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On the Usefulness of Earnings and Earnings Research: Lessons and Directions from Two Decades of Empirical Research

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1. Introduction

Assessing the usefulness of earnings to investors was a major motivation for the most concerted research effort in accounting history—the tradition of returns/earnings studies launched by Ball and Brown [1968] and Beaver [1968]. That earnings usefulness was the principal issue investigated at the time was made clear at the outset by Ball and Brown; the term usefulness, and closely related phrases such as utility and interest to investors, appear no less than *ten* times in their brief introduction. The focus on usefulness is reinforced by Ball and Brown in their second section [1968, pp. 160–61]: *"Recent developments in capital theory provide justification for selecting the behavior of security prices as an operational test of usefulness. An impressive body of theory supports the proposition that capital markets are both efficient and unbiased in that if information is useful in forming capital asset prices, then the market will adjust asset prices to that information quickly. . . ."*[1]

* University of California, Berkeley. This paper is dedicated to Sidney Davidson, mentor and close friend, on the occasion of his retirement. The comments and suggestions of Yakov Amihud, Sasson Bar-Yosef, William Beaver, Nicholas Dopuch, Peter Easton, Catherine Finger, George Foster, Dan Givoly, Mahendra Gupta, Robert Kaplan, Wayne Landsman, James Ohlson, Alfred Rappaport, Barry Schachter, Toshi Shibano, Siew Hong Teoh, Oliver Williamson, and particularly of Stephen Penman and Brett Trueman are deeply appreciated.

[1] Beaver [1968, p. 68] comments in a similar vein: "The issue [the information content of earnings] is of major concern to the accounting profession because its outcome directly

The emphasis on earnings usefulness in the late 1960s is not surprising, since accounting research at that time attempted to be policy-relevant. Issues of financial information usefulness and relevance, and the optimal choice of accounting procedures, were at the top of the research agenda. However, during the 1970s it became increasingly evident that earnings usefulness does not lend itself to a straightforward empirical assessment. Costs of producing and disseminating information are hard to estimate, and issues of social usefulness are largely intractable. As is now widely known, even information releases that trigger stock price increases do not necessarily imply social desirability, due to the potential redistributive effect of the information. No wonder then that subsequent researchers examining the relationship between earnings and various characteristics of securities detached themselves from the strong utilitarian implications and normative connotations of the term usefulness by setting more guarded research objectives, such as examining the extent to which the information conveyed by earnings is consistent with that reflected in security returns (no causal inferences drawn). Currently, normative, policy-oriented research seems to be an endangered species in accounting.

Our ability unambiguously to infer financial information usefulness from capital market evidence is obviously restricted. This, however, does not justify foresaking altogether the assessment of earnings (and other financial information) usefulness. Evaluation of the social usefulness of any public or regulatory action, such as environmental policy or drug certification, involves complex issues no simpler than those of financial disclosure regulations. Such difficulties, however, do not deter economists and other social scientists from engaging in the evaluation of the effectiveness, relevance, and usefulness of social policies. Assessing the usefulness of earnings, the premier product of financial disclosure regulation, is obviously of considerable importance, given the widespread interest in this performance measure. A typical research finding, such as that the information content of earnings just captures some economic events that are reflected in stock prices (possibly prior to the earnings announcement), is not particularly revealing to investors or accounting policymakers. The initiators of the returns/earnings research tradition should, therefore, be commended for setting the policy-oriented assessment of earnings usefulness high on the accounting research agenda.

The objective of this paper is twofold: to assess the usefulness of earnings to investors, based on the available returns/earnings research evidence, and to use this assessment for a reexamination of the accounting research agenda in this area. The question of earnings usefulness is obviously of major importance to users of financial information as well

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reflects upon the utility of the accounting activity." Watts and Zimmerman [1986, p. 35], summarizing the returns/earnings research, recently stated: "It [the efficient market hypothesis] also suggests that, if accounting earnings are associated with changes in stock prices, those earnings can be useful."

as to accounting researchers, practitioners, and regulators.[2] Earnings, the "bottom line," are widely believed to be the premier information item provided in financial statements. Economic theory ascribes to corporate earnings the crucial role of a signal optimally directing resource allocation in capital markets. Many equity valuation models, both theoretical and those used by practitioners, share a common element—expected earnings as an explanatory variable. When asked to quantify their beliefs about future outcomes of securities, financial analysts express such beliefs almost exclusively in the form of earnings (rather than equity, sales, or total assets) forecasts. Management decisions and their compensation are often stated in terms of earnings objectives. On the other hand, the list of skeptics regarding the usefulness of reported earnings is also formidable. Differences between economic and accounting earnings (e.g., Fisher and McGowan [1983] and Fisher [1987]), as well as the incidence of manipulation and fraud in reported earnings (National Commission on Fraudulent Financial Reporting [1987]), are often cited as major deficiencies in earnings. Thus, assessing the usefulness of earnings to investors and using this assessment to reexamine the accounting research agenda is as relevant today as it was 20 years ago when it motivated the pioneering returns/earnings studies.

The major conclusions of this study are as follows. (*a*) The correlation between earnings and stock returns is very low, sometimes negligible. Moreover, the nature (parameters) of the returns/earnings relation exhibits considerable instability over time. These findings suggest that the usefulness of quarterly and annual earnings to investors is very limited. (*b*) To date, theoretical and methodological refinements aimed at improving the specifications of the returns/earnings relation have yielded very modest results in furthering our understanding of how and to what extent earnings are used by investors, and in providing policymakers with useful knowledge. (*c*) While misspecifications of the return/earnings relation or the existence of investor irrationality ("noise trading") may contribute to the observed weak association between earnings and stock returns, the possibility that the fault lies with the low quality (information content) of reported earnings looms large. (*d*) This calls for a reexamination of the returns/earnings research paradigm. While current research largely takes reported financial variables at face value and focuses on methodological issues, a departure in the direction of emphasizing accounting issues and in particular the quality of reported information appears promising. (*e*) The proposed research agenda focuses on two broad issues. The first (positive) one calls for investigating the process of financial information dissemination in capital markets. In particular, this research is aimed at understanding the actual use of reported data by investors (i.e., the process of financial statement analysis). The second, a policy-oriented research agenda, focuses on possible

[2] Earnings usefulness is defined in the next section.

improvements in accounting measurement and valuation techniques which affect the ability of earnings and other financial items to facilitate the prediction of investor cash flows.

2. *On the Definition and Evaluation of Earnings Usefulness*

The approach used by the returns/earnings research pioneers to evaluate the usefulness of earnings to investors was to equate usefulness with actual use: if individuals act as if they use a specific information item, then such information can be considered useful. Ball and Brown [1968, p. 161] state: "An observed revision of stock prices associated with the release of the income report would thus provide evidence that the information reflected in income numbers is useful." This empirical approach rests on the definition of information in "information (communication) theory." A message (e.g., a financial report or a news broadcast) is said to convey information if it causes a change in the receiver's probability distribution of the concerned random variable. Such a change in the probability distribution (beliefs) will trigger an action;[3] hence, if an action (reflected by, say, a change in stock price or volume) can be attributed to specific information, such information is considered useful. This is the logic underlying the returns/earnings association studies.[4]

If a revision in stock prices provides evidence on earnings usefulness, then obviously larger revisions imply greater usefulness. Accordingly, inferences about earnings usefulness can be derived from estimates of the correlations between stock returns (price revisions) and earnings. Stated differently, if the information contribution of earnings to investors is significant, then earnings should exhibit a considerable explanatory power (both cross-sectionally and over time) with respect to price revisions around the earnings announcements. Conversely, if price revisions are found to be largely unrelated to earnings, the information contribution (usefulness) of earnings to investors cannot be large. This points to a consideration of the returns/earnings correlation, or the R^2 of the regression of stock returns on earnings, as a measure of the information contribution of earnings to investors.[5]

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[3] Of course, the change in beliefs has to be sufficiently large to compensate for the transaction costs associated with the action.

[4] The maintained hypothesis of this paradigm is that of capital market efficiency; see Lev and Ohlson [1982]. The stock price change is, of course, a restricted indicator of information usefulness, since in a heterogeneous belief setting, investors might use the information without the price being changed. Volume of trading is a more sensitive indicator of information usefulness. In reality, however, price and volume changes are, in general, highly correlated.

[5] The emphasis of most returns/earnings studies is on the slope (response) coefficient of the returns/earnings regressions, and not on R^2. The reason is that many such studies were not aimed directly at assessing the usefulness of earnings; rather, their purpose was to test specific hypotheses, such as the relationship between the response coefficient and earnings

The emphasis in the first part of this study on the extent of the returns/earnings correlation as a measure of earnings usefulness is further motivated by reference to a major objective of earnings—facilitating the prediction of future investor cash flows or stock returns. The centrality of this objective is embedded in the following statements from the FASB's "Conceptual Framework": *"The principal role of financial reporting [is] to furnish the investor and lender with information useful to assess the prospective risk and returns associated with an investment"* (FASB [1976, pp. 3–4]). *"The primary focus of financial reporting is information about an enterprise's performance provided by measures of earnings and its components. Investors, creditors, and others who are concerned with assessing the prospects for enterprise net cash inflows are especially interested in that information. Their interest in an enterprise's future cash flows and its ability to generate favorable cash flows leads primarily to an interest in information about its earnings. . ."* (FASB [1978, sec. 43]). If earnings, as stated above, are intended to facilitate predictions of stock returns, then the extent of the actual returns/earnings correlation is obviously an important measure of the usefulness of earnings.[6]

There is no pretense here that the returns/earnings R^2 is a complete measure of the usefulness of earnings. Earnings were found to be useful in various capital market contexts that are not examined here, such as in the prediction of stocks' systematic risk, corporate bankruptcy, and bond ratings (see Foster [1986]).[7] Furthermore, earnings are used in various contexts beyond capital markets, such as for contracting purposes within the firm (e.g., for managerial compensation), and between the firm and its creditors and suppliers. Even within the capital market context considered here, a complete evaluation of earnings usefulness requires consideration of the costs of producing and disseminating earnings, as well as their social usefulness in risk sharing and in enriching markets (i.e., enhancing the completeness of markets); see Ohlson [1979].

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persistence (see section 5). The correlation coefficient, R^2, is not generally of major concern in hypothesis testing. However, when information contribution of the premier financial statement item—earnings—is at issue, the degree to which observed price revisions can be ascribed to (or explained by) earnings obviously provides evidence on earnings usefulness (or, rather, the extent to which earnings are actually used by investors). Moreover, since earnings are postulated by economic theory to be a major determinant of asset values (e.g., Miller and Rock [1985] and Ohlson [1988*b*]), not just one of many potentially value-relevant variables, the R^2 of the returns/earnings regression cannot be ignored.

Theil [1971, pp. 662–63] establishes the correspondence between information theory measures (based on the entropy concept) which reflect information contribution and the regression correlation coefficient, R^2.

[6] Campbell and Shiller's [1988] study is a recent example where the predictive ability of earnings and dividends with respect to stock prices is evaluated in terms of R^2. A more rigorous formulation of the relationship between earnings usefulness and R^2 is provided in Appendixes A and B.

