $R_3t$   | $-0.1053$             | $-0.0850$              | $-0.0999$              | $-0.0675$              |
| ($0.0001$) | ($0.0003$)             | ($0.0001$)             | ($0.0001$)             | ($0.0001$)             |
| $D_t$    | $0.0103$               | $0.0217$                | $-0.0836$              | $-0.0513$              |
| ($0.4718$) | ($0.2560$)             | ($0.0064$)             | ($0.1875$)             | ($0.1875$)             |
| $D_t \times X_{t-1}$ | $0.3990$             | $0.7099$              | $0.4060$                | $0.5853$              |
| ($0.0736$) | ($0.0135$)             | ($0.1424$)             | ($0.0539$)             | ($0.0539$)             |
| $D_t \times X_t$ | $-0.3793$             | $0.4578$              | $-0.5038$             | $0.3484$              |
| ($0.1304$) | ($0.1007$)             | ($0.1114$)             | ($0.2611$)             | ($0.2611$)             |
| $D_t \times X_3t$ | $0.3959$             | $-0.0481$             | $0.4375$              | $-0.0296$              |
| ($0.0001$) | ($0.5488$)             | ($0.0001$)             | ($0.7300$)             | ($0.7300$)             |
| $D_t \times R_3t$ | $0.0189$             | $0.0466$              | $-0.0121$             | $0.0216$              |
| ($0.6299$) | ($0.2322$)             | ($0.7073$)             | ($0.4785$)             | ($0.4785$)             |
| Adj $R^2$ | $0.2054$               | $0.2083$              | $0.2090$                | $0.2178$                |
| $F$ statistic on $D_t \times X_3t$ and $D_t \times R_3t$ | $22.55$            | $0.72$              | $17.29$                | $0.25$                |
| ($0.0001$) | ($0.4863$)             | ($0.0001$)             | ($0.7751$)             | ($0.7751$)             |

Firms in SEC one-digit codes 1, 2 or 3 (mining, construction and manufacturing) are classified as having longer accounting lags and all other industries are classified as shorter accounting lags. Current earnings ($X_t$) for year $t$ is income before extraordinary items—available to common, scaled by market value three months after year $t$ fiscal year-end. Future earnings ($X_3t$) is the sum of income before extraordinary items—available to common for the three years following the current year (i.e., for years $t + 1$, $t + 2$ and $t + 3$). Market value (closing price times the number of shares outstanding) is measured three months after year $t$ fiscal year-end. Future returns ($R_3t$) are the buy-and-hold returns for the three-year period following the current year (i.e., starting three months after the current fiscal year-end). Disclosure ranking ($D_t$) is calculated by converting the firm’s annual AIMR industry ranking to a percentile as follows: $D_t = \text{rank}^{-1}/(\text{number of firms in the industry} - 1)$. 


returns is increasing in the firm’s disclosure activity is completely driven by firms with longer accounting recognition lags. For both the raw data and the industry-adjusted data, the interaction term $D_t \times X_3_t$ is significantly positive in the subsample with longer accounting lags but insignificant in the subsample with shorter accounting lags.\footnote{For the shorter recognition lag subsample, the negative of the coefficient on $X_{t-1}$ is larger than the coefficient on $X_t$, suggesting that, for firms with $D_t$ near zero, the time-series model of earnings implied in the market returns is not consistent with an AR-1 process. However, as $D_t$ increases the interaction terms make the combined coefficient on $X_t$ more positive and the combined coefficient on $X_{t-1}$ less negative; for the majority of firm-years, the implied time-series process is consistent with an AR-1 process.} Following the same approach as in section 6, we also analyze how changes in disclosure affect the incremental $R^2$ of future earnings for both accounting lag subsamples. Using both raw and industry-adjusted data, we find that the difference between the increase in the disclosure increasers’ incremental $R^2$ and the increase in the disclosure decreasers’ incremental $R^2$ is greater for firms with the longer accounting lags (untabulated results). In sum, changes in disclosure have a more pronounced impact on returns for firms with longer accounting recognition lags.

