# The Valuation Consequence of Accounting Changes: A Multi-Year Examination

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*We examine the valuation impact of changes in the accounting procedures and estimates underlying reported financial data in the year of the change as well as in the postchange years. Since most accounting changes have undisclosed effect on financial variables in subsequent years in addition to the earnings impact disclosed in the year of the change, an accounting change might be motivated by its long-term valuation effect, even if investors are cognizant of the initial earnings impact and fully account for it in the year of the change. This conjecture is empirically examined for the first time in this study.*

*Our tests are based on a cross-sectional examination of the valuation impact of the earnings effect of accounting changes in the year of the change and a longitudinal examination of the behavior of returns in the postchange years. We also provide descriptive evidence indicating that earnings management is a managerial motive for changing accounting techniques. Cross-sectionally, for income-increasing accounting changes, our results show that investors' valuations seem to reflect a concern for the reduced quality of earnings, as reflected by smaller earnings response coefficients and $R^2$s. However, the decline is not attributable specifically to the earnings effect of the accounting change. Similarly, the earnings effect of income-decreasing changes does not have valuation impact in the year of the accounting change.*

*Although investors appear to largely ignore the accounting changes in the year they are made, our longitudinal test does show that firms undertaking accounting changes experience different long-term returns relative to other firms in the postchange period. How-*

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*ever, income-increasing accounting changes are associated with negative valuation changes in the postchange period, rather than the positive impact expected from the conjecture stated above. Over the five years following the year of the accounting change, abnormal returns of income-decreasing firms exceed those of income-increasing firms substantially, with the latter firms experiencing large negative returns over the period. We demonstrate a trading rule that, ex post, exploits the information contained in the accounting changes to yield large abnormal stock returns. The results suggest that income-increasing accounting changes are perhaps the first visible sign indicating other hidden, fundamental problems that get revealed in subsequent years.*

## 1. Introduction

The issue of the valuation impact of accounting changes is related to the fundamental question: why do managers voluntarily change accounting techniques? Substantive reasons, such as changes in the economic environment of firms, probably account for some accounting changes.[1] Other accounting changes may be motivated by various contractual arrangements, such as management compensation and loan covenants.[2] Yet another frequently mentioned motivation for accounting changes, of particular interest to policy-makers and regulators, is managers' desire to influence the valuation of the firm's securities. Early market-based research appeared to discredit this motivation on the premise that investors (in efficient markets) "see through the numbers," so that "cosmetic" (i.e., no cash-flow impact) accounting changes would be ignored by investors. This sweeping conclusion concerning investor rationality has since been challenged by many researchers in finance and accounting, calling for a reexamination of this issue.[3]

Even if investor rationality as a working assumption is accepted, it should be noted that past studies on accounting changes restricted their examination to the *year* of the change, often over a brief interval around the announcement of the change.[4] This left unexplained the possibility that managers engaged in accounting changes attempt to affect subsequent years'

1. Examples include tax or inflation rate changes leading to the adoption of LIFO (Lee and Petruzzi [1989]), and a decrease in production rate leading to the assumption of longer lives for depreciable assets (Dharan and Mascarenhas [1992]).

2. Examples include managers' desire to affect their compensation (Healy [1985]), or to overcome debt constraints or other contractual limitations (Daley and Vigeland [1983]).

3. See, for example, the discussion in Lev and Ohlson (1982, Sect. 2) and Hand (1990).

4. For example, Ball (1972).

security valuations. Such a "subsequent years" functional fixation rationale has been advanced by researchers and practitioners. For example, a veteran financial analyst writes: "[Managers] know that a switch from conservative to liberal accounting can pay off. This is because changes in accounting that serve to elevate reported share earnings have a *permanent* uplifting effect that becomes embedded in the stock price of an individual security" (O'glove [1987, pp. 168–169; emphasis added]). Palepu (1987) notes in a case study on accounting changes: "The company knew that the analysts would adjust the company's reported numbers for the effect of the accounting changes in the year of the change. But given the difficulties in tracing the effects of these changes in subsequent years, management did not believe that profits in subsequent years would be adjusted" (p. 88).