[7] Also note that measuring the informational contribution of earnings in terms of returns/earnings R^2s might not fully capture the information-transfer aspects of earnings (e.g., learning about one firm's earnings from the earnings of another firm).

However, information costs and social usefulness issues are not examined here because of their intractability in an empirical setting. Even though the returns/earnings R^2 is not a complete measure of the usefulness of earnings, it captures (indirectly, through investors' valuations) a very important attribute of earnings—their ability to facilitate the prediction of future securities returns. This attribute is obviously of primary concern to an important group of financial information users—investors in capital markets.

In the context of the returns/earnings research, the specific information item most commonly examined is reported earnings (unadjusted by the researcher), and the variable with which earnings are associated is the common stock's rate of return. Thus, two measures of change are typically correlated: the change in the stock price (return) around the earnings announcement and the change in the firm's equity (earnings).[8] Given that stock prices reflect expectations about future earnings before such earnings are announced, it seems reasonable to correlate the change in price (return) with *unexpected* earnings (new information) rather than with reported earnings. This can be expected to increase the power of the returns/earnings analysis. The emphasis on unexpected earnings led to the use of proxies for expected earnings, such as time-series or analysts' forecasts. Recently, there is a growing interest in the persistent (permanent) component of the earnings innovation. This line of research essentially attempts to allow for the regression (response) coefficient to vary across firms. As to the stock return variable, residual (or market-adjusted) returns were substituted for raw returns, given that the earnings information is firm-specific.[9] These are then the fundamental variables and constructs involved in the returns/earnings research.

3. *The Accumulated Evidence*

Table 1 summarizes various relevant characteristics and findings of a sample of returns/earnings studies, based on a survey of the three major accounting research journals for the period 1980–88.[10] An evaluation of research findings focusing on the informational contribution of earnings follows.

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[8] There are, of course, alternative characterizations to the returns/earnings relationship, such as price/earnings (i.e., regressing prices on earnings). Despite the high R^2s of the levels' (price on earnings) regressions, the returns/earnings relationship is by far the most widely used characterization, probably because of nonstationarities in levels' (i.e., price) characterizations. Indeed, Easton and Zmijewski [1989] show that predictions of stock prices based on the returns/unexpected earnings constructs were far more accurate than price predictions based on "levels" regressions (e.g., price regressed on earnings).

[9] Strictly speaking, this is not accurate, as earnings might be correlated with the market index; see Beaver [1981] and, for empirical evidence, Penman [1988].

[10] The journals are *The Accounting Review* (*AR*), *Journal of Accounting Research* (*JAR*), and *Journal of Accounting and Economics* (*JAE*). The set of studies reported in table 1 is not meant to be exhaustive; rather it contains studies with different characteristics and methodologies aimed at representing a broad spectrum of the returns/earnings research.

3.1 THE RETURN WINDOW

The issue of the window (time interval) over which returns are cumulated is an important one. A regression of returns cumulated over a narrow window around announcements of earnings might understate the usefulness of earnings, if the narrow window fails to capture earnings-induced price revisions beyond the windows (e.g., a delayed investor reaction after announcement—postannouncement drifts). Regressions using wide windows, on the other hand, might overstate the incremental information contribution of earnings, as price changes within the window probably reflect investors' reaction to a myriad of other timely, nonearnings information (e.g., industry-wide events or stock splits and repurchases), which are correlated with earnings.[11] Accordingly, varying the window length in returns/earnings studies allows one to focus on the important distinction between the unique informational contribution of earnings over other sources of information (the timeliness of the earnings information) and the extent to which earnings are just correlated with other, perhaps more timely, value-relevant information items. Usefulness of an information item in its strictest sense is clearly indicated by its incremental contribution over other information items.

Will the returns/earnings correlation be perfect if the window is properly measured? Not necessarily. The model presented in Appendix A shows that a regression of stock price revisions on unexpected earnings should result in $R^2 = 1$ only when (*a*) the earnings information is solely responsible for the price change: namely, the window is properly specified and investors do not adjust reported earnings (e.g., for accounting changes) prior to their use in valuation; (*b*) expected earnings are properly measured; and (*c*) investors react identically (constant cross-sectional response coefficient) to the earnings releases of all firms. When these conditions are not met, the returns/earnings association will obviously be less than perfect. The following discussion of empirical findings will relate to these conditions. The first condition deals with the return window and will be discussed presently.

Return windows of practically all possible sizes were used in the returns/earnings research. It seems reasonable that a very narrow window will assure that the price change around announcement is mostly due to the earnings information. Accordingly, I first consider studies with narrow (less than a week) windows. Hagerman et al. (study no. 1 in table 1) report an R^2 of 5% for a window of five days around the announcement of quarterly earnings. The R^2s were virtually unaffected by changing the

[11] Earnings are obviously correlated with many other value-relevant, timely information items and firm activities. For example, stock repurchases, which are on the average associated with stock price increases around the announcement date, are generally conducted by firms enjoying unexpected increases in earnings (e.g., Bartov [1989]). Indeed, signaling models argue that financial devices, such as dividend and capital structure changes and stock splits and stock dividends, are used by managers to convey *preearnings* (more timely) information; see Lakonishok and Lev [1987].

TABLE 1

Sample of Research (1980–88) on the Relationship Between Earnings and Stock Returns

	Author/ Reference	Sample Period	Return Variable	Earnings Variable	Earnings Expectations	Additional Independent Variables	Cross-Section or Time Series	"Window"	R^2
1.	Hagerman et al., *JAR* (Autumn 1984)	1974–76	Residual returns	Quarterly *EPS*	Last-quarter *EPS*	None	C-S	Five days around announcement	0.05
2.	Wilson, *JAR* (Supplement 1986)	1981–82	Residual returns	Earnings	Time-series predictions	Components of cash flows and accruals	C-S	Two days	0.02–0.05
3.	Hughes and Ricks, *AR* (January 1987)	1979–84	Residual returns	Quarterly *EPS*	Analyst forecasts or previous *EPS*	Two independent variables; analyst and mechanical forecast errors	C-S	Two days	0.02 for entire sample; 0.06 when extreme forecast errors were dropped
4.	Hopwood and McKeown, *JAR* (Spring 1985)	1973–78	Residual returns	*EPS*	Time-series model	Interim sales and expenses	C-S	One quarter	*EPS* = 0.04 Sales = 0.01 Expenses = 0.004
5.	Beaver et al., *JAE* (March 1980)	1958–76	% change in price	*EPS*	Last year's *EPS*	None	C-S	Fiscal year	0.07 for individual securities 0.55–0.95 for portfolios
6.	Bowen et al., *AR* (October 1987)	1972–81	Residual returns	Annual earnings	Last year's earnings	Cash flow components	C-S	Twelve months	0.04
7.	Fried and Givoly, *JAE* (October 1982)	1969–79	Residual returns	*EPS*	Analysts forecasts or time-series forecasts	None	C-S	4/1–3/31	$R = 0.33$ for analyst forecasts; $R = 0.27$ for time-series forecasts
8.	Freeman, *JAR* (Spring 1983)	1963–77	Residual returns	Change in profit to total assets, minus the industry change	—	Leads and lags of industry and price variable approximating current costs	C-S	Fiscal year	0.07 0.10
9*a*.	Jacobson, *AER* (June 1987)	1963–82	Raw returns	$ROI = \frac{\text{Net income}_t}{\text{Total assets}_{t-1}}$	—	—	C-S	12/31–12/31	0.02

9*b*.	Jacobson, *AER* (June 1987)	1963–82	Residual returns	Residual *ROI*	—	—	C-S	12/31–12/31	0.05
10.	Lustgarten, *JAE* (October 1982)	1976–77	Residual returns	Earnings	Last year's earnings	Replacement costs and sales	C-S	Ten months (−6 to +4 of fiscal year-end)	0.02–0.04 for earning alone; 0.05–0.09 for all three variables
11.	Beaver et al., *JAE* (July 1982)	1977–78	Raw returns	Net income	Last year's income	Cash flows or inflationary gains	C-S	12/31–12/31	0.14–0.15
12.	Lipe, *JAR* (Supplement 1986)	1977–80	Residual returns	*EPS*	Time series	Six earnings components	C-S	4/1–3/31	0.15
13.	Hoskin et al., *JAR* (Supplement 1986)	1979–81	Residual returns	Fourth-quarter earnings to market value	Analyst's forecasts	A large number of additional disclosures	C-S	Two days	0.12–0.15
14.	Rayburn, *JAR* (Supplement 1986)	1963–82	Residual returns	—	Time series	Components of earnings and cash flows	C-S	Annual	R^2 of annual regressions fluctuate from −0.002 to 0.28
15.	Beaver et al., *JAE* (July 1982) for Easman et al. sample	1973–77	Raw returns	Net income	Last year's income	Inflationary gain	C-S	12/31–12/31	1973 = 0.04 1974 = 0.30 1975 = 0.05 1976 = 0.03 1977 = 0.23
16.	Sepe, *AR* (July 1982)	1974–76	Residual returns	—	—	Various financial ratios, risk, and *inflation*-adjusted measures	C-S	Fiscal year	0.30
17.	Ajinkya and Gift, *JAR* (Autumn 1984)	1970–77	Residual returns	Management forecasts	Analysts' forecasts	—	C-S	Month before forecast to March next year	0.05–0.17
18.	Imhoff and Lobo, *JAR* (Autumn 1984)	1977–78	Residual returns	Revisions in *IBES* forecasts	Last forecast	—	C-S	Month of forecast revision	0.01
19.	Magliolo, *JAR* (Supplement 1986)	1979–83	Change in market value of firm	—	—	Reserve recognition data for oil and gas company	C-S	Annual	0.10–0.062

definition of residual returns (market model residuals, mean-adjusted returns, or Scholes-Williams adjusted returns for nonsynchronous trading). Perhaps a window of five days is too wide, allowing nonearnings information to affect prices, thereby leading to the low R^2s. In this case, narrowing the window further should increase R^2. This, however, is not the case. For a two-day window (the day prior to and the day of announcement), Wilson (no. 2) reports R^2s ranging between 2% and 5% for accrual earnings and components of cash flows. A two-day window (with a precise identification of announcement date from Broad Tape) was also used by Hughes and Ricks (no. 3), who measured unexpected quarterly earnings relative to analysts' forecasts as well as to past earnings. The R^2 for their entire sample was 2%, increasing to 6% when extreme cases of unexpected earnings were dropped from the sample.[12]

Narrowing the return window does not increase R^2 above the 2–5% level. This result does not appear to be sample- or period-specific, as the sample periods of the various studies range from the early 1970s to the mid-1980s. Furthermore, the finding does not appear to be due to other obvious misspecifications, since the specific definition of residual returns does not substantially affect the correlation coefficient, nor does the choice of earnings expectation model (analyst vs. time-series forecasts). When components of cash flows are substituted for accrual earnings (Wilson [1986]), the R^2 increases slightly. Accordingly, only 2–5% of the cross-sectional variability of residual returns can be ascribed to the unexpected earnings information. Do the narrow windows of the above-mentioned studies understate the information contribution of earnings?

