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EVIDENCE ON NEGATIVE EARNINGS RESPONSE COEFFICIENTS

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INTRODUCTION

This paper provides empirical evidence on negative earnings response coefficients. There is a growing body of literature on cross-sectional and intertemporal differences in earnings response coefficients.[1] This paper addresses an extreme case. Namely, the situation in which earnings response coefficients (ERCs) have the opposite sign of that normally predicted and empirically observed (i.e., negative). This extreme case is of interest since it illustrates the potential magnitude of cross-sectional differences in ERCs and makes a strong case for the importance of informational interactions in understanding the relationship between accounting earnings and firm value (Antle, Demski and Ryan, 1995). That is, the paper focuses on situations in which accounting earnings reports are unconditionally good (bad) news but, conditional on other information, earnings are bad (good) news.[2]

Examples of informational interactions from the extant literature are abundant including increases in banks' loan loss reserves, information transfer of intra-industry earnings announcements and the incremental information conveyed by cash flows conditional on earnings reports. Unconditionally, increases in a bank's loan loss reserves are bad news; however, there is an abundance of other information which reflects a bank's troubled loans in a more timely fashion than the allowance for loan loss. Thus, conditional on this other, more timely information, evidence such as in Beaver, Eger, Ryan and Wolfson (1989) and Liu and Ryan (1995) suggests that increases in loan loss reserves, conditional on nonperforming loans, are good news.

Intra-industry information transfers of firms' earnings reports may signal good or bad news conditional on other information (Foster, 1981, and others). For instance, earnings increases for a firm may reflect good news for its competitors if the industry has benefited from increased market size. On the other hand, an earnings increase for a firm, conditional on a non-increasing market size for the industry, is likely bad news for its competitors as the firm's gain comes at the expense of its competitors.

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Whether more cash flow for a given level of earnings is good or bad news is also likely to be time period specific (Bernard and Stober, 1989). For instance, increases in cash flows when investment prospects are favorable may be bad news since the firm should be investing.

These examples illustrate the importance of informational interactions between accounting disclosures and other information in predicting the nature and magnitude of the information content in accounting disclosures. This study employs a simple, two signal model for identifying when earnings information is unconditionally good (bad) news but conditionally is bad (good) news (i.e., negative ERCs).

Ex ante predictions of positive and negative earnings response coefficients are developed by reference to a simple, stylized two-signal model following Holthausen and Verrecchia (1988). In particular, time series variance-covariance estimates of a firm's reported earnings per share and Value-Line's earnings per share forecasts are employed to determine these predictions. Simple correlations, and multiple regressions (employing experimental control variables from the extant literature) during a hold-out period support the predicted differences in association between price changes and unexpected earnings for the *ex ante* identified positive and negative groups. Two return intervals are examined: (i) an interval from the forecast date through the earnings report date and (ii) a two-day interval at the earnings announcement date. As predicted, tests employing the latter return interval (in conjunction with appropriate experimental control variables) have greater discriminatory power for detecting a negative association between returns and earnings for the negative group. The results are surprisingly supportive given the limitations of the classification procedure (e.g., parameters are assumed to be firm-specific intertemporal constants, the reference model is a two-signal economy which under-specifies the information interactions for the economy in which the test firms operate).

The remainder of the paper is organized as follows. The next section reviews a stylized two-signal model and discusses its implications. The third section develops the implications of the two-signal model for the empirical analysis reported in the paper. The fourth section describes the data and the partitioning of firms based on time series parameter estimates. The fifth section presents hold-out period correlation, and multiple regression results for the *ex ante* identified positive and negative ERC groups. The sixth section discusses implications of these results for other sequential information issues including management forecasts, variation in ERC by firm size, and intra-industry information transfer. The final section offers a summary and conclusions of the paper.

A TWO-SIGNAL MODEL OF CHANGES IN FIRM VALUE

A number of papers (implicitly or explicitly) predict that the sign of the ERC can be negative (e.g. Holthausen and Verrecchia, 1988; and Lundholm, 1988).

Holthausen and Verrecchia (1988) consider sequential signalling of public information, while Lundholm considers simultaneous public and private signals. Though there are some differences in their assumed economies,[3] there are no substantive differences for purposes of the predictions adopted for this study.

For simplicity of exposition, this paper adopts the model of Holthausen and Verrecchia (1988). There exists a single, risky asset which pays a liquidating dividend $\tilde{u}$. It is known that $\tilde{u}$ has a normal distribution with mean m and variance v.[4] Information about the liquidating dividend is reported to all market participants at two dates from the time the market opens until liquidation of the risky asset. This first signal $\tilde{y}^1$ communicates the liquidating dividend perturbed by noise $\tilde{\epsilon}^1$: $\tilde{y}^1 = \tilde{u} + \tilde{\epsilon}^1$. $\tilde{\epsilon}^1$ has a normal distribution with mean zero, variance n^1, and $\tilde{u}$ and $\tilde{\epsilon}^1$ are uncorrelated. The second signal $\tilde{y}^2$ is also imperfect: $\tilde{y}^2 = \tilde{u} + \tilde{\epsilon}^2$. Residual uncertainty (noise) for signal two, $\tilde{\epsilon}^2$, also has a normal distribution with mean zero, variance n^2, and $\tilde{u}$ and $\tilde{\epsilon}^2$ are uncorrelated. Thus, $(\tilde{u}, \tilde{y}^1, \tilde{y}^2)$ has a trivariate normal distribution with mean (m, m, m) and covariance matrix:

$$\begin{bmatrix} v & v & v \\ v & v+n^1 & v+c \\ v & v+c & v+n^2 \end{bmatrix}$$

where c is the covariance between the noise in the two information signals (i.e. $c = \text{Cov}[\tilde{\epsilon}^1, \tilde{\epsilon}^2]$, where Cov refers to the covariance operator).

