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Do Analysts and Auditors Use Information in Accruals?

MARK T. BRADSHAW,* SCOTT A. RICHARDSON,†
AND RICHARD G. SLOAN†

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ABSTRACT

Existing research indicates that firms with high accruals are more likely to experience future earnings problems, but that investors' expectations, as reflected in stock prices, do not appear to anticipate these problems. In this paper, we directly examine the published opinions of two types of professional investor intermediaries to see if they provide investors with information concerning the future earnings problems experienced by firms with high accruals. First, we examine the earnings forecasts of sell-side analysts. We show that analysts' earnings forecasts do not incorporate the predictable future earnings declines associated with high accruals. Second, we examine the behavior of independent auditors. We find no evidence that auditors signal the future earnings problems associated with high accruals through either their audit opinions or through auditor changes. Overall, our evidence indicates that analysts and auditors do not alert investors to the future earnings problems associated with high accruals, thus corroborating previous findings that investors do not appear to anticipate these problems.

1. Introduction

This paper investigates whether sell-side analysts and auditors identify and communicate information about "low-quality" earnings to investors.

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We measure earnings quality using a refined version of the accruals technique employed by Sloan [1996]. Specifically, we show that firms with unusually high working capital accruals are more likely to experience declines in subsequent earnings performance and SEC enforcement actions for GAAP violations. We then investigate whether information about the subsequent earnings declines is reflected in analysts' earnings forecasts and whether information about the consequences of future earnings declines and associated GAAP violations is reflected in audit opinions and auditor turnover. We find that sell-side analysts' forecast errors are large and negative for firms with unusually high accruals, consistent with analysts failing to anticipate the subsequent earnings declines. We also find no evidence of a higher frequency of modified audit opinions or auditor changes in firms with high accruals, consistent with auditors failing to communicate the increased likelihood of future earnings declines and GAAP violations.

Our evidence complements and reinforces the evidence provided in Sloan [1996]. Sloan demonstrates that stocks prices act "as if" investors do not anticipate the subsequent stock price declines associated with unusually high levels of accruals. However, a limitation of Sloan's study is that the relation between the predictable earnings declines and stock prices could be attributable to unidentified risk factors or unknown research design flaws (e.g., Kothari [2001]). We mitigate these concerns by providing direct evidence that sell-side analysts do not incorporate fully the predictable subsequent earnings declines into their forecasts. We also show that auditors do not alert investors to the increased incidence of future earnings declines and GAAP violations associated with high accruals. Our evidence suggests that even professional investment intermediaries who specialize in interpreting accounting information do not alert investors to the subsequent earnings problems that are associated with high accruals. Thus, our evidence corroborates the hypothesis that investors do not anticipate fully the negative implications of unusually high accruals.

Our evidence also generates insights into the effectiveness of analysts and auditors as financial intermediaries. With respect to analysts, one interpretation of our results is that sell-side analysts lack the necessary sophistication to understand the future implications of high levels of accruals. Another possible interpretation is that sell-side analysts collude with management to inflate expectations of future earnings by inflating current accruals, current earnings and forecasts of future earnings. Under either of the above interpretations, our results are consistent with related research suggesting that accruals management can be used to boost stock prices around events such as equity issuances (e.g., Rangan [1998] and Teoh, Welch and Wong [1998]).

The two interpretations provided above are also applicable to our auditor results. However, a third interpretation of our auditor results is that earnings quality issues of the type that we investigate are beyond the scope of the audit. In other words, auditors may understand that inflated accruals imply a greater likelihood of future earnings declines and GAAP violations, but are not required to communicate this information to investors

through their audit opinions. This third interpretation reflects less critically on the competence of auditors. However, all three interpretations are consistent with recent concerns that the audit process is ineffective at warning investors about many subtle cases of earnings management. For example, Levitt [1998] argues that all three of the above interpretations contribute to the ineffectiveness of the audit process in revealing many cases of earnings management to investors. Our evidence is consistent with Levitt's claim that the current audit process is ineffective at warning investors about many subtle cases of earnings management.

The next section of this paper develops our hypotheses and research design. Section 3 describes our data and section 4 presents our results. Section 5 concludes the paper.

2. *Hypotheses*

The question of whether investors "see through" temporary distortions in accrual accounting numbers is of great interest to both academics and capital market participants. Perhaps Abraham Briloff has been the best-known spokesperson for the view that investors are systematically misled by such distortions (e.g., Briloff [1972]). In the 1970s, academics produced a large body of empirical evidence in support of the claim that stock prices act "as if" investors are extremely sophisticated and see through accounting distortions. This evidence consisted of demonstrating that stock prices respond to earnings information in a timely manner, and that accounting changes do not lead to direct mechanical effects on stock prices.[1] One possible shortcoming of this research is that it may fail to reject the null hypothesis of market efficiency because of the use of low power tests. For example, the fact that stock prices do not respond mechanically to the earnings effects of a FIFO-LIFO switch does not mean that investors also see through more subtle manipulations of revenue recognition or expense capitalization.

More recently, a growing body of evidence has documented rejections of market efficiency in favor of the alternative hypothesis that investors respond to current earnings without fully appreciating the implications of the current accounting choices for future earnings and cash flows. For example, Sloan [1996] finds firms with high levels of current accruals experience systematic reductions in future earnings and that stock prices act "as if" investors do not anticipate the future earnings declines. He finds that the stock prices of firms with high accruals subsequently decline, and that the magnitude and timing of the subsequent stock price declines are directly related to the magnitude and timing of the predictable declines in earnings. Subsequent research by Xie [2001] finds that the accruals driving the predictable earnings reversals appear to be attributable to earnings management. In related research, Dechow, Sloan, and Sweeney [1996] find that a sample of firms targeted

[1] See Watts [1986] for a review of this research.

by the SEC for manipulating earnings were able to temporarily raise their stock prices through the use of large positive accounting accruals.

Despite the statistical and economic significance of the recent findings, many academics continue to view the evidence in this area as mixed. For example, a recent review of earnings management research by Healy and Wahlen [1999] concludes that: "Findings on resource allocation effects of earnings management are conflicting, suggesting the need for future empirical and theoretical research on this issue." Perhaps one reason for this view is academics' reluctance to give up on the efficient markets paradigm, as it provides a convenient and parsimonious framework for understanding capital markets. Academics are also concerned that recent research may suffer from research design biases. In particular, there is concern that the observed stock price behavior may be due to unknown risk factors and/or survivorship biases. For example, any correlation between accruals and an underlying risk factor might manifest itself in the data as a correlation between accruals and stock returns.

In this paper, we attempt to overcome the above research design issues by focussing directly on the expectations of professional financial intermediaries, rather than relying on stock prices. Stock prices traditionally have been used in research as a measure of the expectations of sophisticated investors, but stock prices are also potentially affected by risk factors and ex post survivorship biases. Therefore, we focus on directly testing whether professional financial intermediaries anticipate the predictable consequences experienced by firms with high accruals. We focus on two groups of financial intermediaries, both of whom issue publicly available opinions to investors. The first group that we examine is sell-side analysts, who issue their earnings forecasts to investors. The second group that we examine is auditors, who issue an opinion about the "fairness" of financial statements to investors.

Our hypothesis with respect to sell-side analysts' forecasts is straightforward. We hypothesize that analysts' forecasts of future earnings do not fully reflect the future earnings declines experienced by high accrual firms. Specifically, we predict that analysts' forecast errors (realized earnings minus forecast earnings) are negatively associated with current accruals:

H_1: Analysts' forecast errors with respect to future earnings are negatively associated with the level of accruals.

Evidence that the predictable earnings changes are not incorporated in analysts' forecasts is inconsistent with the alternative risk factor and research design flaw explanations that have been used to explain prior stock price results.[2]

[2] In an independent and concurrent working paper, Elgers, Lo and Pfeiffer [2000] also examine analysts' ability to incorporate information in accruals in their earnings forecasts. Using a somewhat different research design, they argue that analysts' forecasts at least partially reflect the differential persistence of the cash flow and accrual components of earnings. Our results indicate that analysts' forecasts do not fully reflect the differential persistence of cash flows and accruals.

Our hypothesis with respect to auditor opinions is also straightforward. Dechow, Sloan, and Sweeney [1996] demonstrate that firms with high accruals are more likely to be subject to an SEC enforcement action for GAAP violations. We begin by replicating and extending their analysis on our sample and confirm that high accruals are associated with a higher incidence of SEC enforcement actions for GAAP violations. If auditors fail to use information in accruals to communicate their concerns about potential GAAP violations and future earnings declines, then high accruals will not be associated with a greater frequency of modified audit opinions. Hence, we hypothesize that auditors are *not* more likely to issue modified audit opinions to firms with high accruals, despite the fact that these firms are more likely to have GAAP violations and future earnings declines.[3] This hypothesis can be formally stated in its *alternative* form as:

H_2: There is a positive association between the level of accruals and the probability that the audit opinion will be modified.

An issue of interpretation arises with this hypothesis, because our position is supported by a failure to reject the null of no association. Of course, we are not the first to propose providing evidence on a hypothesis by setting it up as the null and then failing to reject that null.[4] However, we want to be open about the fact that our failure to reject could be due to low power rather than because the alternative hypothesis is false. Having said this, the standard errors in our empirical tests are such that power is not an issue—any economically significant relations in the data will certainly achieve statistical significance.

A second limitation of our audit opinion tests is that auditors are not required to issue a modified audit opinion just because there is higher probability of a GAAP violation or an expected future decline in earnings. For example, a qualified opinion is only required when there is a scope limitation or a departure from GAAP. Moreover, the SEC will typically only accept financial statements that are prepared according to GAAP,[5] so our sample contains very few qualified opinions. An adverse opinion and a disclaimer of opinion are also only required in very rare circumstances. However, auditors do have the option of modifying an unqualified opinion by adding explanatory language. Circumstances that warrant explanatory language include going concern doubts, material changes in accounting principles and their application and other matters that the auditor may wish to emphasize.