Hopwood et al. (no. 4 in table 1) use a relatively wide quarterly window (beginning of the quarter to the week of earnings announcement) and report average R^2s of 4% from regressing residual returns on unexpected quarterly *EPS*.[13] Incorporating sales and expense data into their regression added marginally to explanatory power. Surprisingly, when researchers considered even wider windows, such as a year, the resulting increase in R^2 was very modest. Thus, for annual windows, Beaver et al. (no. 5) report R^2s of 7% for *EPS* changes; Bowen et al. (no. 6) report R^2s of 4% for annual earnings changes and cash flow components; and Fried and Givoly (no. 7) report R^2s of 7–10% for unexpected *EPS* (where expectations were formed by time-series forecasts or obtained from analysts).[14]

A specific examination of the "optimal window" issues was recently conducted by Collins and Kothari [1989], who regressed annual earnings changes on a two-year return window: contemporaneous (April–March)

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[12] Naive (extrapolation) earnings forecasts produced stronger associations between unexpected earnings and returns than analysts' forecasts. This is consistent with O'Brien [1988], but not with Fried and Givoly [1982].

[13] These R^2s are "average signed squared rank correlations."

[14] I squared the simple correlation coefficient reported by Fried and Givoly [1982].

annual returns and the previous year's returns.[15] Data reported in their table 3 indicate that adjusted R^2s ranged from 4–7% according to the earnings deflator used (percentage change in earnings or earnings change deflated by price). Collins and Kothari then experimented with various windows, commencing with different months into the fiscal year. Such variations affected the R^2 somewhat, registering increases of up to 10%. Such a search, however, is ad hoc. For example, no theoretical or institutional reason was provided by Collins and Kothari to explain why their "winner"—a 15-month window starting in August of the preceding year—is optimal.

One of the critical varibles in the returns/earnings studies is the proxy for the market's expected earnings. Since this expectation is unobserved, errors in estimating expected earnings might lead to a misrepresentation of the true returns/earnings association. Expanding the return window provides an opportunity to examine the sensitivity of the returns/earnings regression results to errors in estimating expected earnings. The reason is that as the earnings announcement date approaches, there is usually an intensive flow of earnings-related information to the market (e.g., via preannouncement firms' communications/warnings to analysts, actual earnings announcements of competitor firms, etc.). Investors' expectations, therefore, change quickly and significantly as the announcement date approaches. Accordingly, returns cumulated over a narrow window (e.g., commencing two days before the announcement) could impound earnings expectations which differ considerably from those used by the researcher, such as the *Value Line* forecasts which are, on the average, a month and a half old at the earnings announcement date. In contrast, when the return cumulation commences a year, say, before the announcement of earnings, using an expectation which is a month and a half old will not matter as much, since the flow of information about next year's earnings is not very intensive at that early date. Accordingly, wide-window regressions—annual returns on annual unexpected earnings—will not be as seriously affected by errors in measuring expected earnings as the narrow window regressions.[16] The low R^2s from wide-window studies thus suggest that the fault does not lie primarily with errors in measuring expected earnings.

To summarize, the low explanatory power of earnings with respect to cross-sectional variation in returns appears robust to the length of the return window. Very narrow windows (two to five days) yield R^2 of 2–5%, while medium (a quarter) to very long (two years) windows result in R^2s ranging from 4–7%. R^2s of up to 10% are occasionally reported for

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[15] This is a "reverse regression," where earnings serve as the dependent variable while returns are the independent variable. The objective is to minimize measurement error with respect to the independent variables; see Beaver et al. [1987].

[16] I am indebted to James McKeown for this insight.

specific subsamples (e.g., firms grouped by size) or by a search for an "optimal window."[17]

An important point should be noted here. Most returns/earnings studies regress returns on *unexpected* earnings, thereby focusing on the incremental information contribution (surprise) of earnings over expectations at the time of announcement. When earnings usefulness is at issue, it might be argued that unexpected earnings understate the usefulness of earnings, since expected earnings are also useful to investors. Stated differently, as the earnings announcement date approaches, investors revise their expectations about earnings (using, for example, firms' preearnings release communications) and such revisions affect stock prices. Accordingly, unexpected earnings, at the time of announcement, might convey only a small part of the total information in earnings. Restricting the analysis to price revisions over narrow windows around earnings announcement dates might, therefore, underestimate the usefulness of earnings to investors. However, as noted above, the extent of the returns/earnings association does not increase considerably when the return window is expanded to one year (and even to two years in Collins and Kothari's [1989] study), or when annual earnings changes are used as right-hand variables. Returns over wide windows regressed on the (deflated) levels of earnings (e.g., study no. 9*a* in table 1) obviously capture the impact of the entire information set about earnings that is released throughout the year, and not just that in unexpected earnings. The wide windows' returns/earnings evidence, therefore, provides an *upper limit* to the informational contribution of earnings.[18] As was indicated above, this upper limit (in terms of R^2s) is not significantly different from the earnings information contribution indicated by narrow-window studies based on unexpected earnings.

The studies analyzed so far were cross-sectional. The underlying assumption of a constant response coefficient in cross-sectional studies (i.e., investors react identically to earnings of all firms) is obviously unrealistic. This assumption might be more tenable for time-series returns/earnings regressions, since investor reaction to earnings of the same firm over time might be more stable than across different firms. To provide an indication of the time-series returns/earnings association, I regressed quarterly residual returns on the percentage change in quar-

[17] For the sake of completeness, I should mention studies which consider lengthening the earnings rather than the returns window. Thus, for example, Jacobson [1987] regressed residual returns on unexpected *ROI* (earnings to total assets) of the current and the succeeding year. The R^2 increased from 7% to 11% by the inclusion of future earnings in the regression. It is doubtful, however, whether such inclusion of yet undisclosed earnings in the regression enhances our appreciation of the usefulness of earnings to investors. A similar lengthening of the earnings window was recently examined by Freeman and Tse [1989] in an attempt to capture postannouncement (confirmation) news.

[18] Upper limit, because some of the wide windows' returns/earnings association probably reflects the information contribution of more timely nonearnings sources (e.g., *R&D* announcements) that are correlated with earnings; see n. 11.

terly earnings (i.e., $[e_t - e_{t-4}]/e_{t-4}$) of firms listed on the quarterly *Compustat* tape. The period examined was 1980–87 (32 observations per firm), and the sample size was 194 firms, representing the union of the *Compustat* firms with positive quarterly earnings throughout the period and the *CRSP* tape population.[19] The sample mean of adjusted R^2 was 1.5%, and the median was −1.0%. The interquartile range of adjusted R^2s was 3.2% to −2.8%. Classifying the sampled firms into four size groups (by market value) indicates a monotonic decrease in average R^2 as size increases. No two-digit SIC industry group appears to be characterized by particularly high R^2s. Thus, time-series returns/earnings regressions are not characterized by higher R^2s than the cross-sectional regressions.[20]

3.2 PROFITABILITY RATIOS

Financial statement analysis is couched in terms of profitability ratios (e.g., return on equity, return on assets) rather than in terms of the earnings changes or price-deflated earnings typically used in the returns/earnings studies. This suggests that ratios may provide more useful information to investors than the raw earnings data. To examine this ratio issue I regressed residual returns (January–December) on annual changes in various profitability ratios of firms reported on the *CRSP* and *Compustat* tapes. Data were pooled for the years 1980–84. The results reported in table 2 do not indicate a dominance of any financial ratio in terms of R^2. Overall, the typical R^2s (except in the life insurance industry) are similar to those reported in the previous section: 4–6%.

Financial ratios were also used in other studies. For example, Freeman (no. 8 in table 1) reports R^2s of 7–10% from regressing returns on changes in the ratio of earnings to total assets (where the firm's ratio was adjusted for the industry change). But Freeman's R^2s might be higher than previously mentioned due to the incorporation in the regression equation of additional independent variables proxying for current costs. Jacobson (no. 9) reports R^2s of 2–7% from regressing stock returns on the ratio of earnings to total assets (*ROI*). An interesting finding of this study is that regressing raw returns on *ROI* yielded the lowest R^2 (2%). This is counterintuitive since earnings are believed to provide information on

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[19] Firms with negative earnings were deleted because of problems in measuring percentage change from negative numbers. Firms with extreme earnings changes (larger than | 300% |) were also excluded from the sample.

[20] These findings are consistent with the time-series results of Oppong [1980], who confirms Beaver's [1968] cross-sectional findings that, on the average, the variability of firms' residual returns in the earnings announcement week is larger than in other weeks. However, Oppong finds that this result is driven by a few extreme price reactions. In fact, the majority of Oppong's firms did not exhibit an above-average price variability during the earnings announcement week. This result, that the average returns/earnings R^2 is driven by a specific characteristic of some firms, appears to be of more general validity and will be mentioned again later (e.g., n. 30).

TABLE 2

R^2 of Regressions of Annual Residual Returns on Annual Changes in Profitability Ratios (Period: 1980–84)

Ratio	Life Insurance	National Banks	State Banks	Electric & Other Services	Natural Gas	Electric Services	Paper & Allied Products	Crude Petroleum
Earnings per share	.39	.10	.02	.05	.01	.04	.14	.05
Return on equity	.36	0	0	.06	.02	.04	.13	.10
EBIT to total assets	—	—	—	.04	0	.02	.09	.02
Residual earnings to equity*	.31	.08	.02	.08	.01	.06	.02	.12
Cash flows to equity	0	.01	0	.09	.20	.06	.19	.08

* Residual earnings are defined as net earnings minus a charge for the cost of equity.

systematic factors (the market return) as well as on residual returns.[21] To summarize, the 5–7% returns/earnings R^2s for financial ratios do not differ markedly from those reported in the previous section. It can, therefore, be concluded that the ratio forms do not significantly improve the explanatory power of earnings.

3.3 INCORPORATING EARNINGS-RELATED ITEMS

Several studies examined the informational contribution of earnings-related items. When narrow return windows were used (e.g., studies nos. 2 and 4 in table 1) such related items (cash flow components, sales, expenses) did not appreciably increase R^2. The situation, however, changes for wide windows. For example, Lustgarten (no. 10), reports R^2s of 2–4% for annual earnings changes alone, and 5–9% when replacement cost and sales data were added to the regression. Beaver et al. (no. 11) report R^2 of 15% for a regression including income, cash flows, and inflationary gains data. Lipe (no. 12) reports R^2 of 15% for unexpected *EPS* along with various components of earnings. R^2s of 12–15% are also reported by Hoskins et al. (no. 13) for fourth-quarter earnings to market values and additional disclosures.