The market prices prior to either signal (p^0), after the first signal (p^1), and following the second signal (p^2) set by the risk-neutral, competitive market maker are as follows:

$$p^0 = \text{E}[\tilde{u}] = m, \tag{1}$$

$$p^1 = \text{E}[\tilde{u} \mid \tilde{y}^1 = y^1] = m + v(v+n^1)^{-1}(y^1 - m), \tag{2}$$

$$p^2 = \text{E}[\tilde{u} \mid \tilde{y}^1 = y^1, \tilde{y}^2 = y^2] = m + \frac{v(n^2-c)(y^1-m) + v(n^1-c)(y^2-m)}{(v+n^1)(v+n^2) - (v+c)^2}. \tag{3}$$

The price changes following the first and second information releases are δ^1 and δ^2, respectively.

$$\delta^1 = p^1 - p^0 = v(v+n^1)^{-1}(y^1-m), \tag{4}$$

$$\delta^2 = p^2 - p^1 = \frac{-v(v+c)(n^1-c)(y^1-m) + v(v+n^1)(n^1-c)(y^2-m)}{(v+n^1)[(v+n^1)(v+n^2) - (v+c)^2]}. \tag{5}$$

Equation (5) can be rewritten in terms of the response to unexpected y^2

$$\delta^2 = \frac{v(n^1-c)}{(v+n^1)(v+n^2) - (v+c)^2}\,[y^2 - \text{E}(\tilde{y}^2 \mid \tilde{y}^1 = y^1)] \tag{6}$$

where $$\text{E}(\tilde{y}^2 \mid \tilde{y}^1 = y^1) = m + (v+c)(v+n^1)^{-1}(y^1-m). \tag{7}$$

Assume the second signal is earnings, the main thesis of this paper is based on the sign of its coefficient. If the noise for the two signals is sufficiently highly correlated and the variance of the noise for earnings is greater than that for signal one (i.e. $c > n^1$), then the ERC is negative.[5] While this seems to be at odds with empirical evidence which documents a positive ERC, *on average*, that evidence does not preclude the possibility that some firm-earnings announcements are *predictably* negatively associated with contemporaneous price changes.

The intuition for negative ERCs is that earnings are not only informative about firm value but are also informative about the noise in the first signal's mapping into firm value. Consequently, earnings are useful for (partially) resolving residual (following the first signal) uncertainty about firm value and sometimes the price response is opposite in direction to the sign of the unexpected earnings signal.

For any imperfect signal, the 'signalling' effect is dampened by the noise in the signal. More formally, since $\tilde{y}^2 = \tilde{u} + \tilde{\epsilon}^2$ and price changes are determined by revision in *expectations of* $\tilde{u}$ only, the stock price response to earnings follows from the nature of the interaction between earnings and the first signal. Specifically,

$$\begin{aligned}\mathrm{Cov}(\tilde{u}, \tilde{y}^2 \,|\, \tilde{y}^1) &= \mathrm{Cov}(\tilde{u}, \tilde{u} \,|\, \tilde{y}^1) + \mathrm{Cov}(\tilde{u}, \tilde{\epsilon}^2 \,|\, \tilde{y}^1)\\ &= n^1 v(v+n^1)^{-1} - cv(v+n^1)^{-1}.\end{aligned}$$

Thus, consistent with intuition, the signalling effect is always positive and the noise effect is negative; however, when the noise effect dominates the signalling effect ($c > n^1$), the revision in expectations of $\tilde{u}$ (and the change in stock price) has the opposite sign to the sign of the unexpected signal.

The above discussion describes the interaction between two imperfect signals generally. Now, we explore the intuition for the specific signals employed in this study, namely analysts' earnings forecasts and reported earnings. In particular, the discussion now considers the intuition regarding how interaction between these two, largely redundant, signals leads to a negative association between returns and unexpected earnings. Such negative association occurs when covariance between the residual uncertainty (noise) in y^1 and y^2 exceeds the variance of noise in the first signal. This statement can be operationally defined in terms of the observable signals. That is, $\mathrm{Var}(\tilde{y}^1) - \mathrm{Cov}(\tilde{y}^1, \tilde{y}^2) = v + n^1 - (v+c) = n^1 - c$ and $c > n^1$ when $\mathrm{Cov}(\tilde{y}^1, \tilde{y}^2) > \mathrm{Var}(\tilde{y}^1)$. Thus, the question becomes, when is Cov(VL, EPS) > Var(VL), where VL refers to *Value-Line*'s earnings forecasts and EPS refers to reported earnings per share? Or, equivalently, when does the correlation between VL and EPS exceed the ratio of the standard deviation of VL to the standard deviation of EPS?

The important question is when is the above relation expected to be observed? Consider that analysts attempt to identify 'turning points' in their forecasts. If there is information available which helps analysts in identifying turning points, then one may expect to observe negative ERCs. For instance, suppose a firm has recently experienced a slow (boom) period and information becomes available which suggests that the trend is about to reverse (e.g. new geological survey evidence identifies that extractable reserves for a major oil or gas field were previously significantly under- (over-) stated). This information may or may not be reflected in transactions which flow into measurement of accounting earnings for the period, but clearly has valuation implications. Further, if analysts are aware of such information, they are uncertain whether current accounting results will reflect such information. Thus, if analysts provide *ex ante* unbiased forecasts, they will likely assign some nonzero probability in anticipation of this new information's impact on earnings even though there may be a small likelihood that the information is reflected in the current earnings report. This implies that analysts' earnings forecasts are subject to *dampened* shocks relative to reported earnings, while the time series of analysts' earnings forecasts and reported earnings remain highly correlated. These conditions imply that Cov(VL, EPS) > Var(VL) and lead to predicted negative ERCs for firms with such characteristics.

Another example involves management's strategic reporting. Suppose the firm has experienced tough times such that management will not achieve its bonus incentive, then management may choose to take a 'big bath' (i.e. write-off significant dollar amounts of assets) in order to embellish future period's financial reports. However, analysts might not know for certain whether management will 'take a bath' or the dollar amount of assets to be written off. Consequently, analysts' forecasts reflect some likelihood of this event but, on average, understate the magnitude of the write-down. This again results in a dampened variance of analysts' earnings forecasts relative to the variance of reported earnings while maintaining a high correlation between anlaysts' forecasts and earnings.

Putting this into perspective so that one does not conclude that a preponderance of negative ERCs are expected to occur, recall that turning points (large earnings shocks) are relatively infrequent events. Thus, analysts' forecasts and reported earnings may be highly correlated but for the majority of firms their covariance will not exceed the variance in analysts' earnings forecasts.

HYPOTHESIS DEVELOPMENT

The above discussion suggests that current unexpected earnings should have an empirically detectable negative association with stock price changes during the earnings report period when the covariance of the noise between earnings and analysts' forecasts exceeds the variance of the noise in analysts' earnings forecasts. This prediction requires at least two qualifications. First, observable economies involve more than two information signals so that the foregoing analysis is not strictly representative. Secondly, the parameters are assumed constant through time in the empirical analysis and this could be a poor approximation for some firms.[6] These qualifiers suggest that there is some (perhaps substantial) likelihood of firm misclassification. Nonetheless, the earnings response coefficient is predicted to be *positive* when Cov(VL, EPS) < Var(VL) and the earnings response coefficient is predicted to be *nonpositive* when Cov(VL, EPS) ≥ Var(VL).

