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# Further evidence on optimism and underreaction in analysts' forecasts

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**Abstract**

In this paper, we argue that the observed optimism in analysts' forecasts of earnings is related to the costs and benefits to analysts of issuing optimistic forecasts — when the costs of issuing an optimistic forecast are high relative to the benefits of doing so, optimism will be less apparent or absent. We also argue that underreaction to past forecast errors and past changes in earnings is most evident when earnings components are viewed as permanent. We test our arguments by examining the properties of analysts' forecasts for two samples of distressed firms: (1) firms that file for bankruptcy and (2) firms that experience financial distress but turnaround. According to our arguments, for bankrupt firms, optimism should become less apparent or absent as bankruptcy approaches. Further, for these (bankrupt) firms, underreaction to past forecast errors and past changes in earnings should persist during the period of financial distress. For turnaround firms, we predict the opposite results. We find that the bias in forecasts for the bankrupt sample declines to insignificant levels by the year prior to bankruptcy filing. Forecast bias for the turnaround sample disappears in the year of recovery and is absent during the first half of the following year. For the bankrupt sample, we find evidence of underreaction to past errors in the 4 years prior to the bankruptcy filing; this underreaction is driven by firms with negative earnings-to-price ratios. Underreaction to past errors for the turnaround sample disappears in the year of recovery and is absent in the two subsequent years. Unlike past research, we do not find analysts' forecasts to be correlated with past earnings changes. Overall, our results support our cost–benefit and permanence of earnings arguments. 

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## 1. Introduction

Extant empirical evidence suggests that analysts' earnings forecasts are, on average, optimistic and exhibit positive serial correlation with past forecast errors, indicating that analysts underreact to the information contained in past earnings.[1] Several explanations for this seemingly irrational behavior have been offered. One is that optimism is driven by the anticipated effect an optimistic forecast has on investors. When an analyst employed by a full-service brokerage firm issues an optimistic earnings forecast for a company, the firm's brokers can call investors and urge them to buy that company's stock, resulting in brokerage commissions for the firm. On the other hand, due to restrictions on short sales and the limited availability and greater risk of options, a pessimistic forecast and the associated sell recommendation result in fewer trades and lower brokerage commissions. Since many brokerage firms compensate analysts partly on the basis of the brokerage commissions they generate (Konrad & Greising, 1989), there is a strong incentive for analysts to be optimistic.[2]

A second explanation is that optimism is motivated by a desire to establish or preserve lucrative investment banking relationship with companies. Siconolfi and Raghavan (1995) report that analysts receive bonuses as much as three times their salary when they bring in investment banking business. Advancing this explanation, Dugar and Nathan (1995) show that earnings forecasts made by analysts working for brokerage firms that have an investment banking relationship with a company are significantly more optimistic than forecasts made by other analysts on the same company.

A third explanation is that optimism stems from analysts' need to maintain good relations with the management of the firms they follow (Berg, 1990; Laderman, Hawkins, & Recio, 1990). Analysts depend on corporate management for accurate and timely information about the companies they follow, and companies wield this as a weapon against analysts who issue a negative research report on their stock. Retribution ranges from refusing the analyst's calls for information, to barring the analyst from mailings, conference calls, and meetings and even threats of legal action and physical harm (Berg, 1990; Galant, 1990; Laderman et al., 1990; Schultz, 1990; Siconolfi, 1995). Under the view that optimistic earnings forecasts can mitigate the damage to management relations caused by negative recommendations, Francis and Philbrick (1993) show that stocks rated sell and hold in a previous period receive more optimistic earnings forecasts than stocks previously rated buy.

A final explanation for the seemingly irrational behavior, offered by Lim (2000), is that analysts trade off optimism for improving management access and forecast accuracy. Assuming that analysts' livelihoods depend on forecast accuracy, Lim predicts the optimism in analysts' forecast to be higher for companies that have more uncertain information environment and for analysts who are more reliant on management access as a source of information. Lim's empirical results are consistent with his predictions. In particular, Lim

[1] For example, see Abarbanell (1991), Abarbanell and Bernard (1992), Ali, Klein, and Rosenfeld (1992), Lys and Sohn (1990), and Mendenhall (1991).

[2] According to Dorfman (1991), at one Wall Street firm, 50% of an analyst's bonus is based on the rating the analyst receives from the firm's sales force. This evaluation includes a review of the number of trades in each stock the analyst follows and the amount of commissions generated.

finds that forecasts are more optimistic for companies that are smaller in size, and that have smaller analyst following, higher volatility, and past poor performance. Forecasts are also more optimistic when the analyst is employed by a smaller regional brokerage firm or, to a weaker extent, is junior in tenure.

The explanations above ignore the costs of issuing optimistic forecasts. We extend the argument that the analyst's decision to issue optimistic earnings forecasts is based on a comparison of the costs and benefits of doing so. The benefits are derived primarily from higher brokerage commissions and better management relations; the costs relate to analyst reputation and legal liability. When the costs of issuing an optimistic forecast are high relative to the benefits of doing so, optimism will be less apparent or absent. This condition holds for firms that are expected to go bankrupt. (The reasons for this are presented in Section 2.) It becomes more pronounced as bankruptcy approaches.

We test for the existence of optimism in analysts' earnings forecasts errors using (separate) regressions of the current year's forecast error on the prior year's forecast error, and on the most recent change in annual earnings. We examine a period of 4 years preceding bankruptcy filing, since prior research (e.g., Altman, 1968; Zmijewski, 1984) indicates that symptoms of financial distress become evident as early as 4 years prior to bankruptcy, with the most noticeable change occurring between the third and the second years before bankruptcy filing. We do not examine subsequent periods due to very small sample sizes.

We replicate our analysis on a second sample of firms that recover after exhibiting similar symptoms of financial distress (hereafter, turnaround firms). If our cost–benefit argument is valid, optimism in analysts' forecasts for turnaround firms should persist, despite symptoms of financial distress.[3] However, this assumes that analysts can distinguish between bankrupt and turnaround firms a year or two in advance. If analysts are unable to distinguish between bankrupt and turnaround firms, they would perceive the same costs (net of benefits) of issuing optimistic forecasts for both sets of firms. If, as we argue, analysts believe those costs to be higher for distressed firms than for healthy firms, a decline in optimism would be expected for both the bankrupt and turnaround firms from the time noticeable signs of financial distress becomes evident (Year $t-2$) until recovery is established (Year $t+1$). If analysts do not perceive those costs to be higher for distressed firms than for healthy firms, we would expect no decline in optimism for either sample. Thus, our tests are joint tests of analysts' ability to distinguish between the bankrupt and turnaround firms and the argument that optimism will be reduced when the costs of being optimistic exceed the benefits.

In addition to testing for the existence of forecast bias, we examine analysts' underreaction to past earnings changes and to past forecast errors. We study underreaction because it represents an implicit failure on the part of analysts to take account of publicly available information and is thus related to the issue of informational efficiency of the stock market. In this context, Abarbanell and Bernard (1992), among others, argue that a study of underreaction is important because of its linkage to post-

[3] Such a finding would be consistent with the results of Ali et al. (1992) who document that the bias in earnings forecasts is greater for firms that have experienced recent transitory earnings.

earnings announcement drifts in stock prices. Specifically, they point out that analysts are an important group of market participants, and that "...evidence of inefficient analysts' forecasts raises the question of whether investor reliance on analysts might explain the anomalous stock price behavior..."

