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Non-earnings information and analysts' revisions of future earnings forecasts

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City University of New York, 1992

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Non-earnings Information and Analysts' Revisions of Future Earnings Forecasts

By

Mahmoud A. Alkhalialeh

A dissertation submitted to the Graduate Faculty in Business in partial fulfillment of the requirement for the degree of Doctor of Philosophy, The City University of New York.

1992

This manuscript has been read and accepted for the Graduate Faculty in Business in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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Abstract

Non-earnings Information and Analysts' Revisions of Future Earnings Forecasts

By

Mahmoud A. Alkhalialeh

Advisor: Professor Steven Lustgarten

In the accounting literature, little attention has been given to non-earnings information, and to the sources of analysts' revisions other than earnings. This study examines the role of non-earnings information in the formation of analysts' revisions of future earnings. Thus, this study is the first to examine analysts' revisions subsequent to the annual report release. The main argument in this study is that financial statements provide new signals about future earnings, and these signals are utilized by analysts who incorporate them in their subsequent revisions of future period earnings forecasts. This proposition has been tested empirically by examining the association between summary measures derived from financial statements and analysts' revisions of future earnings following the annual report

release. These summary measures are simply financial statement variables which include change in receivables, capital expenditures, inventories, sales and accounting rate of return.

The general test model employed by this study is estimated using 1720 observations (firm-years), pooled across firms and over the five year period ending in 1990. The empirical findings are in general consistent with the main argument in this study that financial statements provide incremental information about future earnings beyond that embodied in current earnings. The regression results consistently indicate that financial statement variables are jointly and significantly associated with analysts' subsequent revisions of future earnings. At least two financial statement variables remain significantly associated with analysts' revisions after controlling for the earnings effect. However, only a small proportion of the variances in analysts' revisions are explained by the financial statement variables.

The model employed by this is limited to several financial statement variables which may not provide a complete summary of financial statement information. In addition, the test model does not incorporate other non-earnings information, such as macroeconomic indicators.

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Chapter 1

INTRODUCTION

The purpose of this study is to examine the role of non-earnings accounting information in financial analysts' revisions of future earnings forecasts. Specifically, the study will examine financial analysts' forecast revisions (here after FAR) subsequent to the annual report release.

Several empirical studies have indicated that financial analysts' forecasts and analysts' revisions have information content, an indication that they are useful to investors(e.g., Imhoff & Lobo,1984; Givoly & Lackonishok,1979). However, little attention has been given to the information that is utilized by analysts in forming and revising earnings forecasts. An interesting question that arises is whether accounting information, other than earnings, is used by analysts in revising earnings forecasts. Recent empirical research(e.g., Ou, 1990), has shown that future earnings changes can be predicted by non-earnings information. Annual reports are most likely to be utilized by analysts in forming revisions of their forecasts.

This study will focus on the association between non-earnings information embodied in the financial statements and

subsequent analysts' revisions of future period earnings forecasts. The main question that will be addressed is whether the annual report conveys information about future earnings beyond that embodied in current earnings.

As accounting researchers, we are concerned whether accounting information conveys relevant information about prospective earnings. Financial statement analysis identifies aspects of financial statements that are relevant in investment decisions. This study theorizes that financial statements provide signals about future earnings and that these signals, are utilized by analysts who incorporate them in subsequent revisions of future period earnings forecasts. There are several reasons which support this proposition. First, financial statements are likely to help analysts identify transitory and permanent components of earnings. Changes in current year earnings, even unexpected, do not necessarily lead to a revision in future period earnings; only changes in the permanent components are likely to trigger subsequent analysts' revisions of future earnings. Second, financial statements may indicate managers' expectations that have implications for future earnings. Presumably, managers have more, or at least different information about their firms than outsiders Therefore, they are in the best position to evaluate the effects of different events on their firms. Thus, managers' expectations may convey new information to

analysts about future earnings. Third, financial statements may signal changes in management's policies which are likely to have direct or indirect effects on future earnings. Recent studies (Ou, 1990; Ou & Penman, 1989) provide empirical evidence which shows that certain summary measures derived from the annual report are associated with future earnings and future stock returns. This suggests that annual report information has predictive ability with respect to future earnings. If the annual report conveys information about future earnings, analysts' subsequent revisions should reflect annual report information, provided that this information is not embodied in prior earnings releases. This study will test this proposition by examining the association of financial analysts' revisions(FAR) with several financial statement descriptors. These include measures of changes in receivables, inventory, capital expenditures, sales and accounting rate of return.

Chapter 2

MOTIVATIONS, CONTRIBUTION AND RELATED RESEARCH

This study is the first to examine the financial analysts' forecast revision(FAR) subsequent to the annual report release. Thus, this study is the first to formally examine the source and the determinants of analysts' revisions. The examination of the source and determinants of FAR is motivated by the notion that financial analysts' forecasts (revisions) are useful to investors. There are several reasons in support of this notion. First, and above all, there is an economic reason to believe so, since earnings forecasts are published by many brokerage firms and are continuously sold to investors. Should analysts' forecasts have no value to investors, there would be no consistent demand for them. Second, several empirical studies reported abnormal returns around and after analysts' forecast revisions (i.e., Imhoff & Lobo, 1984; among others). Third, several empirical studies provide consistent evidence which indicate that analysts' forecasts are more accurate and represent better proxies for market expectations than do time series forecasts.

Additionally, the study provides an alternative way to examine the usefulness of accounting information, in particular non-earnings information. As accountants, we are concerned about the usefulness of accounting information embodied in the financial statements and whether the financial statements provide incremental information beyond earnings. Beginning with Ball and Brown (1989), a significant portion of capital market research in accounting has examined the usefulness of accounting numbers. However, as Bernard (1989) pointed out, little attention has been given to the non-earnings accounting information. Earlier studies(Wilson, 1986;

1987; Stober & Bernard, 1989) examined market reaction to the annual report release to detect the information content of one earnings component (cash flow) over another (accruals). This study examines the financial analysts' response (revision) to the annual report release. Therefore, it can be viewed as an alternative way to examine the usefulness of accounting data, in particular the annual report to capital market participants. The primary advantage of this approach is that it does not require any assumption about market efficiency which has been questioned recently(1).

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(1) The efficient capital market hypothesis has been questioned by academics in Economic, Finance and Acounting since the mid 80's. Several studies in the economic and finance literature showed that stock returns are predictable based on historical stock returns (e.g Fama & French,1988; Meckinly,1988; Poterb & Summer,1989; among others). In the accounting literature lately, Ou and

Finally, unlike previous studies which were limited to earnings, cash flow and accruals, this study examines the information content of a wider set of accounting data (i.e., Receivables, Inventory, Capital Expenditures, Sales and the Accounting rate of return).

Penman (1989) questioned the semistrong form of market efficiency and provide empirical evidence which indicate that future stock returns can be predicted by financial statements descriptors (mostly financial ratios) derived from the annual report. These findings have been viewed, at least, inconsistent with the efficient market hypothesis.

Chapter 3

LITERATURE REVIEW

3.1 The Information Content of Analysts' Revisions

Beginning with Givoly and Lakonishok(1979), several studies examine the information content of analysts' forecasts revisions. Generally, it has been shown that analysts' revisions provide useful information to the stock market.

Early studies by Givoly and Lakonishok (1979), and Richards and Martin(1979), examined market response to revisions in analysts' forecasts. Both studies found significant abnormal returns in the expected direction: positive (negative) abnormal returns were associated with upward(downward) revisions in the month of forecast revision as well as in the month preceding it. Results from the two studies strongly suggest that analysts' revisions have information content. One notable finding of Richards and Martin(1979) is that analysts' revisions, occurring early in the year, appear to contain more new and useful information. Revisions occurring early in the year are likely to reflect corporate accounting releases(earnings announcements and annual report).

Imhoff and Lobo (1984) examined the relationship

between revisions in analysts' forecasts and contemporaneous stock price movements. They defined revisions as the change in the mean of the distribution of analysts earnings forecast from one month to the next. They found a significant positive association between the magnitude of forecast revisions and the magnitude of unsystematic stock returns. Recently, Jennings(1987), examined the association between unsystematic security returns and both management forecasts and revisions in analysts' forecasts subsequent to management forecasts. Both management forecasts and subsequent analyst revisions are significantly associated with unsystematic returns during the week of management forecast release. More recently, Lys and Sohn(1990), examined two kinds of analysts' revisions: revisions occurring subsequent to corporate accounting releases (quarterly and/or annual earnings, 10-K or annual report), and revisions not occurring subsequent to corporate accounting releases. The results indicate that analysts' revisions are informative when they follow, at least, one corporate accounting release, but they are not informative otherwise.

Brown, Foster and Noreen (1985) use annual earnings forecasts from the IBES summary data base, to investigate the relative ability of current changes in annual earnings and revisions in next year's earnings forecast to explain changes in stock prices over eight to ten month holding periods. They

found that the one year ahead revision has more explanatory power than the current change in earnings in two ways. First, when each variable is used separately in a univariate regression , the year ahead revision produces a higher R^2-square. Second, when the orthogonal component of the year ahead revision is added to the current innovation in a multivariate regression, its estimated coefficient is significantly greater than zero. However, when the orthogonal component of the current innovation is added to the one year ahead revision in a multivariate regression, its estimated coefficient is not significantly different from zero. The results, therefore, suggest that all the information contained in current earnings innovation is contained in the one year ahead revision but not vice-versa.