The accounting recognition lag has also been hypothesized to vary across good news and bad news firms, where news is defined by the sign of the current stock return (Basu [1997]). Because of conservative accounting rules, it is argued, bad news is reflected in earnings more quickly than is good news. Basu shows in a “reverse regression” of earnings on concurrent annual returns that the coefficient on returns is significantly larger for negative returns than for positive returns. A possible implication of this finding is that the relation between current returns and future earnings will be stronger for firms with positive returns because their current earnings will not capture all of the news, due to conservative accounting rules. Note, however, that this theory is silent about how market participants come to learn the good news that is not reflected in the current earnings; our hypothesis is that it is through the firm’s disclosure activity.\footnote{There are also some questions as to the econometric appropriateness of using reverse regressions to examine accounting conservatism. For example, Muller and Riedl [2001] argue that Basu’s results are completely explained by coefficient bias caused by the asymmetric distributions of positive and negative stock returns.}

We examine whether disclosure is incrementally significant after controlling for the sign of the current stock return by interacting the sign of the return with all of the independent variables in model 2 of table 4. The results are reported in the right-most column of table 9. While the interaction terms are all significant, this is partly by construction since the sign of the dependent variable is being used as an independent variable. More importantly, the coefficient on “revealed future earnings” $(D_t \times X_3_t)$ remains significant, and $D_t \times X_3_t$ and $D_t \times R_3_t$ remain jointly significant.
7.3 CONTROLLING FOR OTHER DETERMINANTS OF THE EARNINGS RESPONSE COEFFICIENT

A rich empirical literature documents many determinants of the earnings response coefficient in regressions of returns on current earnings. Past growth, risk, earnings persistence, firm size and the presence of an accounting loss have all been shown to be significantly related to the coefficient on current earnings. Therefore, an alternative explanation for our results is that the AIMR scores used here to measure disclosure activity are merely proxying for these more fundamental determinants of the earnings response coefficient. Note, however, that the determinants of the coefficient on future earnings, in the presence of current earnings, need not be the same as the determinants of the more traditional earnings response coefficient. For example, firms with high expected growth are likely to have a high earnings response coefficient in a simple returns-earnings regression, but when future earnings is added to the regression, the coefficient on future earnings will not necessarily be greater for high growth firms because realized growth is now in the regression directly. Nonetheless, to the extent that future earnings and future returns capture expectations about future earnings imperfectly, the variables identified in prior research may still be relevant. To explore this issue, we first examine the association between the AIMR scores and previously documented determinants of earnings response coefficients. Table 8 provides descriptive statistics by AIMR decile for five variables previously shown to be related to the earnings response coefficient. As seen in the table, there is a nearly monotonic relation between the AIMR score and the presence of a loss, with 5 percent of the firm-years in the highest decile experiencing losses versus 10 percent of the firm-years in the lowest decile experiencing losses. There is also a clear relation between beta and the AIMR score, although the magnitude is small; the highest decile’s mean beta is 1.081 while the lowest decile’s mean beta is...
TABLE 9
Regressions of Current Returns on Aggregated Current and Future Earnings and Interactions with Disclosure and Controls for the Determinants of Earnings Response Coefficients and the Sign of the Dependent Variable