Thus, R^2s of up to 15% characterize regressions of returns on earnings and earnings-related items run over wide windows. The explanatory power of earnings components over wide return windows is not surprising, since such earnings-related items probably proxy for more timely information. For example, given the positive market reaction to firms' announcements of capital expenditures and *R&D* outlays (e.g., Woolridge [1988]), an association between annual stock returns and cash flow components reflecting such outlays is almost tautological. Also, current values of earnings (e.g., replacement cost) reflect industry- and economy-wide information (e.g., input price changes) that are also reflected in

[21] An unusual R^2 of 15% is reported by Jacobson [1987] for a regression where the independent variable is "unanticipated, unsystematic *ROI*" (i.e., *ROI* adjusted for both time-series expectations and economy-wide changes).

stock returns.[22] Nevertheless, R^2s of up to 15%, and for specific years up to 30% (see studies no. 14 and 15 in table 1), associated with earnings-related variables highlight the modest informational contribution of the "bottom line" as a *summary measure* or a "sufficient statistic." Information dissemination costs could be reduced if earnings were a comprehensive summary measure that reflects the information contained in a broad set of other financial variables. Currently reported earnings do not appear to be a successful "sufficient statistics" (see also Ou and Penman [1989] for the incremental information content of nonearnings data). The 15–30% R^2s from regressing returns on fundamental variables also dispel frequently heard arguments that the variability of residual returns is mostly "white noise" (or the result of "noise trading") that cannot be explained by systematic, fundamental factors.

4. Intertemporal Stability of the Returns/Earnings Relation

The returns/earnings studies examined so far generally reported regression coefficients and R^2s averaged over time or for samples pooled over time. If earnings are to be useful in predicting future returns (recall the discussion in section 2), the form of the returns/earnings relationship should exhibit a certain degree of stability over time. If such a relationship is intertemporally unstable (namely, the coefficients of the regressions of returns on earnings and possibly additional variables fluctuate significantly from period to period), then even perfect foreknowledge of future earnings will not be of much use in predicting returns. The degree of intertemporal stability of the returns/earnings relationship is, therefore, an important determinant of the usefulness of earnings to investors. However, researchers have devoted scant attention to this issue.

To obtain evidence on the returns/earnings stability, I cross-sectionally regressed residual returns (April through March) on the percentage change in annual earnings of the NYSE firms listed on the *CRSP* tape (December 31 fiscal year). Regressions were run separately for each of the years 1982–86, and estimated coefficients are reported in table 3. The estimated intercepts range from −.029 to .034; the slope estimates range from −.009 to .031; and the R^2 fluctuates between 1% and 4%. The variation in parameter estimates is evidently large and statistically significant. A Chow test for changes in the slope coefficient indicates that out of the four adjacent pairs of coefficients (e.g., 1982 and 1983, 1983 and 1984, etc.), three changes were statistically significant (see table 3). The evidence thus indicates considerable instability over time of the returns/earnings relation.

Other studies also provide indirect evidence on wide intertemporal

[22] At issue here is the distinction between earnings as a summary measure for other, more timely information sources versus earnings as a unique, timely source of information. The length of the return window is used here and earlier to draw this distinction.

TABLE 3

*Regression of Residual Returns on Percentage Change in Net Income**

Year	Intercept	Slope		T-Value Slope	Adjusted R^2
1982	.013	.031		4.65	.04
			>††		
1983	−.020	.011		2.43	.01
			>†		
1984	.034	.004		3.00	.01
			>		
1985	.032	.004		3.30	.02
			>††		
1986	−.029	−.009		−2.44	.01
Overall	.005	.004		4.25	.01
Overall—extremes omitted**	.007	.074		9.51	.03

* The sample size is about 550 observations per regression. Firms with negative earnings were omitted from the sample. Fiscal year of all firms ends on December 31.

** Firms for which the percentage change in net income was larger than 300% or smaller than −300% were omitted from this sample.

†† The difference in the slope coefficients is statistically significant by the Chow test at the .05 level († indicates significance at the .10 level).

fluctuations of the returns/earnings regression coefficients. For example, Bowen et al. [1987] regressed residual returns on unexpected earnings for each of the years 1972–81. The R^2s ranged between 1% and 25%, while the yearly response (slope) coefficients ranged from .001 to .432, and only six out of the ten response coefficients were statistically significant at the .05 level. Similar fluctuations over time in the returns/earnings regression coefficients can be found in Rayburn [1986], Beaver et al. [1982] (note the annual R^2s of this study in table 1, no. 15), Beaver et al. [1979], and Bublitz et al. [1985]. Related evidence can be found in Beaver and Morse [1978] who regressed E/P ratios on subsequent earnings changes for the years 1956–70. The coefficients of the next year's earnings change ranged from −.003 to −.304, while the coefficients of the earnings change two years after the E/P formation ranged from .098 to −.167. Many of these coefficients were not statistically significant at conventional levels.

The wide intertemporal fluctuations of the parameters of the returns/earnings regression reflect negatively on the usefulness of earnings in facilitating the prediction of future stock returns—perhaps even more so than the low level of the returns/earnings association. The findings presented above suggest that high-quality return predictions, conditional on earnings, would be difficult to come by, since the returns/earnings relationship appears to be very time-specific.[23] Not much is currently known about the underlying reasons for this instability. Theory suggests that one of the reasons might be changes in the discount rate. Indeed,

[23] This was recently confirmed by Easton and Zmijewski [1989]. The quality of their stock price predictions, based on foreknowledge of earnings and on various constructs of the returns/earnings relationship, is not substantially better than predictions based on the assumption of no change in prices (random walk). This is not merely a confirmation of market efficiency, since foreknowledge of earnings was assumed here.

when an explicit interest rate (e.g., in Collins and Kothari [1989]) or yearly dummy variables (e.g., in Easton and Harris [1989]) were incorporated into the returns/earnings relationship, the R^2s increased. It is not clear, however, whether the regression coefficients become more stable over time with the addition of these variables. Other reasons for instability might include business cycle stages, changes in anticipated inflation, and changes in firms' production-investment decisions. Given the importance of the issue, it should be explicitly addressed in returns/earnings studies. Most important, the validity of research findings should always be verified on holdout samples from different industries and particularly different time periods.[24]

5. *The Benefits of Research Refinements*

The literature on the returns/earnings relation is characterized by continual attempts at refining the analysis, often exhibiting considerable ingenuity and methodological sophistication. Thus, for example, the seemingly crude Ball-Brown earnings expectation model (last year's earnings) gave way to time-series expectation models and later to analysts' forecasts; residual returns were estimated in various ways (e.g., market-model residuals vs. mean-adjusted returns); a precise identification of the earnings announcement date (e.g., from the Broad Tape) was substituted for the traditional *Wall Street Journal* source; and "reverse regressions" (see n. 15) were substituted for traditional ones. However, the recent empirical findings summarized in table 1 indicate a surprising robustness of low R^2s to such refinements; none appears to indicate an appreciably higher explanatory power of earnings than that of the earlier studies.[25]

The current interest in the "persistent" component of earnings is an example of a recent refinement. This development draws on the well-known distinction between permanent and transitory earnings, which received recent impetus by Miller and Rock [1985]. Earnings persistence is defined as the extent to which an innovation (unexpectedness) in the earnings series causes investors to revise their expectations about future earnings. Thus, unexpected earnings are split into two components: one (persistence) that affects expectations of future earnings and cash flows, and the other (transitory) that does not affect expectations. The persistence component is often estimated from the time series of earnings, and

[24] This is analogous to the problems that characterized the early bankruptcy and bond ratings prediction models, which reported prediction tests made on the samples used to estimate the models. The subsequent use of holdout samples to verify predictive ability of the models improved their validity and application.

[25] This observation is not meant to imply that the expressed objective of the recent returns/earnings studies was to achieve higher R^2s. In many cases the objective was to test specific hypotheses. However, with improved model specification and data one would expect to observe a higher returns/earnings association, if the low association observed earlier was mainly due to modeling or methodological deficiencies. This, however, does not appear to be the case.

thus the measurement of persistence depends on the time-series model assumed by the researcher.

The emphasis on the persistence of earnings is mainly aimed at alleviating the constant response coefficient assumption in cross-sectional studies. The reason investors could be expected to react differently to earnings of different firms is that they perceive the persistent (permanent) component of such earnings to differ cross-sectionally and over time. Indeed, recent empirical studies by Kormendi and Lipe [1987] and Easton and Zmijewski [1988] report a positive association between estimates of earnings persistence and the slope (response) coefficient of the returns/earnings regression. Collins and Kothari [1989] show that when a measure of persistence is added to the independent variables in their model (returns, growth, risk, and interest rate), its coefficient is statistically significant and the R^2 increases.

Related to the persistence issue is the question of whether unexpected earnings fully capture the information contribution of earnings. Specifically, consider a simple two-period valuation model in which the value of the firm, V, is equal to expected earnings in the current and the next period, e_1 and e_2.[26] Assume, for simplicity, a zero discount rate, then the value of the firm at time 0 (beginning of period 1) is:

$$V_0 = E(e_1) + E(e_2). \tag{1}$$

The value of the firm at the end of period 1, V_1, after observing e_1, is:

$$V_1 = e_1 + E(e_2 \mid e_1). \tag{2}$$

The change in the firm's value due to the disclosure of e_1 is therefore:

$$\Delta V = V_1 - V_0 = [e_1 - E(e_1)] + [E(e_2 \mid e_1) - E(e_2)]. \tag{3}$$

The terms in the left brackets on the right-hand side of expression (3) reflect unexpected earnings (innovation) conventionally used in the returns/earnings regressions, while the terms in the right brackets reflect the revision in earnings expectations subsequent to the earnings disclosure. This then suggests that in order fully to capture the information content of an earnings disclosure, one has to include investors' forecast revisions in the regression expression. This proposition was empirically tested by Brown et al. [1985] on annual earnings, and by Cornell and Landsman [1989] on quarterly earnings. Both teams used *IBES* consensus forecasts to estimate the impact of the term $[E(e_2 \mid e_1) - E(e_2)]$ on returns. Results indicate that most of the explanatory power of the independent variables is provided by the forecast revision term $[E(e_2 \mid e_1) - E(e_2)]$ and not by unexpected earnings $[e_1 - E(e_1)]$. These constructs, however, are not substantially different from previous ones in terms of overall explanatory power of earnings with respect to returns. Thus, for example, the average R^2s in the Cornell-Landsman study, including both

[26] This is obviously a highly simplified two-period model in which cash flows to investors (dividends) are assumed equal to the firm's earnings.

unexpected earnings and analysts' revisions of expectations, is about 3%.[27]

Yet another refinement of the returns/earnings relationship has recently been suggested by Ohlson [1988*b*]. One implication of his model is that *both* the level and the change in earnings affect stock values, and therefore both should be used as independent variables in the returns/earnings regression. This proposition was empirically corroborated by Easton and Harris [1988]; earnings levels appear to provide most of the explanatory power with respect to market-adjusted returns. However, as to overall explanatory power, this regression (R^2 = 3%) yielded results similar to previous regressions.