These two groups are operationally identified by time series estimation of the variances and covariance of observed quarterly earnings per share and analysts' forecasts of quarterly earnings per share over the period 1973 through 1979 (28 quarters). The years 1980 and 1981 (8 quarters) are held out for test purposes.

DATA DESCRIPTION

Quarterly earnings per share (EPS) and the latest available one-quarter ahead forecast of EPS (adjusted for stock splits and dividends) from *The Value-Line Investment Survey* from the first quarter of 1973 through the fourth quarter of 1981 for 269 firms were obtained for the analysis.[7] The 269 firm sample meets the following criteria:

1. The firm is included in Value-Line continuously from 1973 through 1981.
2. The firm is a member of a Value-Line industry that contained at least eight firms.
3. The firm is included on Standard and Poors' COMPUSTAT tapes.
4. Daily returns data are available on the current CRSP file during the 1980–1981 period.
5. Monthly returns data are available on the current CRSP file for at least 20 months for the period ending September 30, 1979.

The first three criteria are the same as those employed in Kross, Ro and Schroeder (1990). The fourth criterion was necessary to complete data collection on returns over the earnings report periods. The last criterion was necessary for computing firm's beta (systematic risk) prior to the test period. Incomplete data for 179 firm-quarters reduce the sample size to 1,973 observations during the two-year hold-out periods.[8]

Firms are classified into *ex ante* positive (negative) earnings response coefficient groups when the variance of the first signal, Value-Line earnings per share forecasts (VL), is larger (smaller) than its covariance with reported earnings per share (EPS). Thus, the negative ERC group is identified as follows

$$\mathrm{Var(VL)} - \mathrm{Cov(VL, EPS)} \leq 0. \tag{8}$$

These parameters are estimated from each firm's time series over the 1973 through 1979 period. The series are assumed to be stationary in either their first difference or seasonal difference. The choice of differencing for both series is determined based on the smaller estimated variance from the first or seasonal difference of the VL earnings forecast series.[9] For example, the covariance between reported EPS and VL earnings forecasts is estimated as the sample covariance between (the regular- or seasonal-difference, whichever VL firm variance is smaller) reported EPS and VL earnings forecasts during the estimation period. The difference between the variance of Value-Line forecasts and its covariance with EPS is positive for 223 firms (82.9%) and nonpositive for 46 firms (17.1%).[10] These firm groups are employed for the tests of association between earnings and stock returns discussed in the next section.

An industry profile of the sample broken down by positive/negative groups is reported in Table 1. Except for a proportionately greater representation in foods and textiles and a lesser representation in utilities by negative group firms, there is little difference in industry representation by negative and positive group firms.

Table 2 reports descriptive statistics on firm characteristics for the classified sample. On average, the negative and positive groups are similar in market

Table 1

Industry Profile of the Sample

		Number of Firms		
Industry	*Four-Digit SIC*	*Full Sample*	*Negative Group*	*Positive Group*
Foods, Textiles	100, 2000–2300	38 (14.1%)	11 (23.9%)	27 (12.1%)
Paper, Chemicals	2600–2899	33 (12.3%)	5 (10.9%)	28 (12.6%)
Petroleum	1311, 2911	22 (8.2%)	4 (8.7%)	18 (8.1%)
Manufacturing Materials	3000–3825	43 (16.0%)	7 (15.2%)	36 (16.1%)
Transportation, Communications	4200–4890	28 (10.4%)	8 (17.4%)	20 (9.0%)
Utilities	4911–4940	51 (19.0%)	4 (8.7%)	47 (21.1%)
Wholesale, Retail Stores	5199–5980	33 (12.3%)	3 (6.5%)	30 (13.5%)
Financial Institutions	6022–6025	18 (6.7%)	4 (8.7%)	14 (6.3%)
Services	7372–8911	3 (1.1%)	0 (0.0%)	3 (1.3%)
	Total	269 (100%)	46 (17.1%)	223 (82.9%)

Table 2

Sample Characteristics

Variable		*Full Sample*	*Negative Group*	*Positive Group*
Sample size		1,973	344	1,629
$\vert R_j(z, 0)\vert$	mean	0.0025	0.0032	0.0024
	median	0.0016	0.0020	0.0016
	std. dev.	0.0029	0.0041	0.0025
$\vert$EFE$\vert$/Price$_z$	mean	0.0182	0.0233	0.0171
	median	0.0051	0.0061	0.0049
	std. dev.	0.0677	0.0594	0.0694
$\vert$UE$\vert$/Price$_z$	mean	0.0266	0.0412	0.0236
	median	0.0071	0.0087	0.0171
	std. dev.	0.0925	0.1141	0.087
$\vert R_j(-1, 0)\vert$	mean	0.0245	0.0275	0.0239
	median	0.0172	0.0214	0.0167
	std. dev.	0.0254	0.0256	0.0253
$\vert$EFE$\vert$/Price$_{-2}$	mean	0.0184	0.0236	0.0173
	median	0.0052	0.0060	0.0050
	std. dev.	0.0692	0.0630	0.0704
$\vert$UE$\vert$/Price$_{-2}$	mean	0.0269	0.0421	0.0236
	median	0.0071	0.0091	0.0068
	std. dev.	0.0921	0.1218	0.0842
Beta	mean	1.022	1.014	1.024
	median	0.963	1.009	0.957
	std. dev.	0.425	0.359	0.438
Market value – common equity	mean	174.9	196.1	170.4
	median	43.6	32.6	48.0
	std. dev.	466.0	601.7	432.1
WSJI	mean	8.3	8.8	8.2
	median	5	6	5
	std. dev.	9.2	8.4	9.4
Forecast lead time (in calendar days)	mean	43.6	37.7	44.9
	median	40	28	45
	std. dev.	28.6	26.0	29.0
Var(VL)	mean	0.363	0.278	0.381
	median	0.046	0.085	0.041
	std. dev.	2.616	0.504	2.869
Var(reported EPS)	mean	0.583	1.616	0.364
	median	0.081	0.23	0.061
	std. dev.	2.932	6.328	1.305
Cov(VL, EPS)	mean	0.138	0.333	0.096
	median	0.023	0.107	0.015
	std. dev.	0.418	0.588	0.360

Notes:

$|R_j(-1, 0)|$ is the absolute value of the sum of firm j's two daily returns around the earnings date (day 0).

