

THE PREDICTIVE VALUE OF INTERIM EARNINGS¹

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This study empirically examines the value of interim earnings in predicting annual earnings. I find that analysts' annual earnings forecast revisions are positively associated with interim earnings forecast error when the interim earnings are relatively persistent. The change in analysts' annual earnings forecast dispersion is positively (negatively) associated with interim earnings forecast-error (persistence).

1. Introduction and Background

The primary purpose of interim reporting is to facilitate the prediction of annual earnings, which are released only once a year (Green and Segall, 1967). Previous studies show that interim earnings announcements prompt analysts to revise their forecasts of firms' future earnings (Stickel, 1989) and that analysts' annual earnings forecast revisions are strongly associated with interim earnings forecast error (Abdel-Khalik and Espejo, 1978; Brown, et al., 1989; and Abdel-Khalik, 1983). This study extends this line of research in two ways. First, It examines whether the association between interim earnings forecast error and analysts' annual earnings forecast revisions is affected by interim earnings **persistence**, while previous studies assume all interim earnings have constant persistency. Secondly, it examines whether interim earnings forecast-error and persistence affect the change in analysts' annual earnings **forecast dispersion**, as well as the average revision, while previous studies examine interim earnings' impact on analysts' average annual earnings forecast revisions only.

Traditional earnings information content research assumes that all earnings have the same persistence and expects a linear relationship between earnings forecast error and some measures of earnings information content, such as abnormal stock returns. However, given the uncertainty in the business world and the nature of the current accounting system, earnings persistence is likely to vary. The various non-linear models adopted in recent studies achieve a stronger return/earnings association by allowing the persistence of earnings to change (Cheng et al., 1992; Freeman and Tse, 1992; Das and Lev, 1994; Hayn, 1995 and Basu, 1997). If the persistence of earnings affects the earnings/return relationship, it should also affect the earnings/forecast relationship. Studies that ignore the impact of persistence do not fully capture the relationship between interim earnings forecast errors and annual earnings forecast revisions around interim announcements.

Both average forecast revision and change-in-forecast-dispersion measures certain revisions of analysts' earnings forecast. Figure 1 illustrates how the average forecast revision and the change-in-forecast-dispersion capture different aspects of analysts' forecast revisions. Each panel of Figure 1 presents a situation in which the important characteristics of forecast revisions are captured by one of the two measures only. Panel A of Figure 1 shows no change in forecast dispersion, but the average forecast has increased. Panel B of Figure 1 shows no average forecast revision, but the

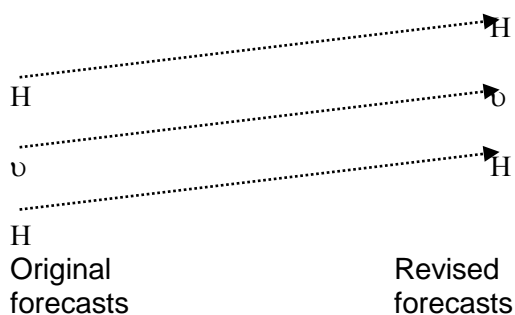
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forecast dispersion has decreased. Therefore, studies of analysts' forecast revisions examine average forecast revisions only do not fully capture the predictive value of interim earnings.

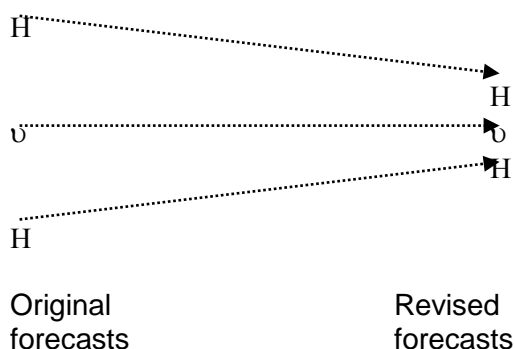
In this study, I find that the positive association between the interim earnings forecast error and analysts' average annual earnings forecast revisions documented in previous research only exists when the interim earnings are relatively persistent. The interim earnings forecast error increases analysts' annual earnings forecast dispersion. The persistence of interim earnings decreases analysts' annual earnings forecast dispersion. These findings should be of interest to accountants, business managers and financial analysts, as well as to accounting researchers. Both the accuracy and the dispersion of financial analysts' earnings forecasts reflect the estimation risk and information asymmetry among investors and eventually are linked to the cost of capital (Miller, 1977; Jarrow, 1980, Barry and Brown, 1985; Glosten and Milgrom, 1985; Coles and Lowenstein, 1988; and Clarkson and Thompson, 1990). The study provides incentives for companies to keep investors well informed and to improve the quality of the reported earnings.