Cornell and Landsman (1989) extended Brown, Foster and Noreen (1985) by investigating the extent to which revisions of more distant earnings forecasts(one quarter and one year ahead revisions), as well as current forecast errors, affect stock returns. Their results are consistent with Brown, Foster & Noreen(1985) in that forecast revisions provide incremental explanatory power over the forecast error. This suggests that both next quarter's and next year's forecast revisions provide investors with new useful information.

3.2 Superiority of Analysts' Forecasts

A significant portion of the earnings forecast literature examines financial analysts' forecasts and compares them with alternative forecasts. One line of research has compared the accuracy of analysts' forecasts with that of management forecasts. Although a few studies do not support the superiority of management's forecasts(i.e., Imhoff, 1978), most studies suggest that management' forecasts are superior to analysts' forecasts (i.e., Ruland, 1978; Jaggi, 1980).

Another line of research examined the performance of analysts' forecasts (hereafter FAF) relative to the forecasts generated by mechanical models(Random Walk & Time series). Early studies compared the accuracy of analysts' forecasts with forecasts generated by time series models. These studies concluded that analysts' forecasts are significantly more accurate than time series forecasts (i.e., Brown and Rozeff, 1978; Collins and Hopewood, 1980; among others). However, more accurate forecasts are not necessarily a better proxy for market expectations. Therefore, later studies addressed the question whether analysts' forecasts represent a better surrogate for market expectations of earnings than forecasts generated by mechanical models. Findings from these studies indicate that analysts' forecasts are not only more accurate, but also represent a better proxy for market expectation of earnings than forecasts generated by random walk or time

series models (i.e., Fried and Givoly, 1982; Brown, Griffin, Hagerman and Zmijewski, 1987b; among others). Fried and Givoly (1982) suggest that the FAF superiority is due to the broadness of the information set used by analysts, and to some extent to analysts' reliance on information released after the end of the fiscal year. Brown, Richardson and Schwager (1987), showed that FAF superiority is a function of the dimensionality of the information set available to the analysts. In general, the superiority of analysts' forecasts suggests that analysts utilized a wider information set than the one utilized by time-series models which are limited to earnings information. Financial analysts are likely to utilize non-earnings information as well as earnings information, while time series models are limited to earnings information. Among the most likely non-earnings information that is likely to be utilized by analysts, in forming and revising future period forecasts is the annual report.

3.3 Determinant of Analysts' Revisions and Non-earnings Information

Several studies have examined the association between earnings announcements and subsequent analysts' revisions of next period's earnings and have shown a strong association between earnings forecast errors and subsequent revisions of

future period(quarters or year) earnings(i.e., Brown and Rozeff, 1979; Abdel-Khalik and Espejo,1978; Givoly, 1985). Givoly (1985), analyzed the process by which analysts form their annual earnings forecasts. He found that annual earnings forecasts are formed adaptively with respect to earnings forecast errors of the previous year. Brown and Rozeff(1979) examined the association between quarterly earnings forecast errors and next quarter analysts' forecast revisions. The results show that analysts utilized their previous forecast errors in forming revisions of future period earnings forecasts. However, their results indicate that the proportion of variation in analysts' revisions, explained by forecast errors for the three quarters examined, ranges from 3% to 41% for one quarter ahead revisions. This suggests that a larger proportion of analysts' revisions (ranging from 59% to 97%) can be explained by non-earnings information. This is consistent with Brown, Foster and Noreen (1985) and Cornell and Landsman (1989) studies, which show that analysts' revisions reflect more information than that contained in earnings changes. For example, Brown, Foster and Noreen(1985), found that a greater proportion of ten month changes in stock prices, is explained by one year ahead revision than by earnings changes. This suggests that there is more useful information reflected in analysts' revision than are embodied in earnings changes.

Recently, Bagniski and Hassell (1989), examined whether analysts utilize management forecasts in forming subsequent revisions. They found that analysts' revisions subsequent to the management forecasts are significantly associated with both a measure of management forecasts and CAR around management forecasts.

Two major conclusions are noteworthy from the reviewed literature. First, analysts' revisions provide investors with incremental information beyond that embodied in earnings. Second, a greater proportion of analysts' revisions can be explained by non-earnings information than by earnings. Nevertheless, studies which have examined the source and determinants of analysts' revisions have been limited to earnings reported or forecasted by management. An interesting question that emerges, is to what degree information other than earnings, is utilized by analysts in revising their forecasts. In light of more recent empirical research(i.e., Freeman,1979; Ohlson & Penman, 1982; Ou, 1990), which has shown that future earnings can be predicted by current non-earnings information, the annual report is likely to be utilized by analysts in forming revisions of their forecasts. For example, Ou(1990) examined the extent to which non-earnings information predict future earnings changes. This

was tested by fitting binary one year ahead earnings prediction models to selected annual report data, and comparing these models' predictions with those of a random walk model. The annual report summary measures that were examined include the change in inventory, the change in capital expenditures, the change in the book rate of return and the growth in sales. The findings suggest that a firm's non-earnings annual report numbers contain information concerning the next year earnings changes. If a firm's current annual report contains new information about future earnings changes, analysts are expected to utilize this information in revising the earnings forecasts of the following year. Therefore, this study will extend Ou(1990), by examining whether analysts use annual reports to extract information relevant to forecasts of future earnings. Additionally, this study uses revised measures for the changes in inventory and receivables and methodology different from that employed by Ou(1990). Finally, this study develops new hypotheses about the association between non-earnings information (embodied in the annual report) and analysts' revisions of future earnings. Ou (1990), on the other hand, did not go beyond providing statistical association between financial statement variables and future period earnings, and her study did not make any predictions about the direction of the association between financial statements variables and future earnings changes. This study theorizes that financial

statements provide signals about future earnings which are likely to be utilized by analysts in revising their forecasts of future earnings. This will be tested empirically by examining the behavior of analysts' revisions after this event. Analysts' revisions subsequent to the annual report occur early in the year. One notable finding of Richards and Martin (1979), is that analysts' forecast revisions occurring early in the year appear to contain more new and useful information. Lys and Sohn (1990) also indicate that analysts revisions are informative when they follow one or more corporate accounting releases (quarterly and/or annual earnings, 10-K or annual report) but are not informative otherwise.

Chapter 4

HYPOTHESES DEVELOPMENT

4.1 Financial Statement Hypothesis

The first hypothesis deals with the main question in this study, that is, whether financial statements convey information about future earnings to analysts, and whether this information has incremental information content in explaining future earnings over current earnings.

Analysts are expected to utilize financial statement information if they believe it has implications for future earnings above and beyond that embodied in current earnings. There are several reasons which suggest this expectation. First, financial statement information is likely to help analysts identify the permanent and transitory components of earnings. Second, financial statements may reflect management expectations of future earnings. Third, financial statements may signal changes in management policies which have implications for future earnings. Finally, several empirical studies have shown an association between summary measures derived from the financial statements and future earnings(i.e., Freeman, Ohlson and Penman,1982; Ou, 1990).

This leads to the following hypothesis:

H_1: Financial statements convey information about future earnings, beyond that embodied in current earnings. This information is incorporated in the subsequent revision of analysts' earnings forecasts.

4.2 The Change in Receivables

If there is an information link between a change in receivables and future earnings, analysts are expected to utilize this link. There are two propositions which jointly establish the information link between a change in receivables and future earnings. First, sales are a major component of earnings and are strongly correlated with earnings. Second, a change in receivables could provide a signal about future sales.

A change in the receivables balance can be sufficiently explained by three factors: (1) current year sales, (2) the effectiveness of the collection procedures, and (3) a firm's credit policies. Sales are usually announced along with preliminary earnings announcements. Therefore, the market can

develop an expectation about the receivable/sales ratio(hereafter REC/S) before the release of the annual report, based on the current sales and the past receivable to sales relationship. Under these conditions a deviation of the reported REC/S ratio from the anticipated one, would reflect an unexpected change in Receivables. Assuming no significant change in the effectiveness of collection procedures in the short run, an unexpected increase in the REC/S ratio is likely to signal that there has been an expansion in a firm's credit policies. This is a negative signal about future sales and future earnings. An increase in REC/S ratio is likely to suggest, in general, that part of current sales is unlikely to persist in the future, or that it can be maintained only by liberal credit policies, which involve a new burden on future earnings in the form of increased bad debt expense(allowances) and interest expense. Therefore, a higher sales level associated with an increase in REC/S ratio is likely to be viewed as less credible and less likely to persist in the future than a sales level associated with a decrease or no change in REC/S ratio[1].

On the other hand, a decrease in REC/S ratio signals a conservative credit policy. Sales resulting from

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(1) Consistent with Stober & Bernard(1989), an increase in REC/S ratio may indicate a problem in collection of receivables. This is also a negative signal about future earnings, since it involves a burden on future earnings and a possible decline in future sales.

a conservative credit policy have higher collection probability than sales resulting from a liberal credit policy. Therefore, sales associated with a conservative credit policy are likely to generate less bad debt expense than sales associated with a liberal credit policy. Therefore, a decrease in the REC/S ratio would suggest a decrease in bad debt expense per dollar of sales.