Most of the recent returns/earnings refinements take one of two forms. (*a*) An addition of nonearnings or even nonfinancial statement variables (e.g., risk, discount rate) to the returns/earnings regression. Such refinements are essentially attempts at constructing equity valuation models and are therefore beyond the boundaries of this study which focuses on earnings. (*b*) Departures from the constant response coefficient assumption implicit in cross-sectional returns/earnings regressions, by partitioning firms according to various attributes such as size, industry, P/E, risk, growth rate, persistence, and liquidity, or using dummy variables for such attributes. Such partitioning might identify factors (e.g., firm size) which affect the returns/earnings relation and circumstances (e.g., firms within homogeneous risk groups) where the informational contribution of earnings is larger than that observed, on the average, over random, heterogeneous samples.[28]

The hazards of overfitting the data should, however, be kept in mind. Clearly, a concerted effort ("fishing expedition") to identify firm classifications within which the returns/earnings correlation is high is bound to "succeed" some time. To avoid overfitting, this line of research should be subjected to at least two constraints. (*a*) The classifications examined should be clearly motivated by economic theory, explicitly linking the

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[27] Brown et al. [1985] report substantially higher R^2s, but their independent variables include the systematic risk, β, of the stocks.

In a similar vein, Abdel-khalik [1989] recently noted that if future-related revisions of earnings expectations or other financial information signals released concurrently with earnings are relevant determinants of stock returns, then the conventional returns/earnings regression is misspecified. The empirical findings mentioned here suggest that, as far as R^2 is concerned, the consequences of such omission (e.g., of revisions of analysts' expectations) are of a secondary order of importance.

[28] One reason for the possible increase in explanatory power of earnings in samples classified by a specific attribute is the truncation of extreme observations resulting from increasing the homogeneity of the sample. The effect on R^2 of eliminating extreme observations can be quite large. I have regressed annual residual returns (January–December) on percentage change in net earnings of December 31, NYSE firms (data pooled for 1982–86). The R^2 for the entire sample (3,258 observations) was 1% (the response coefficient: .005, t = 5.71). When extreme observations—percentage change in earnings larger than 300 or smaller than −300—were omitted, R^2 increased to 7.4% (response coefficient: .109, t = 15.74, sample size 3,101).

classifying attribute (e.g., risk) to the returns/earnings relation. (*b*) The stability of the returns/earnings relation within the proposed classification should be verified on holdout samples from different industries and particularly different time periods (see section 4). Even when these two conditions are met, the research on earnings usefulness has to address the issue of the *incremental* information contribution of earnings. As discussed above (section 3.1), in wide-window studies and particularly when levels of earnings are included in the regression, earnings might proxy for more timely information releases (e.g., capital expenditures and *R&D* announcements) and economic events (e.g., input price changes). These alternative information sources have to be accounted for if inferences about the incremental information contribution of earnings are being made. The important point is that in firm classification or other methodological variations, a mechanical increase in the returns/earnings R^2 should not be the primary research objective.

What is the incremental contribution of the recent metnodological improvements in the returns/earnings research to our understanding of how and to what extent earnings are used by investors? What is the contribution of such developments to the enhancement of earnings usefulness or to the deliberations of accounting policymakers? The answer seems to be—very little. To the best of my understanding, recent studies do not reveal a more significant or different role of earnings in security valuation than did the early studies. Nor do they provide new, deeper insights into how earnings are used or should be used by investors (e.g., the kinds of adjustments which are made to reported earnings). If one considers the persistence research, for example, the idea that investors react differently to the earnings of different firms and that such differential reaction is related to the future implications of earnings (persistence) is not particularly revealing. The important questions of why some earnings innovations are more persistent than others (i.e., the relation of persistence to fundamental factors, such as *R&D* and market share), the impact of accounting techniques on persistence, and the practical issues of operationally identifying the persistent component in earnings upon announcement, are still largely unanswered. It is also doubtful whether recent returns/earnings research provides accounting policymakers with useful knowledge.[29] The benefits of recent research developments in the returns/earnings area are, therefore, questionable, and a reexamination of this research paradigm is called for.

6. The Informational Contribution of Earnings and Implications for Future Research

The evidence on the returns/earnings relation cumulated over the past 20 years provides a consistent picture. Earnings and earnings-related

[29] A similar conclusion is reached by Dopuch [1989]. The blame for this, however, should not rest solely with researchers. Far from it; policymakers' general lack of interest in

information (e.g., cash flows) explain 2–5% of the cross-sectional or time-series variability of stock returns for relatively narrow windows, and up to perhaps 7% for very wide windows. Accordingly, an earnings explanatory power of about 5%, on the average, for large, heterogeneous samples appears representative. The parameters of the returns/earnings relation are subject to considerable instability over time, which has yet to be explained. These findings appear robust to the time periods examined and to the various methodologies used. The returns/earnings area, therefore, provides one of the rare cases in economic research in which extensive empirical findings converge to portray a consistent (but somewhat bleak) picture.

Given the overriding utilitarian orientation of accounting and the results of the voluminous returns/earnings research, it is now appropriate to ask: how useful are earnings to equity investors? Strictly speaking, earnings are of some use since their release is associated with a certain market activity (increased securities trade, revision of analyst forecasts, etc.).[30] However, the extent of earnings usefulness appears to be very modest. An information variable that explains only about 5% of stock return variability, and whose relation with returns is unstable, cannot be very useful.[31] This conclusion is reinforced by the low quality of stock price predictions based on foreknowledge of earnings (see n. 23 above).[32]

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research findings and their choice of agenda items that do not lend themselves to research are also significant contributors to the current state of affairs.

[30] Even this modest statement is open to question. Several studies reported that when firm size is accounted for in the returns/earnings regression, the coefficient of the earnings variable is statistically insignificant (e.g., Meek [1989]). Similarly, Atiase [1985] reports that for large firms there is no unusual variance in stock returns during the earnings announcement week. These sobering findings bring to mind the following observation: "It has been facetiously noted that size may be the best theory we now have of expected returns" (Chen et al. [1986, p. 394]).

[31] Is an R^2 of 5% really low? Following are the R^2s of some recent studies regressing cross-sectionally stock returns on various information variables: (1) $R^2 = .04$ to .07 for announcement-period residual returns on stock-split signals (McNichols and Dravid [1989]). (2) $R^2 = .10$ for dividend changes on three-day stock price changes (Ofer and Siegel [1987, p. 900]). (3) $R^2 = .28$ for two-day announcement-period residual returns on the size of asset write-downs and other variables (Strong and Meyer [1987, p. 657]). (4) $R^2 = .17$ for announcement-day residual returns on the size of divestitures (sell-offs) (Klein [1986, p. 690]). (5) $R^2 = .55$ for announcement-period residual returns on changes in leverage and debt tax shield (Masulis [1983, p. 124]). (6) $R^2 = .16$ for *OLS* and $R^2 = .46$ for *WLS*, for two-day announcement-period residual returns on the fraction of equity value distributed by spin-offs (Hite and Owers [1983, p. 430]).

The information items examined in these studies (e.g., stock splits) occur less frequently and regularly than earnings, and, therefore, their R^2s may not be directly comparable with the returns/earnings R^2s. However, despite their regular release, earnings are widely believed to be a major informational source on the firm's performance, so that a comparison of the information contribution of earnings with that of less frequent releases seems warranted.

[32] Oliver Williamson (in a private communication) suggested to me the following perspective on the usefulness of earnings: "Accounting has (at least) two purposes. One is to provide nuanced information for internal decision making purposes. A second is to provide

The observed low informational contribution of earnings, however, is counterintuitive, given the central role of earnings in the firm's financial information system. Casual observation suggests that large earnings changes, particularly negative ones, do significantly impact prices. Financial analysts express their beliefs about the future performance of firms almost exclusively by means of earnings forecasts, and a large component of managers' compensation is generally determined by changes in earnings-related measures. What could explain the low returns/earnings associations?

Several possibilities come to mind. Earnings might indeed be very useful to investors, yet the methodologies used by researchers fail to substantiate this usefulness. Numerous methodological shortcomings were mentioned in sections 3 through 5 (e.g., the relationship between returns and earnings seems nonlinear; the response coefficient is obviously not constant across firms or over time; estimates of expected earnings used to derive the earnings innovation contain errors, etc.). Other, yet unknown misspecifications might also exist and contribute to the low observed returns/earnings R^2s. Obviously, the full impact of such misspecifications is yet to be determined and may never be fully known. Nevertheless, considering the wide range of methodological variation used and the extent of effort invested in the past 20 years in returns/earnings research, it is doubtful that the "poor showing" of earnings is primarily due to methodological shortcomings.

Another possible reason for the observed low explanatory power of earnings is investor irrationality (market inefficiency). The association between stock returns and value-relevant information, such as earnings, will obviously be low if investors systematically err in information interpretation, or if they overreact to or ignore relevant information (see, for example, Modigliani and Cohn [1979] and Summers [1986] on investor irrationality).[33] Recent work on "noise trading," namely, irrational investors' demands unrelated to fundamental stock values, is particularly relevant to this issue (e.g., DeLong et al. [1989]). Investor irrationality with respect to earnings, however, appears inconsistent with evidence on systematic, seemingly rational investor reaction to a myriad of other

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crude aggregate information that is used as an integrity check on the enterprise. Earnings reports are of this second kind. The information therein embedded is historical, aggregate, and tells little that is not already known—provided the firm is being operated responsibly. Such aggregate information is a rough check on managerial discretion, malfeasance, and the like—much in the same way as the Board of Directors is mainly window dressing but can be mobilized to 'throw the rascals out' if excesses are extreme." Williamson's prediction that "prices lead earnings in the short run but the two move together in the long run" is borne out by the data. These ideas are somewhat similar to the stewardship notion in Paton and Littleton [1940].

[33] Related to the issue of investor rationality is the evidence on postannouncement drifts (e.g., Bernard and Thomas [1989]), indicating seemingly systematic stock price changes subsequent to earnings announcements. This suggests a delay in the response of investors to earnings releases.

corporate announcements, such as capital expenditures, dividend and capital structure changes, and corporate restructuring activities (e.g., spin-offs). Thus, investor irrationality or market inefficiency arguments and their impact on the returns/earnings relation still await comprehensive theoretical and empirical substantiation.

A third possible explanation for the weak returns/earnings relation, one that should be of particular interest to accounting researchers, is that the information content of currently reported earnings regarding future outcomes of securities is low. The arbitrariness of many accounting measurement and valuation techniques, the lag in reporting earnings, and the incidence of earnings manipulation by managers adversely affect the information content of earnings. The seriousness of these adverse effects can be examined by comparing the extent of the short-term returns/earnings correlation with that of the long-term, since, on the average, the impact of accounting techniques and earnings manipulation decreases as the period over which earnings are measured increases. For example, expensing a particularly large *R&D* outlay will have a significant effect on a given quarter's earnings, while over, say, a five-year period whether such *R&D* is immediately expensed or partially capitalized would not have a significant impact on reported earnings. To examine this proposition, I have cross-sectionally regressed residual returns cumulated over five years (1980–84) on the corresponding five-year percentage change in *EPS* of a sample of 150 *Compustat* firms spread over eight industries. The R^2 of this regression was 35%, about seven times that of the short-term returns/earnings R^2.[34] There is thus a significant difference between the extent of the short-term (quarterly or annual) returns/earnings relation and the long-term one. This suggests that the low quality (information content) of short-term earnings is a significant contributor to the observed weak association between earnings and stock returns, and that this low quality is related to the impact of accounting techniques and occasionally management manipulation.