Figure 1
The complementary relationship between the average forecast revision and change in forecast dispersion

Panel A. Change in Average Revision Only



Panel B. Change in Forecast Dispersion Only



v: Average forecast
H: Individual forecast

The rest of this study is organized as follows: Section 2 formulates the testable hypotheses and regression models; Section 3 defines the variables and describes the data; Section 4 presents the results of empirical tests; and Section 5 summarizes the study.

2. Hypotheses Formulation

2.1 Hypothesis about Average Forecast Revisions

Assuming the interim earnings are perfectly persistent, any forecast error in interim earnings suggests that there is a change in the earnings that analysts were not aware of. Because this change is going to persist, analysts' forecasts of all future period earnings will be off by the same amount. Therefore, analysts will revise all their future forecasts accordingly. On the other hand, assuming interim earnings are transitory, a forecast error in current interim earnings will have no implication in the future earnings because whatever caused the forecast error will not happen again. Therefore, analysts have no basis for revising their forecasts of future earnings. Generally, earnings are summary measures that have various components, some of which are more permanent and some are more transitory. The more permanent the earnings, the more responsive analysts should be to the forecast error they incurred in revising their future earnings forecasts, and vice versa.

Analysts' annual earnings forecasts are the sum of each quarter's forecasts. When interim earnings are announced, revisions of annual earnings forecasts consist of 1) the difference between the current quarter's actual earnings and analysts' forecasts, and 2) revisions to the remaining quarters' earnings forecasts. *Ceteris paribus*, earlier interim quarter earnings have more significant impact on annual earnings forecast because more quarters will be affected. Thus, the first hypothesis, stated in alternative form, is

H1: *Financial analysts' annual earnings forecast revisions around the interim earnings announcement are positively associated with the surprise in the interim earnings announcement. The association strengthens with the persistence of interim earnings and weakens with the forecast horizon.*

To test this hypothesis, I use multiple regression (OLS) to regress average annual earnings forecast revisions (ΔF) on the forecast error of interim quarterly earnings (UX) and interim earnings persistence (ω) for each interim quarter. The regression model and predicted signs of the regression coefficients are

$$\Delta F = \alpha + \beta (UX) + \gamma (UX * \omega) + \varepsilon \quad (R1)$$

Predicted sign: (+) (+)

Earnings persistence is a dummy variable with one for more persistent earnings and zero for less persistent earnings (see Section 3 for definition). The coefficient γ captures the difference in analysts' reaction to earnings surprise between high and low persistence and should be positive. As the year progresses, regression coefficients γ and $\beta + \gamma$ should be smaller, reflecting the smaller impact of late quarter earnings.

2.2 Hypothesis about Change in Forecast Dispersion

Interim earnings announcements provide all analysts with the same public information that has implications for the annual earnings. Some disagreement among analysts as to the future earnings should resolve as a result of the new information. Consistently, using only the recent forecasts from detail I/B/E/S data, Brown and Han (1992) find that on average, analysts' future year earnings forecast variance decreases after current year earnings announcements. Interim earnings announcements reduce analysts' future earnings forecast dispersion because of their implication for future

earnings. The impact of interim earnings on future earnings forecast dispersion thus depends on the strength of this implication. *Ceteris Paribus*, the greater the interim earnings forecast error, the more new information they convey, and the more room there is for different interpretations. Thus, the greater the interim earnings forecast error, the less the analysts' forecasts will converge (or the more analysts' forecasts will diverge). This is consistent with Bamber's (1987) argument that bigger surprises are more likely to result in a wider variety of interpretations. Second, the more persistent the interim earnings, the clearer the implication on the future earnings and the more analysts' forecasts will converge (or the less the analysts' forecast will diverge). Finally, the larger the forecast dispersion before the announcement, the more likely interim earnings announcements will reduce the dispersion. The second hypothesis can be formally stated in alternative form:

H2: *The change in analysts' annual earnings forecasts dispersion around interim earnings announcements is positively associated with the absolute value of the interim earnings forecast error and pre-announcement annual earnings forecast dispersion. The change in analysts' forecast dispersion is negatively associated with interim earnings persistence.*

To test Hypothesis 2, the change in forecast dispersion (ΔV) is regressed (OLS) on the absolute value of interim earnings forecast error ($|UX|$), interim earnings persistence (ω), and pre-announcement annual earnings forecast dispersion ($V1$) with the following predicted sign:

$$\Delta V = \alpha + \beta |UX| + \gamma\omega + \lambda V_1 + \varepsilon \quad (R2)$$

Predicted sign: (+) (-) (+)

The change in analysts' annual earnings forecast dispersion is the difference between the forecast dispersion after and before an interim announcement, i.e., $\Delta V = V2 - V1$. Therefore, analysts' pre-announcement forecast dispersion will appear on both sides of regression (R2):

$$V2 - V1 = \alpha + \beta |UX| + \gamma\omega + \lambda(1 - V1) + \varepsilon$$

Including the same variable on both sides of the regression will inflate the regression R^2 . To avoid this problem, I use the following regression:

$$V2 = (\alpha + \lambda) + \beta |UX| + \gamma\omega + (1 - \lambda) V1 + \varepsilon \quad (R2')$$

Let $\lambda' = 1 - \lambda$. λ is predicted to be positive in regression (R2). By definition, the values of forecast dispersion and earnings persistence variables are all between zero and one (see Section 3). Therefore, the regression coefficient on pre-announcement annual earnings forecast dispersion information in regression (R2), λ , should also be less than one. This leads to the prediction that λ' should be positive. All other regression coefficients have the same predicted signs as those in (R2).

3. Variables Definitions and Data

To test these hypotheses requires the specification of pre- and post-announcement periods. Following Barron (1995) and Bamber et al. (1997), I specify the pre-announcement period as the period of 45 days before an interim announcement date and a post-announcement period of 30 days after an interim announcement date. The pre-announcement period is allowed to be longer than the post-announcement period because analysts tend to postpone their forecast release until after an interim earnings announcement.

Analysts' average forecast revision, ΔF , is the difference between the post- and pre-announcement period analysts' average earnings forecasts of the remaining quarters of the year. The change in forecast dispersion, ΔV , is the difference between the standard deviation of all forecasts in the post- and the pre-announcement periods, V_2 and V_1 , respectively. The forecast error in interim earnings is the difference between the actual earnings and analysts' average forecast. All above variables are deflated by the previous period closing stock price to avoid a heteroscedasticity problem.

I use three proxies for earnings persistence in this study. All three are dummy variables with value "1", indicating relatively high persistence, and "0", relatively low persistence. The first is based on whether the interim earnings forecast error is extreme. Freeman and Tse (1992) argue that transitory earnings are likely to be associated with extreme earnings forecast error. The potential benefit of forecasting transitory earnings is small, so analysts put less effort into forecasting them. Consequently, transitory earnings are likely to have larger forecast errors. Since stock prices react less to transitory earnings, an "S-shape" return/earnings relationship should exist. Their results indeed show an "S-shape" return/earnings relationship. In light of this discussion, I rank my sample of each quarter by the magnitude of the absolute surprise in interim earnings. If the earnings surprise is in the top 10% of the ranking, then its persistence is considered to be relatively low. Otherwise, its persistence is considered to be relatively high.