An increase in receivables or liberal credit policy are often associated with sales increase. Therefore, it could be argued that an increase in receivables, signal a sales increase and in this sense, it can be a good signal about future earnings. However, it is important to notice that within this research context , change in receivable or receivable-sales ratio, does not provide any new information about changes in current sales level. That is because sales are usually announced in the media prior to the annual report release. Therefore, whatever signals changes in current sales are provided about future earnings, they will be incorporated in analysts' revisions made prior to the annual report release. However, a change in the receivable-sales ratio (REC/S) can provide a signal about sales quality (i.e., how costly sales are or the degree of persistence in sales). Higher sales quality is a positive signal for future earnings. This discussion leads to the following hypothesis.

H_2: Given current sales, unexpected changes in the receivables to sales ratio are likely to be negatively associated with analysts' revisions of future earnings.

4.3 Book Rate of Return (BRRT)

There are several reasons to believe that financial analysts are likely to utilize current BRRT in revising next year forecasted earnings. First, BRRT has been shown to follow a mean-reverting process, that is ($BRRT_{t+1}$ - $BRRT_t$) is negatively correlated with BRRTt(Beaver,1970; Lookabili,1976). Second, BRRT is strongly correlated with earnings. Finally, at least two studies have provided consistent empirical evidence indicating an association between current BRRT and next period earnings changes. The evidence from Freeman, Ohlson & Penman(1982), suggests that BRRT has a predictive ability with respect to future earnings changes. Ou(1990), showed a highly significant negative association between BRRT and next year earnings change. This leads to the following hypothesis.

H_3: Book rate of return is likely to be negatively associated with analysts' forecast revisions of next period's earnings.

4.4 Inventory Change Hypotheses

This study theorizes that changes in inventory level provide financial analysts with signals about future earnings. If analysts utilize these signals, they should be reflected in their forecast revisions of future earnings.

Ou(1990), in an attempt to establish an information link between financial statement descriptors and future earnings, found a negative association between inventory changes and future earnings changes. This result suggests that an inventory build up provides a bad signal for future earnings. However, an increase in inventory could mean two things; either a highly unanticipated decline in current year sales, or higher future sales. These are two different signals about future sales and future earnings. Therefore, this paper argues that conditioning changes in inventory on sales growth clarifies the implications of inventory changes on future earnings and provides a more appropriate link between

inventory changes and future earnings than the one suggested by Ou(1990). Sales are always disclosed prior to or at the time inventory figures are released in the annual report. Therefore, the expected level of inventory could be estimated based on current year sales and the past sale-inventory relationship. Assuming that firms utilize inventory efficiently, or at least, that there is no significant change in this efficiency in the short run, then an increase or a decrease in reported inventory over expected inventory, conditioned on current sales, is likely to signal future sales change or managers' failure to adjust inventory levels to future sales. These are different signals with direct or indirect implications on future sales and future earnings. Presumably, inventory level can be sufficiently explained by future sales, since managers are expected to adjust inventory to future period sales rather than to current sales level. However, if current year sales experience an unanticipated significant decline, it could affect inventory level as well. Thus, the implication of inventory changes on future earnings depends not only on the direction of the inventory change(increase or decrease), but also on whether current sales are higher or lower than anticipated. Therefore, to examine the inventory signal, firms are grouped along two dimensions. First, firms are grouped along sales growth into sales lower than expected and higher than expected. Next, each group is divided into two groups based on the direction

of inventory change(e.i., increase or decrease, from now on inventory increase or decrease will refer to increase or decrease in reported inventory over the desired inventory level conditioned on current sales).

For firms that have achieved higher than expected current sales and an inventory increase, the possibility of having inventory build up resulting from less than anticipated sales is excluded because current sales are higher than anticipated. Therefore, an inventory increase suggests that the current increase in sales is not only credible and likely to persist in the future, but also managers expect higher future sales and have adjusted inventory accordingly. This leads to the following prediction:

H_4: For firms with higher than expected current sales, an inventory increase represents a good signal about future earnings, and is likely to lead to upward forecast revision of future earnings.

However, an inventory decrease for firms with higher than expected sales is likely to suggest one of two alternatives. First, an inventory decrease could suggest that

the current sales increase is less credible and part of it, at least, is unlikely to persist in the future period because management did not adjust the inventory to the new sales level. On the other hand, this inventory decrease could be unplanned and due to an unanticipated increase in current sales and managers' failure to adjust inventories to the new sales level. However, this is also a negative signal about future earnings because managers' failure to maintain sufficient inventories involve future costs(i.e., loss of some future sales). These two signals, eventhough they are different, have the same implication for future earnings, which leads to the following hypothesis:

H_5: For firms with higher than expected current sales, inventory decrease represents a negative signal for future earnings, and is likely to lead to a downward forecast revision of future earnings.

On the other hand, firms that have experienced lower than expected current sales could have either an inventory increase or an inventory decrease. For those which have inventory decreases, the possible effect of current sales on inventory change resulting from less than anticipated current sales, is excluded. Therefore, an inventory decrease suggests not only that the decline in current sales is likely to persist in the future, but also managers anticipate a further decline in

future periods, and have adjusted inventory levels accordingly. This leads to the following hypothesis:

H_6: For firms with lower than expected current sales, an inventory decrease represents a negative signal for future earnings, and is likely to lead to a downward forecast revision of future earnings.

However, for those firms which experienced an unanticipated decline in sales, an inventory increase signal is highly contextual. In this case it is difficult to tell whether the inventory build up is due to the current decline in sales and managers' failure to adjust inventory to the new sales level, or that managers believe that the decline in sales is transitory, and the inventory build up is planned to meet higher future sales. Therefore, this study provides no prediction about this particular group. The following figure displays predictions related to inventory changes.

Predictions related to inventory changes

	Current sales higher than expected $((S_t - E(S_t)) > 0$	Current sales higher than expected $(S_t - E(S_t)) < 0$
Inventory** Increase	**FAR+**	**FAR ?**
Inventory Decrease	**FAR-**	**FAR-**

FAR+ : Upward analysts' forecast revisions of future earnings.
FAR- : Downward analysts forecast revisions of future earnings.

**Inventory Increase refers to reported inventory greater than expected inventory given current sales. While inventory decrease refers to reported inventory less than expected inventory given current sales.

4.5 The Change in Capital Expenditures

A firm's current and past investment activities are one of the most important determinants of its future earnings. Changes in capital expenditures which reflect new investment decisions are an important element in predicting earnings, and very likely to be utilized by analysts in revising future period earnings forecasts.

It has been posited by economists that expected profit is an important determinant of the level of investment. Tinbergen, J., among others, argued that "it is almost tautology to say that investment is governed by profit expectation." (Jorgenson & Siebert, 1968, p.683). Several empirical studies have examined the expected profits model of investment which suggests that expected profits induces investment and provided supporting findings[1] (i.e., Eisner, 1967; Grunfeld, 1960; among others). Eisner(1967) for example, found that profits and the rate of growth in sales are both significant determinants of the level of investment. A notable observation from the studies that have examined the investment-profit relation is that they employ measures of profit almost identical to accounting earnings(e.g., net income used by Eisner, 1964), or highly correlated with accounting earnings. For example, Eisner(1967)'s measure of expected profit, net income plus depreciation, is highly

correlated with accounting earnings. Bowen, Burgstahler and Daly(1986) showed that net income plus depreciation is almost perfectly correlated with net income(the median correlation coefficient = 0.98).

The literature suggests that expected profits induce investment and accounting earnings is an acceptable measure of profit. Given that management follows a value maximization rule, they will undertake only profitable investments. In addition, future earnings would be a function of the current level of investments. Therefore, it could be argued that a change in capital expenditures reveals management expectations of future earnings. The above discussion leads to the following hypothesis:

H_7: A change in capital expenditures is likely to be positively associated with analysts' revision of future earnings.

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(1) Early studies (e.g, Eisner, 1967 & Kuh, 1964) posited that expected profit or sales induce investment and found empirical evidence in support of this proposition. For a review of these studies and other investment models see Jergenson Dale W. " Econometric Studies of Investment Behavior," Journal of Economic Literature 9 (1971), pp. 1111-46.

Chapter 5

METHODOLOGY

5.1 The General Test Model The following test model will be used to examine the association between financial statement variables and analysts' revisions.

$$\textbf{MODEL I: } FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 \Delta CE_{it} + \delta_3 BRRT_{it} + \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \varepsilon_{it}$$

Where:

FAR_{it} : The one year ahead forecast revision for firm i for year t+1 made subsequent to the annual report release of year t.
= $E_a(EPS_{i,t+1}) - E_b(EPS_{it+1})$, where $E_b(EPS_{it+1})$ is the pre-annual report release forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1

$\Delta RECS_{it}$: The unexpected change in Receivable/Sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i and year t. It is given by the ratio of reported income to total equity.