$|R_j(z, 0)| = |1/(0-z)\ln(P_0/P_z)|$ = the absolute value of firm j's average daily continuously compounded return over the forecast horizon (i.e. from the forecast date z to the earnings announcement date – day 0).

EPS is reported EPS before extraordinary items and discontinued operations (adjusted for stock splits and dividends, etc.).

VL is Value-Line's forecast of EPS.

|EFE| is absolute value of EPS less VL.

|UE| is absolute value of EPS less E[EPS|VL], where

$$E[EPS|VL] = EPS_{q-1} + Cov[EPS_q - EPS_{q-1}, VL_q - VL_{q-1}] * Var[VL_q - VL_{q-1}]^{-1} * (VL_q - VL_{q-1}])$$

if $Var[VL_q - VL_{q-1}] \leq Var[VL_q - VL_{q-4}]$, or

$$E[EPS|VL] = EPS_{q-4} + Cov[EPS_q - EPS_{q-4}, VL_q - VL_{q-4}] * Var[VL_q - VL_{q-4}]^{-1} * (VL_q - VL_{q-4}])$$

if $Var[VL_q - VL_{q-1}] > Var[VL_q - VL_{q-4}]$.

$Price_d$ is stock price on day d.

Beta is the firm's systematic risk (estimated from approximately 60 monthly returns in advance of the test period).

Market value – common equity is the firm's end of quarter stock price times the number of outstanding common shares (in millions) during the test period.

WSJI is the number of column inches of coverage on the firm in the annual *Wall Street Journal Index* during the test period.

Forecast lead time is the number of calendar days between the release of the Value-Line earnings forecasts and the earnings report date during the test period.

Var(VL) is the variance of (the regular- or seasonal-difference, whichever VL firm variance is smaller) Value-Line's EPS forecast during the estimation period.

Var(reported EPS) is the variance of (the regular- or seasonal-difference, whichever VL firm variance is smaller) reported EPS during the estimation period.

Cov(VL, EPS) is the covariance between (the regular- or seasonal-difference, whichever VL firm variance is smaller) Value-Line's EPS forecast and reported EPS during the estimation period.

value of common equity, systematic risk and reported and forecasted EPS scaled by stock price. The negative group, on average, has a greater return variability during the earnings announcement period in conjunction with greater variability in unexpected earnings, somewhat greater financial press coverage and more timely earnings forecasts than the positive group. (Timely forecasts may facilitate the prediction of turning points by analysts.) By construction, the covariance between reported and forecasted EPS is greater (less) than the variance of forecasted EPS for the negative (positive) group. The variance of reported EPS and the covariance between reported and forecasted EPS appear to be much larger for the negative than the positive group, while the variance of forecasted EPS appears to be similar for the two groups (however, these variables are not scaled for cross-sectional comparability).

ANALYSIS AND RESULTS

This section examines whether a difference in the association between unexpected earnings with stock price changes is empirically detectable for the positive and negative groups. Simple correlations and regressions of returns with two measures of earnings surprise are examined. The first earnings surprise measure is the earnings forecast error (EFE = EPS − VL) and provides comparability with the extant literature. The second earnings surprise measure is drawn from equation (7). Unexpected earnings (UE) is defined to be reported EPS less E[EPS|VL], i.e. expected earnings conditional on the *Value-Line* earnings forecast based on the time series variance-covariance estimates employed to classify positive and negative ERC firms.[11] Since price changes are deflated by initial price to determine returns,[12] the earnings forecast error is also deflated by price at the beginning of the return interval.

Two return intervals are examined: (i) the price change from the time of the VL forecast[13] through the earnings report date (the day reported in the *Wall Street Journal*), and (ii) the sum of the two daily returns during the two-day announcement period (day before and the day reported in the *Wall Street Journal*). The former corresponds with the model in the section headed Hypothesis Development in that the price change is aligned with the timing of disclosure for the two signals. However, the model assumes that the second signal instantaneously follows the first signal so that issues of discounting, changes in equilibrium returns and, importantly, other information do not alter investors' perceptions. Since the median number of calendar days between the VL forecast date and the earnings report date is 40 days, it is very likely that price changes during this interval are contaminated by other information events so that any differential ERC tests are likely to have low power. The choice of the second (shorter) return interval is expected to mitigate this omitted variables problem.

Simple Correlations

Table 3 reports simple (Pearson-product moment) correlations between returns and earnings surprise as well as the information primitives (reported EPS, VL forecasts and E[EPS|VL]) for the two groups. Two return measures are examined for each return interval: (i) raw returns, and (ii) market-adjusted returns, that is, the firm's raw return less the contemporaneous return on a market index.[14] The two return metrics yield similar correlations for a given return interval. Differences in correlations across return intervals are as expected. The forecast-to-earnings report date return interval demonstrates dampened (toward zero) correlations relative to the two-day earnings date interval.[15] As predicted, there are very substantial differences between the positive and negative groups' correlations for all return measures and intervals and both measures of earnings surprise. For example, the correlations for the

Table 3

Association Between Returns and Unexpected Earnings by Positive and Negative Groups
Pearson Product-Moment Correlations (p-values)

Negative Group (344 observations)

Return Metric	EFE/P_z	UE/P_z	EPS/P_z	VL/P_z	EE/P_z
$R_j(z, 0)$	−0.00045	−0.00668	0.04098	0.06221	0.03462
	(0.9933)	(0.9018)	(0.4487)	(0.2499)	(0.5223)
$R_j(z, 0) - R_m(z, 0)$	−0.01690	−0.01404	0.03942	0.07981	0.04119
	(0.7548)	(0.7953)	(0.4661)	(0.1396)	(0.4463)
$R_j(-1, 0)$	−0.09623	−0.03196	−0.01395	0.09907	0.02442
	(0.0747)	(0.5547)	(0.7966)	(0.0665)	(0.6518)
$R_j(-1, 0) - R_m(-1, 0)$	−0.13068	−0.07133	−0.02439	0.12623	0.05904
	(0.0153)	(0.1869)	(0.6521)	(0.0192)	(0.2749)

Positive Group (1,629 observations)

Return Metric	EFE/P_z	UE/P_z	EPS/P_z	VL/P_z	EE/P_z
$R_j(z, 0)$	0.09032	0.04617	0.14885	0.12099	0.13759
	(0.0003)	(0.0624)	(0.0001)	(0.0001)	(0.0001)
$R_j(z, 0) - R_m(z, 0)$	0.09919	0.05998	0.16087	0.12897	0.13606
	(0.0001)	(0.0155)	(0.0001)	(0.0001)	(0.0001)
$R_j(-1, 0)$	0.14051	0.18796	0.15278	0.07643	−0.01786
	(0.0001)	(0.0001)	(0.0001)	(0.0020)	(0.4714)
$R_j(-1, 0) - R_m(-1, 0)$	0.14820	0.19496	0.16553	0.08739	−0.00944
	(0.0001)	(0.0001)	(0.0001)	(0.0004)	(0.7034)

Notes:

$R_j(z, 0) = 1/(0-z)\ln(P_0/P_z)$ = firm j's average daily continuously compounded return over the forecast horizon (i.e. from the forecast date z to the earnings announcement date − day 0).