Ali et al. (1992) find that the degree of underreaction to past forecast errors varies according to whether earnings outcomes are viewed as transitory or permanent; it is most evident for firms that have predominantly permanent earnings.[4] The results of Ali et al. applied to our bankrupt sample would suggest that underreaction to past forecast errors and to past changes in earnings should exist during the period of financial distress, which generally is up to 4 years before bankruptcy filing.[5] This is due to the fact that negative earnings outcomes are very likely to persist for firms approaching bankruptcy. On the other hand, for turnaround firms, we expect little (or no) underreaction to past forecast errors and to past changes in earnings during periods of financial distress (which generally is the 4-year period before recovery) *if* analysts are able to discern that the symptoms of distress are temporary. Thus, again, our tests are joint tests of analysts' ability to distinguish between the bankrupt and turnaround firms and the argument that underreaction is more pronounced when earnings components are viewed as permanent.

Although other researchers have investigated the properties of earnings forecasts for firms with recent poor performance (e.g., Abarbanell & Bernard, 1992; Klein, 1990), our research differs from their work in two important aspects. First, based on our expectation of differences in cost–benefit tradeoffs, we distinguish between poor performers that become bankrupt and those that recover. Second, the composition of our samples is different from both Klein and Abarbanell and Bernard. Klein identifies poor performers based on stock price (as opposed to earnings) performance.[6] Abarbanell and Bernard sample from firms followed by Value Line. Value Line only covers stocks that meet certain investor interest criteria.[7] In addition, Value Line analysts do not have the same incentives as sell-side analysts. Our study is broader in scope insofar as we examine both bias and underreaction in sell-side analysts' forecasts for bankrupt and turnaround firms and control for the effect of other variables such as past stock returns.[8]

An important feature of our study, one that has not been addressed by prior research, is that we examine changes in the properties of earnings forecast errors over an extended period of time surrounding bankruptcy or turnaround. By documenting changes in the properties of

[4] They show that for healthy firms, the market views extreme earnings outcomes (i.e., either negative or very high positive earnings-to-price ratios) as transitory. Earnings-to-price ratios that fall between these two extremes are considered permanent.

[5] This presumes that analysts can foresee impending bankruptcies.

[6] Klein examines earnings forecasts following large stock price changes. She finds that analysts do not: (1) underpredict earnings following large stock price declines, rather they remain overly optimistic; and (2) overpredict earnings for firms after periods of extreme stock price rises.

[7] These benchmarks include minimum threshold levels of sales revenue, net income, share price, market capitalization, number of shares outstanding, number of shares traded, and number of shareholders.

[8] Abarbanell and Bernard (1992), Francis and Philbrick (1993), and Mendenhall (1991) also study underreaction. However, they use Value Line forecasts. Ali et al. (1992) use sell-side analysts' forecasts to study bias and underreaction, but do not focus on bankrupt firms.

sell-side analysts' forecasts over a period of time during which the analysts' incentives, and thus the costs and benefits of issuing optimistic forecasts, are likely to change, we hope to provide greater insight into their forecasting behavior.

Briefly, the main results of our paper and our conclusion are as follows. For the bankrupt firms, forecast bias declines to insignificant levels by the year prior to bankruptcy filing. Forecast bias for the turnaround firms disappears in the year of recovery and remains absent during the first half of the following year. For the bankrupt firms, there is evidence of underreaction to past forecast errors in the 4 years prior to bankruptcy; the underreaction is driven by firms with negative earnings-to-price ratios in every year. For the turnaround firms, underreaction to past forecast errors disappears in the year of recovery and is absent in the two subsequent years. Analysts' forecast errors are not correlated with past earnings changes for either of our samples. Overall, the results support our cost–benefit and permanence of earnings arguments.

Section 2 presents our cost–benefit discussion. Section 3 describes our sample selection procedures and experimental design. The results of our empirical tests are presented in Section 4. Finally, Section 5 contains our concluding remarks.

## 2. Cost–benefit discussion

We expect the benefits that accrue to the analyst from issuing optimistic forecasts for firms approaching bankruptcy to be relatively small. That is, the analyst's incentives to cultivate good relations with the management of bankrupt firms are not expected to be a strong motivating factor because bankruptcy or restructuring will likely bring about a change in incumbent management (for related statistics see, Betker, 1994; Gilson, 1989; Hotchkiss & Mooradian, 1997).

In addition, given the poor financial condition of these firms, we expect investor interest in (and consequently, the demand for) analysts' earnings forecasts to be low, especially from institutional investors. Hence, the potential for generating brokerage commissions based on the analyst's forecasts is likely to be small. This is likely for two reasons. First, despite the positive abnormal returns they offer, investments in bankrupt firms are speculative and have a greater risk of loss. Institutional investors such as pension funds and trusts are legally bound (e.g., by the prudent man rules of trust law and the provisions of ERISA and the 1940 Investment Advisers Act[9]) to adopt a conservative stance in their investment decisions. In fact, many statutes and case law precedents require that *each* investment in the portfolio must individually satisfy the test of prudence. Evidence on the restrictive effect of such provisions on investment decisions is provided in Del Guercio (1996).

[9] Until 1986, these statutes prohibited performance-based compensation arrangements, presumably to prevent investment managers from making excessively speculative investments. As late as August 1988, *Institutional Investor* reported that such arrangements were still rare (Elliott, 1988).

Second, institutions typically compensate their investment managers on the basis of the dollar value of assets under management. Superior performance does not yield any extra reward. Further, the possibility of lawsuits for lack of prudence is clearly greater for large losses than for gains. Thus, institutional money managers are likely to be more averse to negative outcomes than are other investors (O'Brien & Bhushan, 1990).

We expect the costs of issuing optimistic forecasts for bankrupt firms to be higher than those for healthy firms because of reputation effects and legal liability considerations. Stickel (1992) reports that forecast accuracy is important in assessing financial analysts' performance and that analysts reputed for their superior forecasting ability enjoy monetary and non-monetary rewards. Examining its association with turnover, Mikhail, Walther, and Willis (1999) also find that forecast accuracy is important to analysts. Since it is well known that earnings forecasts are (on average) optimistic, ex-post judgement of whether the forecast bias for a particular firm was justified in light of the information available to the analyst at the time of issuing the forecast is subjective in the case of firms that are *not* in financial distress. However, this subjectivity is likely to be much lower in the case of bankrupt firms because of the presence of lead indicators of bankruptcy (e.g., default on debt repayment, deterioration in key financial ratios, downgrade of debt rating). Therefore, we expect the negative reputation effect to be much higher when unjustifiably optimistic forecasts are issued for bankrupt firms.