The second proxy is based on whether a firm reports a profit or loss. Basu (1997) argues that since accounting conservatism usually requires "bad news" to be reported in a more timely manner than "good news," bad news tends to be reported more concurrently, while good news tends to be spread over several periods. He predicts, and finds, consistent empirical evidence that negative earnings surprises reverse more often than positive earnings surprises, indicating that negative earnings surprises are more transitory than positive earnings surprises. Similar evidence is reported by Brooks and Buckmaster (1976), Hayn (1995) and Elgers and Lo (1994). In addition, Hwang, Jan and Basu (1996) find that analysts on average provide far more optimistic earnings forecasts for loss firms than for profit firms because, they infer, losses are more transitory. In the spirit of the above argument, if a firm reports losses in its earnings, its persistence is considered relatively low. Otherwise, its persistence is considered relatively high.

The third proxy of earnings persistence is based on a direct measure of the transitory components in earnings, that is, the extraordinary items. If a firm reports no extraordinary items in interim earnings, the persistence is considered relatively high. Otherwise it is considered relatively low.

Individual analysts' annual and quarterly earnings forecasts and actual quarterly earnings are obtained from detailed I/B/E/S files. Interim earnings announcement date and prior quarter closing stock price are obtained from the quarterly COMPUSTAT Primary, Supplementary and Tertiary (PST) files. Samples are required to have a December 31 fiscal year end. For each firm-quarter to be included, at least five analysts must have annual earnings forecasts in the pre-announcement period, and the **same** analysts must revise their forecasts in the post-announcement period to ensure that the estimates of forecast dispersion used in this study are reasonably precise. To mitigate the influence of extreme values, the top 1% extreme value of earnings surprise, average forecast revision, post-announcement forecast dispersion and pre-announcement forecast dispersion (0.5% largest and 0.5% smallest) are excluded. The final sample includes 1,467 observations between 1984 and 1994 inclusive.

4. The Results

Tables 1 and 2 show the regression test results of the hypotheses. Each table shows the results of the hypotheses using the three proxies for earnings persistence separately in Panels A through C. Each panel shows the results of each of the three interim quarters in each year separately.

4.1 Tests on Average Forecast Revision (Hypothesis 1)

Earnings persistence in Panel A of Table 1 is based on whether the interim earnings surprise is extreme. The adjusted R² ranges from 4.62% to 13.67%. The sum of the coefficient on the interim earnings forecast error and on the interactive term of the interim earnings forecast error and the persistence, $\beta+\gamma$, is positive and significant at 1% level for all quarters. This means that analysts' average forecast revisions are positively associated with the interim earnings forecast error when the interim earnings persistence is relatively high. The coefficient of the interactive term of interim earnings forecast error and persistence, γ , is positive and significant at the 1% confidence level for all three

Table 1 The Test Results about Average Forecast Revisions
Regression: $\Delta F = \alpha + \beta UX + \gamma \omega UX + \varepsilon$

Panel A. Earnings persistence is based on whether earnings surprise is extreme

Coefficient	α	β	γ	$\beta+\gamma$
Predicted sign	?	+, 0, or -	+	+
1 st Quarter	-0.0001	0.1214	0.7488	0.8702
Adj-R ² =0.062	(-0.264)	(1.5924)	(4.596) ^{***}	P=0.0001
2 nd Quarter	-0.0017	-0.2495	0.7157	0.4662
Adj-R ² =0.046	(-2.711) ^{***}	(-3.142) ^{***}	(4.084) ^{***}	P=0.0035
3 rd Quarter	-0.0023	-0.4029	0.5260	0.1231
Adj-R ² =0.137	(-4.802) ^{***}	(-9.232) ^{***}	(4.237) ^{***}	P=0.2988

Panel B. Earnings persistence is based on whether there is profit or loss

Coefficient	α	β	γ	$\beta+\gamma$
Predicted sign	?	+, 0 or -	+	+
1 st Quarter	0.0001	0.3591	-0.2303	0.1288
Adj-R ² =0.029	(0.169)	(3.995) ^{***}	(-1.300)	P=0.3496
2 nd Quarter	-0.0034	-0.2496	0.6920	0.4424
Adj-R ² =0.028	(-4.814) ^{***}	(-2.924) ^{***}	(3.140) ^{***}	P=0.0207
3 rd Quarter	-0.0029	-0.3502	0.0338	-0.3164
Adj-R ² =0.110	(-5.434) ^{***}	(-7.595) ^{***}	(0.194)	P=0.0013