Research on the quality of earnings and other financial information items and on the ways investors disseminate such information (namely, adjust for quality deficiencies) offers a promising extension of the returns/earnings research paradigm. This is a clear departure from current research which largely takes the earnings number at face value. Except for the most obvious experimentation, like the substitution of cash flows or components of earnings for earnings, no serious attempt is being made to question the quality of the reported earnings numbers prior to correlating them with returns. Indeed, there is a surprising imbalance between the level of effort and sophistication that goes into the statistical methodology of the returns/earnings studies and the cavalier approach toward reported earnings. While various deficiencies in earnings are obviously

[34] Adding the level of the five-year *EPS* as a second independent variable to the change in *EPS* increased R^2 to 36% only.

adjusted for by financial analysts and even in the media,[35] most researchers (myself included) accept the reported numbers at face value. This, of course, precludes current research from providing insights on how financial information is used by investors, insights that can lead to possible improvement in the measurement and reporting of earnings. Research on the quality of earnings shifts the focus to an explicit consideration of accounting issues by calling for a systematic examination of the extent to which the specific principles underlying accounting measurements and valuations, as well as managerial manipulations, detract from the usefulness of earnings and other financial variables. Such research has the potential both to further our understanding of the role of financial information in asset valuation and to contribute meaningfully to accounting policymaking.

7. Insights into the Financial Information Dissemination Process

Economic and finance models establish the relation between firms' earnings or cash flows and their market values (e.g., Fama and Miller [1972, chap. 2]). The role of earnings (and possibly of other financial variables) in many such models is to provide investors with information about future securities' returns (e.g., Ohlson [1988*b*]). The quality of earnings in such a scenario will be determined by the contribution of earnings to the prediction of investors' returns: the higher the predictive contribution of earnings and other financial variables, the higher their quality. This then provides an operational framework within which quality issues can be explored.[36]

When investors perceive deficiencies in the quality of reported earnings (i.e., earnings contain elements that detract from their ability to predict returns), they will obviously attempt to adjust earnings for such deficiencies. For example, if reported earnings of a given firm were increased by an accounting change which is perceived to have no future cash flow or

[35] Consider the following example: "The General Motors Corporation reported today that its fourth-quarter earnings more than doubled, while its earnings for all of 1987 rose 21 percent. The quarterly and yearly profits were increased by a change in accounting standards, adopted in the third quarter, to provide longer depreciation periods for the company's plants and equipment .... The change in accounting standards increased 1987 earnings by $800 million, or $2.55 per share, the company said. Without the change, earnings for the year would have declined 3 percent, to $2.8 billion, or $7.51 a share" (*New York Times* [February 10, 1988]). The *New York Times* reporter obviously discounted heavily the 21% earnings increase. In fact, he/she goes on to discuss "GM's soft performance and sales slump." A researcher, however, using the earnings change as a proxy for unexpected earnings, will correlate the 21% earnings increase with GM's residual return around the announcement (about zero).

[36] This quality of earnings definition is similar to that used, for example, by Holthausen and Verrecchia [1988], the difference being that their earnings are stipulated to predict (firms'?) cash flows. Here, in line with the FASB (see section 2), earnings are assumed to facilitate the prediction of the ultimate variable of interest to investors—securities' returns.

contractual implications, then informed investors can be expected to adjust earnings by eliminating the impact of the accounting change. Adjustments of reported data are an essential element of financial statement analysis or the information dissemination process in capital markets. However, surprisingly little is known about this important process.[37] Capital market research can be used to fill this void, thereby providing the suppliers of financial information with vital knowledge about how and to what extent such information is used.

Consider again the low R^2 characterizing the returns/earnings regressions. The model in Appendix B demonstrates the impact of investors' adjustments of reported earnings on R^2. Specifically, if earnings contain an error (ϵ_2 in Appendix B) perceived by investors to detract from earnings ability to predict returns, then they will adjust for this error in the process of financial analysis and use the adjusted earnings for asset valuation. The researcher, on the other hand, generally does not adjust reported earnings in the returns/earnings studies. Appendix B shows that the variance of the difference between the reported and adjusted earnings ($\sigma^2(\epsilon_2)$) is inversely related to the returns/earnings R^2. The extent of investors' adjustments of reported earnings will, therefore, be reflected in the returns/earnings R^2 (and, of course, in other regression estimates). The returns/earnings paradigm can thus be used to study the information dissemination process in capital markets.

I have used the recently adopted *FAS No. 87* (pension accounting) data to provide a preliminary example of this line of research. *FAS No. 87* was mandated for general use in 1987, but early adoption was allowed in 1985 and 1986. Almost all of the firms that opted for an early adoption boosted their earnings by it, due to the partial write-off of the surplus of pension assets over liabilities mandated by *FAS No. 87*. Given that this surplus was reported in footnotes to the financial statements before the enactment of *FAS No. 87*, investors were probably aware of its value implications. Accordingly, when a firm flows part of this asset surplus through its income statement upon adoption of the accounting change, it should not have substantial value implications. Stated differently, investors can be expected to ignore (or heavily discount) the addition to earnings resulting from the adoption of *FAS No. 87*. To examine whether investors indeed performed such an adjustment to reported earnings, I first ran a cross-sectional regression of residual returns (1/1/86–12/31/

[37] For example, financial analysts use various criteria and signals (e.g., an abnormal increase in inventory) to assess the quality of reported earnings; e.g., *Value Line* [1973] and O'Glove [1987]. Such quality assessments appear to affect investor decisions. For example, Imhoff [1989] classified firms into high, medium, and low financial reporting quality classes, as judged by financial analyst rankings. Over a two-day window, the earnings response coefficient was significantly greater than zero only for the high-quality group of firms, and the returns/earnings R^2 for this group (.08) was twice as large as that of the low-quality group. We lack, however, systematic knowledge of the determinants of such quality rankings, namely, of the de facto financial statement analysis process.

86) on the percentage change in 1986 reported *EPS* for a sample of some 150 firms that adopted *FAS No. 87* in 1986.[38] The R^2 of this regression was 6% (response coefficient = .091, t-value = 3.1). I ran the same regression again, substituting adjusted *EPS* (i.e., subtracting the impact of *FAS No. 87*) for the reported ones. The R^2 of this regression was 9% (response coefficient = .082, t-value = 3.3). The 50% increase in R^2 suggests that investors do adjust reported earnings for perceived deficiencies (in this case, an earnings increase that has already been reflected in market values), and that such adjustments bias the estimated returns/*unadjusted* earnings R^2 downward.

The above regressions obviously provide only very preliminary evidence. A thorough understanding of the financial information dissemination process requires a careful economic analysis. To continue with the *FAS No. 87* example, previous studies have shown that the pension assets surplus is discounted to some extent by investors (namely, a dollar of surplus is associated, on the average, with less than a dollar of equity market value); e.g., Landsman [1986]. Accordingly, one may test the hypothesis that the extent of investors' adjustment of earnings for the impact of *FAS No. 87* was related to the prior market undervaluation of the pension surplus. The larger the prior surplus undervaluation, the higher will be investors' recognition of the earnings impact of *FAS No. 87*. A confirmation of this hypothesis will provide further evidence on investors' perceptiveness. This example demonstrates an important difference between the line of research suggested here and conventional returns/earnings studies. Whereas conventional research does not generally distinguish among sample firms (treating heterogeneous firms as homogeneous), research into investors' use of financial information has to be predicated on the different economic circumstances of firms and industries. Understanding investors' treatment of the earnings impact of, say, *FAS No. 87* will require much more than a simple event study. Explicit consideration should be given to factors such as the pension asset undervaluation of each firm, the discount rate used by each firm to determine the pension liability (alleged to be misused by firms to manipulate the pension liability, given the wide latitude allowed prior to *FAS No. 87*), and to whether the asset surplus (and the consequent earnings impact) was due to the investment acumen of the pension fund manager, signaling future abnormal fund performance, or just to large firm contributions to the pension fund. This line of research will obviously require a careful economic modeling of the event examined, based on a thorough accounting and institutional knowledge.

In general, the research line suggested here is aimed at understanding the use of financial data by investors. Among the interesting questions are: (*a*) What financial variables play a role in asset valuation? Preliminary work on this question was done recently, for example, by Ou and

[38] This is part of an ongoing research project with Russell Langer.

Penman [1989] on nonearnings variables and by Harris and Ohlson [1988] on oil and gas historical asset values vs. current value disclosures. (*b*) What are the specific adjustments made by analysts to reported data? Some information on this issue can be obtained from practitioners dealing with the quality of financial information (e.g., O'Glove [1987]). (*c*) What is the role of financial variables in unusual circumstances, when market values are nonexistent or are of limited usefulness? These issues include the role of financial variables in the valuation of new public firms (initial public offerings) or in the transactions observed in the market for corporate control (mergers and acquisitions, leveraged buyouts, spin-offs, etc.). A thorough understanding of the use of financial variables is imperative to providers of such information, as well as to policymakers in their efforts to improve information quality and decrease the social costs of information production and dissemination.

8. Conjectures on Improving the Quality of Financial Information

The preceding section presented mostly positive (descriptive) research suggestions. The current section provides conjectures about normative research on the quality of financial information. Economic and finance models establish the relation between firms' earnings and their market values. These models, however, are silent about the impact of *GAAP* on earnings and consequently on market values. Specifically, if different accounting measurement and valuation principles affect the predictive ability (quality) of earnings with respect to future securities' outcomes, then such principles will have an effect on market values. This important effect, of *GAAP* on market values, via the impact of *GAAP* on the predictive contribution of earnings and other financial variables, is largely unresearched. The research conjectures proposed here are aimed at outlining a paradigm that will provide accounting policymakers with information relevant to standard setting, and investors with new evidence on the usefulness of financial variables in security analysis. Such research essentially involves developing operational measures of financial information quality and identifying the specific determinants of, or detractors from, information quality.

8.1 FROM CONTEMPORANEOUS CORRELATIONS TO PREDICTIONS

Current capital market research generally assumes that markets are efficient, and that sufficient inferences about the information content of financial variables can be made from *contemporaneous* correlations with prices (e.g., Beaver et al. [1980]).[39] This perspective is sufficient for the

[39] "An impressive body of theory supports the proposition that capital markets are both efficient and unbiased . . ." (Ball and Brown [1968, p. 160]).

positive research on the use of financial information proposed in the preceding section. For normative research, however, the efficient markets framework appears now to be too restrictive. Both theoretical (e.g., Grossman and Stiglitz [1976]) and empirical (e.g., Ou and Penman [1989]) research suggest that capital markets are not efficient in the strict sense of fully reflecting all available information.[40] It is highly questionable, therefore, whether sufficient inferences about the quality and potential usefulness of financial information can be derived from *contemporaneous* correlations with stock returns. Empirical studies should, therefore, extend beyond contemporaneous correlations to include explicit tests of the ability of financial information items to facilitate the prediction of asset outcomes or to form portfolios and test for abnormal returns (e.g., Harris and Ohlson [1988]). An operational measure of quality, on which alternative definitions of financial variables can be ranked, is needed. This measure could be the ability of the variable to facilitate the prediction of securities' outcomes or to provide for improved portfolio decisions. Such a measure of quality reflects both real-life notions of financial information usefulness as well as the FASB's concept of usefulness and quality (recall the quotations in section 2).