Standard IIIA of the *Code of Ethics* of the Association for Investment Management and Research requires analysts to have a "reasonable basis" for their earnings forecasts and investment recommendations. Rule 206(4) of the *Investment Advisers Act* (1940) prohibits the analyst from making "any untrue statement of a material fact, or which is otherwise false or misleading" and Section 10(b) of the *Securities Exchange Act* (1934) contains a similar provision. Plaintiffs (investor–clients of financial analyst) are more likely to contend that a forecast or investment recommendation did not have a "reasonable basis" or was misleading in cases where losses are suffered due to a decline in stock price than in cases where (opportunity) losses occur due to stock price increases. Thus, the probability of facing legal action from dissatisfied investor clients is higher if the analyst issues optimistic forecasts for a bankrupt firm.[10]

The analyst's legal liability for unjustified optimistic forecasts is also enhanced by the fact that courts rely heavily on the common law principle of "shingle theory"[11] in application of the provisions of the *Securities Exchange Act* (1934) and *The Investment Advisers Act* (1940). As a consequence, the burden of proving that a forecast was justified at the time it was made

[10] In practice, very few lawsuits are brought against financial analysts under these provisions. Our search in the LEXIS database uncovered only two cases during the last 10 years. The reason for so few lawsuits is that almost all brokerage firms ask investors to agree to submit all disputes to binding arbitration. Arbitration proceedings are administered by Self-Regulatory Organizations (SROs), such as the New York Stock Exchange (NYSE) and the National Association of Securities Dealers (NASD) under SEC oversight.

[11] The essence of the shingle theory is that when brokers hold themselves out as experts in investments in general or in the securities of a particular issuer, they will be held to a higher standard of care in making recommendations. In applying the shingle theory, a broker who makes a recommendation is viewed as making an implied representation that he/she has adequate information on the security in question (Hazen, 1990).

rests with the analyst. These features of the institutional environment suggest high cost to analysts for issuing optimistic forecasts for bankrupt firms.

To sum, the benefits decline and the costs increase as bankruptcy approaches. By 1 or 2 years prior to bankruptcy filing, the costs will most likely outweigh the benefits and analysts' incentive to issue optimistic forecasts for bankrupt firms disappears.

## 3. Sample and methodology

### *3.1. Sample*

We focus on two groups of financially distressed firms: bankrupt and turnaround. The group of bankrupt firms consists of firms that filed for bankruptcy from 1985 to 1993. We identify the bankrupt firms by examining relevant issues of PREDICAST. The names of the firms and the dates of bankruptcy filing are cross-checked against the *Wall Street Journal Index*. In a few cases where a discrepancy cannot be resolved, the firm is deleted from the sample.

The group of turnaround firms consists of firms that experienced financial distress sometime during the period 1983–1991 and did not experience symptoms of distress again for at least 2 years following the year of recovery.[12] Similar to Statement on Auditing Standards (SAS) 59, a firm is considered to be in a state of financial distress if it has operating losses or negative operating cash flows for at least two consecutive years, or if it has negative net worth in any year.[13] Conversely, a firm is considered viable if none of these distress conditions is met.[14] The turnaround firms are identified by searching the 1994 COMPUSTAT Industrial Tapes. Firms that experience more than one instance of financial distress and firms that are operating under bankruptcy law protection are excluded from this sample.

Application of the above criteria yields initial samples of 350 bankrupt and 631 turnaround firms. For both samples, we examine the relation between current and lagged values of forecast error, and between current forecast error and prior year's earnings change, in each of the 4 years preceding bankruptcy or turnaround. For the turnaround sample, we also examine the year of recovery and the 2 years following. Since the results in Abarbanell and Bernard (1992) suggest that forecast optimism and underreaction decline over the course of the year, we repeat our analysis four times each year, using forecasts of

[12] The specification that firms do not demonstrate signs of financial distress for at least three consecutive years creates a time window that is consistent with analysts' forecast horizon, as indicated by Institutional Brokers Estimate System (I/B/E/S). Analysts frequently forecast the earnings for the current year, and 1 to 2 years in the future. However, prediction beyond 3 years is difficult, especially for distressed firms.

[13] Since most financially distressed firms have both operating losses and negative cash flows, we do not attempt to examine differences in the behavior of firms meeting one criterion as opposed to the other.

[14] This is a stricter definition of financial distress than in SAS 59, where 1 year of negative operating cash flows is considered an indication of financial distress.

the current year's earnings produced after the previous annual earnings announcement, and after each of the three quarterly earnings reports. We use the first forecast available on the I/B/E/S tape after the annual or quarterly earnings are announced. This procedure results in 1400 and 2524 firm-quarter observations for each year of analysis for the bankrupt and turnaround samples, respectively.

To enable comparability between actual and forecast earnings, we then drop observations for all years in which a change in fiscal period occurred. The remaining firm-quarter observations are screened on the basis of the availability of: (1) earnings per share data on COMPUSTAT; (2) earnings report date on COMPUSTAT or the *Wall Street Journal Index*; (3) monthly stock price and return data on CRSP; and (4) earnings forecast data on the I/B/E/S.[15]

As a result of these data availability requirements, our final sample sizes range between 173 and 227 firm-quarters for the bankrupt sample and between 223 and 552 firm-quarters for the turnaround sample. Approximately 48% of the turnaround firms are listed on the two major stock exchanges; the comparable figure for bankrupt firms is 30%. The largest concentration of bankrupt firms (8.3%) is in the Industrial/Commercial Machinery industry (SIC code 35). The sample of turnaround firms is dominated by firms from the Industrial/Commercial Machinery, Electrical Equipment and Supplies, and Measurement Instruments industries (SIC codes 35, 36, and 38), which comprise 14.5%, 10.3%, and 9.5% of that sample, respectively. No other industry accounts for more than 5% of either of the two samples. Observations within the above industry groups are not clustered in calendar time. Therefore, we do not use dummy variables to control for possible cross-sectional correlation in forecast errors as in O'Brien (1988).

### 3.2. Methodology

Our empirical tests examine the optimism and underreaction in analysts' forecasts for each of the 4 years preceding the bankruptcy filing or turnaround. For turnaround firms, we also examine the year of turnaround and the 2 years that follow. As in Abarbanell and Bernard (1992), Ali et al. (1992), and Mendenhall (1991), we use multivariate regression models to address two (related) issues. First, we investigate whether analysts' earnings forecasts are optimistically biased and whether their forecasts take into account all the information contained in past forecast errors, via the following regression:

$$\mathrm{ERR}_t = \alpha + \beta_1 \mathrm{ERR}_{t-1} + \beta_2 \mathrm{RET}_{t-1} + \theta, \tag{1}$$

where, $\mathrm{ERR}_t = (A_t - F_t)/P_t$; $A_t$ = primary EPS before extraordinary items in Year $t$; $F_t$ = first available forecast of primary EPS for Year $t$ made after earnings information for previous

[15] A very large number of firm-quarter observations (between 983 and 1068 for the bankrupt sample and between 1594 and 2093 for the turnaround sample) have missing earnings, earnings report date, stock price, and/or stock return data.

year (or quarter[16]) is released;[17] $P_t$ = the stock price at the beginning of Year $t$, adjusted for stock splits and stock dividends;[18] $\mathrm{RET}_{t-1}$ = the compounded 12-month stock return at of the end of the previous year (or quarter); $\theta$ = a random error term with zero mean and constant variance; $t = -4$ to $-1$ for the bankrupt sample and $-4$ to $+2$ for the turnaround sample, where 0 is the year of bankruptcy or turnaround.