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[3] Francis and Krishnan [1999] also investigate the relationship between audit opinions and accruals, and provide evidence that is consistent with our results. They show that firms with large absolute accruals are more likely to have qualified audit opinions, and show that this result is strongest for firms with extremely large negative accruals. Thus, they also provide evidence suggesting a negative relation between accruals and audit opinions, but suggest that this relation may be non-linear.

[4] Most of the literature in support of the efficient markets hypothesis also employs this approach.

[5] See Article 4(a) of Regulation S-X, Securities Act of 1933.

Thus, auditors do have the opportunity to alert investors to the potential future problems experienced by firms with high accruals. Our auditor tests shed light on whether auditors take advantage of this opportunity.

We also supplement our audit opinion tests by conducting tests on auditor changes. Evidence suggests that auditors typically resign or are fired before they get to the point of issuing a negative opinion.[6] The company then "shops around" for an auditor willing to issue a clean opinion.[7] Consistent with this possibility, DeFond and Subramanyam [1998] find that auditor changes are associated with increases in discretionary accruals. Thus, it is possible that some auditors may initially want to issue a modified opinion, but then resign or are dismissed before they get to do this. In order to address this possibility, we also examine the relation between accruals and auditor changes. This final hypothesis can be stated in its *alternative* form as:

H_3: There is a positive association between the level of accruals and the probability of an auditor change.

This hypothesis is also subject to the limitations discussed for the audit opinion tests. First, our position is supported by a failure to reject the null. However, this limitation is again mitigated to the extent that power is not an issue, given our large sample size and small standard errors. Second, auditors are not necessarily expected to resign simply because a firm has high accruals that are likely to depress future earnings. Here again, our objective is simply to provide evidence on whether auditor changes provide information to investors about the negative consequences of high accruals. We do this for the purpose of establishing the plausibility of Sloan's [1996] hypothesis that investors do not anticipate these negative consequences. We are not advocating that auditor changes should necessarily occur in such circumstances.

3. Data

Our empirical tests employ data from three sources. Financial statement data are obtained from the *COMPUSTAT* annual database. Analyst forecast data are obtained from the *IBES* summary statistics file. Finally, data on stock returns are obtained from the *CRSP* daily stock returns files. Our sample is restricted to the eleven-year period beginning in fiscal 1988 and ending in fiscal 1998. The main reason that we restrict our sample to post-1987 data is so that we can consistently measure cash flows and accruals using *Statement of Financial Accounting Standards No. 95* (SFAS 95) data. SFAS 95, the standard governing the preparation of the statement of cash

[6] See, for example, "More Accounting Firms Are Dumping Risky Clients," *Wall Street Journal*, April 25, 1997.

[7] In related research, Francis, Maydew and Sparks [1999] and Becker et al., [1998] find that firms with 'Big Six' auditors tend to have lower discretionary accruals. One implication of these results is that firms with large accruals may select lower quality auditors, who are less likely to issue a qualified opinion.

flows, took effect in fiscal 1988. Use of this sample period also allows us to conduct an out-of-sample test of Sloan's [1996] results, since Sloan restricted his sample to pre-1988 data in order to consistently use pre-SFAS 95 data. The introduction of SFAS 95 made accrual and cash flow data more visible—both to us as researchers and to investors. Thus, it will be interesting to see whether investors continue to ignore information in cash flows and accruals in the post-SFAS 95 period. A final reason for using the post-1987 period is that *IBES* forecast data is only available for the very largest firms in the early 1980s, but coverage is much more comprehensive by the late 1980s.

We use two alternative measures of accruals in our empirical tests. The first measure of accruals focuses on working capital accruals:

$$\begin{aligned} WCAcc = {} & \text{Increase in Accounts Receivable (}\textit{COMPUSTAT}\text{ item \#302)} \\ & + \text{Increase in Inventory (\#303)} \\ & + \text{Decrease in Accounts Payable and Accrued Liabilities (\#304)} \\ & + \text{Decrease in Accrued Income Taxes (\#305)} \\ & + \text{Increase (Decrease) in Assets (Liabilities)—Other (\#307)} \end{aligned}$$

Our second measure of accruals measures total net operating accruals:

$$\begin{aligned} TAcc = {} & \text{Income Before Extraordinary Items, } EBXI \text{ (\#123)} \\ & - \text{Net Cash Flows from Operating Activities, } TCF \text{ (\#308)} \end{aligned}$$

There are two key differences between *WCAcc* and *TAcc*. First, *WCAcc* excludes a variety of long-term accruals, such as depreciation of plant and amortization of debt premiums/discounts. These accruals tend to be fairly constant over time and account for little of the variation in total accruals (see Sloan [1996]).[8] Second, *TAcc* includes a variety of "special" accruals, such as gains and losses on the sale of plant/other investments and accruals associated with restructurings and asset writedowns. These accruals tend to mean revert very quickly, but they are usually flagged as special, non-recurring items on the income statement. Thus, we expect that investors are more likely to anticipate the non-recurring nature of these accruals. Overall, our priors suggest that *WCAcc* should do a better job than *TAcc* of capturing the accruals that lead to earnings reversals that are unanticipated by investors. However, we conduct our initial set of tests with both measures of accruals in order to verify that this is indeed the case.

Our accruals tests also involve the examination of future earnings changes. We use two measures of earnings that correspond to the two measures of accruals. The measure corresponding to *WCAcc* is earnings before interest,

[8] Sloan [1996] reports that the most significant source of accrual variation is attributable to movements in receivables and inventories that are not matched by movements in current liabilities. Sloan points out that it is important to look at aggregate working capital accruals rather than individual components in order to identify such mismatches.

taxes, depreciation and amortization, *EBITDA* (#13). *EBITDA* excludes special items, and so measures the "recurring" earnings number that is tracked by analysts and is more highly correlated with stock prices than "bottom line" measures of earnings that include special items. Also note that *EBITDA* excludes depreciation and amortization expense, as does the corresponding accruals measure *WCAcc*. The cash flow measure corresponding to *EBITDA* and *WCAcc* is *WCCF*, equal to the difference between *EBITDA* and *WCAcc*, an estimate of cash flows attributable to recurring operations. The earnings measure corresponding to *TAcc* is earnings before extraordinary items, *EBXI* (#123). The cash flow corresponding to *EBXI* is *TCF*, total cash flow from operations (#308). Thus, *WCAcc* and *WCCF* sum to *EBITDA*, while *TAcc* and *TCF* sum to *EBXI*. In our empirical tests, we deflate all variables by average total assets.

Our final sample with non-missing accruals, cash flows and earnings data consists of 66,762 firm years. Table 1 presents descriptive statistics and correlations for the accruals, earnings, and cash flows variables. Mean *WCAcc* is 0.018, whereas mean *TAcc* is −0.060. Similar to prior research, mean *TAcc* is

TABLE 1

Descriptive Statistics and Correlations for Accruals, Earnings, and Cash Flows Variables

Panel A: Descriptive Statistics

	Mean	*Median*	*Std. Dev.*	*25%*	*75%*
WCAcc	0.018	0.010	0.128	−0.021	0.056
EBITDA	0.053	0.108	0.245	0.012	0.176
WCCF	0.036	0.087	0.244	−0.017	0.161
TAcc	−0.060	−0.044	0.175	−0.104	0.008
EBXI	−0.044	0.028	0.244	−0.061	0.074
TCF	0.011	0.057	0.220	−0.029	0.120

Panel B: Pearson (above diagonal) and Spearman (below diagonal) correlations (p-values shown below correlations)

	EBITDA	*WCCF*	*WCAcc*	*EBXI*	*TCF*	*TAcc*
EBITDA	—	0.87	0.24	0.90	0.82	0.34
		0.0001	0.0001	0.0001	0.0001	0.0001
WCCF	0.79	—	−0.23	0.77	0.93	0.00
	0.0001		0.0001	0.0001	0.0001	0.5271
WCAcc	0.24	−0.27	—	0.26	−0.21	0.70
	0.0001	0.0001		0.0001	0.0001	0.0001
EBXI	0.85	0.65	0.26	—	0.76	0.54
	0.0001	0.0001	0.0001		0.0001	0.0001
TCF	0.70	0.91	−0.29	0.63	—	−0.08
	0.0001	0.0001	0.0001	0.0001		0.0001
TAcc	0.18	−0.22	0.73	0.39	−0.31	—
	0.0001	0.0001	0.0001	0.0001	0.0001	

The sample consists of 66,762 firm years from 1988 to 1998. *EBITDA* is earnings before interest, taxes, depreciation and amortization (#13); *WCAcc* is working capital accruals, calculated using changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307); and *WCCF* is equal to the difference between *EBITDA* and *WCAcc*, an estimate of cash flows attributable to recurring operations. *EBXI* is income before extraordinary items (#123), *TCF* is total cash flow from operations (#308). *TAcc* is total accruals, calculated as the difference between *EBXI* and *TCF*. All variables are scaled by average total assets.

negative, reflecting the depreciation and amortization charges included in the calculation. Also, the standard deviation of *WCAcc* is 0.128, whereas the standard deviation of *TAcc* is 0.175, reflecting the exclusion of non-recurring accruals from *WCAcc*. Panel B of table 1 presents correlations among the variables. The "working capital" variables are highly correlated with the corresponding "total" variables (e.g., corr(*WCAcc*, *TAcc*) = 0.70, corr(*EBITDA*, *EBXI*) = 0.90, and corr(*WCCF*, *TCF*) = 0.93, all Pearson correlations). Consistent with previous research, the accruals variables are negatively correlated with the associated cash flows variables, and the accruals variables are positively correlated with the associated earnings variables (e.g., Sloan [1996]).