Panel C. Earnings persistence is based on whether earnings contain extraordinary items

Coefficient	α	β	γ	$\beta+\gamma$
Predicted sign	?	+, 0 or -	+	+
1 st Quarter	-0.0004	0.2397	0.0679	0.3076
Adj-R ² =0.023	(-0.768)	(3.357) ^{***}	(0.521)	P=0.0020
2 nd Quarter	-0.0028	-0.3199	0.6473	0.3274
Adj-R ² =0.040	(-5.216) ^{***}	(-5.812) ^{***}	(5.204) ^{***}	P=0.0042
3 rd Quarter	-0.0033	-0.4597	0.2671	-0.1926
Adj-R ² =0.197	(-7.130) ^{***}	(-13.552) ^{***}	(2.637) ^{***}	P=0.1491

^{***}, ^{**}, and ^{*}:

two tailed T-test significant at 1%, 5% and 10% levels respectively.

ΔF :

Average earnings forecast revision around interim earnings announcements deflated by stock price at the beginning of the period.

|UX|:

The absolute value of the surprise in interim earnings announcements deflated by stock price at the beginning of the period.

ω :

The persistence of interim earnings.

interim quarters. This suggests that the association between the average forecast revisions and the interim earnings forecast error is stronger when the interim earnings are more persistent. The coefficient of surprise, β , is positive but statistically insignificant for the first quarter and negative and significant at the 1% level for the second and third quarters. This suggests that analysts are not responsive to the less persistent interim earnings forecast error if the earnings are less persistent in the first quarter and expect the interim earnings forecast error to reverse in the second and third quarters. In summary, the results in Panel A in Table 1 support Hypothesis 1 that the average forecast revisions are positively associated with the interim earnings forecast error when earnings persistence is high and the association is strong for the earlier quarters in each year. Analysts are less responsive to interim earnings forecast errors or expect them to be reversed later when earnings persistence is low.

In Panel B of Table 1, the earnings persistence is based on whether interim earnings show a net profit or a net loss. In Panel C of Table 1, the earnings persistence is based on whether the interim earnings contain extraordinary items. The results presented in these two panels are weaker than the results in Panel A of Table 1. The coefficient of the interactive term of the interim earnings forecast error and the persistence, γ , is positive, as predicted, for five of the six quarters but significant at the 1% level for only three of the six quarters. The sum of the coefficient of the interim earnings forecast error and the interactive term of the interim earnings forecast error and the persistence is positive as predicted for only four of the six quarters and positive and significant at the 1% level for only three of the six quarters. An alternative explanation is that the second and third proxies for earnings persistence are poor ones.

Although the adjusted R^2 Panels A through C of Table 1 are smaller for the first two interim quarters than those in previous studies, they are quite stable across models. Overall, the adjusted R^2 are slightly higher for the first model, which could be another indication that the first proxy for earnings persistence is a better measure.

4.2 Tests on Change in Forecast Dispersion (Hypothesis 2)

In Panel A of Table 2, earnings persistence is based on whether the interim surprise is extreme. The adjusted R^2 of the regression ranges from 41.62% to 51.10%. The coefficient on the absolute value of the interim earnings forecast error, β , is positive, as predicted, and significant at the 1% confidence level for all quarters. β has similar values for the first and the second quarters but decreases about 20% in the third quarter. This suggests that as a year approaches its end, the difference between analysts' interpretation of the interim earnings forecast error with high and low persistence decreases.

The coefficient of earnings persistence, γ , is negative as predicted and statistically significant at the 1% confidence level for the first and third quarters and positive but not significant for the second quarter. This means that, on average, analysts' forecast dispersion decreases about 0.0025 and 0.0030 for the first and third quarters, respectively, and more for earnings of high persistence than low persistence. The magnitudes of the coefficient are about 50% of the average change in forecast dispersion for each quarter (see Table 1). The trend of γ shows that the change in analysts' forecast dispersion is affected more by earnings persistence for the first and third quarter and less for the second quarter. As argued before, in the first quarter, earnings are more important because less information is available. In the second quarter, since more information becomes available as the year progresses, the earnings become less important. In the third quarter, earnings become important again because the fiscal year end is near. Consistently, I also found a relatively larger coefficient on pre-announcement dispersion, λ , for the second quarter, indicating that in the second

quarter, post-announcement analysts' forecast dispersion is more strongly influenced by pre-announcement analysts' forecast dispersion.