$R_j(z, 0) - R_m(z, 0) = 1/(0-z)\,[\ln(P_{j,0}/P_{j,z}) - \ln(I_{SP,0}/I_{SP,z})]$ where $I_{SP,z}$ = the S&P 500 Index level on day z (relative to earnings announcement date equal to day zero).

$R_j(-1, 0)$ is the sum of firm j's two daily returns around the earnings date (day 0).

$R_m(-1, 0)$ is the sum of the two daily returns on CRSP's value-weighted market index around the earnings date (day d).

EFE = EPS − VL = unexpected earnings, reported earnings per share (EPS) less Value-Line's earnings per share forecast (VL).

UE is EPS less E[EPS|VL], where

$$E[EPS|VL] = EPS_{q-1} + Cov[EPS_q - EPS_{q-1}, VL_q - VL_{q-1}] * Var[VL_q - VL_{q-1}]^{-1} * (VL_q - VL_{q-1}])$$

if $Var[VL_q - VL_{q-1}] \leq Var[VL_q - VL_{q-4}]$, or

$$E[EPS|VL] = EPS_{q-4} + Cov[EPS_q - EPS_{q-4}, VL_q - VL_{q-4}] * Var[VL_q - VL_{q-4}]^{-1} * (VL_q - VL_{q-4}])$$

if $Var[VL_q - VL_{q-1}] > Var[VL_q - VL_{q-4}]$.

EE = E[EPS|VL] (defined above).

P_z is the firm's stock price on day z (z = −2 or VL forecast date for the two-day or forecast-to-earnings date return interval, respectively).

positive group are 0.141 and 0.148 (both with p-values less than 0.0001) for two-day observed returns and market-adjusted returns with earnings forecast error (deflated by price), respectively. On the other hand, the correlations for the negative group are −0.096 and −0.131 (with two-tailed p-values of 0.0747 and 0.0153) for two-day observed returns and market-adjusted returns, respectively. These differences between the *ex ante* identified positive and negative groups are quite striking; however, they do not control for other factors with documented links to cross-sectional variation in ERCs. This is considered next.

Regression Analyses

The extant literature documents cross-sectional variation in ERCs as a function of various firm characteristics. For instance, Easton and Zmijewski (1989) argue that ERCs are inversely related to a firm's systematic risk. Freeman (1987) and Ro (1989) provide evidence that ERCs are inversely related to firm size. Kross and Schroeder (1989) provide evidence that ERCs are inversely related to a firm's financial press coverage. These characteristics might offer an alternative explanation to the posited dampening of ERCs for the negative group. That is, if the negative group firms are partitioned such that it is disproportionately represented by risky, large firms which receive substantial financial press coverage, then this might explain the dampened correlations observed in Table 3 for the negative group relative to those for the positive group.[16] Accordingly, experimental controls for beta, firm size and press coverage are incorporated into the next set of tests via regression analysis.

In particular, since the documented effects associated with these firm characteristics are most prominent for low beta firms, small firms and low financial press coverage firms, an interaction between earnings surprise (EARNSUP_t) and a dummy variable denoting the smallest third of the sample for each of these characteristics is incorporated in the regression.[17]

$$R_{jt} = \gamma_0 + \gamma_1\text{EARNSUP}_t + \gamma_2\text{EARNSUP}_t * \text{NEG} + \gamma_3\text{EARNSUP}_t * \text{LOWBETA} + \gamma_4\text{EARNSUP}_t * \text{SMALL} + \gamma_5\text{EARNSUP}_t * \text{LOWWSJI} + \gamma_6 R_{mt} + \xi_t \qquad (9)$$

R_{jt} = returns for firm j either measured over the interval from the forecast-to-earnings report date or over the two-day earnings report period,

EARNSUP_t = earnings surprise measured as either the VL forecast error or EPS less E[EPS|VL] both deflated by opening price (the forecast date price or price on day −2 depending on the return interval),

NEG = one if the firm is classified as a negative group firm, and zero otherwise,

LOWBETA = one if the firm is in the lowest third of sample firms' beta, and zero otherwise,

SMALL = one if the firm is in the lowest third of firm size for the sample, and zero otherwise,

LOWWSJI = one if the firm is in the lowest third of financial press coverage (measured as column inches in the annual *Wall Street Journal Index*) in the sample, and zero otherwise,

R_{mt} = return on the market index contemporaneous with the firm's return interval (either the return on the S&P 500 Index over the forecast-to-earnings report date or the return on CRSP's value-weighted index over the two-day earnings report period),

ξ_t = a disturbance term.

Table 4 reports results of regression analyses for four combinations of return intervals (forecast-to-earnings report date, or two-day earnings report date interval) and earnings surprise (VL earnings forecast error, or reported EPS less E[EPS|VL]). These results are very similar to the correlation results reported in Table 3. There is a substantial difference in ERCs between the positive and negative groups after controlling for other cross-sectional influences on ERCs. The difference is statistically significant in all four panels.[18] Panels A and C report the forecast-to-earnings date interval regressed on the VL earnings forecast error and unexpected earnings conditional on the VL forecast, respectively. As expected, the differences between the negative and positive groups' ERCs are dampened (but still significant) relative to the two-day return intervals reported in Panels B and D. Further, the ERC is significantly negative for the two-day return interval for both the VL earnings forecast error and unexpected earnings conditional on VL earnings surprise measures reported in Panels B and D, respectively. For instance, the ERC on the negative group reported in Panel B is -0.168 $(0.035 - 0.203)$ which has a p-value of 0.0001 (reported at the bottom of the panel as Negative ERC test).