Our stock return tests also require data from the *CRSP* files. Stock returns are measured using compounded buy-hold returns, inclusive of dividends and other distributions. Market adjusted returns are calculated by deducting the corresponding return on a value-weighted market portfolio. Size adjusted returns are computed by deducting the corresponding value-weighted return for all available firms in the same size-matched decile, where size is measured using market capitalization as of the beginning of the year. The requirement that *CRSP* stock return data is available in addition to *COMPUSTAT* data reduces our sample size to 35,956 observations.

Our analyst forecast tests are conducted across fiscal months using the median *IBES* forecast of the current year annual earnings. If analysts fully impound the information in last year's accruals in their forecasts of this year's earnings, there should be no relationship between last year's accruals and this year's forecast errors. We initially measure the forecast in the month after financial results for the most recent fiscal year have been announced. We then track the forecast errors over the months leading up to the announcement of the current year's earnings.[9] For most firms, this period is 12 months long. Forecast errors are computed by subtracting forecast earnings from realized earnings and dividing by the stock price at the end of the first month in which the forecast is measured (i.e., the month after financial results for the most recent fiscal year have been announced). Imposing the requirement that *IBES* forecast data is available reduces the sample size to 21,482 observations.[10]

Data on audit opinions and auditor changes are obtained from the *COMPUSTAT* tapes. *COMPUSTAT* provides six codes for the audit opinion—

[9] That is, we track forecast errors beginning in the month after fourth quarter earnings for the most recent fiscal year have been announced, through to the month in which fourth quarter earnings for the current year are announced. It is possible that accrual information is not available until the release of the Form 10-K, which may be some time after the fourth quarter earnings announcement date. However, even allowing for a delay of several months for the release of this information, our results still suggest that analysts are overly optimistic about next year's earnings for high accrual firms (see figure 2 and table 5). The optimism only gradually disappears during the year and a significant proportion remains up until the time of the next year's earnings announcement.

[10] The smaller sample with *IBES* data available is only used for the analyst forecast tests. The other tests employ all available *COMPUSTAT* and *CRSP* data.

unaudited (#0), unqualified (#1), qualified (#2), no opinion (#3), unqualified with explanatory language (#4), and adverse (#5). Only the unqualified opinion (#1) represents an unambiguous "clean" opinion from the auditors. We therefore create an audit opinion indicator variable that takes on the value of 0 for an unqualified "clean" opinion (code #1) and 1 for a modified "unclean" opinion (codes #2–#5). Note that this measurement procedure will result in some "unclean" audit opinions that arise for reasons unrelated to the level of accruals. This is most likely to be the case for "unqualified with explanatory language" opinions. For example, explanatory language may relate to the adoption of a newly prescribed accounting standard. We therefore conduct additional robustness tests that treat opinions that are unqualified with explanatory language as "clean" opinions. Details of these tests are discussed in section 4. An alternative procedure would be to manually inspect and code the "unclean" opinions to try and exclude cases that appear unrelated to the level of accruals. However, manual inspection of all opinions is not cost effective, given that there are over 5,000 "unclean" opinions in our sample. Finally, *COMPUSTAT* also provides data on the identity of the auditor. We use this data to create an indicator variable coded as 0 if the identity of the auditor is the same as in the previous fiscal year and 1 if there is a change in the identity of the auditor. We code all auditor changes that were attributable to a merger between two previous "big eight" firms as 0 (no auditor change).[11]

4. Results

4.1 ACCRUALS, EARNINGS, AND STOCK PRICES

We begin by replicating Sloan's [1996] results using our later time period and our refined measure of accruals. Recall that Sloan's sample period predates the release of SFAS 95, while our sample period post-dates SFAS 95. Thus, while Sloan imputes accruals using balance sheet data, we are able to take the accruals directly from the statement of cash flows, resulting in "cleaner" measures of cash flows and accruals (e.g., changes in balance sheet accounts can be affected by events such as divestitures and mergers, etc.).

[11] The mergers taking place during our sample period are the Ernst & Young and the Deloitte & Touche mergers. The results are insensitive to how we code auditor changes for firm-years affected by the mergers (e.g., excluding merger firms). An additional issue with the auditor change construct is that *COMPUSTAT* codes a number of "small" auditors under a single category. This issue is mitigated in our sample, because *COMPUSTAT* separately coded many smaller auditors for the first time in 1988 (codes #10–27), which pre-dates our sample period. There remains an "other" auditor category (#9), for which we would fail to identify auditor changes, but only if they occurred between two auditors that *COMPUSTAT* classifies as "other." Approximately 6% of our sample represents auditors categorized as "other." We estimated the auditor change regressions after deleting all firm-years with an auditor that *COMPUSTAT* classified as "other," with no material effect on the reported results.

TABLE 2

Ordinary Least Squares Regressions of Future Earnings Performance on the Accrual and Cash Flow Components of Current Earnings Performance[a]

Panel A: OLS regressions with *WCAcc*

(1a) $EBITDA_{t+1} = \gamma_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + v_{t+1}$

Independent Variables	γ_0	γ_1	γ_2	R^2
Actual Values	0.015	0.592	0.776	0.62
	(26.8)	(122.9)	(296.2)	
Decile Rankings[b]	−0.258	0.191	0.451	0.46
	(−140.5)	(90.4)	(191.0)	
F-test of $\gamma_1 = \gamma_2$ (Actual Values): 1522.4				
F-test of $\gamma_1 = \gamma_2$ (Decile Rankings): 10708.9				

Panel B: OLS regressions with *TAcc*

(1b) $EBXI_{t+1} = \gamma_0 + \gamma_1 TAcc_t + \gamma_2 TCF_t + \xi_{t+1}$

Independent Variables	γ_0	γ_1	γ_2	R^2
Actual Values	−0.023	0.425	0.691	0.45
	(−35.1)	(102.9)	(201.5)	
Decile Rankings[b]	−0.345	0.237	0.390	0.36
	(−168.2)	(103.9)	(213.9)	
F-test of $\gamma_1 = \gamma_2$ (Actual Values): 3179.9				
F-test of $\gamma_1 = \gamma_2$ (Decile Rankings): 3582.9				

[a]The sample consists of 66,762 firm years from 1988 to 1998. *EBITDA* is earnings before interest, taxes, depreciation and amortization (#13); *WCAcc* is working capital accruals, calculated using changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307); and *WCCF* is equal to the difference between *EBITDA* and *WCAcc*, an estimate of cash flows attributable to recurring operations. *EBXI* is income before extraordinary items (#123), *TCF* is total cash flow from operations (#308). *TAcc* is total accruals, calculated as the difference between *EBXI* and *TCF*. All variables are scaled by average total assets. t-statistics are shown in parentheses.

[b]OLS regressions with decile rankings substitute the portfolio rankings of *WCAcc*, *TAcc*, *WCCF* and *TCF*, where the rankings are converted to a [0, 1] scale. Rankings are obtained by annually ranking observations and assigning them in equal numbers to portfolios for each variable.

Table 2 reports our examination of the contribution of the cash flow and accrual components of earnings to the rate of mean reversion in earnings. This is accomplished by regressing next period's realized earnings on the cash flow and accrual components of this period's earnings.[12]

$$EBITDA_{t+1} = \gamma_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + v_{t+1} \quad (1a)$$

$$EBXI_{t+1} = \gamma_0 + \gamma_1 TAcc_t + \gamma_2 TCF_t + \xi_{t+1} \quad (1b)$$

These regressions measure the relative persistence of the accruals and cash flows components of earnings. Coefficients between 0 and 1 on each of this period's earnings components indicate that they contribute to mean reversion in earnings, with a smaller coefficient indicating that the component contributes to more rapid mean reversion. Panel A reports results using *WCAcc*, representing recurring working capital accruals, while panel B

[12] Requiring next period earnings leads to a decline in the sample from 66,762 observations to 54,682.

reports results using *TAcc* representing all accruals. Within each panel we report results for both continuous variables and decile rankings.

Consistent with Sloan [1996], we find that the coefficients on cash flows and accruals are both between 0 and 1, and that the coefficient on accruals is consistently lower than the coefficient on cash flows. In all regressions, we can easily reject the null of equality on the cash flow and accrual coefficients in favor of the alternative that the coefficient on accruals is less than the coefficient on cash flows. The results obtained using continuous variables indicate that the accrual versus cash flow coefficient differential is greatest using *TAcc*, while the results obtained using decile rankings indicate that the differential is greatest using *WCAcc*. Further analysis (not reported) reveals that a small number of outliers caused by non-recurring items, such as gains and losses and restructuring charges explained the large differential for *TAcc* using the continuous variables. Note that because such non-recurring accruals are usually explicitly flagged as non-recurring in the income statement, investors are more likely to anticipate their non-recurring nature. We are more interested in understanding whether investors appreciate the more rapid mean reversion attributable to the regular working capital accruals captured in *WCAcc*. Thus, we anticipate that the *WCAcc* variable will have greater predictive ability with respect to future stock returns, because investors are less likely to anticipate the relatively high rates of mean reversion in these accruals.