Lending some support to the "subsequent years" conjecture is the fact that, under current disclosure standards (AU420, AU508), the earnings effect of accounting changes is not disclosed in the postchange years' financial statements.[5] However, this does not necessarily mean that analysts do not discount the earnings effect of past accounting changes. As a counterexample to the "subsequent years" conjecture, consider this quote from *The Wall Street Journal* (December 14, 1989, p. A8): "And last year's earnings [of General Motors] wouldn't have set a record if GM hadn't made five favorable accounting changes in the two previous years." Given the strong anecdotal evidence on both sides of the argument, an empirical study of the "subsequent years" valuation impact of accounting changes should indeed be of interest.

Our tests include cross-sectional regressions to examine the valuation consequence of accounting changes in the year of the change, and a longitudinal "buy-and-hold" test to examine the valuation consequence in the postchange years. The regression results for income-increasing accounting changes show that investors' valuation seems to reflect a concern for the reduced quality of earnings, where quality can be defined in terms of earnings persistence (Lev and Thiagarajan [1991]). Specifically, the active "earnings management" by income-increasing change firms, which we document, negatively affects the relationship between stock returns and earnings changes as reflected by reduced earnings response coefficients and $R^2$s in the year of the accounting change relative to income-decreasing change firms. However, the decline in these measures is not attributable specifically

5. For example, in 1987 General Motors increased the estimated useful lives of assets and reported its earnings impact ($1.237 billion from reduced depreciation charge, compared to a reported net income of $3.551 billion). GM's 1988 annual report included a footnote referring to the 1987 change but did not provide the impact of the change on 1988 earnings. In the following year (1989), the 1987 change was not mentioned in the annual report.

to the earnings impact of the accounting change.[6] In other words, it is the accounting change "event," as much as its earnings magnitude, that seems to affect investor interpretation of reported earnings for income-increasing change firms.

As for the "subsequent years" hypothesis, we do find significant and systematic abnormal returns for portfolios selected on the basis of accounting changes and held for up to five years, but interestingly the results are opposite of what one would expect from the "subsequent years" conjecture. Specifically, using Dimson and Marsh's (1986) methodology to control for size-related returns, we show that excess returns of income-decreasing (e.g., a switch to LIFO) accounting change firms exceed those of income-increasing (e.g., extending the useful asset lives estimate) change firms by substantial amounts over the five years following the year of the accounting change.

This finding, reported here for the first time, has obvious implications for market efficiency issues. We demonstrate a trading rule that exploits the information contained in the accounting changes to yield large excess stock returns. Thus income-increasing accounting changes, rather than leading to increased excess stock returns (as postulated by the "subsequent years" hypothesis), actually portend falling stock prices and bad times. This suggests that income-increasing accounting changes are perhaps the first visible sign indicating other, hidden, fundamental problems that get revealed in subsequent years.[7] It is also consistent with the findings of DeAngelo, DeAngelo, and Skinner (1992), among others, that accounting changes made by managers of financially distressed companies primarily reflect "acknowledgement of their firms' financial troubles."[8]

## 2. Sample

A variety of data bases were used to identify discretionary accounting change firms: *Disclosure*, the National Automated Accounting Research System (NAARS) data base, and *Accounting Trends and Techniques* (*AT&T*), an annual publication of the AICPA. Unlike *AT&T*, *Disclosure* and NAARS permit searching for accounting changes by keyword.[9] The

6. This is indicated by the fact that the coefficient for the earnings impact of accounting change is insignificant in cross-sectional regressions.

7. The case of International Business Machines Corporation provides an example. Discussing the significant income-increasing accounting changes that were made by IBM in the mid-1980s as its business started to slow, an article in *The Wall Street Journal* (April 7, 1993) states: "IBM may have helped delay its day of reckoning with some surprisingly aggressive moves."

8. Also see Lilien, Mellman, and Pastena (1988).

9. Many previous studies mainly used *Accounting Trends and Techniques* to identify accounting changes; see Ball (1972), Harrison (1977), Abdel-khalik and McKeown (1978), Moses (1987), and Harrison and Grudnitski (1987). NAARS and *Disclosure*, not available to the earlier studies, have a much broader coverage.

sample includes both accounting "principle" changes and accounting "estimate" changes.[10] The year 1979 was chosen as the earliest year to exclude the very large number of LIFO changes that occurred during 1974–78.[11] For each identified firm, information on the type of accounting change and its effect on annual earnings was obtained from the firm's annual report.