To reduce the effect of extreme values on the results, the values of $\mathrm{ERR}_t$ and $\mathrm{ERR}_{t-1}$ in each regression are winsorized at both tails of their distributions. Generally, the winsorization is at the fifth (95th) percentile point of the distribution; in three cases, we winsorize at the tenth (90th) percentile.

A negative (positive) $\alpha$ coefficient in regression (1) indicates optimism (pessimism) and a positive (negative) $\beta_1$ coefficient implies underreaction (overreaction) to past forecast errors.

Past returns are included in the regressions for two reasons. First, results of prior research (e.g., Abarbanell, 1991; Ali et al., 1992) suggest that current forecast errors are correlated with past returns. Failure to control for this correlation can lead to incorrect inferences since the estimate of the residual variance is overstated. Second, it is well known that contemporaneous forecast errors and stock returns (e.g., $\mathrm{ERR}_{t-1}$ and $\mathrm{RET}_{t-1}$) are positively correlated; omission of the return variable in the regression can therefore cause biased estimation of the regression coefficient for $\mathrm{ERR}_{t-1}$.[19]

Next, following the suggestion of Abarbanell and Bernard (1992), we examine the relationship between forecast errors and past changes in earnings per share to determine if analysts underreact (or overreact) to recent earnings information. We estimate the following regression:

$$\mathrm{ERR}_t = \gamma + \delta_1 \mathrm{CEPS}_{t-1} + \delta_2 \mathrm{RET}_{t-1} + \varepsilon, \tag{2}$$

where, $\mathrm{CEPS}_t = (A_t - A_{t-1})/P_t$; $\varepsilon$ = a random error term with zero mean and constant variance.

[16] As discussed before, we repeat our analysis four times for each year using the first forecast produced after the announcement of prior year's earnings, and after the announcement of first, second, and third quarter earnings, respectively.

[17] In cases where I/B/E/S indicates that the analyst's forecast is for fully diluted rather than primary EPS, we use annual fully diluted EPS to compute ERR.

[18] We do not use actual earnings per share as a deflator because our sample consists of financially distressed firms, many of which tend to report earnings realizations marginally below zero. Deflating by these small numbers produces large numbers (outliers) in the data. Deflating by the standard deviation of analysts' forecasts is not a viable alternative because the standard deviation is not a meaningful statistic in cases where the number of available forecasts is one or two.

[19] As discussed in Section 4, omission of firm size, forecast consensus, earnings–price ratio, and analyst following may also lead to similar omitted-variable problems in the context of our study. Size and analyst following proxy for investor interest in and demand for earnings forecasts. Size, earnings-to-price ratio, and forecast consensus capture certain aspects of a firm's information environment (e.g., supply of information, earnings persistence, and earnings predictability) and hence influence forecasting behavior. The effects of adding these variables to the regressions are discussed in the Results section.

A negative (positive) estimate for $\gamma$ in regression (2) implies optimism (pessimism) and a positive (negative) estimate for $\delta_1$ indicates underreaction (overreaction) to the prior year's earnings change.[20]

An important objective of our study is to investigate changes in the properties of forecast errors over the periods surrounding bankruptcy and turnaround. Therefore, we test for structural changes in regressions (1) and (2) using a Chow test (Johnston, 1984, pp. 207–225). Beginning with the third year prior to bankruptcy or turnaround, we compute $F$ statistics for each of the four forecast horizons to determine whether the bias (intercept) and underreaction/overreaction (slope for $ERR_{t-1}$ or $CEPS_{t-1}$) have changed significantly from the corresponding prior period.

## 4. Results

### *4.1. Descriptive statistics and univariate results*

Results of recent research suggest that forecast bias is related to the degree of analysts' informational advantage relative to other market participants. This informational advantage is determined by the supply of and the demand for information about firms, which in turn are a function of firm size, forecast dispersion, analyst following, and unexpected earnings/returns (Abarbanell, 1991; Brous & Kini, 1993; Das, Levine, & Sivaramakrishnan, 1998; Mendenhall, 1991). Thus, systematic differences in these firm characteristics (size, etc.) over time or across bankrupt and turnaround samples are indicative of differences in the supply of and the demand for information. In turn, this would imply dissimilarities in analysts' incentives and hence their forecasting behavior. To determine if such differences exist, we perform Mann–Whitney $U$ tests on firm size (as measured by the natural logarithm of market value of equity), coefficient of variation of forecasts, number of forecasts, and unexpected earnings (as measured by the most recent change in annual earnings, scaled by share price) across samples and over time.[21] In addition, we also investigate differences in the $z$ scores (Altman, 1968) across samples and over time. This analysis provides some insight into whether market participants can distinguish between the two sets of firms, or detect changes over time, based on publicly available information, and thus the extent of analysts' informational advantage. We measure the market value of equity and $z$ score as of the beginning of the fiscal year for which the

[20] As in regression (1), the values of $ERR_t$ and $CEPS_{t-1}$ in each regression for turnaround sample are winsorized at both tails of their distributions. The winsorization is at the fifth (95th) percentile point of the distribution. For the bankrupt sample, the results are sensitive to outliers, and hence, these results are reported after deletion of outliers using the SAS programs for detection of outliers. The number of outliers deleted range from two to six for all the years examined.

[21] Since both unexpected earnings and unexpected returns measure the same underlying construct, namely, investors' incentives to acquire additional information, we only examine the first of these variables.

forecast is issued. The coefficient of variation and the number of forecasts are computed for forecasts issued after the third quarter's earnings are announced.[22]

For bankrupt firms, the median values of market value of equity, the number of forecasts, and the coefficient of variation in forecasts decline as bankruptcy approaches. The changes are not significant from year-to-year, but are significant at the 1% level of confidence over the combined 4-year period preceding bankruptcy. The trends in the market value of equity and the number of forecasts indicate that analysts prefer to focus their research efforts on larger firms (Bhushan, 1989), and that they tend to discontinue coverage of firms which perform poorly, either because of lack of investor interest or because of the potential loss of reputation or litigation as discussed in Section 2. The trend in the coefficient of variation is consistent with our cost–benefit argument.

For turnaround firms, market value of equity and number of forecasts do not change significantly either from year-to-year or for the combined period examined. However, the coefficient of variation in analysts' forecasts increases every year from Year $t-1$ to Year $t+1$. These year-to-year increases are significant at the 5%, 5%, and 1% level of confidence, respectively.

Based on Mann–Whitney $U$ tests, the market value of equity, coefficient of variation in forecasts, and the number of forecasts are not significantly different across the two samples in any of the 4 years prior to bankruptcy/turnaround.

The intertemporal change in the coefficient of variation for both bankrupt and turnaround firms suggests that the uncertainty about future earnings of these firms changes over time. Thus, analysts' informational advantage and hence their forecasting behavior may be different over time. An intertemporal analysis of analysts' forecasting behavior is valuable.