ΔCE_{it} : the change in capital expenditures for firm i and year t. It is given by $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditures in year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory.
= 0 otherwise

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory.
= 0 otherwise

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory.
= 0 otherwise.

The effect for firms with current sales higher than expected and sales increase will be reflected in the intercept. The above model will be used to test the main hypothesis (H_1). A significant coefficient for some or all of the financial descriptors in the model is consistent with the analysts' utilization of annual report data in forming revisions. The model will be used to test the other hypotheses as well. I expect δ_1 and δ_3 , δ_5 and δ_6 to be less than zero while δ_2 and δ_4 to be greater than zero.

5.2 Variable Measurement

5.2.1 One Year Ahead Revision

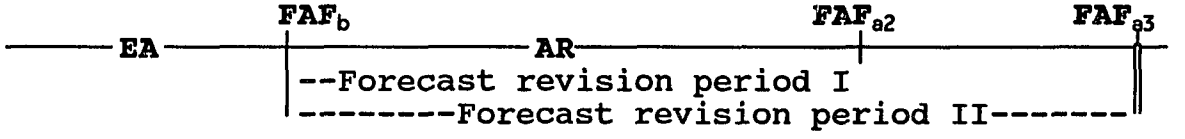
The data items reported by the IBES tapes include the high and low forecasts, two measures of consensus forecast, and the mean and the median forecasts of variety of horizons are available including one year ahead and two year ahead forecasts. In this study, one year ahead median forecast will be used to calculate one year ahead revision, the dependent variable in the model. One year ahead revisions will be computed as the difference between two forecasts(FAF_a-FAF_b). FAF_b is the IBES one year ahead forecast prior to the annual report release and after the announcement of earnings on the WSJ. FAF_a is the post annual report one year ahead forecast. It is the first forecast released by IBES after the date on which the a company files the 10-k with the SEC. However, because there is a lag between the forecast date and the date on which IBES releases the monthly forecasts, some of the post-annual report consensus forecasts may not include some of the one year ahead forecasts made immediately after the annual report release. Instead these forecasts will be included in the following month IBES monthly consensus forecast. Therefore, the measured revision may not fully captures forecasts made following the annual report release. To reduce the bias in analysts' revisions induced by the

reporting lag, I allow for an appropriate time interval between the date of the annual report and the date of the consensus forecast. Therefore, two measures of analysts' revisions are used in the analysis. One is based on post annual report forecast with a two week interval (hereafter "reporting lag"), and another is based on post annual forecast with a three week reporting lag. The post annual report forecast with a two week reporting lag is the first forecast made at least two weeks following the annual report release.

Figure 1

The following figure shows the sequence of events relative to the two forecasts used to compute the revision.

The SEQUENCE OF EVENTS



FAF$_b$:the last one year ahead forecast before the annual report release and after the earnings announcement.

FAF$_{a2}$: The post annual report forecast with two week reporting lag.

FAF$_{a3}$: The post annual report forecast with three week reporting lag.

EA : the date of the earnings announcement in the WSJ.

AR : the filing date for the 10-K with the SEC.

For example, if firm X filed the 10-K with the SEC on March 10 1991, the post annual report forecast with two week reporting lag would be the first forecast released after March 25, which is going to be April IBES consensus forecast. This is because IBES releases the monthly consensus forecast on the third thursday of each month. Therefore, March consensus forecasts were released on March 19 for 1991.

5.2.2 Measurement of Inventory

In theory, the desired inventory could be affected by many factors(i.e inflation, carrying costs as well as future sales). However, as Irvine (1981) indicated, most recent studies of inventory investment have postulated a target inventory level that depends solely on expected future sales. Future expected sales have been shown to be the most important factor in determining inventory investment(i.e., Lovell, 1967; Grossmam, 1973; Irvine, 1981).

The desired inventory level may not equal the reported inventory level when current sales are different from the level anticipated by management. If current sales are as expected by management, then the reported inventory is simply the desired inventory. Therefore, any change in inventory is

planned and reflects management's expectation of future sales. However, if current sales are different from expectation, the reported inventory level could be affected by current sales changes as well as the desired inventory level. In order to control for the effect of current sales on the direction of inventory change (increase or decrease), sampled firm-years are grouped along two dimensions. First, firms are grouped into higher than expected and lower than expected current sales groups. The expected sales here are management's expectation of current sales. It is estimated by the following model, which expresses current sales as a function of last year sales and the average growth in past years sales:

$$E_{t-1}(S_t) = S_{t-1} + \gamma S_{t-1}$$

Where,

$E_{t-1}(S_t)$: Is the expected sales for period t made at the end of period t-1.

S_{t-1} : Is the actual sales for period t-1.

γ : Is the average three years sales growth rate prior to period t-1.

Then each of these two groups is divided into two subgroups along inventory change (increase or decrease). Change in inventory is measured by the follow model:

$$\Delta INV_t = INV_t - E(INV_t)$$

Where,

ΔINV_t : the unexpected change in inventory at the end of period t.

INV_t : the reported inventories at the end of period t.

$E(INV_t)$: the expected inventory at the end of period t.

The expected inventory at the end of period t is estimated using the following model:

$$E(INV_t) = E(INV/S)(E(S_{t+1}))$$

Where,

E(INV/S): Is the desired inventory-sales ratio which is estimated by the average five years of inventory-sales ratios.

$E(S_{t+1})$: Expected sales in period t+1.

This process results in classifying each observation in one of the following four groups:

1- Higher than expected current sales and inventory increase.
2- Higher than expected current sales and inventory decrease.
3- Lower than expected current sales and inventory increase.
4- lower than expected current sales and inventory decrease.

This methodology effectively controls for the effect of current sales on the direction of inventory change in two groups. Specifically, when current sales are higher than expected, the inventory increase is planned and not due to the deviation of current sales from expectation. On the other hand, when current sales are less than expected, the inventory decrease is planned and not due to the deviation of current sales from expectation.

5.2.3 Book Rate of Return

Book Rate of Return is measured by dividing net income before extraordinary item (COMPUSTAT item #18) by total stock holders equities(COMPUSTAT item #60). For 28 firm-years the total equity has a negative value. A negative value for equity creates a problem in measuring BRRT for those observations. For those observations, the calculated BRRT will be positive if net income is negative. However, for those observation with positive net income, the calculated

BRRT will be negative. In both cases, the BRRT measure is meaningless. Using the absolute value of equity will not mitigate the problem. In addition to the sign problem the absolute value of equity for those observations is very small producing an extreme value for BRRT. This will introduce an estimation problem because of OLS regression sensitivity to outlier. Therefore, 28 observations with a negative book rate of return were excluded reducing the sample size to 1692 firm-years.

5.2.3 Change in Capital Expenditures

The change in capital expenditures is measured as the difference between actual capital expenditures reported in the statement of cash flow (Compustat items #128) and expected capital expenditures for the same year. The naive model is used to estimate capital expenditures.

$$\Delta(CE_{it}) = CE_{it} - CE_{it-1}$$

Where,

$\Delta CEit$ is the change in capital expenditures for firm i in year t, and CE_{it} and CE_{it-1} are capital expenditures in years t and t-1 respectively

In addition to the naive model, a random walk model with a drift is used to estimate unexpected capital expenditures

$$\Delta CE_{it} = CE_{it} - CE_{it-1} + \theta$$

Where,

$\Delta CEit$, CE_{it} and CE_{it-1} are as defined above, and θ is the average five year average growth in capital expenditures prior to year t.

5.3 Annual vs Quarterly Data

The study can be conducted on quarterly as well as annual accounting information. However, annual data is used for the following reasons:

First, annual financial statements are audited while interim financial statements are not. Presumably, audited accounting information is more credible than unaudited accounting information. Recently, Cornell and Landsman (1989), provided empirical evidence which suggests that annual earnings announcements are uniquely informative. Second, the preparation of the interim report involves a unique measurement error, because some of the reported figures are products of estimation. For example, most firms do not make an actual count of inventories (one of the variables of interest in this study), rather they use an estimation method, such as the gross profit method or the retail method, or the perpetual inventory records, to estimate inventory reported in the interim statements. Finally, empirical evidence suggests that analysts wait for annual announcement to update one year and two year ahead revisions. Cornell & Landsman (1989), examine security price reaction to quarterly earnings announcement and analysts' revisions both one quarter ahead and one year ahead revisions. For interim announcement, the coefficient of the quarter ahead forecast is significant

while the coefficient of the one year ahead revision is marginally significant. However for the fourth quarter, the coefficient of the quarter ahead forecast revision is insignificant, the coefficient of the forecast errors is significant and there is a sharp increase in the explanatory power of the regression due to the one year ahead forecasts revisions. The results are interpreted as consistent with the following. For the interim announcements, analysts focus their attention on forecasting quarter ahead earnings. Accordingly, most of the information of interest to investors is provided by quarter ahead forecast revisions. However, for audited annual earnings announcement, the annual forecast errors rather than the quarter ahead forecast revision provides significant explanatory power. Second, the one year ahead forecast revision, which has marginal impact for interim announcements, provides most of the explanatory power. This suggests that audited annual announcements are uniquely informative, and because of that, analysts wait until year end earnings are announced to update their forecasts.