Firms that provided no information on the current year earnings effect were deleted from the sample, as well as utilities and firms with incomplete monthly return data for a two-year period after the accounting change. For firms with multiple accounting changes within four years, only the first change was retained to prevent overrepresentation in longitudinal buy-and-hold tests. Firms making both income-decreasing and income-increasing accounting changes in the same year were also excluded to prevent their arbitrary classification in subgroup tests. This yielded a final sample of 285 accounting changes, made by 271 firms.[12] For convenience, the 285 changes are referred to in the rest of the paper as "firms."

Distribution data on the accounting changes made by the sample firms are given in Table 1. Panel A of Table 1 provides a breakdown of the accounting changes by type. Eighty-seven firms adopted or extended the use of LIFO.[13] Depreciation method or estimate changes (58), investment tax credit method changes (39), other inventory method changes (34) and pension estimate changes (31) were the other major categories.[14] The industry classification of the accounting change firms shows a wide distribution, with firms coming from 50 industries (based on SIC two-digit codes), 28 of which have four or fewer firms,[15] which suggests that cross-sectional and, particularly, longitudinal test results are unlikely to be explained by industry effects.[16]

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10. Examples of accounting principle changes would include a change from the straight-line depreciation method to the unit-of-production depreciation method and change from FIFO to LIFO. Examples of accounting estimate changes would include revising the estimated useful lives of depreciable lives and revising the assumptions used to compute pension expense.

11. A few firms with accounting changes prior to 1979 and one firm with a 1989 accounting change were identified during data collection and were retained.

12. Elliott and Philbrick (1990) used similar data sources for their sample selection and obtained similar sample size. They used the 1976 to 1984 files of NAARS to identify an initial sample of 1,273 accounting changes and a usable sample of 612 accounting changes (due to data availability criteria) made by 500 firms. Of the 612 changes, 285 were discretionary.

13. Eighty-two of these accounting changes led to a decrease in reported income in the year of the accounting change. Of the remaining 198 non-LIFO changes, 146 led to an increase in reported income and 52 resulted in income decreases.

14. By way of comparison, Elliott and Philbrick's (1990) 285 discretionary accounting changes included 132 LIFO changes, 30 depreciation method changes, 20 investment tax credit method changes, 11 pension changes, 25 expense recognition changes, and 18 revenue recognition changes.

15. As noted, utilities (SIC code 49) have been excluded from the analysis, and if included would have constituted the largest group.

16. The seven largest industries in the sample had a total of 58 income-increasing changes and 55 income-decreasing changes. Thus differences in test results between the two subgroups are unlikely to be caused by industry effects.

## TABLE 1

## Accounting Changes: Distribution by Type and Year

*A. Types of Accounting Changes*

| | *Firms* | | *Firms* |
|---|---|---|---|
| Inventory | | Investment Tax Credit | |
| Adopt or expand the use of LIFO | 87 | Deferral to flow through | 32 |
| LIFO to FIFO or other methods | 16 | Calculation changes | 7 |
| Inventory calculation changes | 18 | Pension | |
| Depreciation | | Changes in pension assumptions | 31 |
| Straight line to unit of production | 8 | Miscellaneous | |
| Accelerated methods to straight line | 9 | Expense deferral | 8 |
| Useful life estimate increase | 29 | Revenue recognition | 8 |
| Other changes | 12 | Consolidation | 2 |
| Oil and Gas Accounting | | Others | 4 |
| Full cost to successful effort | 10 | | |
| Successful effort to full cost | 4 | Total sample | 285 |

*B. Distribution by Year*

| *Year* | *Sample Firms* | *Control Firms* | *Year* | *Sample Firms* | *Control Firms* | *Year* | *Sample Firms* | *Control Firms* |
|---|---|---|---|---|---|---|---|---|
| 1978 | 6 | 4 | 1982 | 41 | 43 | 1986 | 23 | 27 |
| 1979 | 21 | 23 | 1983 | 34 | 23 | 1987 | 14 | 18 |
| 1980 | 44 | 46 | 1984 | 21 | 25 | 1988 | 13 | 12 |
| 1981 | 45 | 45 | 1985 | 22 | 17 | 1989 | 1 | 2 |
| | | | | | | Total | 285 | 285 |

The distribution of the firms by the year of accounting change, Panel B of Table 1, shows that the bulk of the changes took place between 1980 and 1986. Our sample differs, by design, from that of Moses (1987) who mainly examines accounting changes occurring in the 1970s. As a result, three-fourths of his 212 accounting changes were either LIFO switches or pension assumption changes. In contrast, our sample includes a wider variety of discretionary accounting changes covering a more recent period.