In summary, the regression results support Hypothesis 2 that the change in analysts forecast dispersion is positively associated with the absolute value of earnings surprise and pre-announcement forecast dispersion, and negatively associated with the earnings persistence. The regression coefficients vary across different quarters in the year.

Panels B and C of Table 2 present the results of regressions that use the earnings persistence measures that are based on whether interim earnings show a profit or loss and whether the interim earnings contain extraordinary items, respectively. The results in these two panels are similar to those in Panel A except that the coefficient on persistence is negative as predicted and statistically significant only half the time. This is consistent with the finding of the previous section 4.1 that the last two proxies for earning persistence do not produce strong supporting evidence.

Table 2 The Test Results of the Change in Forecast Dispersion
Regression: $V_2 = \alpha + \beta|UX| + \gamma\omega + \lambda V_1 + \varepsilon$

Panel A. Earnings persistence is based on whether earnings surprise is extreme

Coefficient	α	β	γ	λ
Predicted sign	?	+	-	+
1 st Quarter Adj-R ² =0.416	0.0047 (3.076) ^{***}	0.3517 (5.747) ^{***}	-0.0025 (-1.728) ^{***}	0.2340 (12.902) ^{***}
2 nd Quarter Adj-R ² =0.442	0.0016 (0.067)	0.3799 (4.765) ^{***}	0.0002 (0.072)	0.3064 (12.081) ^{***}
3 rd Quarter Adj-R ² =0.511	0.0045 (3.726) ^{***}	0.2941 (9.856) ^{***}	-0.0030 (-2.649) ^{***}	0.1629 (10.763) ^{***}

Panel B. Earnings persistence is based on whether there is profit or loss

Coefficient	α	β	γ	λ
Predicted sign	?	+	-	+
1 st Quarter Adj-R ² =0.423	0.0030 (6.722) ^{***}	0.4153 (9.865) ^{***}	-0.0016 (-3.129) ^{***}	0.2327 (12.910) ^{***}
2 nd Quarter Adj-R ² =0.442	0.0018 (3.021) ^{**}	0.3759 (6.829) ^{***}	0.0000 (0.020)	0.3065 (12.082) ^{***}
3 rd Quarter Adj-R ² =0.507	0.0011 (3.420) ^{***}	0.3561 (16.392) ^{***}	0.00074 (1.709)	0.1705 (11.513) ^{***}

Panel C. Earnings persistence is based on whether there is extraordinary item

Coefficient	α	β	γ	λ
Predicted sign	?	+	-	+
1 st Quarter Adj-R ² =0.477	0.0018 (4.841) ^{***}	0.6491 (16.732) ^{***}	-0.0005 (-0.873)	0.2143 (13.014) ^{***}
2 nd Quarter Adj-R ² =0.443	0.0022 (2.239) ^{***}	0.3708 (6.704) ^{***}	-0.0095 (-1.988) [*]	0.3070 (12.099) ^{***}
3 rd Quarter Adj-R ² =0.441	0.0020 (5.725) ^{***}	0.2777 (14.456) ^{***}	-0.0166 (-2.372) ^{**}	0.2485 (14.962) ^{***}

- ***, **, and * : two tailed T-test significant at 1%, 5% and 10% levels respectively.
V2: Annual earnings forecast dispersion after interim earnings announcements deflated by stock price at the beginning of the period.
V1: Annual earnings forecast dispersion before interim earnings announcements deflated by stock price at the beginning of the period.
|UX|: The absolute value of the surprise in interim earnings announcements deflated by stock price at the beginning of the period.
 ω : The persistence of interim earnings.