The results in table 2 are illustrated graphically in figure 1 using the *EBITDA*, *WCAcc*, and *WCCF* definitions of earnings, accruals, and cash flows. Figure 1a reports the time-series behavior of earnings for portfolios of high and low earnings firm-years. Firms are assigned to decile portfolios based on the magnitude of earnings in year 0. The graph illustrates that earnings are slowly mean reverting, and that mean reversion is far from complete even after five years. Figures 1b and 1c report the time-series behavior of earnings for portfolios of high and low accrual and cash flow firm-years, respectively. Figure 1b illustrates that mean reversion in earnings is rapid for portfolios of firms formed on accruals. There is extreme reversion in the first year, and mean reversion is almost complete after three years. In contrast, figure 1c shows evidence of much slower mean reversion in earnings for portfolios formed on cash flows. We next move on to test whether investors anticipate the more rapid earnings mean reversion induced by the accrual component of earnings.

Table 3 reports future stock returns for portfolios of firm-years formed based on the magnitude of accruals. Return measurement begins four months after the end of the fiscal year in which accruals are measured, to ensure that the accrual information would have been available to investors. Returns are then tracked over the subsequent three-year period. If investors do not anticipate the more rapid mean reversion in earnings associated with extreme accruals, then we expect that the high accrual firms (that experience subsequent earnings declines) will have poor stock price performance. Conversely, the low accrual firms (that experience subsequent

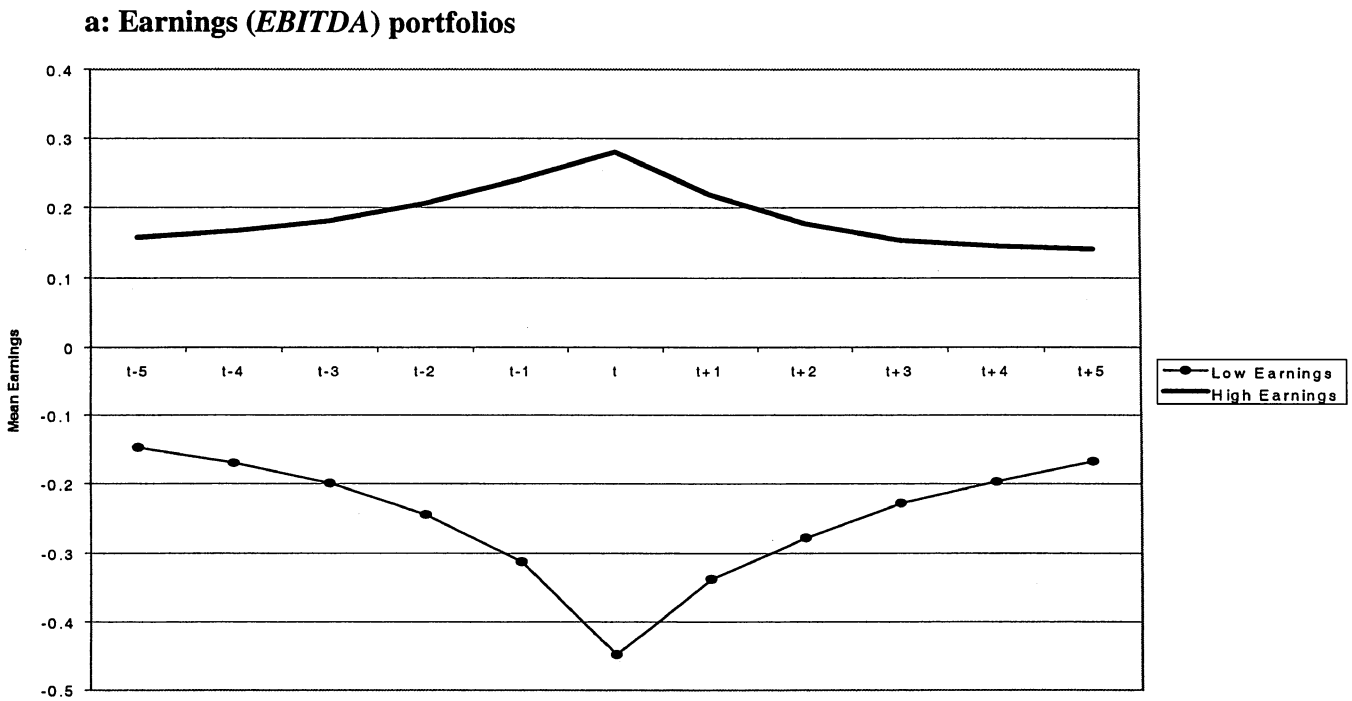

FIG. 1.—Time series properties of earnings for deciles of earnings, accruals, and operating cash flows.[a]

[a] The figures present mean earnings relative to portfolio formation year *t* based on rankings of *EBITDA*, *WCAcc*, and *WCCF*. Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on *EBITDA*, *WCAcc*, and *WCCF* rankings. *EBITDA* is earnings before interest, taxes, depreciation and amortization (#13); *WCAcc* is working capital accruals, calculated using changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307); and *WCCF* is equal to the difference between *EBITDA* and *WCAcc*, an estimate of cash flows attributable to recurring operations. All variables are scaled by average total assets. The figures present mean earnings for deciles 1 ('Low') and 10 ('High') for each ranking. The sample size in year *t* is 66,762 firm-years spanning 1988–1998.