The extension of the research domain to include future securities' outcomes also breaks out from the embarrassing circularity in some of the current research. If one assumes that current prices already impound all the relevant information in earnings (i.e., the assumption of market efficiency), then what normative implications can be gained from correlating earnings with contemporaneous returns? What can investors learn from observing the consequences of their own actions (namely, price revisions)? The proposed research thus calls for a considerable expansion of the securities price domain in capital markets accounting research, to include both current and future prices.

8.2 EXPLORING THE DETERMINANTS OF EARNINGS QUALITY

Research on the quality of earnings should be aimed at identifying the determinants of quality. This calls for both theoretical and empirical work intended to specify the impact of *GAAP* and alternatives to *GAAP* on firm valuation, that is, identifying the effects of the fundamental accounting valuation and measurement principles on the ability of financial variables to predict assets' returns. Specifically, *GAAP* attempts to enhance the predictive power of financial variables by requiring that anticipated events potentially affecting a firm's future cash flows (e.g., uncollectible accounts receivable) be reflected in *current* earnings and asset values. However, *GAAP*, which is based on various postulates and principles (e.g., conservatism), also biases this predictive power. Exam-

[40] "In the structure we have developed, the market never fully adjusts. Prices never fully reflect all the information possessed by the informed individuals. Capital markets are not efficient. . ." (Grossman and Stiglitz [1976, p. 248]).

ples of such biases abound. (*a*) The "lower of cost or market" rule calls for the adjustment of earnings and asset values to reflect expected losses on inventories and short-term securities, while not allowing these items to reflect expected gains. (*b*) *GAAP* mandates that assets and liabilities be recorded and depreciated at historical costs. Accordingly, the occurrence of changes in the values of assets and liabilities due to expected changes in their future cash flows (e.g., a deregulation increasing expected cash flow from airlines' assets) will not be reflected in current earnings. (*c*) *GAAP* mandates the discounting of assets and liabilities haphazardly. Discounting is required for some assets/liabilities (e.g., deferred compensation payments, cash flows from oil and gas) while not for others (e.g., deferred income taxes, troubled debt restructurings).[41] Such biased measurements of assets/liabilities and the consequent impact on earnings clearly affect the ability of financial variables to predict firms' cash flows and securities' outcomes. The proposed research is aimed at identifying these effects or quality determinants, thereby providing a basis for improvement in accounting measurement and valuation techniques.

Various lines of research can be conjectured at this stage. For example, one can use a theoretical framework to investigate the differential effect of alternative accounting principles on the time-series behavior of earnings, and consequently on earnings' ability to predict asset outcomes (e.g., Ryan [1986] on historical vs. current-cost accounting). The impact of such accounting alternatives on market values can be then analyzed within a valuation model (e.g., Ohlson [1988*b*]) which links earnings and book values to market values. This line of research is aimed at filling a void in valuation models—the impact of *GAAP* on market values via *GAAP*'s impact on the predictive role of financial variables. This in fact amounts to developing a theory of financial accounting.

Another research route departs from *GAAP* by investigating alternatives to current practices. For example, generally accepted depreciation practices for tangible (e.g., straight-line depreciation) and intangible (e.g., 100% depreciation for *R&D*) assets appear to be arbitrary, as the depreciation is generally unrelated to the actual change in the values of these assets. Economists, on the other hand, use publicly available data to estimate the economic depreciation and the consequent capital stock of tangible as well as intangible assets.[42] Researchers could use such estimation methods to perform a comprehensive adjustment of firms' re-

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[41] See Weil [1989] for a comprehensive discussion of this topic.

[42] See, for example, Pakes and Griliches [1982]. Based on their estimation of the relationship between past investments in plant and equipment and current profits, these authors conclude: "what is clear is that the usual depreciation schemes which assume that the contribution of past investments declines rapidly and immediately with age [i.e., the assumption underlying accelerated depreciation methods] are wrong. If anything there may be an 'appreciation' in the early years as investments are completed, shaken down, and adjusted to" [1982, p. 37]. On alternative depreciation estimates, see also Hirschey and Weygandt [1985], Salamon [1988], and Kim and Moore [1988].

ported earnings and asset values. The usefulness of such *GAAP* alternatives to investors could be examined by, for example, comparing the performance of portfolios selected on the basis of the adjusted numbers with that of portfolios selected as the basis of the reported figures. Additional, broad-based *GAAP* alternatives can be examined. For example, a comprehensive discounting procedure for assets and liabilities can be developed as a substitute for the haphazard discounting under *GAAP*. Also, estimation techniques for "mark to market" valuation of assets and liabilities (based, for example, on market prices of assets and inventories, such as in Magliolo [1989]) can be developed as substitutes for the "lower of cost or market" rule.

The research proposed here, with its emphasis on accounting issues, can be integrated into topical capital market research. For example, the persistence element in earnings (i.e., the impact of earnings on investor expectations) has recently drawn researchers' attention. The issues of interest include the relation between persistence and the returns/earnings response coefficient, and the role of persistence in equity valuation models (see section 5 for references). However, from an accounting policy point of view the interesting issue is the relation between *GAAP* and persistence, since persistence is presumably a desirable attribute of reported earnings. The question is whether there is a differential effect of accounting principles on persistence. For example, are earnings (or earnings changes) based on capitalized *R&D* more strongly associated with persistence measures than conventionally computed earnings? Or do inflation-adjusted earnings contain a larger persistence factor than historical-cost earnings? One way to perform such tests is to use the time series of alternative definitions of earnings (e.g., earnings based on capitalized vs. fully expensed *R&D*) to estimate persistence measures (such as, say, Kormendi and Lipe's [1987] *PVR* measure) and then correlate cross-sectionally these alternative persistence measures with the returns/earnings response coefficient. Whatever the specific test design, the proposed research focuses on the impact of accounting policy issues on attributes (e.g., persistence) considered by the researcher as valuation-relevant.

It should be noted that the research line suggested here is free of "true value" or "economic earnings" notions, popular in the policy-oriented research of the 1960s.[43] It also does not seek to establish the "social desirability" (in the welfare economics sense) of *GAAP* alternatives. Rather it proposes a simple, utilitarian benchmark for assessing the usefulness of such alternatives—facilitating investors' risk and return estimates. The suggested research is also distinguished from the current paradigm by its emphasis on a *comprehensive* adjustment of financial statements. Previous attempts to examine the valuation impact of accounting alternatives were generally restricted to a single item, such as

[43] See Gonedes and Dopuch [1988, pp. 244–60] for a critique of this approach.

lease capitalization. The mild and mostly inconclusive results of this research might be due to the insensitivity of the statistical tests to the valuation impact of individual items and to offsetting effects ignored by the researcher. For example, when the inclusion of the discounted value of future lease payments is considered alone, it should increase the firm's debt/equity ratio. In a comprehensive discounting of several balance sheet items, however, this debt/equity increase may be offset by decreases resulting from determining other liabilities (e.g., deferred taxes) at their discounted values. The suggested research, therefore, calls for the development and testing of comprehensive (multi-item) adjustment mechanisms as alternatives to *GAAP*.

8.3 IDENTIFYING THE REASONS FOR NOISE REDUCTION

Insights into the determinants of earnings quality can also be gained by identifying the reasons for the observed noise reduction in the process of averaging and aggregating firms' earnings. The returns/earnings research area is replete with examples of large increases in R^2 achieved by aggregating firms into portfolios according to various characteristics (e.g., Beaver et al. [1980] and Brown et al. [1985]). The portfolio level, however, is not a viable option to security analysts. Real-life security analysis is overwhelmingly conducted on an *individual security* level. Most analysts are following individual securities and not diversified portfolios. Similarly, earnings forecasts are made for individual firms and not for aggregated groups. Thus, evidence on the strong returns/earnings correlation on the portfolio level is not of considerable practical relevance to analysts. However, the noise reduction achieved by such aggregation might suggest to the researcher clues for reducing noise in the earnings series of individual firms.

The averaging of earnings over time also appears to eliminate significant noise. For example, Campbell and Shiller [1988, p. 675] report that "*. . .a long [30 years] moving average of real earnings helps to forecast future real dividends. The ratio of this earnings variable to the current stock price is a powerful predictor of the return on stock, particularly when the return is measured over several years . . . . it can be argued that a long moving average of earnings is a very natural variable to use to represent fundamental value, and that there are not many competitors for this role.*" This long-run averaging idea is, of course, not new; it was recommended, for example, by Graham and Dodd [1934, p. 452] over 50 years ago. But the finding that earnings averaged over many years are "a powerful predictor of the return on stock" is reassuring. Here too the interesting question is what noise elements in short-term earnings are eliminated in the averaging process.

8.4 MANAGEMENT MANIPULATION OF FINANCIAL REPORTS

Low quality of financial information can result from financial reporting manipulation and fraud. Indeed, there is a recent surge in public concern

about such activities. For example, the National Commission on Fraudulent Financial Reporting states [1987, p. 5]: "*The damage that results [from fraudulent reporting] is widespread with a sometimes devastating ripple effect. Those affected may range from the immediate victims—the company's stockholders and creditors—to the more remote—those harmed when investor confidence in the stock market is shaken. Between the two extremes, many others may be affected.*"[44] Manipulation of financial variables is obviously of major concern to investors, hampering their ability to monitor managers and to assess the values of securities. Research on the motives and consequences of financial reporting manipulation should therefore be an integral part of the quality of earnings research agenda.

Prima facie evidence on manipulation of financial information is widespread. For example, Scholes et al. [1988, p. 32] concluded: "[*The evidence*] *is consistent with the argument that the magnitude of realized securities gains are chosen strategically to 'smooth' the level of income reported shareholders. That is, realized securities gains are higher when loan loss provisions are higher, so the gains offset the income reduction effect of the high bad debt expense.*" Similarly, Allen and Saunders [1988, p. 8] find "*evidence of a systematic and continual adjustment in bank size on the last day of each quarter in the 1978–1986 time period. Almost 85% of banks in the sample window dressed their balance sheets upward. . . .*" Manipulation of financial data is not restricted to financial firms. Dharan [1989] examined firms that changed accounting methods and found that, on average, the firms that adopted income-increasing accounting changes (e.g., a switch from accelerated to straight-line depreciation) had a prechange decline in *EPS* of 23%, while the income-decreasing firms had a prechange increase of 12% in *EPS*. Accounting change appears to be an income-smoothing device.