In summary, the regression analyses provide strong evidence that the *ex ante* predicted negative ERC firms have smaller ERCs than *ex ante* predicted positive ERC firms after controlling for firm characteristics associated with cross-sectional variation in ERC and contemporaneous returns on a market index. It should be noted that low beta and low financial press coverage firms have significantly higher ERCs than their counterparts, but no difference is detected for small firms relative to medium and large firms. This latter result may be due to *Value-Line*'s propensity to cover larger firms. As expected, the power of these tests appears to be strongest for the two-day return interval since the forecast-to-earnings date return interval is more likely contaminated by other information events. Indeed, the two-day return interval results indicate a significantly negative ERC for firms in the negative group.

DISCUSSION

Implications For Other Information Environments

In addition to providing empirical evidence on negative earnings response coefficients, these data also provide indirect evidence on other issues involving

Table 4

Regression Analyses (all p-values reported are for two-tailed tests)

Panel A: Regressions of observed returns over forecast interval on VL earnings forecast errors (reported earnings less VL forecasts) scaled by beginning of return interval price

Coefficients	*Estimate*	*OLS (p-value)*	*White (p-value)*
Intercept	0.000158	(0.0424)	(0.0438)
EFE/P_z	0.002511	(0.0970)	(0.0909)
EFE*NEG/P_z	−0.008301	(0.0153)	(0.0596)
EFE*LOWBETA/P_z	0.019378	(0.0066)	(0.0204)
EFE*SMALL/P_z	0.001344	(0.6016)	(0.5816)
EFE*LOWWSJI/P_z	0.006949	(0.0486)	(0.1229)
$R_{SP}(z, 0)$	0.92154	(0.0001)	(0.0000)
R^2_{adj}	0.1779		

Tests:

White's Model Specification (conditional heteroskedasticity) χ^2(15 df) = 14.785 (p-value = 0.4670)

Negative ERC F(1, 1966 df) = 2.5176 (p-value = 0.1127) χ^2(1 df) = 1.5619 (p-value = 0.2114)

Panel B: Regressions of observed two-day returns at earnings announcement date on VL earnings forecast errors (reported earnings less VL forecasts) scaled by beginning of return interval price

Coefficients	*Estimate*	*OLS (p-value)*	*White (p-value)*
Intercept	0.000951	(0.2081)	(0.2090)
EFE/P_z	0.034767	(0.0249)	(0.2277)
EFE*NEG/P_z	−0.202593	(0.0001)	(0.0000)
EFE*LOWBETA/P_z	0.211141	(0.0024)	(0.0082)
EFE*SMALL/P_z	0.022802	(0.3320)	(0.5718)
EFE*LOWWSJI/P_z	0.175198	(0.0001)	(0.0013)
$R_m(-1, 0)$	0.681585	(0.0001)	(0.0000)
R^2_{adj}	0.1034		

Tests:

White's Model Specification (conditional heteroskedasticity) χ^2(23 df) = 26.4711 (p-value = 0.2791)

Negative ERC F(1, 1966 df) = 23.8181 (p-value = 0.0001) χ^2(1 df) = 10.6075 (p-value = 0.0011)

Panel C: Regressions of observed returns over forecast interval on unexpected earnings conditional on the VL earnings forecast scaled by beginning of return interval price

Coefficients	*Estimate*	*OLS (p-value)*	*White (p-value)*
Intercept	0.000145	(0.0615)	(0.0617)
UE/P_z	0.00283	(0.0874)	(0.0703)

Panel D: Regressions of observed two-day returns at earnings announcement date on unexpected earnings conditional on the VL forecast scaled by beginning of return interval price

Coefficients	*Estimate*	*OLS (p-value)*	*White (p-value)*
Intercept	0.000838	(0.2637)	(0.2636)
UE/P_z	0.044648	(0.0048)	(0.1093)

UE∗NEG/P_z	−0.004255	(0.0504)	(0.0750)	UE∗NEG/P_z	−0.148209	(0.0001)	(0.0004)
UE∗LOWBETA/P_z	0.01456	(0.0079)	(0.0080)	UE∗LOWBETA/P_z	0.174803	(0.0010)	(0.0037)
UE∗SMALL/P_z	−0.003677	(0.0829)	(0.1237)	UE∗SMALL/P_z	0.015441	(0.4322)	(0.6248)
UE∗LOWWSJI/P_z	0.007156	(0.0014)	(0.0032)	UE∗LOWWSJI/P_z	0.111106	(0.0001)	(0.0153)
$R_{SP}(z, 0)$	0.928618	(0.0001)	(0.0000)	$R_m(-1, 0)$	0.689854	(0.0001)	(0.0000)
R^2_{adj}	0.1765			R^2_{adj}	0.1125		

Tests:			*Tests:*		
White's Model Specification (conditional heteroskedasticity)	χ^2(17 df) = 20.88454 (p-value = 0.2315)		White's Model Specification (conditional heteroskedasticity)	χ^2(23 df) = 23.08166 (p-value = 0.4560)	
Negative ERC	F(1, 1966 df) = 0.2954 (p-value = 0.5869)	χ^2(1 df) = 0.2571 (p-value = 0.6121)	Negative ERC	F(1, 1966 df) = 18.4031 (p-value = 0.0001)	χ^2(1 df) = 4.885037 (p-value = 0.0271)

Notes:
Dependent Variables:
Returns from the VL forecast date (z) to earnings report date = $1/(0-z)\ln(P_0/P_z)$.

P_z = firm's stock price on day z (relative to day zero − the earnings announcement date).

Returns over the two-day earnings report date = $\sum_{d=-1}^{0} R_{jd}$, where R_{jd} = observed return on firm j's common stock for day d.

Independent Variables:
EFE = EPS − VL.

EPS = reported earnings per share.

VL = Value-Line's earnings per share forecast.

UE is EPS less E[EPS|VL], where

$$E[EPS|VL] = EPS_{q-1} + Cov[EPS_q - EPS_{q-1}, VL_q - VL_{q-1}] * Var[VL_q - VL_{q-1}]^{-1} * (VL_q - VL_{q-1}])$$

if $Var[VL_q - VL_{q-1}] \leq Var[VL_q - VL_{q-4}]$, or

$$E[EPS|VL] = EPS_{q-4} + Cov[EPS_q - EPS_{q-4}, VL_q - VL_{q-4}] * Var[VL_q - VL_{q-4}]^{-1} * (VL_q - VL_{q-4}])$$

if $Var[VL_q - VL_{q-1}] > Var[VL_q - VL_{q-4}]$ (subscripts are omitted where unambiguous).

NEG = one for firm's predicted to have negative ERCs based on time series parameters as discussed in the text and zero otherwise.

LOWBETA = one for smallest one-third firm betas and zero otherwise.

SMALL = one for smallest one-third firm market values and zero otherwise.