b: Accruals (*WCAcc*) portfolios

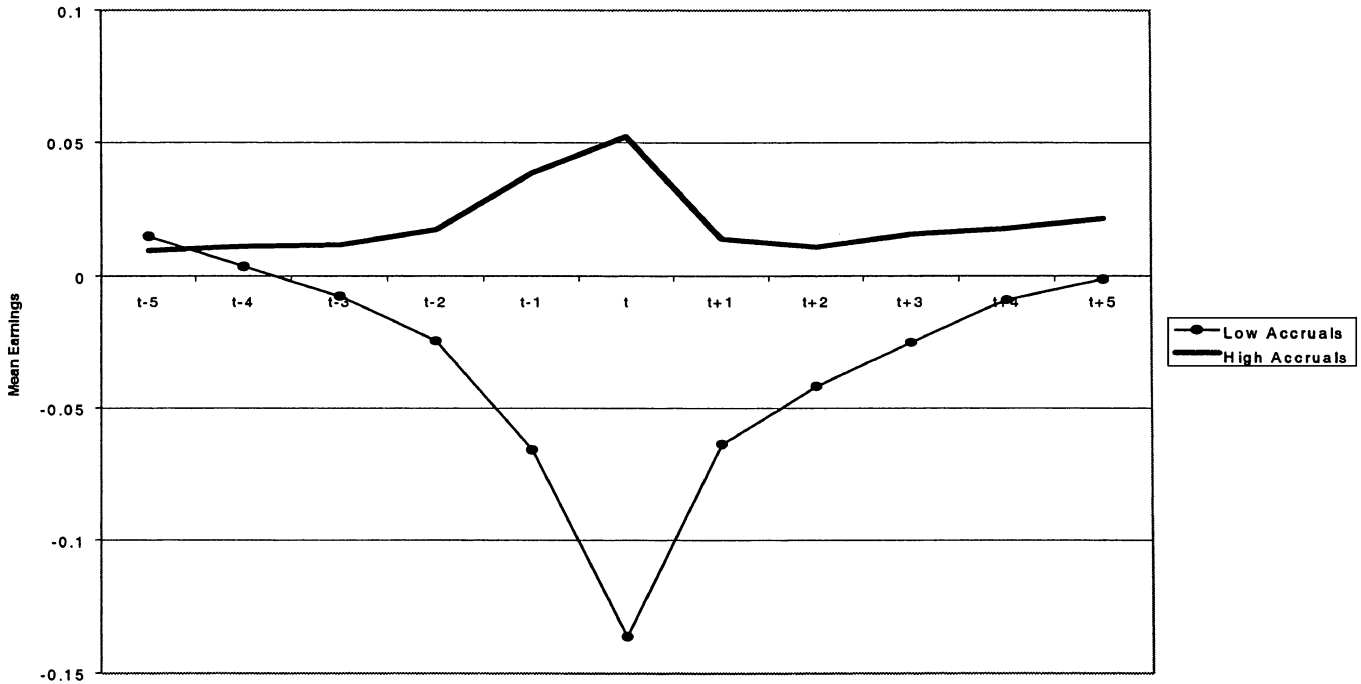

FIG. 1.—*Continued*

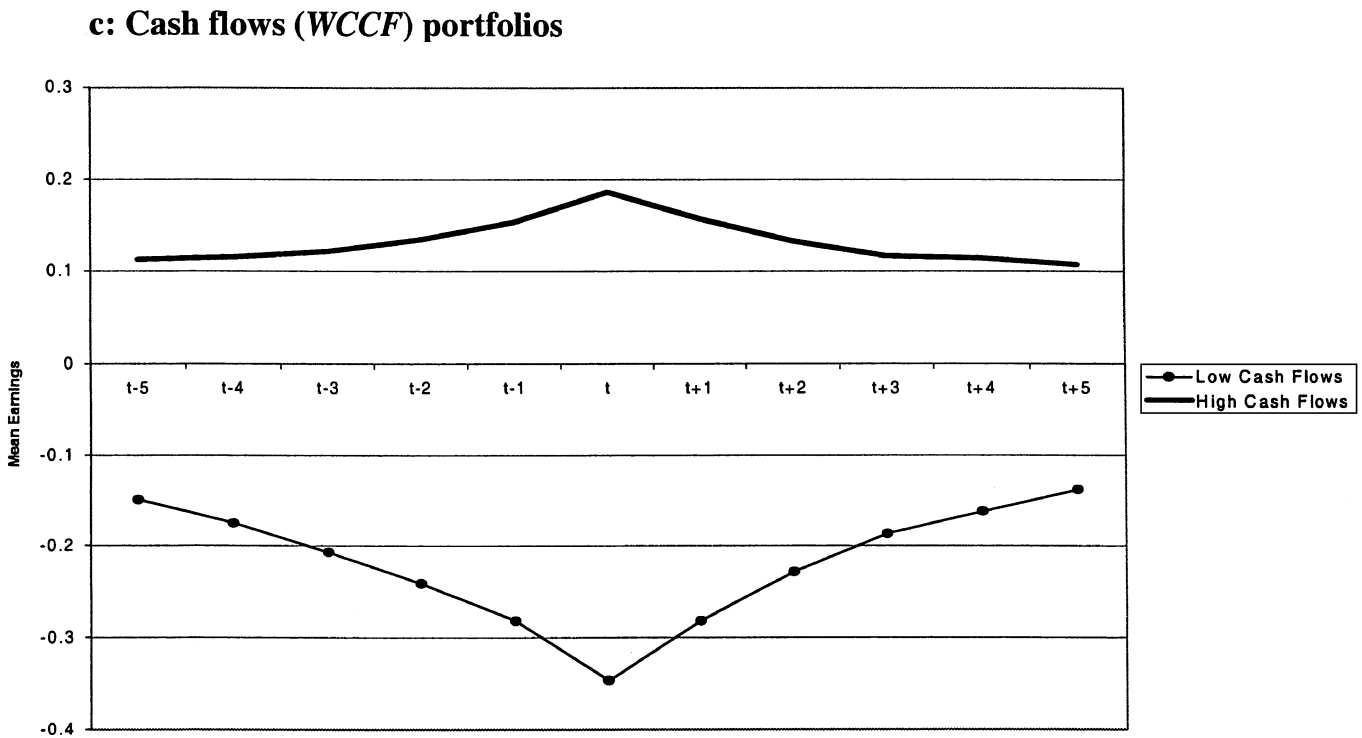

FIG. 1.—*Continued*

TABLE 3
Annual Mean Returns for Accruals Portfolios[a,b]

Panel A: Portfolios constructed on *WCAcc*

	Raw Returns			*Market-Adjusted Returns*			*Size-Adjusted Returns*		
Rank	$t+1$	$t+2$	$t+3$	$t+1$	$t+2$	$t+3$	$t+1$	$t+2$	$t+3$
Low	0.203	0.249	0.217	0.037	0.076	0.038	0.048	0.073	0.025
2	0.211	0.229	0.235	0.049	0.060	0.060	0.064	0.065	0.048
3	0.183	0.185	0.227	0.022	0.018	0.056	0.038	0.021	0.049
4	0.161	0.165	0.187	−0.002	0.000	0.019	0.010	0.006	0.017
5	0.141	0.158	0.176	−0.019	−0.009	0.007	−0.002	−0.001	0.004
6	0.154	0.173	0.153	−0.006	0.006	−0.018	0.013	0.017	−0.025
7	0.152	0.175	0.213	−0.009	0.008	0.038	0.011	0.016	0.036
8	0.146	0.192	0.185	−0.017	0.024	0.012	0.000	0.033	0.010
9	0.117	0.149	0.219	−0.047	−0.017	0.041	−0.031	−0.012	0.033
High	0.080	0.147	0.210	−0.082	−0.023	0.034	−0.063	−0.018	0.025
N[c]	35,956	28,608	22,429	35,956	28,608	22,429	35,107	27,951	21,932

Panel B: Portfolios constructed on *TAcc*

	Raw Returns			*Market-Adjusted Returns*			*Size-Adjusted Returns*		
Rank	$t+1$	$t+2$	$t+3$	$t+1$	$t+2$	$t+3$	$t+1$	$t+2$	$t+3$
Low	0.196	0.229	0.228	0.032	0.057	0.049	0.044	0.065	0.036
2	0.197	0.238	0.222	0.033	0.067	0.050	0.050	0.064	0.038
3	0.186	0.190	0.220	0.021	0.023	0.043	0.038	0.025	0.031
4	0.168	0.205	0.198	0.008	0.039	0.027	0.021	0.039	0.026
5	0.160	0.154	0.166	0.000	−0.012	−0.003	0.015	−0.006	−0.005
6	0.160	0.186	0.192	0.000	0.021	0.021	0.016	0.031	0.017
7	0.159	0.164	0.209	−0.001	−0.004	0.036	0.017	0.008	0.035
8	0.131	0.163	0.192	−0.031	−0.004	0.018	−0.013	0.005	0.012
9	0.105	0.170	0.177	−0.057	0.002	0.003	−0.037	0.009	−0.003
High	0.088	0.124	0.228	−0.077	−0.044	0.051	−0.059	−0.035	0.042
N[c]	35,956	28,608	22,429	35,956	28,608	22,429	35,107	27,951	21,932

[a] Portfolios are formed based on two accruals measures. *WCAcc* is working capital accruals, calculated using changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307). *TAcc* is total accruals, the difference between *EBXI* and *TCF*, where, *EBXI* is income before extraordinary items (#123) and *TCF* is total cash flow from operations (#308). All variables are scaled by average total assets. Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on *WCAcc* or *TAcc*.

[b] Returns are calculated for three years after portfolio formation. Annual returns are calculated from the start of the fifth month subsequent to the fiscal year-end in which firms are assigned to portfolios. Market adjusted returns are calculated by deducting the value-weighted market portfolio from the raw returns. The size-adjusted returns are calculated by deducting the market returns for all firms in the size-matched decile, where size is measured as market capitalization.

[c] The sample size in each column represents the subsample of the initial *COMPUSTAT* sample (66,762 , 1988–1998) with available returns on the *CRSP* tapes. Individual portfolio sample sizes vary across portfolios from a low of 1,297 (year $t+3$) to a high of 3,845 (year $t+1$).

earnings increases) will have strong subsequent stock price performance. The results are consistent with this hypothesis. Panel A indicates that the return differential for *WCAcc* in the first subsequent year is at least 11% whether we use raw returns, market-adjusted returns, or size-adjusted returns. The return differential dissipates rapidly as we move out to year three, by which time the mean reversion induced by accruals has slowed considerably. Similar results are reported in Panel B, where accruals are measured using *TAcc*

Note, however, that the return differentials are generally somewhat smaller for *TAcc*. This is consistent with the idea that some of these accruals are explicitly flagged as non-recurring in the income statement, so that investors anticipate some of the subsequent earnings reversals attributable to these accruals. Given that *WCAcc* better captures accruals that are not explicitly flagged as non-recurring, we use this accruals variable exclusively in our remaining tests.[13]

Table 4 reports formal tests of market efficiency using the framework developed in Sloan [1996]. The purpose of these tests is to corroborate those presented in Sloan using a different sample and definition of accruals, and so we discuss them briefly.

$$EBITDA_{t+1} = \gamma_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + v_{t+1} \tag{1a}$$

$$Abnormal\ Return_{t+1} = \beta_0 + \beta_1 (EBITDA_{t+1} - \gamma_1^* WCAcc_t - \gamma_2^* WCCF_t) + \varepsilon_{t+1} \tag{2}$$

The implication of market efficiency highlighted by this model is that only unanticipated changes in *EBITDA* can be correlated with *Abnormal Return*. Market efficiency imposes the constraint that $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$. Market efficiency is easily rejected, and the results suggest that investors act "as if" they over-estimate the persistence of the accruals component of earnings. For example, in the panel A results, we find that investors should rationally use a persistence coefficient on accruals of $\gamma_1 = 0.624$, but instead, the expectations embedded in stock prices reflect a coefficient of $\gamma_1^* = 0.825$.[14] By contrast, the implied rational and implied persistence coefficients on cash flows are $\gamma_2 = 0.791$ and $\gamma_2^* = 0.769$, respectively, indicating that investors expectations correspond closely with the rational expectation. It appears that investors irrationally expect accruals to persist about as strongly as cash flows, when in fact they are significantly less persistent.

In summary, the preceding results provide two basic findings. First, we show that Sloan's [1996] results extend to the post-SFAS 95 period. Second, we show that we can improve on Sloan's results by focussing on working capital accruals. These accruals are not flagged explicitly as non-recurring in the income statement, and it appears to be these accruals that lead to mean reversion in earnings that is not anticipated by investors.

4.2 ANALYSTS' FORECASTS

In this section, we investigate whether analysts' forecasts of future earnings reflect the predictable mean reversion in earnings associated with high levels of accruals. Our tests are conducted using *IBES* consensus (median) forecasts of annual earnings. We measure analysts' expectations of earnings

[13] All results are very similar if we use *TAcc*.

[14] Note that the estimated coefficients in the forecasting regression reported in table 2 differ slightly from the coefficients in table 4, because the table 4 results are restricted to the sample for which *CRSP* returns data are available.

TABLE 4

Non-Linear Generalized Least Squares Estimation of the Stock Price Reaction to Information in the Accrual and Cash Flow Components of Current Earnings About Future Earnings[a]

$$EBITDA_{t+1} = \gamma_0 + \gamma_1 WCAcc_t + \gamma_2 WCCF_t + v_{t+1}$$

$$Abnormal\ Return_{t+1} = \beta_0 + \beta_1 (EBITDA_{t+1} - \gamma_0 - \gamma_1^* WCAcc_t - \gamma_2^* WCCF_t) + \varepsilon_{t+1}$$

Panel A: Regressions using actual financial statement values

Parameter	*Estimate*	*Asymptotic standard error*
γ_0	0.0004	0.0045
γ_1	0.624	0.0059
γ_1^*	0.825	0.0280
γ_2	0.791	0.0032
γ_2^*	0.769	0.0150
β_0	0.019	0.0007
β_1	1.422	0.0353
Test of market efficiency:	$\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$	
Likelihood ratio statistic	50.152	
Marginal significance level	<0.001	

Panel B: Regressions using decile rankings of financial statement values[b]

Parameter	*Estimate*	*Asymptotic standard error*
γ_0	0.023	0.0114
γ_1	0.172	0.0024
γ_1^*	0.277	0.0149
γ_2	0.396	0.0024
γ_2^*	0.349	0.0146
β_0	−0.193	0.0021
β_1	0.895	0.0288
Test of market efficiency:	$\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$	
Likelihood ratio statistic	61.668	
Marginal significance level	<0.001	

[a] The sample consists of 35,956 firm-years from 1988 to 1998. *EBITDA* is earnings before interest, taxes, depreciation and amortization (#13); *WCAcc* is working capital accruals, calculated using changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307); and *WCCF* is equal to the difference between *EBITDA* and *WCAcc*, an estimate of cash flows attributable to recurring operations. *EBITDA* and *WCAcc* are all scaled by average total assets. *Abnormal Return* is calculated as raw buy-hold return (inclusive of dividends and distributions) less the value-weighted market portfolio. The return cumulation period begins a full four months after fiscal year end.