5. Conclusion

This study examines how interim earnings affect analysts' annual earnings forecast revisions around interim announcements. The study shows that analysts' annual earnings forecast revisions are positively associated with interim earnings forecast error when interim earnings are relatively persistent. The interim earnings forecast error increases analysts' annual earnings forecast dispersion while the persistence of interim earnings decreases analysts' annual earnings forecast dispersion. These findings should help corporate managers who desire to use interim reporting to increase earnings forecast accuracy and reduce earnings forecast dispersion.

References

- Abdel-Khalik, A.R. 1983. "Over-fitting bias in the models assessing the predictive power of quarterly reports." *Journal of accounting Research* 21: 293-296.
- Abdel-Khalik, A.R. and J. Espejo. 1978. "Expectations data and the predictive value of interim reports." *Journal of accounting Research* (spring): 1-13.
- Bamber, L.S. 1987. "Unexpected earnings, firm size, and trading volume around quarterly earnings announcement." *The Accounting Review* 55: 510-532.
- -----, O.E. Barron, and T.L. Stober. 1997. "Trading volume and different aspects of disagreement coincident with earnings announcements." *The Accounting Review* 72: 575-597.
- Barron, O.E. 1995. "Trading volume and belief revisions that differ among individual analysts." *The Accounting Review* 70: 581-598.
- Barry, C.B., and S.J. Brown. 1985. "Differential information and security market equilibrium." *Journal of Financial and Quantitative Analysis* 20: 407-427.
- Basu, S. 1997. "The conservatism principles and the asymmetric timeliness of earnings." *Journal of Accounting and Economics* 24: 3-37.
- Brooks, L. and D. Buckmaster. 1976. "Further evidence of the times series properties of accounting income." *Journal of Finance* 31: 1359-1373.
- Brown, L. and J.C.Y. Han. 1992. "The impact of annual earnings announcement on convergence of beliefs." *The Accounting Review* 67: 862-875.
- Brown, L., J. Hughes, M. Rozeff, and J. Vanderweide. 1980. "Expectations data and the predictive value of interim reports: a comment." *Journal of accounting Research* (spring): 278-88.
- Cheng, A., W. Hopwood, and J. McKeown. 1992. "Non-linearity and specification problems in unexpected earnings response regression model." *The Accounting Review* (July): 579-598.
- Clarkson, P., and R. Thompson. 1990. "Empirical estimates of beta when investors face estimation risk." *Journal of Finance* 45: 431-454.
- Coles, J.L., and D.U. Lowenstein. 1988. "Equilibrium pricing and portfolio composition in the presence of uncertain parameters." *Journal of Financial Economics* 22: 279-304.
- Das, S. and B. Lev. 1994. "Non-linearity in the returns-earnings relations: test of alternative specifications and explanations." *Contemporary Accounting Research* (fall): 353-379.
- Elgers, P.T., and M.H. Lo. 1994. "Reductions in analysts' annual forecast errors using information in prior earnings and security returns." *Journal of Accounting Research* 32: 290-301.
- Freeman, R., and S. Tse. 1992. "A non-linear model of security price response to accounting earnings." *Journal of Accounting Research* 30: 185-209.

- Glosten, L. and P. Milgrom. 1985. "Bid ask and transaction prices in a specialist market with heterogeneously informed traders." *Journal of Financial Economics* 26: 71-100.
- Green, D. and J. Segall. 1967. "The predictive power of first quarter earnings reports." *Journal of Business* (January): 44-55.
- Hayn, C. 1995. "The information content of losses." *Journal of Accounting and Economics* 20: 125-144.
- Hwang, L., C. Jan, and S. Basu. 1996. "Loss firms and analysts' earnings forecast errors." *Journal of Financial Statement Analysis* 1: 18-30.
- Jarrow, R. 1980. "Heterogeneous expectations, restrictions on short sales and equilibrium asset prices." *Journal of Finance* 35: 1105-1113.
- Miller, E. 1977. "Prices, uncertainty and divergence of opinion." *Journal of Finance* 32: 1151-1168.
- Stickel, S. 1989. "The timing of and incentives for annual earnings forecasts near interim earnings announcements." *Journal of Accounting and Economics* 11: 275-292.