The median values of the unexpected earnings as measured by the change in prior year's annual earnings per share are close to zero for both samples over the 4-year period prior to bankruptcy/turnaround. There is a slight decline in unexpected earnings over time prior to bankruptcy/turnaround. The difference between the two samples is not significant in any of the 4 years.[23] For turnaround firms, unexpected earnings increase significantly in Years $t$ and $t+1$ (Mann–Whitney $U$ tests are significant at the 1% level of confidence).

As expected, the $z$ scores for both groups of firms decline in the period prior to bankruptcy/turnaround and the $z$ scores for turnaround firms increase after the recovery. The only significant year-to-year change occurs in Year $t+1$ for the turnaround sample (Mann–Whitney $U$ test is significant at the 1% level of confidence). The $z$ scores for turnaround firms are significantly higher than for bankrupt firms during each of the 4 years preceding bankruptcy/turnaround. Further, the median $z$ score for the bankrupt sample is in the "gray

[22] We also replicate the analysis based on the coefficient of variation and the number of analysts as computed after the announcement of the previous year's earnings and after the first and the second quarters' earnings announcements. The results are qualitatively similar and hence are not reported.

[23] Nonparametric tests are used because the distributions of past unexpected earnings are skewed towards negative values.

area'' during the 3-year period prior to bankruptcy and falls below the ''critical value'' of 1.8 in the year prior to bankruptcy.[24]

### 4.2. Multivariate results

The results of regression (1), presented in Tables 1 and 2, show that the bias and serial correlation in analysts' forecast errors vary both across time and across samples. Consistent with prior work (e.g., Ali et al., 1992; Fried & Givoly, 1982; Lim, 2000), we find that the intercept term ($\alpha$) is generally negative for both samples, suggesting that, on average, analysts tend to overestimate earnings. Panel A of Table 1 indicates that the bias in forecasts for bankrupt firms becomes statistically insignificant in Year $t-1$ (i.e., the year prior to the bankruptcy filing) and remains insignificant over the next 3 years (not reported due to small sample sizes which range from 9 to 25).[25] The Chow tests indicate a significant decline from prior year in the level of bias in Year $t-1$, but no change in Year $t$ (not reported). The median $z$ score for bankrupt firms (not reported) also dips below the critical value of 1.8 at about the same time. The bias results for the bankrupt sample support our argument that as bankruptcy approaches, the costs to analysts of issuing optimistic forecasts about these firms become high in relation to the benefits of doing so and therefore, analysts become unbiased in their forecasting behavior.[26]

Given the definition of forecast error (actual earnings less forecast of earnings, scaled by share price), the decline in optimism from Year $t-2$ to Year $t-1$ noted could be attributable either to higher (less optimistic) unscaled forecast errors or to higher stock prices. Since prior research (Clark & Weinstein, 1983) indicates that the stock market anticipates bankruptcy and stock prices of bankrupt firms adjust downward before the bankruptcy filing, the decline in optimism must be driven by an increase in unscaled forecast errors. Nevertheless, to isolate the cause of the decline in bias, we perform (separate) univariate analysis on stock prices and unscaled forecast errors. The results confirm our expectations. They indicate that stock prices of the bankrupt firms decline marginally in Year $t-1$ (the decline is significant at the 10% level of confidence). Further, unscaled forecast errors in Year $t-1$ are significantly less optimistic than the errors in Year $t-2$.

Similarly, our inability to detect a significant decline in optimism from Year $t-1$ to Year $t$ (not reported) could be due to the fact that the stock prices decline in proportion to the decline in the magnitude of unscaled forecast errors. The results of univariate analyses of stock prices and unscaled forecast errors indicate that the changes in stock prices and unscaled forecast

[24] Predictive ability tests of the Altman (1968) bankruptcy prediction model suggest that a $z$ score greater than 2.66 indicates a low risk of bankruptcy while a $z$ score lower than 1.8 is associated with a high probability of bankruptcy. Scores between 2.66 and 1.8 fall in a ''gray area'' where the model's ability to discriminate between viable and bankrupt firms is poor.

[25] An analysis of differences in empirical results between bankrupt firms that continue and those that do not would reveal potentially interesting information. We chose not to perform this analysis due to small sample sizes.

[26] The decline in bias is also consistent with the possibility that bankrupt firms may be issuing more information about their pending problems to avoid being accused of omitting information. Generally though, there is less information available on firms approaching bankruptcy, as evidenced by late filing with the SEC, missing earnings report in the *Wall Street Journal* and COMPUSTAT, and the drop in the number of analysts following.

Table 1
Tests of the hypothesis that analysts are optimistic in their earnings forecast

Panel A: Bankrupt sample

| Year relative to bankruptcy | Sample size[b] | Timing of annual EPS forecast: After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
|---|---|---|---|---|---|
| −4 | 37–50 | −0.153 | −0.133 | −0.089 | −0.079 |
| | | (−1.74) | (−2.22)* | (−2.21)* | (−2.81)** |
| −3 | 44–58 | −0.274 | −0.299 | −0.194 | −0.215 |
| | | (−2.56)** | (−3.41)** | (−2.01)* | (−1.10) |
| −2 | 46–64 | −0.179 | −0.226 | −0.233 | −0.149 |
| | | (−1.89) | (−2.30)* | (−3.02)** | (−2.64)** |
| −1 | 44–58 | −1.016† | −0.659† | 0.158 | −0.332† |
| | | (−1.62) | (−1.44) | (0.43) | (−0.58) |
| −1 outliers excluded | 38–54 | −0.013† | −0.165† | 0.385† | 0.103† |
| | | (−0.03) | (−0.38) | (0.89) | (0.32) |

Panel B: Turnaround sample

| Year relative to turnaround | Sample size[b] | Timing of annual EPS forecast: After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
|---|---|---|---|---|---|
| −4 | 44–62 | −0.038 | −0.026 | −0.039 | −0.040 |
| | | (−4.10)** | (−1.80) | (−2.48)* | (−3.38)** |
| −3 | 64–78 | −0.063 | −0.058 | −0.034 | −0.034 |
| | | (−2.34)* | (−3.68)** | (−2.68)** | (−2.77)** |
| −2 | 82–105 | −0.061 | −0.065 | −0.033 | −0.046 |
| | | (−3.77)** | (−3.83)** | (−2.92)** | (−4.10)** |
| −1 | 93–125 | −0.070 | −0.054 | −0.046 | −0.027 |
| | | (−3.99)** | (−4.51)** | (−5.04)** | (−3.67)** |
| 0 | 106–130 | −0.018† | −0.015† | −0.008† | −0.000† |
| | | (−1.93) | (−1.84) | (−1.55) | (−0.20) |
| 1 | 110–138 | −0.009 | −0.002 | −0.008 | −0.004 |
| | | (−1.48) | (−0.35) | (−3.88)** | (−2.50)** |
| 2 | 121–149 | −0.023† | −0.022 | −0.012 | −0.006 |
| | | (−4.70)** | (−4.28)** | (−4.23)** | (−3.12)** |

Regressions of the forecast error against prior year's forecast error: $ERR_t = \alpha + \beta_1 ERR_{t-1} + \beta_2 RET_{t-1} + \theta$.[a]

[a] $ERR_t = (A_t - F_t)/P_t$; $A_t$ = primary EPS before extraordinary items in Year $t$; $F_t$ = first forecast of primary EPS for Year $t$ after earnings information for previous year (or quarter) is released; $P_t$ = the stock price at the beginning of the year, adjusted for stock splits and stock dividends; $RET_{t-1}$ = the compounded 12-month stock return as of the end of previous year (or quarter); $\theta$ = the error term; and $t = -4$ to $-1$ for bankrupt sample and $-4$ to $+2$ for turnaround sample, where 0 is the year of bankruptcy or turnaround.