[b] Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on each of the financial statement variables: *EBITDA* and *WCAcc*. The ranks variables are converted to a [0, 1] scale.

for the forthcoming fiscal year immediately following the release of fourth fiscal quarter earnings for the most recent fiscal year. We then stratify the sample based on the magnitude of accruals for the most recent fiscal year. If analysts incorporate the predictable mean reversion in earnings associated with accruals, then their forecast errors should not be a function of the magnitude of the most recent year's accruals. If they do not incorporate the information in accruals, then their forecast errors will be more negative (i.e., more optimistic) for firms with higher accruals. We also expect that their forecast errors will gradually correct themselves over the course of the

subsequent year, as they revise their forecasts in response to earnings reversals that are revealed through subsequent quarterly earnings announcements. Tests using analyst forecast errors are complicated by the fact that analysts' forecasts have historically been optimistically biased, resulting in negative average forecast errors (Barefield and Comiskey [1975]). Thus, our formal tests are restricted to predicting a negative relation between accruals and forecast errors.

Our basic results are illustrated graphically in figure 2. The graph plots analysts' forecast errors for the current year's earnings over the 12 months following the announcement of the prior year's results. The horizontal axis lists the number of months since the announcement of last year's results. The horizontal axis stops at 12, because most firms have announced their earnings for the current year within 12 months of the announcement of last year's results. The vertical axis lists the forecast error, defined as realized earnings less forecasted earnings all divided by price at the end of the first month. The graph plots the behavior of average forecast errors computed for portfolios consisting of firm-years in the highest and lowest deciles of accruals, respectively. We also plot the sample average forecast errors as a benchmark. The forecast errors are consistently negative for all portfolios at all points in time. This reflects the well-documented average over-optimism in analysts' forecasts during this time period. Consistent with our hypothesis, the forecast error for the high accrual portfolio is larger than the sample average forecast error, which is larger than the low accrual portfolio at all points in time. Moreover, the magnitude of the difference is greatest in month 1, and gradually declines as the year progresses. This pattern is consistent with our hypothesis that analysts do not initially anticipate the implications of the most recent year's accruals for the subsequent year's earnings. Moreover, analysts gradually appear to realize the implications of accruals for subsequent earnings as the year progresses. This latter effect probably is due to the gradual release of earnings information through quarterly earnings announcements and preannouncements.

Table 5 provides formal statistical tests of the relation between analysts' forecast errors and accruals. We regress the forecast errors on the decile accrual portfolio ranking assigned to the firm-year. Regressions are conducted for each of the 12 months between the announcement of last year's earnings and the announcement of the current year's earnings. The regression intercept, β_0, measures the average forecast error for a low accrual firm-year. The coefficient on the accrual rank, β_1, measures the average incremental forecast error for a high versus a low accrual firm-year. The intercept is significantly negative in month 1, indicating that even low accruals firms have over-optimistic forecasts. However, the magnitude of the over-optimism gradually declines over the next twelve months and is insignificant immediately before the announcement of annual earnings. The coefficient on the accrual portfolio rank is significantly negative in month 1, indicating that the degree of over-optimism is significantly greater for high accrual firms. The degree of over-optimism associated with high accruals also declines

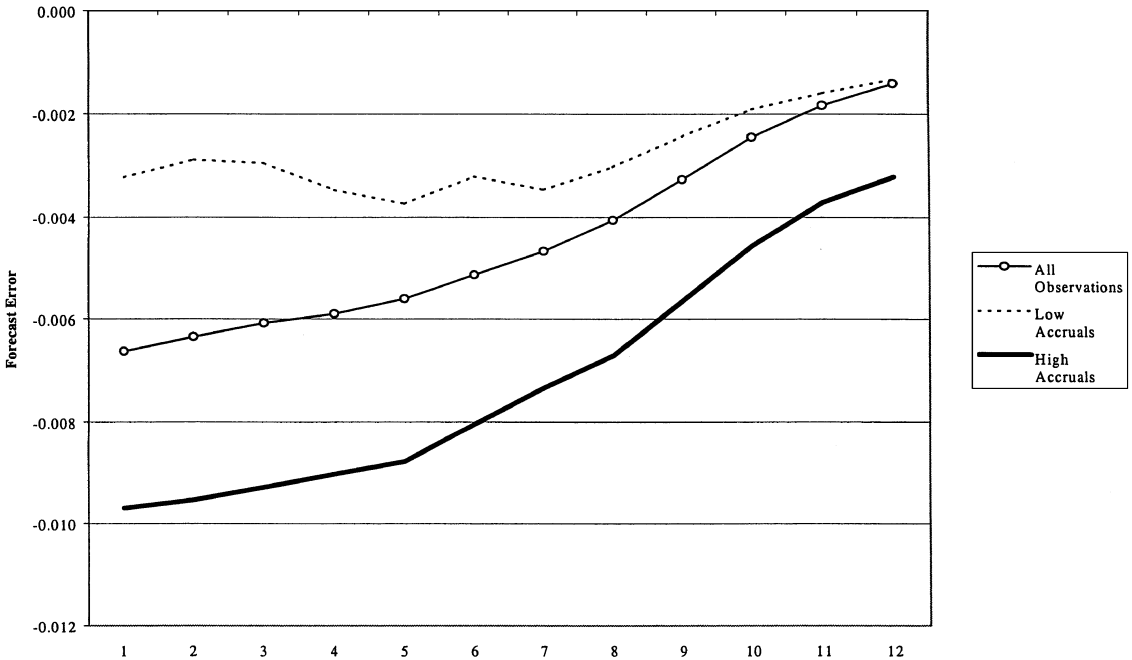

FIG. 2.—Analyst forecast errors for deciles of accruals portfolios in the 12 months following the previous year's earnings announcement.[a]

[a] This figure presents mean forecast errors for months leading up to the annual earnings number being forecast. Month 1 is the first month following the prior year's earnings announcement, month 2 is the second month following the prior year's earnings announcement, and so on. Monthly forecast errors are calculated as realized earnings minus forecasted earnings in month *t*, all scaled by stock price in month 1. Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on *WCAcc*. *WCAcc* is working capital accruals, calculated using changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307). The figure presents mean forecast errors for deciles 1 ('Low Accruals') and 10 ('High Accruals'), as well as the overall sample ('All Observations'). Sample sizes are approximately 1,700 firm-years per decile in each month, and constitute observations in the initial sample of 66,762 firm-years for which analyst forecasts are available in month 1 on the *IBES* summary statistics file.

TABLE 5

Ordinary Least Squares Regressions of Forecast Errors on Accruals Portfolios[a]

$$FError_{s,t+1} = \beta_0 + \beta_1 Port\ WCAcc_t + v_{t+1}$$

Month	β_0	$t(\beta_0)$	β_1	$t(\beta_1)$	R^2	N
1	−0.0033	−14.9**	−0.0063	−16.9**	.013	21,482
2	−0.0030	−13.5**	−0.0063	−17.2**	.014	21,360
3	−0.0029	−13.1**	−0.0061	−16.9**	.013	21,208
4	−0.0030	−13.9**	−0.0056	−15.9**	.012	21,030
5	−0.0029	−13.8**	−0.0052	−14.9**	.011	20,878
6	−0.0026	−12.7**	−0.0049	−14.4**	.010	20,700
7	−0.0025	−12.6**	−0.0043	−13.2**	.008	20,507
8	−0.0020	−10.4**	−0.0040	−12.6**	.008	20,269
9	−0.0015	−8.3**	−0.0034	−11.3**	.006	20,024
10	−0.0010	−5.8**	−0.0029	−10.1**	.005	19,685
11	−0.0005	−3.2*	−0.0026	−9.4**	.005	19,199
12	−0.0003	−2.0	−0.0021	−7.5**	.003	16,678

[a] The sample constitutes observations in the initial sample of 21,482 firm-years for which analyst forecasts are available in month 1 on the *IBES* summary statistics file. $FError_{s,t+1}$ is the monthly forecast error in month s following the announcement of year t earnings (i.e. prior year). Month s = 1 is the first month following the prior year's earnings announcement, month s = 2 is the second month following the prior year's earnings announcement, and so on. $FError_{s,t+1}$ is calculated as realized earnings for year $t+1$ less forecasted earnings in month s, scaled by stock price in month 1. *PortWCAcc* is the portfolio ranking of the firm-year based on *WCAcc* in year t, scaled to a [0,1] range. *WCAcc* is calculated using changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307).

* Denotes significance at the 0.005 level using a 2-tailed t-test.

** Denotes significance at the 0.0001 level using a 2-tailed t-test.

over the course of the twelve months. However, the coefficient is still significantly negative immediately before the announcement of earnings, indicating that part of accrual-related over-optimism remains until earnings have actually been announced.