<table>
<thead>
<tr>
<th>Model</th>
<th>Loss</th>
<th>Growth</th>
<th>Beta</th>
<th>Persistence</th>
<th>Size</th>
<th>Sign of $R_t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Industry-Adjusted Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>$-0.0144^{**}$</td>
<td>$-0.0074$</td>
<td>$-0.0056$</td>
<td>$-0.0079$</td>
<td>$-0.0154$</td>
<td>$-0.1656^{***}$</td>
</tr>
<tr>
<td>$X_t-1$</td>
<td>$-1.0609^{***}$</td>
<td>$-0.8235^{***}$</td>
<td>$-0.7761^{***}$</td>
<td>$-0.8130^{***}$</td>
<td>$-0.6479^{***}$</td>
<td>$-0.3883^{***}$</td>
</tr>
<tr>
<td>$X_t$</td>
<td>$1.2715^{***}$</td>
<td>$0.7016^{***}$</td>
<td>$0.7805^{***}$</td>
<td>$0.6872^{***}$</td>
<td>$0.6738^{***}$</td>
<td>$0.4314^{***}$</td>
</tr>
<tr>
<td>$X_t^3$</td>
<td>$0.3537^{***}$</td>
<td>$0.2916^{***}$</td>
<td>$0.3143^{***}$</td>
<td>$0.3098^{***}$</td>
<td>$0.3107^{***}$</td>
<td>$0.1579^{***}$</td>
</tr>
<tr>
<td>$R3_t$</td>
<td>$-0.0944^{***}$</td>
<td>$-0.0848^{***}$</td>
<td>$-0.0924^{***}$</td>
<td>$-0.0891^{***}$</td>
<td>$-0.0963^{***}$</td>
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<td>$D_t$</td>
<td>$0.0192$</td>
<td>$0.0156$</td>
<td>$0.0144$</td>
<td>$0.0172$</td>
<td>$0.0334^{**}$</td>
<td>$0.0103$</td>
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<tr>
<td>$D_t \times X_{t-1}$</td>
<td>$0.4338^{**}$</td>
<td>$0.4125^{**}$</td>
<td>$0.4636^{**}$</td>
<td>$0.3852^{**}$</td>
<td>$0.2125^{**}$</td>
<td>$0.3560^{**}$</td>
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<tr>
<td>$D_t \times X_t$</td>
<td>$-0.2882$</td>
<td>$0.2080$</td>
<td>$-0.0516$</td>
<td>$0.0313$</td>
<td>$0.1087$</td>
<td>$-0.1010$</td>
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<td>$D_t \times X_t^3$</td>
<td>$0.0942^{***}$</td>
<td>$0.1564^{***}$</td>
<td>$0.1250^{**}$</td>
<td>$0.1546^{**}$</td>
<td>$0.1186^{**}$</td>
<td>$0.1000^{**}$</td>
</tr>
<tr>
<td>$D_t \times R3_t$</td>
<td>$0.0418$</td>
<td>$0.0320$</td>
<td>$0.0328$</td>
<td>$0.0327$</td>
<td>$0.0475^{*}$</td>
<td>$0.0427^{*}$</td>
</tr>
<tr>
<td>Control</td>
<td>$-0.0804^{***}$</td>
<td>$0.0372^{***}$</td>
<td>$0.0103$</td>
<td>$0.0095$</td>
<td>$-0.0249^{**}$</td>
<td>$0.2991^{***}$</td>
</tr>
<tr>
<td>Control $\times X_{t-1}$</td>
<td>$0.5320^{***}$</td>
<td>$0.0711$</td>
<td>$-0.3600^{**}$</td>
<td>$-0.3232^{**}$</td>
<td>$0.1711^{***}$</td>
<td>$-0.4891^{***}$</td>
</tr>
<tr>
<td>Control $\times X_t$</td>
<td>$-1.0224^{***}$</td>
<td>$0.2142$</td>
<td>$-0.3479^{***}$</td>
<td>$0.3519^{***}$</td>
<td>$0.0016$</td>
<td>$0.3494^{***}$</td>
</tr>
<tr>
<td>Control $\times X_t^3$</td>
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<td>$-0.0583$</td>
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<td>$0.0125$</td>
<td>$0.0043$</td>
<td>$0.1502^{***}$</td>
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<tr>
<td>Control $\times R3_t$</td>
<td>$0.0009$</td>
<td>$0.0376$</td>
<td>$0.0215$</td>
<td>$-0.0161$</td>
<td>$-0.0198^{**}$</td>
<td>$-0.0098$</td>
</tr>
<tr>
<td>Adj $R^2$</td>
<td>$0.2224$</td>
<td>$0.2014$</td>
<td>$0.2136$</td>
<td>$0.2015$</td>
<td>$0.2101$</td>
<td>$0.3461$</td>
</tr>
<tr>
<td>$F$ statistic on $D_t \times X_t$ and $D_t \times R3_t$</td>
<td>$4.82^{***}$</td>
<td>$8.01^{***}$</td>
<td>$5.78^{***}$</td>
<td>$8.06^{***}$</td>
<td>$6.68^{***}$</td>
<td>$6.41^{***}$</td>
</tr>
</tbody>
</table>