To obtain insights into the characteristics of firms engaged in accounting changes, we compared them with a control group of firms that made no accounting changes. (Use of a control group for this purpose is unique to our study.) First, for each accounting change firm, up to 10 matching firms (actually firm-years) were identified from the Compustat annual tape with the same two-digit SIC code and having no accounting change footnote codes for the change year and the preceding one. This procedure yielded over 2,000 firm-years, from which we randomly obtained a control sample of 285 firms with usable data. By design, the distribution of industry codes

and years examined for the control group of firms closely matches the distribution of the change firms reported in Table 1.

## 3. Accounting Changes and Earnings Management

Table 2 provides descriptive data for the accounting change and control firms on sales, earnings per share (EPS), *adjusted* preaccounting change EPS, and the accounting change effect. Panel B of the table also includes *T*-ratios for mean comparisons between income-decreasing and income-increasing accounting changes (panels B and C). For EPS, we use the primary earnings per share before discontinued operations, extraordinary items, and cumulative effect of accounting change, rather than net income, to avoid confounding the valuation effect of accounting changes with the valuation effect of the classification of extraordinary items and discontinued operations.[17] To use the EPS data as well as other independent variables in cross-sectional regressions, the variables for a year $j$ are divided by the stock price per share at the beginning of year $j$.

The data in Table 2 indicate that the accounting change and control firms had similar mean and median sales and EPS levels as well as abnormal returns (panels A and D). The data also indicate that the income-decreasing change firms are smaller in size compared to the income-increasing change firms. However, it is the differences in the earnings variables between the two accounting change subgroups that deserve attention: the income-increasing change firms had a negative average adjusted earnings change ($-0.0264$), which became substantially less negative ($-0.0061$) after the accounting change. As shown by the *T*-ratios for the differences in means, thanks to the accounting changes, the two groups reported indistinguishable mean earnings changes ($t = 0.53$ for $dE$) even though the prechange earnings changes of income-increasing firms were much smaller (in fact negative) than those of income-decreasing change firms ($t = 3.12$).

Income-increasing accounting changes thus appear to have been used to avoid reporting a large decline in earnings. For example, without the accounting change, the income-increasing firms would have reported, on average, worsening earnings declines in the year of the change ($dE_{t-1} = -0.0191$; $dAE_t = -0.0264$). After the accounting change, they managed to report an improvement in the earnings decrease ($dE_t = -0.0061$). As

17. We exclude the cumulative effect from the definition of "earnings impact of accounting change" as well as from earnings, because not all accounting methods in our sample result in a cumulative effect calculation. Some accounting changes such as adoption of LIFO are applied prospectively (no cumulative effect) and others, such as full-cost-to-successful method, result in retroactive restatement (and hence no cumulative effect in the income statement).

## TABLE 2

## Descriptive Statistics for Examined Variables

*A. All Accounting Changes*

| | *Number* | *Mean* | *Std. Dev.* | *Median* | *Minimum* | *Maximum* |
|---|---|---|---|---|---|---|
| Sales$_t$ ($million) | 285 | 2,352 | 6,753 | 748 | 10 | 101,781 |
| $E_t$ | 283 | 0.0688 | 0.1510 | 0.0950 | −0.7697 | 0.4833 |
| $AE_t$ | 283 | 0.0660 | 0.1633 | 0.0890 | −0.7448 | 0.6629 |
| $AC_t$ | 285 | 0.0030 | 0.0407 | 0.0017 | −0.1796 | 0.2822 |
| $dE_{t-1}$ | 278 | −0.0004 | 0.1412 | 0.0073 | −0.7106 | 0.6877 |
| $dE_t$ | 280 | −0.0066 | 0.1204 | 0.0014 | −0.4248 | 0.4907 |
| $dAE_t$ | 280 | −0.0088 | 0.1268 | −0.0001 | −0.4358 | 0.5608 |
| $R_t$ | 269 | 0.0392 | 0.3796 | 0.0190 | −0.7618 | 1.8630 |