5.4 Sample and Data Bases

The initial sample consists of all COMPUSTAT firms which meet the following criteria.

1- The availability of six-years of sales, capital expenditures and inventory data on the COMPUSTAT industrial type.
2- The availability of two years of equity and receivables data on the COMPUSTAT annual file.
3- The availability of earnings announcement date on the quarterly COMPUSTAT file.
4- The availability of the data on which the firm filed the 10-k with the Securities and Exchange Commission (SEC)
5- The availability of regular earnings forecasts (one year and two years ahead forecasts) on the IBES summary tape over the six year period (1985-1990).

The first criterion ensures the estimation of unexpected inventory, sales and capital expenditures. The second criterion ensures the computation of Book Rate of Return (BRRT), and receivable-sales ratio (RECS). The third criterion is imposed to determine the revision period which commences after the earnings announcement date. The fourth criterion is imposed to determine the close of the revision period, which ends after the annual report release. The fifth

criterion is imposed to ensure sufficient forecasts to compute revisions. A minimum of two forecasts, one before and one after the annual report release, are needed for an observation (firm-year) to be included in the sample.

The sample selection process began by searching the COMPUSTAT ANNUAL INDUSTRIAL FILE for firm-years which meet the first two criteria over the five year period (1985-1989). Then the QUARTERLY COMPUSTAT FILE was searched to identify the earnings announcement date for these observations. These procedures produced 2448 firm-years with sufficient data for inventory, capital expenditures, income, sales, equity and earnings announcement date data. The 10-K filing date for each firm-year was obtained from the SEC MICROFICHE and ON-LINE data base. Eighty-seven observations (firm-years) were excluded either because they were non-SEC[1] firms, or their filing dates were simply missing. Finally, the IBES Summary Data Base was searched to identify earnings forecasts for these observations. An additional 470 observations were excluded because of missing forecasts. This selection process produced 1891 observations (firm-years), over the six year period (1985-1990), with at least two forecasts, one before and one after the annual report release. For 171 firm-years of this data set, there were no one-year ahead forecasts

(1) Only few of the exluded firm-years are non-SEC firm. Some of the foreign companies covered by the COMPUSTAT are not listed with the SEC.

between the earnings announcement date and the date on which firms file the 10-K with the SEC. Since the pre-annual report forecasts for these observations were made before the earnings announcement, the computed revision will capture the

earnings effect, as well as the annual report effect. Therefore, these observation were excluded to control for the possible earnings effect. The final sample consists of 1720 firm-years, from 45 industries (Standard Industrial two Digit Classification). Table 1 summarizes the sample selection procedures.

TABLE 1

SUMMARY OF THE SAMPLE SELECTION PROCESS

Total number of firm-years with sufficient data of inventory, sales, capital expenditure, equity and earnings announcement date on the COMPUSTAT annual and quarterly files.....	2448
Firm-years for which the filing of the 10-k with the SEC are unavailable.....	87
Remaining observations	2361
Missing forecasts on the IBES tape	470
Firm-years with at least two forecasts one before and one after the annual report release.....	1891
Observation with pre-annual report forecasts made before earnings announcement.....	171
	1720
firm-years with negative value for total equity.....	28
The final sample.....	1692

Chapter 6

RESULTS OF EMPIRICAL TESTS

6.1 Descriptive Statistics

Table 2 provides descriptive statistics for the raw data. The mean, the maximum and the minimum values were presented for each variable.

Table 1A

Descriptive statistics for the variables used in the analysis

Full sample(N=1692) (1985-1989)

Var.	Mean	Std. Dev.	Min.	Max.
ΔRECS	0.0043	0.079	-0.687	1.373
BRRT	0.0712	1.546	-1.890	0.627
ΔCE	16.064**	161.814	-1810.0	2549.19
SALES	2450.9**	7533.95	7.613	124993.0
INVII	0.1241	0.3298	0	1
INVDI	0.3676	0.4822	0	1
INVDD	0.3788	0.4852	0	1
ANALYST	11	9.945	1	46

DRECS : The unexpected change in receivable/sales ratio for firm i in year t.
= $(REC_t/S_t)-(REC_{t-1}/S_{t-1})$, where (REC_t/S_t) and (REC_{t-1}/S_{t-1}) are the receivables /sales ratio for year t and t-1 respectively.

BRRT : The book rate of return for firm i in year t.
DCE : change in capital expenditures for firm i in year t.
INVII = 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.
INVDI = 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.
INVDD = 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.
SALES : the total sales for firm i and year t.
ANALYST: the number of estimates which are included in each consensus one year ahead forecast for firm i and year t+1.

** Dollar amounts are in Millions.

Table-1b

The following are descriptive statistics for analysts' revisions following the earnings announcement the annual report release

PANEL A (N=1664)*

	Mean	Median	SD.
FARE	-0.0340	0.0	0.116
FARE/p	-0.0027	0.0	0.026
FAR	-0.0220	0.0	0.1274
FAR/p	-0.0015	0.0	0.0103

PANEL B (N=1814)**

	Mean	Median	SD.
FARc	-0.0541	0.0	0.222
FARc/p	-0.0042	0.0	0.023

FARE : Analysts' revisions following the earnings announcement
FARE/p= FARE/(price)

FAR : Analysts' revisions following the annual report release
FAR/p = FARE/(price)

FARc : Analysts' revisions following the annual report release
measured over the expanded revision period.
FARc/p = FARc/(price)

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* This sample used as a basis for the subsequent analysis.
** This sample consists of firm-year with two forecasts: one before the earnings announcement and one after the annual report release. It is used as a basis for the test in chapter 6.

As is apparent from Table-1b, analysts' revisions following the earnings announcement (FARE) is negative on average. The negative mean of -0.034 suggests that analysts revise their one year ahead forecast downwards following the earnings announcement. This result is based on a sample which consists of firm-years with at least two forecasts; one before and one after the earnings announcement. The post earnings announcement forecasts are required to be released before the filing date of the company's 10-K with the SEC. The pre-earnings announcement forecasts are the last forecasts before the earnings announcement over the period commencing one month before the fiscal year end through the earnings announcement.

Table 1b also shows a negative mean for analysts' revisions (FAR) following the annual report release but less than the mean for revisions following the earnings announcement. When the revision period is expanded to include both earnings announcement and annual report release date, the mean value for analysts' revisions (FARc) remains negative (panel B of Table-1B). Analysts' revision over the expanded period is measured as the difference between pre-earnings forecast and post-annual report forecast. The negative means for analysts' revisions following the earnings announcement and the annual report release are consistent with previous studies which report tendency of optimism among

analysts (i.e. Fred & Givoly).

6.2 Regression Results:

To examine the association between financial statement variables and analysts' one year ahead revisions the general model is first estimated using the full set of observations with complete forecast before and after the annual report release, where the prior annual report forecasts are the post-earnings announcement forecasts. To facilitate pooling the data across firms and over time, all the variables are expressed on a per share basis. Two measures of revision are used. One is based on the post annual report forecast with a minimum two week reporting lag and another is based on post annual report forecasts with a minimum of three week reporting lag.

The results for both regressions are presented in Tables 2 and 3. The t-values for the regression coefficients are adjusted for Hetroscedasticity using the White method. The reported adjusted t-values are based on the consistent standard errors. The regression model is significant at the conventional level. The coefficient on the indicator variable, sale increase-inventory increase (INVII) is in the hypothesized direction, positive and significant at the

conventional level in both regressions. As hypothesized the coefficient on book rate of return(BRRT) is negative and significant at the conventional level across the two regressions. Consistent with the hypothesis, the coefficient on change in capital expenditures is positive but insignificant in both regressions. The coefficients for inventory decrease-sales increase(INVID) is negative, as hypothesized, for the three weeks reporting lag revision while positive for the two weeks reporting lag revision. In both regressions the coefficients for this variable are insignificant. The coefficients on change in receivables (ΔREC) are not in the hypothesized direction, however, both are very low and insignificant. The regression model is significant at the conventional level for both regressions, and the explanatory power of the regression model does not change across the two reporting lags.

TABLE 2

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES

MODEL I: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it} + \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \varepsilon_{it}$

(N=1664)[a] Two week reporting lag

Indep. Vars.	Est. Coef.	t-statistics	Adjust. t-Stat.
INTERCEPT	-0.2813	-2.335**	-1.900*
ΔRECS	0.2607	0.060	0.042
BRRT	-9.1654	-1.796*	-4.252***
ΔCE	0.0327	0.978	0.495
INVII	0.5047	2.981***	2.393***
INVDI	0.0226	0.191	0.165
INVDD	0.2336	1.691*	1.448
R^2	0.011		
F-statistics	3.090		χ^2= 23.04
Prob > F	0.005		P < 0.34

FAR_{it} = (one year ahead forecast revision) = $E_a(EPS_{i,t+1})-E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-annual report forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t. = (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t-E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.
a) Two observations with extreme value for book rate of return are excluded. Also the number of shares outstanding is missing for 26 observations (this data item was not required initially).