The regression coefficient magnitudes provide some indication of the economic significance of the results. The Month 1 regression indicates that a low accrual firm has an average forecast error of −0.0033, while a high accrual firm has an average forecast error of −0.0096 (i.e., −0.0033 + −0.0063). To put these numbers into perspective, the forecast errors are scaled by price and the sample average price-to-earnings ratio is just over 20. Multiplying by an assumed price-earnings ratio of 20, these forecast errors translate into 6.6% and 19.2% of reported earnings, respectively.

In summary, the results in this section demonstrate that analysts' forecasts do not fully incorporate the predictable earnings reversals associated with extreme levels of accruals. Moreover, the magnitude of this effect is such that the forecast errors for high accrual firms are almost 20% of reported earnings.

4.3 AUDIT OPINIONS AND AUDITOR TURNOVER

Our final set of tests examines whether auditors signal the negative consequences associated with high accruals through their audit opinions or through auditor turnover. We begin this section by demonstrating that firms

with high accruals are more likely to be subject to SEC enforcement actions for GAAP violations. While these tests represent a relatively straightforward replication and extension of research in Dechow, Sloan, and Sweeney [1996], the tests are useful because they provide evidence that firms with high accruals are more likely to be violating GAAP. Given that the auditor's primary function is to provide an opinion as to whether the financial statements are prepared fairly in accordance with GAAP, we hypothesize that modified audit opinions and auditor turnover will be correlated with information that predicts GAAP violations. Our null hypothesis for audit opinions is that modified audit opinions are unrelated to the magnitude of accruals, because auditors do not incorporate information in accruals into their opinions. In addition to examining the contemporaneous association between audit opinions and accruals, we also examine subsequent audit opinions and auditor turnover. Our motivation for examining subsequent audit opinions is to see whether auditors only start issuing modified opinions when the negative consequences associated with high accruals subsequently begin to materialize. Our motivation for examining auditor turnover is based on prior evidence that auditors often resign or are fired by management before they get to the point of issuing a modified audit opinion. Thus, auditor changes provide an alternative method through which auditors can signal their concerns with a company's accounting.

Evidence on the relation between accruals and SEC enforcement actions is provided in table 6. In order to construct these tests, we review all *Accounting and Auditing Enforcement Releases* issued by the SEC and pertaining to our 1988–1998 sample period. Following Dechow, Sloan, and Sweeney [1996], we identify all enforcement actions alleging that firms have violated GAAP in a manner that leads to the overstatement of annual earnings.[15] We then link the GAAP violations with our sample of firm-years. Note that only four of the eleven years in our sample period overlap with the original Dechow, Sloan, and Sweeney paper, so our results serve as a replication and extension of their results.

The first panel of table 6 shows the distribution of alleged annual earnings overstatements. There are 78 overstatements during our eleven-year sample period.[16] Panel B reports the mean level of accruals for firms subject to SEC enforcement actions versus the rest of our sample firms. The mean level of accruals is significantly higher in firms subject to enforcement actions for both of our accrual measures. The economic significance of the results is quite striking, with an average accrual differential between the two sets of firms of about 7–8% of total assets (depending on the accruals measure).

[15] Many enforcement actions relate only to the manipulation of quarterly earnings. We exclude these from our sample, since the effect of these manipulations is reversed in a subsequent quarter and has no impact on annual earnings.

[16] The absence of SEC enforcement actions during the latter years of our sample (1995–1998) is due to the long lag between the date the GAAP violation occurs and the date the action is disclosed by the SEC (see table 4 in Feroz, Park, and Pastena [1991]).

TABLE 6

Analysis of Accruals of Firms Subject to SEC Enforcement Actions[a,b]

Panel A: Distribution by year of firms subject to SEC enforcement actions

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Total
Non-SEC firms	933	4,934	5,119	5,082	5,194	5,463	5,822	6,254	6,959	7,626	7,676	5,622	66,684
SEC firms	3	10	18	7	19	12	6	3	0	0	0	0	78

Panel B: Mean difference in accruals for firms with SEC enforcement actions

	Accrual Measure	
	WCAcc	***TAcc***
Non-SEC firms	0.0176	−0.0602
SEC firms	0.0889	0.0225
Test of mean difference	−4.48	−4.63
significance level	0.0001	0.0001

Panel C: Distribution of SEC enforcement actions across accrual portfolios[c]

	PortWCAcc									
	1	2	3	4	5	6	7	8	9	10
Non-SEC firms	6,669	6,667	6,668	6,670	6,667	6,668	6,669	6,668	6,670	6,668
SEC firms	4	6	4	5	2	6	4	10	9	28
Chi-square test		64.939								
significance level		0.001								

[a] The sample consists of 66,762 firm years from 1988 to 1998. Accruals are measured in two ways. *WCAcc* is calculated using changes in working capital accounts from the statement of cash flows (# 302, 303, 304, 305 and 307). *TAcc* is total accruals, calculated as the difference between *EBXI* and *TCF*, where, *EBXI* is Income before extraordinary items (#123), *TCF* is total cash flow from operations (#308). All variables are scaled by average total assets.

[b] Our sample is selected via a reading of the SEC Accounting and Auditing Enforcement Releases from 1987–1998.

[c] Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on *WCAcc*. Decile 1 is the lowest accrual portfolio.

Finally, in panel C, we report the distribution of SEC enforcement actions across accrual portfolios. Over a third of the enforcement actions are concentrated in the highest accrual portfolio and a chi-square test confirms that enforcement actions are significantly concentrated in the high accrual portfolios. In short, table 6 clearly demonstrates that firm-years with high accruals are more likely to be subject to SEC enforcement actions for GAAP violations involving earnings overstatements.

Our tests of the relation between accruals and audit opinions are presented in table 7. These tests are based on regressions of an audit opinion indicator variable on accrual portfolio rank (*PortWCAcc*) and a variety of control variables. The audit opinion variable (*Unclean*) is assigned the value of 0 for a standard unqualified opinion and the value of 1 for any other modified opinion, including qualified, adverse or unqualified with explanatory language (e.g., ability to continue as a going concern). Finer partitions of the audit opinion might be possible based on the nature and severity of the opinion. However, for our main empirical tests, we use the simple partition of coding the opinion as either completely "clean," or modified in some way.[17] We estimate the regression using a logit model, because of the dichotomous nature of the dependent variable. Our controls are based on variables identified in previous research that has modeled audit opinions (e.g., Dopuch, Holthausen and Leftwich [1987]; Krishnan and Krishnan [1996]). The control variables that we use are firm size (a control for stability), cash from operations (a control for performance that is unrelated to accrual accounting), leverage (a control for long-term solvency) and times-interest-earned (a control for short-term solvency and liquidity). Detailed definitions for the control variables are provided in table 7. *PortWCAcc* is expected to load up with a positive coefficient if higher accruals result in a greater likelihood of a modified audit opinion.

The results in the first column of table 7 indicate that all the control variables except for leverage load up statistically significantly with the hypothesized sign. Additional tests (not reported) indicate that the explanatory power of leverage is subsumed by the times-interest-earned variable. Surprisingly, *PortWCAcc* loads up with a significantly negative coefficient. This result indicates that high levels of accruals are associated with a greater frequency of clean audit opinions. Apparently, auditors interpret the higher earnings associated with higher accruals as a positive sign, and are less likely to issue modified opinions in such cases.

The remaining three columns of table 7 examine audit opinions over the subsequent three years. The audit opinion and control variables are each measured contemporaneously over the next three years, respectively. *PortWCAcc* continues to measure the decile accrual ranking as of year 0.

[17] We also replicated our results using an audit opinion indicator variable taking the value of 0 for both straight unqualified opinions and opinions that are unqualified with explanatory language and 1 for any other kind of modification. All of the key inferences in our audit opinion tests remain unchanged.

TABLE 7

Logit Regression of Audit Opinion on Accrual Portfolios and Control Variables[a,b]

$$Unclean_t = \eta_0 + \eta_1 TA_t + \eta_2 CFO_t + \eta_3 LEV_t + \eta_4 TIE_t + \eta_5 PortWCAcc_0$$

Variable[c]	Predicted Sign	Year (p-value in parentheses)			
		$t = 0$	$t + 1$	$t + 2$	$t + 3$
Intercept	−	−1.429	−1.640	−1.674	−1.520
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
TA	−/+	0.126	0.134	0.139	0.136
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
CFO	−	−0.777	−0.128	−0.192	−0.216
		(0.0017)	(0.5668)	(0.4269)	(0.4010)
LEV	+	0.008	0.014	0.026	0.029
		(0.5363)	(0.3432)	(0.1115)	(0.1132)
TIE	−	−0.011	−0.011	−0.012	−0.012
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
Port WCAcc	+	−0.466	−0.206	−0.032	−0.021
		(0.0001)	(0.0018)	(0.6484)	(0.7716)
#*Clean*		14,825	12,721	10,617	8,678
#*Unclean*		5,027	4,469	4,096	3,821
Total N[d]		19,852	17,190	14,713	12,499
Model χ^2		435.7***	364.2***	342.5***	365.5***
% concordant pairs(+tied)		60.3%	60.0%	60.2%	60.2%

[a] Regressions are performed for the year firms are assigned to portfolios, year 0, and for the subsequent three years. All control variables in the regressions are contemporaneous with the dependent variable. The *t* subscripts refer to the year of the opinion (and control variables) relative to the year of portfolio formation (year 0).

[b] Portfolios are formed using the refined accrual measure, *WCAcc*, working capital accruals, is calculated as the changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307). Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on *WCAcc*. Port $WCAcc_0$ is the portfolio ranking of *WCAcc* in year 0, converted to a [0, 1] scale.