Panel B: Raw Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Loss</th>
<th>Growth</th>
<th>Beta</th>
<th>Persistence</th>
<th>Size</th>
<th>Sign of $R_t$</th>
</tr>
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<tbody>
<tr>
<td>Intercept</td>
<td>$0.0639^{***}$</td>
<td>$0.1188^{***}$</td>
<td>$0.0984^{***}$</td>
<td>$0.0949^{***}$</td>
<td>$0.2995^{***}$</td>
<td>$-0.1538^{***}$</td>
</tr>
<tr>
<td>$X_t-1$</td>
<td>$-0.8089^{***}$</td>
<td>$-0.5816^{***}$</td>
<td>$0.2153$</td>
<td>$-0.1775$</td>
<td>$-1.2916^{***}$</td>
<td>$-0.2171^{**}$</td>
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<tr>
<td>$X_t$</td>
<td>$1.2179^{***}$</td>
<td>$0.6015^{***}$</td>
<td>$0.7230^{***}$</td>
<td>$0.2123$</td>
<td>$1.2520^{***}$</td>
<td>$0.2827^{***}$</td>
</tr>
<tr>
<td>$X_t^3$</td>
<td>$0.4309^{***}$</td>
<td>$0.3634^{***}$</td>
<td>$0.2529^{***}$</td>
<td>$0.3840^{***}$</td>
<td>$0.3163^{***}$</td>
<td>$0.0823^{***}$</td>
</tr>
<tr>
<td>$R3_t$</td>
<td>$-0.0869^{***}$</td>
<td>$-0.0814^{***}$</td>
<td>$-0.1192^{***}$</td>
<td>$-0.0547^{**}$</td>
<td>$-0.0081$</td>
<td>$-0.0313^{**}$</td>
</tr>
<tr>
<td>$D_t$</td>
<td>$-0.0228$</td>
<td>$-0.0626^{***}$</td>
<td>$-0.0531^{**}$</td>
<td>$-0.0580^{***}$</td>
<td>$-0.0338$</td>
<td>$-0.0362^{*}$</td>
</tr>
<tr>
<td>$D_t \times X_{t-1}$</td>
<td>$0.3675^*$</td>
<td>$0.4142^{**}$</td>
<td>$0.3492^*$</td>
<td>$0.3057$</td>
<td>$0.2585$</td>
<td>$0.2299$</td>
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<td>$-0.3718^*$</td>
<td>$-0.0649$</td>
<td>$-0.1352$</td>
<td>$-0.0513$</td>
<td>$0.0358$</td>
<td>$-0.0290$</td>
</tr>
<tr>
<td>$D_t \times X_t^3$</td>
<td>$0.1159^{***}$</td>
<td>$0.1586^{***}$</td>
<td>$0.1533^{***}$</td>
<td>$0.1819^{**}$</td>
<td>$0.1378^{**}$</td>
<td>$0.0761^*$</td>
</tr>
<tr>
<td>$D_t \times R3_t$</td>
<td>$0.0181$</td>
<td>$0.0073$</td>
<td>$0.0046$</td>
<td>$0.0060$</td>
<td>$0.0207$</td>
<td>$0.0243$</td>
</tr>
<tr>
<td>Control</td>
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<td>$0.0128$</td>
<td>$0.0310$</td>
<td>$-0.0264^{**}$</td>
<td>$0.4221^{***}$</td>
</tr>
<tr>
<td>Control $\times X_{t-1}$</td>
<td>$0.4195^{***}$</td>
<td>$-1.5666^{***}$</td>
<td>$-0.6419^{***}$</td>
<td>$-0.5225^{**}$</td>
<td>$0.1126^{***}$</td>
<td>$-0.2464^{***}$</td>
</tr>
<tr>
<td>Control $\times X_t$</td>
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<td>$1.1544^{***}$</td>
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<td>$0.4876^{**}$</td>
<td>$-0.1077^{**}$</td>
<td>$0.0692$</td>
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<tr>
<td>Control $\times X_t^3$</td>
<td>$-0.2481^{***}$</td>
<td>$0.0196$</td>
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<td>$-0.0186$</td>
<td>$0.0086$</td>
<td>$0.2467^{***}$</td>
</tr>
<tr>
<td>Control $\times R3_t$</td>
<td>$0.0131$</td>
<td>$0.0356^*$</td>
<td>$0.0311^{**}$</td>
<td>$-0.0312^{*}$</td>
<td>$-0.0113^{**}$</td>
<td>$-0.0269^{***}$</td>
</tr>
<tr>
<td>Adj $R^2$</td>
<td>$0.2273$</td>
<td>$0.2134$</td>
<td>$0.2264$</td>
<td>$0.2103$</td>
<td>$0.2236$</td>
<td>$0.5093$</td>
</tr>
<tr>
<td>$F$ statistic on $D_t \times X_t$ and $D_t \times R3_t$</td>
<td>$3.66^{**}$</td>
<td>$5.06^{***}$</td>
<td>$4.52^{**}$</td>
<td>$6.54^{**}$</td>
<td>$4.93^{***}$</td>
<td>$3.97^{**}$</td>
</tr>
</tbody>
</table>