TABLE 3

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES

MODEL I: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it} + \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \varepsilon_{it}$

(N=1662)a (three week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjust-t-stat.
INTERCEPT	-0.2465	-2.051*	-1.643*
ΔRECS	0.2156	0.050	0.042
BRRT	-9.1890	-1.770*	-4.558***
ΔCE	0.0373	1.110	0.623
INVII	0.4823	2.816**	2.253**
INVDI	-0.0103	-0.074	-0.161
INVDD	0.1960	1.409	0.852
R^2	0.011		
F-statistics	3.060		χ^2= 27.90
Prob > F	0.006		P < 0.14

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1})$-$E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-annual report forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$ = 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$ = 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$ = 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

(a) Two post annual report forecasts missing when the reporting lag is expanded to three weeks.

Table 4 shows the correlation coefficients for the independent variables. With one exception, none of the pairwise correlation coefficients exceeds 0.29. However, two of the inventory variables, (INVDD) and (INVDI), are moderately correlated with the correlation coefficient reaching 0.59. The correlation matrix in general does not indicate a serious multicollinearity problem in the data. According to Judge et. al. (1980, p459), a correlation between the independent variables higher than 0.80 may signal a serious multicollinearity problem. However, the moderate correlation between the two inventory variables may signal moderate multicollinearity. Therefore, further testing will be made in later analysis to detect and assess the magnitude of collinearity in the data.

TABLE 4

SAMPLE CORRELATION COEFFICIENTS

PANEL A : (N=1664)

	ΔRECS	ΔCE	BRRT	INVII	INVDI	INVDD
ΔRECS	1.0	-0.011	0.010	0.051	-0.054	-0.010
		(0.65)	(0.58)	(0.03)	(0.02)	(0.66)
ΔCE		1.0	0.013	0.006	0.055	-0.003
			(0.58)	(0.00)	(0.02)	(0.03)
BRRT			1.0	0.005	0.029	-0.019
				(0.21)	(0.22)	(0.43)
INVII				1.0	-0.287	-0.298
					(0.00)	(0.00)
INVDI					1.0	-0.592
						(0.00)
INVDD						1.0

For each variable, the first line shows Pearson correlation coefficient, the second line stands for the related p-value

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

6.3 The Reporting Lag

I hesitate to draw a definite conclusion based solely on the results from the previous regressions because of the possibility of measurement errors due to the reporting lag in prior annual report release analysts' forecasts. This section will examine the possible effects of the reporting lag on the measurement of analysts' revisions and the appropriate remedies.

In the previos analysis, analysts' revision (FAR) is measured as the difference between the pre-annual report release forecast and the post-annual report release forecast. The pre-annual report release forecast is required to be released after the annual earnings announcement date to control for earnings effect. However, this requirement may not completely control for the earnings effect, because there is a time lag between the date on which analysts make forecasts and the date on which the IBES releases summary forecasts. This reporting lag could introduce a measurement error into the computed revision, because some of the forecasts, which are made after the earnings announcement, may not be included in the IBES summary released immediately after the earnings announcements. An early study by O'Brien (1988) reports a long reporting lag. O'Brien (1988), examined forecasts on the early IBES tapes over the period from 1975 to

mid 1981. However, the reporting lag was reduced significantly in later years. Cornell & Landsman (1989) examined analysts' revisions over the three year period 1984 through 1986. In their study, they cited Karen Waldemar, an IBES official, who estimates the average reporting lag of 10 days over that period (84-86). The reporting lag is believed to be reduced further in more recent tapes.

The reporting lag effect is not likely to be serious in forecasts following annual earnings announcements. It is well documented in the literature that earnings announcements are important events which are likely to trigger immediate analysts' revision. Givoly & Lackinshock (1979) reported a concentration of revisions during the month in which earnings announcements are made. Recently, Stickel (1989) reported that analysts avoid revising forecasts two weeks before earnings announcements, while analysts' activities peaked immediately after earnings announcements. This suggests a shorter reporting lag after earnings announcement, and hence a minimal reporting lag effect on post-earnings announcement forecasts.

To further examine the extent of the reporting lag I conducted a limited test of the IBES masked (detailed) tape, which provides individual analysts forecasts along with the forecast date for each individual forecast. Individual

forecasts for 84 firm-years from the 1988 IBES tape were examined. An examination of these individual forecasts indicates that the reported consensus forecast for a particular month includes both forecasts revised during the month as well as outstanding forecasts (forecasts made in the previous period).This was confirmed by IBES Inc. However, Mr. Robert Shifini from IBES INC.[1] indicated to me, that forecasts which are included in the consensus monthly forecasts are either revised or verified by analysts at least once every month. The verification process is usually made through a weekly summary IBES receives from brokerage firms and analysts or by telephone. Mr. Shifini indicated that if an analyst fails to verify her or his forecast, the analyst's previous estimate will be dropped from the consensus measure.

The limited test of the detailed tape indicated that approximately 50 percent of the analysts following the firm revise their forecasts after the earnings announcement. For the 84 observations (firm-year), the mean(median) reporting lag is 10.7 (11) days for 446 forecast revisions. For the same firm-years 412 analysts revise their one year ahead forecasts following the annual report release with a mean(median) reporting lag of 10.5(13) days. The reporting lag as it is measured in this test is the time lag between the

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(1) From my telephone conversation with Mr. Shifini.

date on which IBES entered the analyst' forecast on the tape and the date on which IBES reports the forecasts (the report date). However, the actual reporting lag could be longer if there is a time lag between the date on which the analyst made the revision and the date on which the analyst reported the forecast to IBES. There is, however, no way to know when the analyst made up his or her mind about the revision. The reporting lag could be lengthened further if there is a lag between the date on which the analyst reported the forecast and the date on which the IBES entered the new forecast into the tape. Mr. Pocci, Vice President and the head of the data center of the IBES Inc., indicated to me that forecasts received from analysts are usually entered into the data base on the same day they are received from analysts or the following day[1].

Control for The Reporting Lag Effect

Two remedies are used in this study to control for the reporting lag in pre-annual report forecasts. First, analyst-earnings forecast error is introduced to the general model to control for the possible earnings effect. The expanded model which includes the earnings variable (analyst's forecast error) as well as the financial statement variables is fitted to the full sample.

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(2) From my inerview with Mr. Pocci on July 30 1991.

The regression results for the expanded model are presented in Table 5. The regression results indicate positive but insignificant coefficient on the forecast error. The coefficients on the financial statement variables are similar to the previous regression before adding the earnings variable to the model. The coefficient on inventory increase-sales increase (INVII) remains in the hypothesized positive direction and is significant at the conventional level. The coefficient on book rate of return (BRRT) is negative and significant at the conventional level. The coefficients on the other financial statement variables remain insignificant and in the same direction. The regression results also indicate that adding the forecast error to the model does not improve the explanatory power of the model. The reported results in Table 5 are based on post annual report forecasts with a three week lag. The result for post annual report forecasts with two week lag is not qualitatively different from this result.

TABLE 5

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES AND FORECAST ERROR

MODEL I: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta 2 BRRT_{it} + \delta_3 \Delta CE_{it}$

$+ \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \delta 7 FE_{it} + \varepsilon_{it}$

(N=1650)a (three week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjus. t-stat.
INTERCEPT	-0.2475	-2.058**	-1.611
ΔRECS	0.1108	0.025	0.025
BRRT	-9.4424	-1.832*	-4.088***
ΔCE	0.0364	1.108	0.581
INVII	0.4857	2.829***	2.243**
INVDI	-0.0111	-0.079	-0.066
INVDD	0.1930	1.384	1.156
FE	0.0230	0.577	0.461
R^2	0.0112		
F-statistics	2.666		χ^2=34.28
Prob > F	0.00		P < 0.23

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1}) - E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-annual report forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

FE_{it} = Analysts-earnings forecasts error
= $(EPS_{it} - E(EPS_{it}))$, where (EPS_{it}) is the realized earnings per share share for year t , and $E(EPS_t)$ is the IBES forecasted EPS for year t.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$ = 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$ = 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$ = 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

(a) The sample is reduced further due to 12 EPS missing (1962-1650).

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

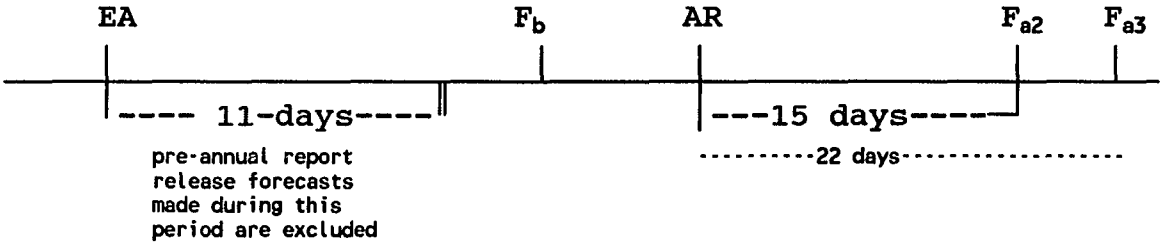
An alternative methodology to mitigate the possible reporting effect is to require a minimum reporting lag for post earnings announcement forecasts. A minimum of 11 day reporting lag is required for prior earnings forecasts to be included in the analysis. Pre-annual report forecasts released within 11 days after the earnings announcement were excluded. This additional criterion reduced the sample size to 1475 observations for the two week reporting lag.