[c] $Unclean_t$ is an indicator variable for audit opinion, and is assigned the value of 0 for an unqualified opinion in year *t* and the value of 1 for any other opinion, including qualified, adverse or unqualified with explanatory language (e.g., ability to continue as a going concern). The control variables are:

$$TA_t = \log(Assets_t)$$

$$CFO_t = \frac{2 \times TCF_t}{Assets_t + Assets_{t-1}}$$

$$LEV_t = \frac{Debt_t}{Equity_t}$$

$$TIE_t = \frac{OpEarn_t}{IntExp_t}$$

Assets is item #6, Total Assets. *TCF* is item #308, Net Cash Flow-Operating Activities. *OpEarn* is item #178, Operating Income After Depreciation. *IntExp* is item #15, Interest Expense. *Debt* is the sum of items #9 and #34 (Debt in Current Liabilities and Long Term Debt). Equity is item #216, Total Shareholders' Equity.

[d] The sample constitutes observations in the initial sample of 66,762 firm-years for which required control variables are also available on the *COMPUSTAT* annual database.

***Denotes significance at the 0.001 level.

The objective of these regressions is to see whether auditors only begin to modify their opinions in response to high accruals when they finally begin to translate into subsequent earnings reversals. The results indicate that the coefficient on *PortWCAcc* remains negative, but declines in economic and statistical significance. Thus, it appears that auditors are less likely to issue clean audit opinions to firms with high accruals once the subsequent earnings reversals and allegations of GAAP violations begin to materialize. However, there is no evidence that auditors' modify their opinions to alert investors to the increased incidence of GAAP violations associated with high accruals on a timely basis.

Table 8 examines the possibility that auditor changes signal the greater likelihood of GAAP violations associated with high accruals. Our tests are based on regressions of an auditor change indicator variable on *PortWCAcc* and a variety of control variables. The audit change variable (Δ *Auditor*) is assigned the value of 0 for no auditor change during the year and 1 if an auditor change occurs during the year. We again estimate the regression using a logit model, because of the dichotomous nature of the dependent variable. Our controls are based on variables identified in previous research that has modeled audit opinions (e.g., Johnson and Lys [1990] and DeFond and Subramanyam [1998]). The control variables that we use are absolute change in firm size (a control for change in the scale of operations), change in new financing (a control for change in the use of external financing), change in times-interest-earned (a control for change in risk of financial distress) and change in cash from operations (a control for change in performance that is unrelated to accrual accounting). Detailed definitions for the control variables are provided in table 8. *PortWCAcc* is expected to load up with a positive coefficient if higher accruals result in a greater likelihood of an auditor change.

The results in the first column of table 8 indicate that all the control variables load up statistically significantly with the hypothesized sign. As in the audit opinion regressions, *PortWCAcc* loads up with a significantly negative coefficient. This result indicates that high levels of accruals are associated with a lower frequency of auditor changes. Apparently, auditors are much more likely to continue serving clients reporting extremely high accruals. This is opposite to what one would expect if auditors resigned to avoid the potential loss of reputation and the lawsuits associated with the increased likelihood of GAAP violations.

The remaining three columns of table 8 examine auditor changes over the subsequent three years. The auditor change and control variables are each measured contemporaneously over the next three years, respectively. *PortWCAcc* continues to measure the decile accrual ranking as of year 0. The objective of these regressions is to see whether auditor changes occur in response to subsequent accrual-induced earnings reversals and the SEC allegations of GAAP violations. The results indicate that the coefficient on the accrual portfolio ranking gradually increases and turns positive (but is not statistically significant) by the third year following the accrual-ranking

TABLE 8

Logit Regression of Auditor Change on Accrual Portfolios and Control Variables[a,b]

$$\Delta Auditor_t = \phi_0 + \phi_1 \Delta Size_t + \phi_2 \Delta Fin_t + \phi_3 \Delta TIE_t + \phi_4 \Delta CFO_t + \phi_5 PortWCAcc_0$$

Variable[c]	Predicted Sign	Year (p-value in parentheses) $t=0$	$t+1$	$t+2$	$t+3$
Intercept	−	−2.568	−2.800	−2.925	−2.999
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
$\lvert\Delta Size\rvert$	+	0.073	0.146	0.178	0.186
		(0.0001)	(0.0001)	(0.0001)	(0.0001)
ΔFin	+	0.037	0.098	0.084	0.107
		(0.0571)	(0.0142)	(0.0773)	(0.0491)
ΔTIE	−	−0.003	−0.005	−0.005	−0.006
		(0.0199)	(0.0052)	(0.0127)	(0.0031)
Δ *CFO*	−	−0.360	−0.457	−0.292	−0.378
		(0.0011)	(0.0029)	(0.0951)	(0.0594)
PortWCAcc	+	−0.184	−0.218	−0.044	0.120
		(0.0463)	(0.0443)	(0.6994)	(0.3347)
#*Change*		1,645	1,067	1,004	868
#*No Change*		21,489	17,312	16,445	14,034
Total N[d]		23,134	18,379	17,449	14,902
Model χ^2		137.2***	126.0***	90.9***	82.5***
% concordant pairs (+tied)		60.8%	60.7%	60.3%	60.0%

[a] Regressions are performed for the year firms are assigned to portfolios, year 0, and for the subsequent three years. All control variables in the regressions are contemporaneous with the dependent variable. The *t* subscripts represent the year of the auditor change (and control variables) relative to the year of portfolio formation (year 0).

[b] Portfolios are formed using the refined accrual measure, *WCAcc*, working capital accruals, is calculated as the changes in working capital accounts from the statement of cash flows (#302, 303, 304, 305 and 307). Firm-year observations are ranked annually and assigned in equal numbers to decile portfolios based on *WCAcc*. *PortWCAcc* is the portfolio ranking of *WCAcc* in year 0, converted to a [0, 1] scale.

[c] $\Delta Auditor_t$ is an indicator variable assigned a value of 0 for no auditor change during year t and 1 if an auditor change occurs during year t. The control variables are:

$$\Delta Size_t = \frac{Assets_t - Assets_{t-3}}{Assets_{t-3}}$$

$$\Delta Fin_t = \frac{\sum_{\tau=1}^{3} EqIss_{t-\tau} + \sum_{\tau=1}^{3} DebtIss_{t-\tau}}{Assets_{t-3}}$$

$$\Delta CFO_t = \frac{TCF_t - TCF_{t-3}}{Assets_{t-3}}$$

$$\Delta TIE_t = TIE_t - TIE_{t-3}$$

$$TIE_t = \frac{OpEarn_t}{IntExp_t}$$

Assets is item #6, Total Assets. *TCF* is item #308, Net Cash Flow–Operating Activities. *OpEarn* is item #178, Operating Income After Depreciation. *IntExp* is item #15, Interest Expense. *EqIss* is item #108, Sale of Common and Preferred Stock (statement of cash flows). *DebtIss* is item #111, Long Term Debt Issuance (statement of cash flows).

[d] The sample constitutes observations in the initial sample of 66,762 firm-years for which required control variables are also available on the *COMPUSTAT* annual database.

***Denotes significance at the 0.001 level.

year. Thus, it appears that the earnings reversals and allegations of GAAP violations that occur in the years following high accruals are characterized by an increased likelihood of auditor turnover. However, in the high accrual years, during which the GAAP violations actually occur, there is no evidence that auditor changes signal these problems to investors.[18]

5. *Conclusions*

Firms with high accruals experience subsequent reductions in earnings and are more likely to be subject to SEC enforcement actions for GAAP violations. In this paper, we show that analysts do not anticipate the earnings reductions in their earnings forecasts. Additionally, auditors do not signal the greater likelihood of GAAP violations through their audit opinions or through increased auditor turnover. Previous research has demonstrated that stock prices act "as if" investors do not anticipate the negative future consequences associated with high accruals. Our findings reinforce this interpretation by demonstrating that even professional investment intermediaries do not inform investors about the negative future consequences associated with high accruals.

Our results add to the growing body of evidence pointing to the conclusion that the manipulation of accruals can lead to temporary resource misallocation. That is not to say that other systems, such as cash accounting, would result in better resource allocation. It does, however, undermine the role of the efficient market hypothesis, on which academics have relied on to play down many of the controversial features of the accrual accounting system that seem to preoccupy managers and investors. For example, the evidence is consistent with the idea that earnings managers can temporarily manipulate their firms' stock prices. Indeed, recent research suggests that firms successfully use earnings management to increase their stock prices during equity offerings (see Rangan [1998] and Teoh, Welch, and Wong [1998]).

These findings provide opportunities for future research. For example, it would be useful to gain additional insights into the extent to which the accrual-induced earnings reversals are due to intentional earnings management versus neutral application of the GAAP accounting system.

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[18] We also estimated modified specifications of the audit opinion and auditor change regressions that include an indicator variable for whether the firm-year was the subject of an SEC enforcement action for an alleged GAAP violation resulting in the overstatement of earnings. This additional variable was included as both a main effect and as an interactive effect with the *PortWCAcc* variable. Both terms are insignificant in the audit opinion regressions, indicating that audit opinions do not alert investors to the earnings overstatements that result in the alleged GAAP violations. In the auditor change regressions, only the main effect is significant and only in year $t+2$, indicating that auditors are more likely to change two years following the alleged earnings overstatement (which corresponds with the period when the allegations generally are being made).

Preliminary research by Xie [2001] suggests that earnings management is responsible for the reversals. It would also be useful to establish whether analysts and auditors lack the necessary sophistication to anticipate the accrual-induced earnings reversals, or whether they collude with management to temporarily inflate expectations of future earnings. Finally, we should seek a better understanding of why investors appear to be "fooled" by the predictable, accrual-induced earnings reversals. The primary purposes of SFAS 95 was to make the cash flows underlying earnings more transparent to investors. However, our results suggest that investors appear to anticipate the earnings reversals no more effectively than in the pre-SFAS 95 era.

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