[b] Sample size is the range of number of observations over the four forecast horizons.

[c] The cell entries in the last four columns are estimates of $\alpha$ and the related $t$ statistics (in parentheses below the estimates). The finding that $\alpha$ is negative and significant indicates that forecast is optimistic.

* Represents significance of $t$ statistic for the coefficient at 5% level of significance.

** Represent significance of $t$ statistic for the coefficient at 1% level of significance.

† Represents significance, at 5% level of significance or better, of $F$ test for a change in the intercept from previous year.

Table 2
Tests of the hypothesis that analysts underreact to prior forecast error

Panel A: Bankrupt sample

| Year relative to bankruptcy | Sample size[b] | Timing of annual EPS forecast: After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
|---|---|---|---|---|---|
| − 4 | 37–50 | 0.784 | 0.162 | 0.432 | − 0.062 |
| | | (1.91) | (2.68)** | (3.21)** | ( − 0.39) |
| − 3 | 44–58 | 0.702 | 0.251 | 0.446 | 2.630† |
| | | (2.29)* | (1.19) | (1.81) | (5.28)** |
| − 2 | 46–64 | 0.604 | 1.074† | 1.488† | 0.612† |
| | | (4.09)** | (6.49)** | (5.06)** | (2.58)** |
| − 1 | 44–58 | 3.429† | 2.072 | 1.992 | 1.830 |
| | | (3.86)** | (3.53)** | (6.40)** | (2.59)** |

Panel B: Turnaround Sample

| Year relative to turnaround | Sample size[b] | Timing of annual EPS forecast: After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
|---|---|---|---|---|---|
| − 4 | 44–62 | 0.233 | 0.593 | 0.199 | − 0.171 |
| | | (1.52) | (2.90)** | (0.56) | ( − 0.58) |
| − 3 | 64–78 | 0.995 | 0.527 | 0.889 | 0.587 |
| | | (2.96)* | (2.31)* | (3.46)** | (2.87)* |
| − 2 | 82–105 | 0.367 | 0.338 | 0.571 | 0.414 |
| | | (3.21)** | (2.17)* | (5.04)** | (2.49)** |
| − 1 | 93–125 | 0.338 | 0.249 | 0.122† | 0.238 |
| | | (2.94)** | (2.83)** | (3.26)** | (2.03)* |
| 0 | 106–130 | 0.084 | 0.039 | 0.001 | 0.002 |
| | | (1.30) | (0.92) | (0.01) | (0.06) |
| 1 | 110–138 | − 0.459† | 0.180 | − 0.118 | − 0.053 |
| | | ( − 4.66)** | (1.52) | ( − 2.55)** | ( − 1.25) |
| 2 | 121–149 | 0.201† | 0.096 | 0.049 | − 0.000 |
| | | (1.77) | (1.07) | (0.70) | ( − 0.01) |

Regressions of the forecast error against prior year's forecast error: $ERR_t = \alpha + \beta_1 ERR_{t-1} + \beta_2 RET_{t-1} + \theta$.[a]

[a] $ERR_t = (A_t - F_t)/P_t$; $A_t$ = primary EPS before extraordinary items in Year $t$; $F_t$ = first forecast of primary EPS for Year $t$ after earnings information for previous year (or quarter) is released; $P_t$ = the stock price at the beginning of the year, adjusted for stock splits and stock dividends; $RET_{t-1}$ = the compounded 12-month stock return as of the end of previous year (or quarter); $\theta$ = the error term; and $t = -4$ to $-1$ for bankrupt sample and $-4$ to $+2$ for turnaround sample, where 0 is the year of bankruptcy or turnaround.

[b] Sample size is the range of number of observations over the four forecast horizons.

[c] The cell entries in the last four columns are estimates of $\beta_1$ and the related $t$ statistics (in parentheses below the estimates). The finding that $\beta_1$ is positive and significant indicates that analysts underreact to prior forecast error.

* Represents significance of $t$ statistic for the coefficient at 5% level of significance.

** Represents significance of $t$ statistic for the coefficient at 1% level of significance.

† Represents significance, at 5% level of significance or better, of $F$ test for a change in the coefficient from previous year.

errors are insignificant at the traditional levels of confidence. These results are logical, as the bias has already disappeared as of Year $t-1$.

Although the $t$ statistics on the intercept in Table 1 become closer to zero as the firms approach bankruptcy, the absolute magnitude of the coefficients does not decline, which seems to contradict our main hypothesis. The large coefficients in Year $t-1$ are, however, due to outliers. Apparently, winsorization of the variables according to their distribution did not alleviate the effects of outliers in Year $t-1$. Results for that year after excluding the outlier observations from the regressions are reported in the last row of Table 1.[27] They support our finding of a significant decline in forecast bias.

The decline in optimism also seems to contradict the results of prior research. Specifically, Abarbanell and Bernard (1992) find that analysts' forecasts are most in error in situations where analysts are optimistic despite poor recent performance. Klein (1990) and Lim (2000) report similar findings when poor performers are identified on the basis of recent stock returns, as opposed to recent earnings changes. However, based on our earlier discussion of costs and benefits of being optimistic, the decline in bias for bankrupt firms is logical. That is, we expect the forecast bias for these firms to diminish as bankruptcy approaches.

The bias for turnaround firms (Panel B of Table 1) declines, falling to insignificant levels in Year $t$ (i.e., the year of turnaround) and remaining insignificant during the first half of the following year. Forecasts issued thereafter again show an optimistic bias. The Chow tests indicate that the bias declines significantly in the year of turnaround and increases 2 years after recovery. One explanation for the results for the turnaround sample is that analysts are unable to distinguish turnaround from bankrupt firms. As stated earlier, if the distinction is not made, analysts would perceive the same costs of issuing an optimistic forecast for both sets of firms. If they believe those costs to be higher than for healthy firms, a decline in optimism would be expected for both bankrupt and turnaround firms prior to emergence of convincing evidence of recovery. An alternative explanation is that analysts are able to distinguish turnaround from bankrupt firms, but unwilling to issue optimistic forecasts following two or more years of poor performance. Once convincing evidence of recovery emerges, i.e., after these firms have reported several quarters of improved results, analysts begin to issue optimistic forecasts.

Similar to the case of bankrupt firms, the decline in optimism from Year $t-1$ to Year $t$ noted for the turnaround sample could be attributable either to higher (less optimistic) unscaled forecast errors or to higher stock prices.[28] To isolate the cause of the decline in bias, we perform (separate) univariate analysis on stock prices and unscaled forecast errors. The results indicate that stock prices are not significantly different (at the traditional levels of confidence) in Year $t$ relative to Year $t-1$. In contrast, the forecast errors in Year $t$ are significantly less optimistic than the errors in Year $t-1$. These results indicate that the decline in optimism from Year $t-1$ to Year $t$ is driven more by a decline in forecast bias than by an increase in prices.