For each column a different control variable is used (as shown at the top of the column). Loss is an indicator variable that is set equal to 1 when income before special items is negative and zero otherwise. Growth is defined as the percentage growth in the firm’s assets from year $t - 1$ to year $t$. Beta is calculated using daily returns from CRSP over year $t$. Because of the limited time series available, earnings persistence is calculated using an approach similar to that in Dechow, et al. [1999]. For each decile of AMR score we regress the member firm-years $X_t$ on $X_{t-1}$, where $X_t$ is income before extraordinary items—available to common, and both are scaled by market value of equity at the end of the firm’s fiscal year $t - 1$, with the resulting coefficient assigned as the persistence measure for each firm in the decile. Size is the natural log of market value of equity at the end of the firm’s fiscal year $t - 1$. The sign of $R_t$ is the sign of the stock return from month $-9$ to $+3$ relative to the year $t$ fiscal year end (which is the dependent variable in each regression). A * denotes significance at the .10 level, ** denotes significance at the .05 level and *** denotes significance at the .01 level.
is 1.007. There appears to be a relation between the AIMR scores and size, although it is not monotonic across the deciles. Finally, past growth and earnings persistence do not appear to be related to the AIMR score in any obvious way.\footnote{Table 4 shows that the market’s perception of earnings persistence varies significantly with disclosure, while table 8 finds no relation between earnings persistence across disclosure deciles. While these results might appear at odds, note that the measure of earnings persistence in table 8, a simple regression between current and lagged earnings within deciles of disclosure score, is quite different from the earnings persistence implied by the returns regressions reported in table 4. The table 4 results are based on the market’s perceptions and pricing of persistence, and the results are estimated with future earnings already in the regression.}

As a more formal test of these alternative variables, we interact each with the variables in our main model (equation 4) and add them individually to the regression. The results appear in table 9. For the industry-adjusted data shown in panel A, the coefficients on past and future earnings are all significantly influenced by the presence of a loss and by beta, and are weakly influenced by earnings persistence. Nonetheless, the coefficient on $D_t \times X_{3t}$ remains significant for all models, as does the $F$-test for the joint significance of future earnings and returns. We reach similar conclusions using the raw data, as shown in panel B of table 9. The results for the individual control variables differ somewhat, but the coefficients on $D_t \times X_{3t}$ and the $F$-tests are all significant. In sum, disclosure activity reveals future earnings news even after controlling for previously-identified determinants of the current earnings response coefficient.\footnote{As another specification check, we estimate equation (4) using earnings before special items. The results using both industry-adjusted and raw data are similar to those reported in table 4.}

8. Conclusion

Our results show that disclosure activity has a significant impact on the relation between returns and future earnings. Both in the cross-section and for changes in disclosure activity over time, we find that variations in disclosure are associated with variations in the amount of future earnings news impounded in current returns. These results hold after controlling for many other factors that have been shown to influence the earnings response coefficient, and they are strongest in industries with relatively long accounting recognition lags. Finally, our cross-sectional results show that the prior year’s earnings are a more important benchmark for performance in low-disclosure firms than in high-disclosure firms.

Our results may offer some solace to regulators concerned about a decline in the quality and quantity of information in the security markets. If firms have compensated for a decline in the relevance of the traditional accounting earnings measure by increasing their disclosure activity, our results show that this activity brings credible, relevant information about future earnings forward into current returns.
REFERENCES


KROSS, W., AND M. KIM. “Differences Between Market Responses to Earnings Announcements in the 1990s versus the 1960s.” Working paper, Purdue University, 1999.