The regression results for this reduced sample are presented in Table 6 (two week reporting lag) and Table 7 (three week reporting lag). The results in general do not improve comparing with that of the original sample. The R^2 declined significantly from the previous regression. The model is significant at the conventional level only for the three week reporting lag regression. The two week reporting lag model is however not significant. The regression results for this sample do however demonstrate some sensitivity to the length of the reporting lag. Only the book rate of return is significant at the conventional level in both regressions. The coefficients on inventory-increase and sales increase (INVII) and inventory decrease-sales decrease (INVDD) are positive and significant only in the three week reporting lag regression.

Figure 2

The following figure displays the reporting lag relative to the earnings announcement date and to 10-K filing date with the SEC.

SEQUENCE OF EVENTS AND THE REPORTING LAG



EA : The earnings announcement date in the WSJ.

AR : The filling date of the 10-K with the SEC

F_b : The prior annual report forecast with minimum 11 day reporting lag.

F_{a2} : The post annual report release forecast with two week reporting lag

F_{a3} : The post annual report release forecast with three week reporting lag

TABLE 6

THE RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES

MODEL I: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it} + \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \varepsilon_{it}$

(N=1475) (Two week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjust. t-value
INTERCEPT	-0.3087	-2.278**	-2.278**
ΔRECS	0.0239	0.217	0.272
BRRT	-25.364	-1.936*	-3.047***
ΔCE	0.0050	0.164	0.110
INVII	0.3342	1.738*	1.516
INVDI	0.0695	0.442	0.379
INVDD	0.2857	1.827*	1.578
R^2	0.007		
F-statistics	1.702		χ^2= 26.55
Prob > F	0.11		P < 0.19

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1}) - E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-annual report forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

TABLE 7

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES

MODEL I: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it}$

$+ \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \varepsilon_{it}$

(N=1474)[a] (three week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjust. t-stat.
INTERCEPT	-0.4167	-3.369***	-2.942***
ΔRECS	0.4984	0.116	0.163
BRRT	-18.191	-1.535	-1.819*
ΔCE	0.1760	0.630	0.463
INVII	0.6166	3.497***	2.907***
INVDI	0.1718	1.195	1.069
INVDD	0.3864	2.706**	2.430**
R^2	0.013		
F-statistics	3.187		χ^2= 32.75
Prob > F	0.00		P < 0.05

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1}) - E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-annual report forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.
a) One more observation missing when the reporting lag is expanded to three weeks

Chapter 7

ADDITIONAL TESTS

7.1 Size Effect

The information that financial statements convey about future earnings is likely to be a function of company size. This is because the amount of available information is likely to increase with company size. To examine this possible effect, the number of analysts following the firm is added to the general regression model (model I) as a proxy for firm size. The expanded model is fitted to the full sample of 1664 observations. The regression results for the expanded model, based on a two week reporting lag for post annual report forecasts (Table 8), are not qualitatively different from those of the general model which are reported in Table 2. The coefficient on the size variable is low and insignificant in the two data sets. The results also indicate no significant increase in R^2 due to the size variables.

Table 8

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATETMENT VARIABLES AND SIZE

MODEL I: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it}$

$+ \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \delta_7 ZIZE_{it} + \varepsilon_{it}$

(N=1664) (Two week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjus. t-stat.
INTERCEPT	-0.2092	-1.5851*	-1.306
ΔRECS	0.5891	0.025	0.025
BRRT	-9.0630	-1.765*	-4.088***
ΔCE	0.0364	1.093	0.581
INVII	0.4810	2.801**	2.118**
INVDI	-0.0161	-0.114	-0.095
INVDD	0.1933	1.385	1.175
SIZE	-0.0480	-0.577	-0.461
R^2	0.0112		
F-statistics	2.666		χ^2= 34.28
Prob > F	0.00		P < 0.23

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1})$-$E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-annual report forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

$SIZE_{it}$ = The number of analysts folowing the firm.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

7.2 Sales Effect

To detect any possible sales effect, the unexpected change in sales is introduced to the general model. The expanded model is then fitted to the full sample of 1664 observations. The regression results do not change qualitatively. The coefficient on change in sales variable is low and insignificant, and no significant increase in the R^2 is observed due to the change in sales variable.

In theory, a link can be established between current sales and analysts' revisions of future earnings through two steps. First, current sales are highly correlated with future sales. Second, future sales are associated with future earnings. Despite this link the results for the sales variable is not surprising. The very low and insignificant coefficient on the sales variable is consistent with the earlier argument in this study, that financial statement information, such as changes in receivables and inventories, although usually associated with sales, do not provide any information about the current sales level. This is because sales are usually announced along with earnings before the annual report release. Therefore, any signal that current sales provide about future earnings will be incorporated in analysts' revision prior to the annual report release. However, financial statement information, such as changes in

receivables and inventories, can provide signals about current sales quality (sales persistence or how costly sales were) as argued earlier.

Table 8B

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES AND SALES

$$\text{MODEL I: } FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it} + \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \delta_7 SALES_{it} + \varepsilon_{it}$$

(N=1664) (Two week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjus. t-stat.
INTERCEPT	-0.2585	-2.107*	-1.615
ΔRECS	0.1607	0.037	0.025
BRRT	-9.0969	-1.771*	-4.545***
ΔCE	0.0389	1.151	0.581
INVII	0.5046	2.864**	2.205**
INVDI	0.0100	0.069	0.058
INVDD	0.1932	1.388	1.176
SALES	0.0022	0.489	0.247
R^2	0.0111		
F-statistics	2.665		χ^2= 36.46
Prob > F	0.00		P < 0.16

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1})-E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-annual report forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

$SALES_{it}$= Unexpected sales in year t. It is given by $S_t-E(S_t)$,

St & E(St) are sales and expected sales for year t.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t-E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

7.3 Expanded Revision Period

In the previous analysis, the dependent variable (analyst's revision) is measured as the difference between pre-annual report one year ahead forecast and post-annual report one year ahead forecast. The pre-annual report forecasts were required to be released after the earnings announcement. Therefore, observations for which there were no forecasts between the earnings announcement and the annual report release were excluded from the analysis.

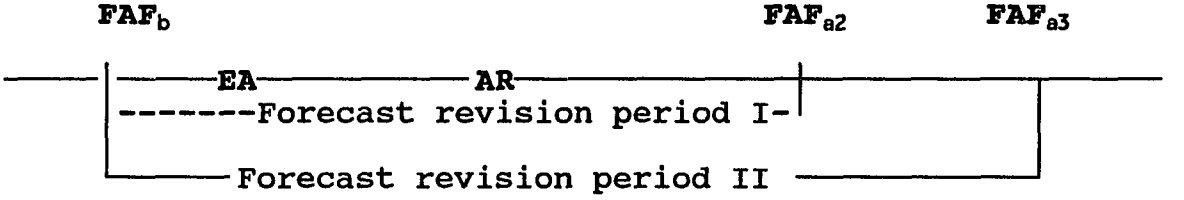
In this section, analyst's revision will be measured over a longer period which includes earnings announcement and annual report revision periods. Accordingly, analyst's revision is measured as the difference between the last two year ahead forecast before the earnings announcement and the post annual report one year ahead forecast. Because the earnings announcement falls within the expanded revision period, the analyst-earnings forecast error is added to the set of independent variables to control for an earnings effect. To reduce the bias in the measured revisions induced by the reporting lag of post annual report forecast, post annual report forecasts are required to have a minimum reporting lag. As in the previous analysis the regression model is fitted to the data set twice using two versions of the analyst's revision; one based on post-annual report

forecast with two week reporting lag and another on post annual report forecast with three week reporting lag. The modified model which includes forecast error as well as financial statement variables is fitted to a sample of all firm-years for which a pre-earnings announcement and a post annual report forecast are available.

Figure 3

The following figure shows the sequence of events relative to the expanded revision period for the two reporting lags.

The SEQUENCE OF EVENTS



FAF$_b$: The last one year ahead forecast before the earnings announcement.

FAF$_{a2}$: The post annual report forecast with two week reporting lag.

FAF$_{a3}$: The post annual report forecast with three week reporting lag.

EA : The date of the earnings announcement in the WSJ.

AR : The filing date for the 10-K with the SEC.

The Modified General Test Model

$$\textbf{MODEL II: } FAR_{it} = d_0 + \delta_1 \Delta RECS_{it} + d_2 \Delta CE_{it} + \delta_3 BRRT_{it} + \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \delta_7 FE_{it} + \varepsilon_{it}$$

Where:

FAR_{it} : The one year ahead forecast revision for firm i for year t+1 made subsequent to the annual report release of year t. $=E_a(EPS_{i,t+1})-E_b(EPS_{it+1})$, where $E_b(EPS_{it+1})$ is the pre-earnings announcement forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year $t+1$

$\Delta RECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i and year t. It is given by the ratio of reported income to total equity.