[27] Outliers are identified using the SAS programs for detection of outliers. The number of outliers deleted ranges from four to five.

[28] Stock prices for turnaround firms may increase from Year $t-1$ to Year $t$ if the market anticipates the turnaround.

Tests of the hypothesis that analysts underreact to the information in past forecast errors are presented in Table 2. The results for the bankrupt sample in Panel A consistently show underreaction through the year of bankruptcy filing. The underreaction increases significantly 2 years before bankruptcy. As mentioned previously, past research (Ali et al., 1992) indicates that underreaction to past errors is higher for firms with permanent earnings components. If the likelihood of bankruptcy is perceived to be high and bankruptcy (in the long term) is associated with negative earnings outcomes, forecast errors for bankrupt firms with negative earnings-to-price ratios (permanent earnings) should show strong underreaction. On the other hand, firms with positive earnings-to-price ratios (transitory earnings components) should exhibit little or no underreaction. To test whether this explanation is driving the results for bankrupt firms, we reestimate regression (1) using the earnings-to-price ratios as a proxy for the permanence of earnings.[29] The results (not reported) confirm our expectation that, in all years examined, underreaction for the bankrupt sample is driven by firms with negative earnings-to-price ratios.

Panel B of Table 2 presents the results of underreaction tests for turnaround firms. If analysts are able to distinguish between bankrupt and turnaround firms, little or no underreaction to prior forecast errors should be observed in the 4 years before the turnaround (i.e., during distress years), but some underreaction to past forecast errors should be present in the 2 years after the turnaround. In contrast, the results show underreaction before, and not after, the turnaround. In fact, there is some evidence of overreaction to past forecast errors in the year following the turnaround. The Chow tests also show a decline in underreaction in the early part of the year following recovery. These results lend further credence to the view that analysts are unable to distinguish between bankrupt and turnaround firms. That is, they do not foresee that the symptoms of financial distress are temporary and the recovery that follows is permanent. To test whether the results are driven by firms with negative earnings-to-price ratios, we perform separate regression analysis for this group of turnaround firms.[30] We find no evidence of underreaction in the year of turnaround or during the following 2 years. For brevity, the results of this analysis are not reported.

Next we examine the relation between forecast error and the most recent change in earnings per share. The objective of this analysis is to determine whether analysts fully take into account recently released earnings information when forming expectations about future earnings. The results appear in Tables 3 and 4. As discussed in Section 4.1, rational forecasting behavior on the part of analysts would imply that $\gamma = 0$ and $\delta_1 = 0$ in regression (2).

Consistent with our expectations and the results from regression (1), Panel A of Table 3 shows that the bias for the bankrupt sample becomes insignificant (after the announcement of the first quarter's earnings) in Year $t-1$ and remains insignificant over the next 3 years

[29] For this purpose, the earnings-to-price ratio was coded as a dichotomous dummy variable based on its sign. As expected, 87% of the bankrupt firms have negative earnings in Year $t-1$; this represents a gradual increase from 38% in Year $t-4$.

[30] In contrast with the bankrupt firms, only 47% of the turnaround firms have negative earnings in Year $t-1$. This is a jump from 38% in Year $t-4$.

(results not reported). The results of Chow tests for bankrupt sample are also consistent with those from regression (1).

The results for tests of optimism in forecasts for turnaround sample in Panel B of Table 3 are also similar to those from regression (1). They confirm that analysts become less optimistic during the year of turnaround and remain so until the first half of the year

Table 3
Tests of the hypothesis that analysts are optimistic in their earnings forecast

Panel A: Bankrupt sample

| | | Timing of annual EPS forecast | | | |
|---|---|---|---|---|---|
| Year relative to bankruptcy | Sample size[b] | After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
| −4 | 33–43 | −0.078 | −0.119 | −0.072 | −0.043 |
| | | (−1.67) | (−2.41)* | (−2.45)* | (−1.52) |
| −3 | 39–52 | −0.194 | −0.181 | −0.117 | −0.225 |
| | | (−3.22)** | (−3.64)** | (−2.15)* | (−1.95) |
| −2 | 42–59 | −0.232 | −0.360 | −0.224 | −0.110 |
| | | (−2.93)** | (−4.51)** | (−4.41)** | (−3.38)** |
| −1 | 36–53 | −1.337† | −0.578 | −0.180 | −0.285† |
| | | (−2.85)** | (−1.43) | (−0.46) | (−0.84) |

Panel B: Turnaround sample

| | | Timing of annual EPS forecast | | | |
|---|---|---|---|---|---|
| Year relative to turnaround | Sample size[b] | After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
| −4 | 44–61 | −0.046 | −0.049 | −0.042 | −0.037 |
| | | (−6.16)** | (−4.14)** | (−3.51)** | (−3.33)** |
| −3 | 64–87 | −0.117 | −0.081 | −0.055 | −0.047 |
| | | (−5.41)** | (−6.46)** | (−4.69)** | (−3.97)** |
| −2 | 82–105 | −0.087 | −0.084 | −0.061 | −0.057 |
| | | (−5.70)** | (−5.76)** | (−5.24)** | (−5.26)** |
| −1 | 93–125 | −0.105 | −0.072 | −0.055 | −0.034 |
| | | (−7.16)** | (−7.02)** | (−5.87)** | (−5.07)** |
| 0 | 106–130 | −0.022† | −0.018† | −0.007† | −0.001† |
| | | (−2.73)** | (−1.81) | (−1.61) | (−0.30) |
| 1 | 110–138 | −0.003† | −0.010 | −0.008 | −0.004 |
| | | (−0.64) | (−1.46) | (−3.34)** | (−2.04)* |
| 2 | 121–149 | −0.026† | −0.024 | −0.012 | −0.006 |
| | | (−5.51)** | (−4.62)** | (−4.22)** | (−2.79)** |

Regressions of the forecast error against prior year's change in EPS: $ERR_t = \gamma + \delta_1 CEPS_{t-1} + \delta_2 RET_{t-1} + \varepsilon$.[a]

[a] $CEPS_{t-1} = (A_{t-1} - A_{t-2})/P_{t-1}$.

[b] Sample size is the range of number of observations over the four forecast horizons.

[c] The cell entries in the last four columns are estimates of $\gamma$ and the related $t$ statistics (in parentheses below the estimates). The finding that $\gamma$ is negative and significant indicates that forecast is optimistic.

* Represents significance of $t$ statistic for the coefficient at 5% level of significance.

** Represents significance of $t$ statistic for the coefficient at 1% level of significance.

† Represents significance, at 5% level of significance or better, of $F$ test for a change in the coefficient from previous year.

following the recovery. As noted previously, this finding suggests that analysts may be unable to distinguish between bankrupt and turnaround firms and issue unbiased forecasts, or else after a period of financial distress they are unwilling to issue optimistic forecasts. Once recovery becomes more certain, analysts begin to issue optimistic forecasts again.