LOWWSJI = one for sample firms with smallest one-third *Wall Street Journal* coverage (measured as inches in the *Index*) and zero otherwise.

$R_{SP}(z, 0)$ = daily return on S&P 500 Index (I_{SP}) over return interval from VL forecast date z to earnings report date $(1/0-z)\ln[I_{SP,0}/I_{SP,z}])$.

$R_{md}(-1, 0) = \sum_{d=-1}^{0} R_{md}$, where R_{md} = observed return on CRSP value-weighted stock index for day d.

information content of accounting disclosures: (i) whether the coefficient on the first signal is greater or less than that for the second signal, and (ii) whether the earnings response coefficient is larger or smaller if preceded by other valuation-relevant information. The first issue speaks to questions such as whether one expects the response to management's earnings forecasts to be greater or less than the earnings report (e.g. Pownall and Waymire, 1989). To the extent that managers advise analysts about their own earnings forecasts, analysts' forecast variance and covariance with reported earnings provides some evidence on the expected explanatory power of management forecasts relative to reported earnings. The second issue provides additional insight into the evidence that earnings response coefficients for small firms (informationally-sparse economies) are greater than large firms (informationally-rich economies) (e.g. Freeman, 1987; Ro, 1989; and Kross and Schroeder, 1989).

These relations are identified by time series parameter estimates similar to the manner in which negative earnings response coefficients are identified. That is, they are identified by the relations in equations (4) and (5). In particular, the coefficient on signal one at the time of its disclosure is larger than the coefficient for signal two at the time of its disclosure when (expressed in terms of observables)

$$\mathrm{Var}(\tilde{y}^1)[\mathrm{Var}(\tilde{y}^2) + \mathrm{Cov}(\tilde{y}^1, \tilde{y}^2) - \mathrm{Var}(\tilde{y}^1)] - \mathrm{Cov}(\tilde{y}^1, \tilde{y}^2)^2 > 0. \qquad (13)$$

The time series estimates indicate that this difference in (13) is positive for 231 firms (85.9% of the sample) and it is nonpositive for 38 firms (14.1%). Thus, this is consistent with Pownall and Waymire's (1989) finding that the association between management's earnings forecasts and abnormal returns during the forecast announcement period is higher than the association between subsequent earnings reports and abnormal returns during the earnings report period.

Similarly, the analysis predicts that the response coefficient for earnings (at the time of the earnings report) not preceded by other valuation-relevant information disclosures (informationally-sparse economies) is greater than the response coefficient for earnings preceded by other valuation-relevant information (informationally-rich economies).[19] Expressed in terms of observables, this is

$$\mathrm{Var}(\tilde{y}^e) > \mathrm{Cov}(\tilde{y}^1, \tilde{y}^e) > 0 \qquad (14)$$

where y^e refers to earnings and y^1 is a prior signal in the informationally-rich economy. Based on the same time series estimates as above, this relation is supported for 263 firms (97.8%) and it is not supported for 6 firms (2.2%). Thus, this evidence is consistent with the relation between ERCs and firm size or financial press coverage documented in the literature (for example, Freeman, 1987; Ro, 1989; and Kross and Schroeder, 1989).

Implications for Information Transfer

The empirical support for the predictions of the stylized, two-signal model, suggests an *ex ante* approach for the study of information transfer.[20] Frost

(1989) argues that some studies overstate the significance of information transfers (e.g. Foster, 1981; Baginski, 1987; and Clinch and Sinclair, 1987) and other studies understate its significance (e.g. Han, Wild and Ramesh, 1989) by the nature of their controls for cross-sectional correlation and return simultaneity. Frost, also, finds sparse evidence of significant information transfers. However, as Antle, Demski and Ryan[21] suggest, this may be because earnings reports sometimes signal industry-wide changes (circumstances representative of positive correlations between firms' future cash flows) and other times earnings reports signal strategic gains or losses by one firm (or group of firms) at the expense of other firms (circumstances representative of negative correlation between firms' future cash flows).[22] The sign of the information transfer coefficient depends on this as well as the interaction of earnings with other signals as suggested in the foregoing analysis.

A similar approach to that taken in this paper may help to identify *ex ante* circumstances in which a positive or negative information transfer occurs. For instance, consider a two-asset, two-signal economy in which two signals are observed in sequence for one firm (as discussed in the second section above). The change in price for firm two (the non-announcer) is very similar to that for firm one (the announcer) given in equations (4) and (5) where y^1 is some other information and y^2 is the announcer's earnings report

$$\frac{-v^{12}(v+c)(n^1-c)(y^1-m) \ + \ v^{12}(v+n^1)(n^1-c)(y^2-m)}{(v+n^1)[(v+n^1)(v+n^2) \ - \ (v+c)^2]} \tag{15}$$

where v^{12} is the covariance of firm one's future cash flows with firm two's future cash flows.

Therefore, the implications for information transfer are very similar to those for earnings response coefficients as indicated in this paper, except that it also depends on the sign (and magnitude) of the covariance between the firms' future cash flows v^{12}. That is, when the covariance v^{12} is positive, the information transfer coefficient (the second term in the numerator of (15)) is positive (negative) for $n^1 > c(n^1 \leq c)$. On the other hand, when the covariance v^{12} is negative, the information transfer coefficient is negative (positive) for $n^1 > c(n^1 \leq c)$. Such an approach allows for cross-sectional pooling of observations which may increase the power of information transfer tests.

CONCLUSIONS

The empirical analysis in this paper is developed from the implications of sequential signalling such as in the stylized models of Holthausen and Verrecchia (1988) and others. The empirical evidence provides strong evidence of cross-sectional variation in earnings response coefficients. That is, while some groups of firms have earnings measures which are significantly, positively associated with changes in stock price, other firms' earnings measures have predictably lower and even negative associations with stock price changes during the earnings report period. The evidence is remarkably robust across simple correlation analyses, and regression analyses.

These results provide empirical support for the importance of complex informational interactions (Antle, Demski and Ryan, 1992; and Garman and Ohlson, 1980) when evaluating the information content of accounting disclosures. This is a very difficult empirical issue since these interactions are likely to vary across firms and intertemporally. This study treats informational interactions as an intertemporal constant for a given firm, an assumption which is almost surely violated.[23] Future work toward relaxing such restrictions are likely to help further untangle these complex informational interactions and improve our understanding of the information content of accounting disclosures. One promising avenue for such future work would be to more fully exploit the impact of accounting structure for determining informational interactions.