ΔCE_{it} : the change in capital expenditures for firm i and year t. It is given by $(CE_t-E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditures in year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory.
= 0 otherwise

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory.
= 0 otherwise

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory.
= 0 otherwise.

FE_{it} = Analysts-earnings forecasts error
= $(EPS_{it}-E(EPS_{it}))$, where (EPS_{it}) is the realized earnings per share for year t , and $E(EPS_t)$ is the IBES forecasted EPS for year t.

TABLE 9

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES AND THE FORECAST ERROR

MODEL II: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it}$

$+ \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \delta_7 FE_{it} + \varepsilon_{it}$

(N=1814) (Two week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjust. t-stat.
INTERCEPT	-0.2389	-2.021**	-1.790*
ΔRECS	2.5229	0.592	0.819
BRRT	-14.628	-2.805***	-3.511**
ΔCE	0.0095	0.361	0.254
INVII	0.2728	1.603	1.428
INVDI	0.0822	0.591	0.541
INVDD	0.2329	1.687*	1.544
FE	0.0700	1.860*	1.627
R^2	0.010		
F-statistics	2.586		χ^2=31.43
Prob > F	0.015		P < 0.34

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1}) - E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-earnings announcement forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

FE_{it} = Analysts-earnings forecasts error
= $(EPS_{it} - E(EPS_{it}))$, where (EPS_{it}) is the realized earnings per share share for year t , and $E(EPS_t)$ is the IBES forecasted EPS for year t.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t - E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

TABLE 10

RESULTS FOR REGRESSION OF ANALYSTS' REVISIONS ON FINANCIAL STATEMENT VARIABLES AND THE FORECAST ERROR

MODEL I: $FAR_{it} = \delta_0 + \delta_1 \Delta RECS_{it} + \delta_2 BRRT_{it} + \delta_3 \Delta CE_{it} + \delta_4 INVII_{it} + \delta_5 INVDI_{it} + \delta_6 INVDD_{it} + \delta_7 FE_{it} + \varepsilon_{it}$

(N=1810) (Three week reporting lag)

Indep. Vars.	Est. Coef.	t-statistics	Adjust. t-stat.
INTERCEPT	-0.2336	-2.113**	-1.776*
ΔRECS	1.3967	0.350	0.467
BRRT	-12.664	-2.596**	-3.856***
ΔCE	0.0514	2.092**	1.632
INVII	0.4950	3.106**	2.546**
INVDI	0.0152	0.116	0.105
INVDD	0.2122	1.643*	1.456
FE	0.0268	0.762	0.618
R^2	0.015		
F-statistics	4.005		χ^2= 36.96
Prob > F	0.00		P < 0.18

FAR_{it} = (one year ahead forecast revision)
= $E_a(EPS_{i,t+1})-E_b(EPS_{it+1}))/P_{it}$, where $E_b(EPS_{it+1})$ is the pre-earnings announcement forecasted earnings per share for year t+1 , and $E_a(EPS_{t+1})$ is the post annual report forecasted EPS for year t+1.

FE_{it} = Analysts-earnings forecasts error
= $(EPS_{it}-E(EPS_{it}))$, where (EPS_{it}) is the realized earnings per share share for year t , and $E(EPS_t)$ is the IBES forecasted EPS for year t.

$DRECS_{it}$: The unexpected change in Receivable/sales ratio, and given by the reported (REC/S) ratio minus the expected (REC/S) ratio for year t and firm i.

$BRRT_{it}$: The book rate of return for firm i in year t.
= (Income before extraordinary items/total equity)

DCE_{it} = The unexpected change in capital expenditures. It is given $(CE_t-E(CE_t))$, where CE_t is capital expenditure in year t and $E(CE_t)$ is the expected capital expenditure for year t.

$INVII_{it}$= 1 for firms with current year sales higher than expected and an increase in inventory, and zero otherwise.

$INVDI_{it}$= 1 for firms with current year sales higher than expected and a decrease in inventory, and zero otherwise.

$INVDD_{it}$= 1 for firm with current sale less than expected and a decrease in inventory, and zero otherwise.

* Significant at the 0.10 level.
** Significant at the 0.05 level.
*** Significant at the 0.01 level.

The regression results for both reporting lags are presented in Table 9 and Table 10. Compared with the results reported in Table 2 of this study for the general model, which is based on analysts' revision measured over a shorter revision period, the explanatory power of the model is improved significantly. The coefficient on the forecast error is positive and significant at the conventional level. In the previous analysis based on the shorter revision period when the forecast error (FE) is added to the model, it fails to be significant at the conventional level. The coefficient for inventory increase- sales increase (INVII) remains positive and significant at the conventional level. The coefficient on the book rate of return (BRRT) remains negative and statistically significant. The coefficient on capital expenditure is positive , as hypothesized and becomes significant at the conventional level. In the previous regression the coefficient on capital expenditures maintains the positive sign but fails to be significant at the conventional level. As for the other dependent variables the results are not qualitatively different from that of the general model reported in Table 2. The result of this regression indicates that financial statement variables remain significant after controlling for earnings which suggests that the financial statement information provides incremental information about future earnings beyond earnings. However, as the results from this regression and previous regressions

indicate, only a small proportion of analysts' revisions are explained by financial statement variables. In general, regressions yield a low R^2 which ranges from 0.011 to 0.015.

Earlier studies which examine analysts' revisions report a relatively higher R^2 than this study. Brown & Rozeff(1979) report R^2 ranges from 0.41 for one quarter ahead revision to 0.03 for three quarter ahead revision[1].

The low explanatory power of the model is likely to be due to the fact that the four summary measures developed by this study do not provide a complete summary of financial statement information. Adding additional financial statement variables is likely to improve the explanatory power of the model. The incomplete specification of the analyst's revision model could also contribute to the low R^2. The model did not incorporate macroeconomic indicators, which are likely to affect analysts' revisions. However, providing a complete model for analysts' revisions is beyond the scope of this study.

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(1) The R2 in this study is not comparable to Brown & Rozeff(1979) for several reasons. This study examines analysts' revisions following the annual report release which are based on IBES monthly forecasts. However, Brown & Rozeff(1979), examined analysts' revisions following the quarterly earnings announcement using the Value Line quarterly forecasts. Givoly(1985) which examined analysts' revisions following the annual earnings announcement reported high R2 for time series regressions. However, when observations were pooled across firms and years, the regression yields a low R2 (0.03).

SUMMARY, CONCLUSION AND FUTURE RESEARCH

The objective of this study is to examine the role of non-earnings information in the formation of analysts' revisions of future earnings. The main argument in this study is that financial statements provide new signals about future earnings, and these signals are utilized by analysts who incorporate them in their subsequent revision of future period earnings forecasts. This proposition has been dealt with empirically by examining the association between summary measures derived from financial statements, and analysts' revisions of future earnings following the annual report release. These summary measures are simply financial statement variables which include change in receivables, capital expenditures, inventories, sales and accounting rate of return.

Hypotheses and predictions have been developed about the association between each of these financial statement variables and subsequent analysts' revisions of future earnings forecasts. The general test model employed by this study is estimated using 1720 observations (firm-years) , mostly manufacturing firms, pooled across firms and over the five year period ending in 1990.

The empirical findings are in general consistent with

the main argument in this study that financial statements provide information about future earnings. The regression results indicate consistently that financial statement variables are jointly and significantly associated with subsequent analysts' revisions of future earnings. The general test model is statistically significant across all regressions. At least two financial statement variables remain significantly associated with analysts' revisions after controlling for the earnings effect. However, only a small proportion of analysts' revision are explained by the financial statement variables.

This study hypothesized that an increase in inventory when current sales are higher than expected is a positive signal for future earnings. Consistent with this prediction, the coefficient on inventory increase-sales increase is positive and highly significant in all regressions. However, the empirical findings did not support the prediction related to the other inventory variables (inventory decrease-sales increase and inventory decrease-sales decrease). The coefficient on inventory decrease-sales increase is insignificant across all regressions. The coefficient on inventory decrease-sales decrease is positive in all regressions, and insignificant with one exception. When we fit the general model to the sample after deleting observations with less than 11 days reporting lag, the coefficient on this

variable becomes significant at the conventional level. This is not consistent with the hypothesis developed by this study. The results for these two inventory variables may be due to the inventory and sales expectation models that are used in this study to group firms according to inventory changes. An inappropriate expectation model could lead to the misclassification of observations among the four inventory-sales configurations. The results for the inventory variables and the related interpretation should be taken with care, because of the collinearity among the inventory variables, especially the correlation between the inventory decrease-sales increase and inventory decrease-sales decrease ($r=0.59$).

The empirical findings provide weak support for the capital expenditure hypothesis. The coefficient for capital expenditure is positive in all regressions as hypothesized. However, it is significant at the conventional level in only one regression. The results do not provide support for the change in receivable hypothesis. The coefficient on change in receivables is positive and insignificant in all regressions.

One extension of this study can be made by replicating this study using quarterly financial statements and quarterly analysts' revisions. Another interesting extension would be made by working with revised methodology for inventory changes which captures the magnitude as well as the sign of inventory

changes. Finally financial statements contain a huge amount of information , from which additional summary measures can be developed and their implication tested empirically.

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