It should be noted, however, that what appears to be manipulation could in fact arise from the firm's optimal financing, production, or investment decisions. For example, an extension of the estimated useful life of the firm's assets might be aimed at increasing reported earnings, or it might be a bona fide reflection of economic reality (e.g., resulting from a technological improvement). Research on earnings "management" must, therefore, distinguish between manipulation and economically induced accounting activities. Models can be developed for this purpose to indicate the expected values of earnings, assets, or liabilities (e.g.,

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[44] Also, it has been recently reported that the SEC is seriously reviewing the performance of the FASB. The *Wall Street Journal* (August 3, 1988, p. 20) commented on this issue: "The SEC review is bound to be looked at closely by Congress. Rep. Ron Wyden, a member of the House Energy and Commerce Committee's Oversight and Investigation Panel, which has held a score of hearings on accounting issues in recent years, said . . . that his prime concern is that the FASB take an aggressive approach to fraud issues. 'Nobody wants things that add to business cost, but we certainly want them to be activist on financial fraud,' the Oregon Democrat said."

McNichols and Wilson's [1988] model for uncollectible accounts receivable) and serve as benchmarks against which the reported numbers will be evaluated. Alternatively, market signals can sometimes be used to distinguish between manipulation and economically induced activities, since preliminary evidence suggests that investors are aware of some earnings manipulation and adjust for it. For example, Kellogg [1984] examined firms that disclosed reductions in previously reported values of assets and found that such reductions in the values of assets were associated with significant *predisclosure* stock price declines. Investors were evidently aware, on average, of some overstatement in asset values before the disclosure was made by the firm. Similarly, Kinney and McDaniel [1989] examined firms that corrected errors in previously reported quarterly results and found that stock returns between the release of the quarterly reports and their correction were, on the average, negative.

The challenge in this area is to gain insight into the motives and means by which management exercises discretion over financial reporting. Most of the accounting research in this area has been limited to choices *within GAAP* (e.g., the *LIFO* switch decision). A systematic examination of managerial choices of non-*GAAP* procedures is called for. From a normative perspective, this knowledge is relevant to regulators in their efforts to enhance the integrity of capital markets. It will also assist investors and auditors in developing early warning systems to signal manipulation. Knowledge of managers' motives and means of manipulation can also be of use in designing contracts with managers to mitigate manipulation and enhance monitoring.

9. Concluding Remarks

The returns/earnings research evidence suggests that while earnings appear to be used by investors, the extent of earnings usefulness is rather limited. This is indicated by the weak and intertemporally unstable contemporaneous correlation between stock returns and earnings and by the very modest contribution of earnings to the prediction of stock prices and returns. Various reasons can account for the "poor showing" of earnings, among which are methodological shortcomings of the returns/earnings research paradigm and investor irrationality ("noise trading").

This study focused on a third explanation to the weak returns/earnings correlation—the low information content (quality) of currently reported earnings and other financial variables. The low information content is probably due to biases induced by accounting measurement and valuation principles and in some cases to manipulation of reported data by managers. Capital market research should, therefore, shift its focus to the examination of the role of accounting measurement rules in asset valuation. Such research involves both positive and normative aspects. Regarding the former, the proposed research is aimed at understanding

the use of financial information by investors, that is, a thorough investigation of the financial statement analysis process. Our current understanding of this process does not extend much beyond the familiar list of financial ratios presumably used by investors. The normative aspect of the proposed research is aimed at filling a current void in financial economic modeling. Economic models posit a relation between generic financial variables (e.g., "income") and market values, leaving unspecified the nature of the financial variables. The research conjectures proposed above are aimed at adding a fundamental element to this relation—the impact of *GAAP* and *GAAP* alternatives on market values, via the impact of accounting techniques on the predictive power of financial variables.

APPENDIX A

The Returns/Earnings Relation and R^2

Let the value of the firm at time 0, V_0, equal the expected present value of all future cash flows (dividends) to the firm's risk-neutral shareholders, $E(\tilde{CF})$:

$$V_0 = E(\tilde{CF});\ \tilde{CF} \sim N(E(\tilde{CF}),\ \sigma^2). \tag{1}$$

Assume that first-period earnings, e_1, are announced before any cash flow is observed. The information conveyed by these earnings allows investors to revise their expectation of the present value of the future cash flows (dividends). For tractability, let earnings, e_1, be related to the present value of these cash flows, CF, as follows:

$$e_1 = aCF + \epsilon;\ \epsilon \sim N(0,\ \sigma_\epsilon^2), \tag{2}$$

where the coefficient a serves as a scale factor and ϵ is independent of CF. Accordingly, the postearnings release value of the firm, V_1, equals:

$$V_1 = E(\tilde{CF} \mid e_1). \tag{3}$$

Using Bayes' rule, $E(\tilde{CF} \mid e_1)$ is given by:

$$E(\tilde{CF} \mid e_1) = \frac{\dfrac{e_1/a}{\sigma_\epsilon^2} + \dfrac{E(\tilde{CF})}{a^2\sigma^2}}{\dfrac{1}{\sigma_\epsilon^2} + \dfrac{1}{a^2\sigma^2}} = V_1. \tag{3a}$$

The price revision around the earnings announcement, $V_1 - V_0$, reflects the change in investors' expectations of the present value of future cash flows:

$$V_1 - V_0 = \frac{\dfrac{e_1/a}{\sigma_\epsilon^2} + \dfrac{E(\tilde{CF})}{a^2\sigma^2}}{\dfrac{1}{\sigma_\epsilon^2} + \dfrac{1}{a^2\sigma^2}} - E(\tilde{CF}) = \frac{e_1/a - E(\tilde{CF})}{1 + \dfrac{\sigma_\epsilon^2}{a^2\sigma^2}}. \tag{4}$$

Noting from expression (2) that $E(\tilde{e}_1) = aE(\widetilde{CF})$, and dropping all tildes, we can rewrite expression (4) as:

$$V_1 - V_0 = \frac{\frac{1}{a}(e_1 - E(e_1))}{1 + \sigma_\epsilon^2/a^2\sigma^2}. \tag{4a}$$

Expression (4*a*) indicates that a cross-sectional regression of the price revision, $V_1 - V_0$, on unexpected earnings, $e_1 - E(e_1)$, should result in $R^2 = 1$, as long as (*a*) the earnings information is solely responsible for the price change (from V_0 to V_1), that is, the window is properly specified; in particular, investors do not adjust reported earnings (e.g., for inflationary effects) prior to their use in valuation; (*b*) expected earnings are properly measured by $E(e_1)$; and (*c*) the ratio of the variances $\sigma_\epsilon^2/a^2\sigma^2$, on the right-hand side of (4*a*), is constant across firms. Note that $[1/a]/[1 + \sigma_\epsilon^2/a^2\sigma^2]$ is the response coefficient from regressing returns on unexpected earnings (when both sides of equation (4*a*) are divided by V_0). Hence, condition (*c*) states that $R^2 = 1$ if investors react identically to the earnings releases of all firms (and the first two conditions hold).

APPENDIX B

The Relation Between the Quality of Earnings and the Returns/Earnings Correlation

The quality of earnings is defined here in terms of perceived deficiencies in reported earnings (e'_1) which detract from their ability to predict investors' cash flows (CF). Such perceived deficiences can be represented by decomposing the error term ϵ in (2) into two errors: ϵ_2, reflecting perceived deficiencies in reported earnings which are adjusted for in the process of financial analysis, and ϵ_1 which is the remaining error, reflecting investors' inability to predict perfectly future asset outcomes from earnings. Reported earnings are thus defined as:

$$e'_1 = aCF + \epsilon_1 + \epsilon_2;\ \epsilon_1 \sim N(0,\sigma_{\epsilon_1}^2);\ \epsilon_2 \sim N(0,\sigma_{\epsilon_2}^2);\ \mathrm{cov}(\epsilon_1,\epsilon_2) = 0. \tag{5}$$

The correlation between stock price revisions around earnings announcements ($V_1 - V_0$) and unexpected reported earnings ($e'_1 - E(e'_1)$) is:

$$r = \frac{\mathrm{cov}[V_1 - V_0, e'_1 - E(e'_1)]}{\sigma(V_1 - V_0)\sigma(e'_1 - E(e'_1))}. \tag{6}$$

Given that V_0 and $E(e'_1)$ are constants:

$$r = \frac{\mathrm{cov}(V_1, e'_1)}{\sigma(V_1)\sigma(e'_1)}. \tag{6a}$$

Substituting the definition of V_1 (expression (3*a*) in Appendix A) into

the above covariances yields:

$$\operatorname{cov}(V_1,e'_1) = \operatorname{cov}\left[\frac{\dfrac{e_1}{a} + \dfrac{E(CF)\sigma^2_{\epsilon_1}}{a^2\sigma^2}}{1 + \sigma^2_{\epsilon_1}/a^2\sigma^2}, e'_1\right], \tag{7}$$

where e_1 stands for adjusted (ungarbled) earnings, expression (2), with ϵ_1 replacing ϵ. Eliminating constants in expression (7) yields:

$$\operatorname{cov}(V_1,e'_1) = \frac{\operatorname{cov}(e_1,e'_1)/a}{1 + \sigma^2_{\epsilon_1}/a^2\sigma^2}. \tag{8}$$

Substituting the definitions of e_1 from expression (2) and e'_1 from expression (5) in the above covariance:

$$\operatorname{cov}(V_1,e'_1) = \frac{\operatorname{cov}(aCF + \epsilon_1, aCF + \epsilon_1 + \epsilon_2)/a}{1 + \sigma^2_{\epsilon_1}/a^2\sigma^2}. \tag{9}$$

Since ϵ_2 is assumed to be uncorrelated with ϵ_1:

$$\operatorname{cov}(V_1,e'_1) = \frac{\sigma^2(e_1)/a}{1 + \sigma^2_{\epsilon_1}/a^2\sigma^2}. \tag{10}$$

Note that $\sigma(V_1)$ can be written as:

$$\sigma(V_1) = \frac{\sigma(e_1)/a}{1 + \sigma^2_{\epsilon_1}/a^2\sigma^2}. \tag{11}$$

Substituting expressions (10) and (11) into (6*a*) yields:

$$\begin{aligned} r &= \frac{\sigma^2(e_1)}{\sigma(e_1)\sigma(e'_1)} \\ &= \frac{\sigma(e_1)}{\sigma(e_1 + \epsilon_2)} \\ &= \frac{\sigma(e_1)}{[\sigma^2(e_1) + \sigma^2(\epsilon_2)]^{1/2}}. \end{aligned}$$

The last expression shows that the quality of earnings, as measured by $\sigma^2(\epsilon_2)$, namely, the variance of the perceived deficiencies in reported earnings, is inversely related to r, the correlation between price revisions $(V_1 - V_0)$ and unexpected reported earnings $(e'_1 - E(e'_1))$. Stated differently, other things constant, the larger the variance of the adjustments made by investors to reported earnings $(\sigma^2_{\epsilon_2})$, the lower will be returns/*reported* earnings R^2.

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