NOTES

1 This statement on earnings response coefficients refers to earnings-returns association based on return cumulation periods which (i) coincide with both the earnings measurement period and report period (usually a quarter or year), and (ii) coincide with only the earnings report or event period (usually two or three days). For clarity of exposition in this paper, the former case is described as 'earnings association coefficients' (e.g. Kormendi and Lipe, 1987; Freeman, 1987; Collins and Kothari, 1989; Lipe, 1990; and Ohlson, 1991 and 1995) and the latter is described as 'earnings response coefficients' (e.g. Easton and Zmijewski, 1989; Kross and Schroeder, 1989; Ro, 1989; and Kross and Schroeder, 1990). Both cases examine the mapping between (unexpected) earnings and changes in stock prices. However, the empirical analysis and results reported in this paper are restricted to the latter event period mapping.

2 Accounting earnings reports convey good (bad) news when investors upwardly (downwardly) revise their beliefs regarding a firm's future cash flows as reflected in the change in a firm's stock price.

3 Lundholm (1988) assumes risk averse investors in a noisy rational expectations equilibrium, while Holthausen and Verrecchia (1988) assume a risk neutral market maker; both economies are competitive.

4 Holthausen and Verrecchia also discuss a multi-asset, multi-signal economy in the latter part of their paper. While this is largely beyond the scope of this paper, preliminary analysis incorporating signals on other assets did not substantively alter the results reported in this paper.

5 Note that the sign of the coefficient in (6) is determined by the numerator, since the denominator in (6) is always nonnegative and only equal to zero when the correlation between the noise terms equals one and their variances are equal.

6 An extension to this work might consider relaxing the intertemporal stability assumption regarding the variance-covariance parameters via Bayesian inference, or perhaps by using ARCH (autoregressive conditionally-heteroskedastic) models. This is left to future work.

7 Missing observations on Value-Line forecasts resulted in the elimination of the quarter for the firm. 244 firms had 36 usable quarters, 15 firms had 35 usable quarters, and 10 had 34 usable quarters; a total of 9,649 quarterly observations were employed.

8 Earnings report dates for 35 firm-quarters are unavailable in the *Wall Street Journal Index*, prices on the VL forecast date are missing for two firm-quarters, and the forecast date is concurrent with or later than the earnings report date for 142 firm-quarters. The latter are eliminated to accommodate return measurement from the forecast date to the earnings report date.

9 The motivation for this approach is threefold. First, seasonality in EPS is not homogeneous across firms (Lorek and Bathke, 1984) and identifying the nature of any nonstationarity is expected to increase the efficiency of classification. Second, the focus is on VL forecasts rather than reported EPS to determine the nature of the nonstationarity, since VL forecasts have smaller

variance on average than reported earnings and are less likely to be influenced by extreme observations. Third, comparing variance-covariance estimates from assumed processes for which second moments may not exist (say, the levels of the two series) is likely to lead to more frequent misclassification. Indeed, assuming that the model predictions under the research hypothesis hold, estimates from the non-differenced series result in frequent misclassifications of firms (relative to the differenced series estimates). Other approaches such as strictly applying regular or seasonal differencing on VL forecasts and reported earnings yield qualitatively similar results but, as expected, suffer some loss in efficiency.

10 The 1,973 firm-quarter observations are divided into 344 (17.4%) firm-quarters in the negative group and 1,629 (82.6%) firm-quarters in the positive group.

11 Recall that the choice of regular or seasonal differencing is determined by the differenced VL series with smaller variance, so that (7) becomes

$$E[EPS|VL] = EPS_{q-1} + Cov[EPS_q - EPS_{q-1}, VL_q - VL_{q-1}] * Var[VL_q - VL_{q-1}]^{-1} * (VL_q - VL_{q-1}])$$

if $Var[VL_q - VL_{q-1}] \leq Var[VL_q - VL_{q-4}]$, or

$$E[EPS|VL] = EPS_{q-4} + Cov[EPS_q - EPS_{q-4}, VL_q - VL_{q-4}] * Var[VL_q - VL_{q-4}]^{-1} * (VL_q - VL_{q-4}])$$

if $Var[VL_q - VL_{q-1}] > Var[VL_q - VL_{q-4}]$.

12 The analysis was also conducted on returns cum dividends. The results are very similar to those reported.

13 The forecast date is the library receipt date; if the stamp is not available, the issue date is used as the forecast date (there is typically no more than a day difference between the two dates).

14 The market index employed for the two-day return interval is CRSP's value-weighted index and the market index employed for the forecast-to-earnings date return interval is the S&P 500 Index. The negative ERC results are not sensitive to the choice of market index or to its inclusion.

15 The forecast-to-earnings report date returns are measured as the geometric (daily) mean to equalize weights across firms and facilitate this (predominantly) cross-sectional analysis.

16 Since some examples of informational interactions seem to be driven by timeliness of accounting disclosures (e.g. increases in banks' loan loss reserves), the impact of the timeliness of reported earnings relative to VL forecasts was also investigated. An interaction between forecast lead time and earnings surprise was added to equation (9); the coefficient on the additional variable is significantly negative and the negative ERC results are very similar to those reported.

17 Inclusion of additional dummy variable interaction terms with earnings surprise for the top one-third for each of the variables was also investigated. The results on negative ERCs is very similar. Since the extant literature suggests that the results are most sensitive for the bottom one-third (and this is corroborated by these data), only the results employing the bottom one-third are reported (in the spirit of parsimony).

18 Standard (two-tailed) p-values are reported along with p-values accommodating conditional heteroskedasticity from White (1980). White's model specification test is reported at the bottom of each panel and suggests that conditional heteroskedasticity is not a serious problem for these analyses.

19 Of course, it is presumptuous to assume that the time series behaviour of observed variables would be the same if the information environment were so altered.

20 Information transfer refers to the signalling effects of one firm's earnings report on other (usually within the same industry or having a customer/supplier relationship) firms' future dividends (e.g. Firth, 1976; Foster, 1981; and Olsen and Dietrich, 1985).

21 This discussion appeared in the 1989 version of the paper.

22 Frost allows for this possibility but her experimental design may not be sufficiently powerful to detect information transfers.

23 One may be disillusioned by the small improvement in explanatory power afforded by the positive/negative ERC classification. However, one should bear in mind that intertemporal stability assumptions are likely to severely limit gains in explanatory power. Nonetheless, the crude methods employed here *are* able to (partially) separate firms with positive/negative ERC. Thus, there is potential that more refined methods which accommodate differences in ERCs across firms and over time may increase, perhaps greatly, the explanatory power of empirical tests.

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