Table 4
Tests of the hypothesis that analysts underreact to prior earnings information

Panel A: Bankrupt sample

| Year relative to bankruptcy | Sample size[b] | Timing of annual EPS forecast: After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
|---|---|---|---|---|---|
| −4 | 33–43 | −0.333 | 0.050 | 0.314 | 0.080 |
| | | (−2.25)* | (0.58) | (1.55) | (0.89) |
| −3 | 39–52 | −0.422 | 0.342 | −0.023 | 0.311 |
| | | (−1.30) | (1.38) | (−0.08) | (1.19) |
| −2 | 42–59 | −0.115 | 0.004 | −0.181 | −0.197 |
| | | (−0.72) | (0.03) | (−2.01)* | (−3.21)** |
| −1 | 36–53 | −0.017 | −0.045 | −0.061 | 0.667[†] |
| | | (−0.23) | (−0.74) | (−1.63) | (1.84) |

Panel B: Turnaround sample

| Year relative to turnaround | Sample size[b] | Timing of annual EPS forecast: After last annual report[c] | After first quarter report | After second quarter report | After third quarter report |
|---|---|---|---|---|---|
| −4 | 44–61 | 0.041 | 0.297 | 0.282 | 0.020 |
| | | (0.24) | (1.60) | (1.44) | (0.11) |
| −3 | 64–87 | 0.114 | −0.110 | −0.242 | 0.088 |
| | | (0.39) | (−0.64) | (−1.25) | (0.63) |
| −2 | 82–105 | 0.048 | 0.016 | −0.044 | 0.009 |
| | | (0.37) | (0.13) | (−0.51) | (0.10) |
| −1 | 93–125 | −0.154 | 0.022 | −0.024 | −0.047 |
| | | (−1.35) | (0.34) | (−0.30) | (−0.84) |
| 0 | 106–130 | −0.100 | 0.030 | −0.048 | 0.009 |
| | | (−1.48) | (0.62) | (−1.21) | (0.44) |
| 1 | 110–138 | 0.020 | 0.055 | 0.002 | −0.002 |
| | | (0.57) | (1.53) | (0.19) | (−0.24) |
| 2 | 121–149 | 0.074 | 0.005 | −0.004 | −0.007 |
| | | (0.93) | (0.07) | (−0.10) | (−0.24) |

Regressions of the forecast error against prior year's change in EPS: $ERR_t = \gamma + \delta_1 CEPS_{t-1} + \delta_2 RET_{t-1} + \varepsilon$.[a]

[a] $CEPS_{t-1} = (A_{t-1} - A_{t-2})/P_{t-1}$.

[b] Sample size is the range of number of observations over the four forecast horizons.

[c] The cell entries in the last four columns are estimates of $\delta_1$ and the related $t$ statistics (in parentheses below the estimates). The finding that $\delta_1$ is positive and significant indicates that analysts underreact to prior earnings information.

* Represents significance of $t$ statistic for the coefficient at 5% level of significance.

** Represents significance of $t$ statistic for the coefficient at 1% level of significance.

[†] Represents significance, at 5% level of significance or better, of $F$ test for a change in the coefficient from previous year.

Tests of whether analysts underreact to recent changes in earnings are reported in Table 4. For the bankrupt sample, there is a slight evidence of overreaction in the second year prior to bankruptcy. For the turnaround sample, recent earnings changes are not associated (either positively or negatively) with forecast errors in any of the years examined. Further, there are no significant changes in the slope from year-to-year for either sample. These results suggest that for both samples, analysts take into account the information conveyed by the past realization of earnings in forming expectations about future earnings.

The lack of underreaction or overreaction to prior earnings changes is important in view of our findings from regression (1) and the conflicting results of prior research on this issue. DeBondt and Thaler (1987) suggest that investor "myopia" can lead to an overemphasis on recent earnings and, based on I/B/E/S data, DeBondt and Thaler (1990) show that compared to actual realizations, earnings changes forecast by analysts are significantly more extreme. On the other hand, Abarbanell and Bernard (1992) conclude that analysts' forecasts underreact to recent earnings changes although the underreaction tends to dissipate with forecasts produced later in the year.[31] The difference in the results of underreaction tests in regressions (1) and (2) can be attributed to what is being measured: underreaction to past errors vs. past earnings changes. Analysts' incentives to protect their reputation and avoid legal liability may induce them to take account of past earnings. However, analysts may not feel compelled to issue forecasts that ensure a lack of serial correlation between current and past forecast errors.

To test whether the results are affected by omitted variables, we add size (measured by the natural logarithm of market value of equity), analyst following (measured by the number of forecasts), earnings persistence (measured by the earnings–price ratio), and forecast consensus (measured by the absolute value of the mean forecast divided by the standard deviation of forecasts) to all of our regressions. In general, these variables are not significant, and their inclusion in the regressions does not improve the explanatory power of the regressions. For the turnaround sample, forecast consensus is significant in a few regressions, and its inclusion improves the explanatory power of the regressions.

Overall, we interpret our results (across firms and over time) as indicating that the bias and underreaction to past forecast errors and past earnings changes are affected by the incentives faced by analysts. In particular, when the costs of issuing optimistic forecasts are high in relation to benefits, analysts prefer to issue unbiased (rational) forecasts. Underreaction to past forecast errors is most evident when earnings components are predominantly permanent.

## 5. Concluding remarks

The results of our study indicate that some of the properties of analysts' earnings forecasts for financially distressed firms are different from those documented for other samples in prior research. Consistent with prior evidence, we find that the analysts' forecasts for bankrupt and turnaround firms are generally optimistic. However, the forecast bias for bankrupt firms

[31] Neither of these studies explicitly considers bankrupt or turnaround firms, although Abarbanell and Bernard find that their results hold for a subsample of poor performers.

declines to insignificant levels by the year prior to bankruptcy filing. This finding is consistent with our hypothesis that analysts' forecast behavior changes over time as the financial condition of these firms worsens and the perceived costs of issuing optimistic forecasts become greater than the benefits of doing so. Forecast bias for the turnaround sample declines to insignificant levels in the year of recovery and remains insignificant during the first half of the following year. These results suggest that following two or more consecutive years of poor performance, analysts are either unable to distinguish turnaround from bankrupt firms, or else they are unwilling to accept the potential risks of litigation and loss of reputation from issuing optimistic forecasts. Thus, they become unbiased (rational) in their forecast behavior.

Consistent with previous research, the results also show that analysts generally underreact to past forecast errors. For bankrupt firms, this underreaction persists from 4 years before through the year of bankruptcy and is driven by firms with negative earnings-to-price ratios in every year. Taken together, these findings indicate that analysts correctly perceive the negative earnings outcome for bankrupt firms to be permanent. For turnaround firms, underreaction to past forecast errors exists in the 4 years prior to recovery but dissipates in the year of recovery and remains absent during the subsequent 2 years. Underreaction in the prerecovery period exists for both firms with positive and negative earnings-to-price ratios. These results reinforce our earlier conclusion that analysts may be unable to distinguish turnaround from bankrupt firms.

We find no evidence of underreaction or overreaction to past changes in earnings for either sample, implying that analysts explicitly consider past earnings outcomes when issuing forecasts for distressed firms. The difference in the results of the underreaction tests may reflect analysts' concern about their reputation and legal liability.

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