*B. Income-Decreasing Changes*

| | *Number* | *Mean* | *Std. Dev.* | *Median* | *Minimum* | *Maximum* | T-*Ratio* (*B vs. C*) |
|---|---|---|---|---|---|---|---|
| Sales$_t$ ($million) | 134 | 1,483 | 2,370 | 552 | 16 | 19,573 | −2.17 |
| $E_t$ | 134 | 0.0795 | 0.1678 | 0.1089 | −0.7697 | 0.4833 | 1.61 |
| $AE_t$ | 134 | 0.0973 | 0.1784 | 0.1155 | −0.7448 | 0.6629 | 3.36 |
| $AC_t$ | 134 | −0.0178 | 0.0293 | −0.0079 | −0.1796 | 0.0000 | −12.82 |
| $dE_{t-1}$ | 130 | 0.0278 | 0.1455 | 0.0145 | −0.7106 | 0.6877 | 2.98 |
| $dE_t$ | 133 | −0.0073 | 0.1173 | 0.0059 | −0.4248 | 0.4028 | 0.53 |
| $dAE_t$ | 133 | 0.0106 | 0.1278 | 0.0138 | −0.3971 | 0.5609 | 3.12 |
| $R_t$ | 129 | 0.0236 | 0.3804 | −0.0188 | −0.7618 | 1.8630 | −0.61 |

## TABLE 2 (*continued*)

*C. Income-Increasing Changes*

| | *Number* | *Mean* | *Std. Dev.* | *Median* | *Minimum* | *Maximum* |
|---|---|---|---|---|---|---|
| Sales$_t$ ($million) | 151 | 3,124 | 8,949 | 919 | 10 | 101,781 |
| $E_t$ | 149 | 0.0593 | 0.1340 | 0.0885 | −0.5600 | 0.3348 |
| $AE_t$ | 149 | 0.0378 | 0.1433 | 0.0775 | −0.5794 | 0.2357 |
| $AC_t$ | 151 | 0.0214 | 0.0407 | 0.0080 | 0.0008 | 0.2823 |
| $dE_{t-1}$ | 148 | −0.0191 | 0.1352 | 0.0010 | −0.5600 | 0.4951 |
| $dE_t$ | 147 | −0.0061 | 0.1235 | −0.0045 | −0.3833 | 0.4907 |
| $dAE_t$ | 147 | −0.0264 | 0.1237 | −0.0111 | −0.4358 | 0.4638 |
| $R_t$ | 140 | 0.0536 | 0.3797 | 0.0643 | −0.7323 | 1.3700 |

*D. Control Firms (No Accounting Change in Year* t*)*

| | *Number* | *Mean* | *Std. Dev.* | *Median* | *Minimum* | *Maximum* |
|---|---|---|---|---|---|---|
| Sales$_t$ ($million) | 283 | 3,011 | 8,976 | 376 | 3 | 90,854 |
| $E_t$ | 262 | 0.1205 | 0.1177 | 0.1171 | −0.3442 | 0.5067 |
| $dE_t$ | 255 | 0.0079 | 0.0964 | 0.0099 | −0.4067 | 0.4288 |
| $R_t$ | 244 | 0.0403 | 0.3310 | 0.0147 | −0.6835 | 1.1590 |

$E$ is the earnings per share; $AE$ is the adjusted (prechange) earnings per share; $AC$ is the per share earnings impact of accounting change; $dE$ is the year-to-year change in earnings; $dAE$ is the year-to-year change in adjusted earnings. All these variables are deflated by the beginning price per share. $R$ is the annual abnormal return. The subscript $t$ refers to the accounting change year. The $T$-ratios given in panel B are for differences in outlier-excluded means between income-decreasing change and income-increasing change firms (panels B and C). However, all other data include all available observations.

## TABLE 3

## Choice of Type of Accounting Changes: Effect of Prechange Earnings

*A. All Accounting Changes*

| | *Income-Decreasing Change* | *Income-Increasing Change* | *Total* |
|---|---|---|---|
| $dAE_t$ is negative | 47 (33%) | 96 (67%) | 143 (100%) |
| $dAE_t$ is positive | 86 (61%) | 55 (39%) | 141 (100%) |
| | | | Total: 285 |
| | | | Chi-square: 23.68 |

*B. Significant Accounting Changes*

Note: Accounting changes having an income effect less than 3% of prechange net income are excluded in this panel.

| | *Income-Decreasing Change* | *Income-Increasing Change* | *Total* |
|---|---|---|---|
| $dAE_t$ is negative | 30 (27%) | 81 (73%) | 111 (100%) |
| $dAE_t$ is positive | 70 (61%) | 45 (39%) | 115 (100%) |
| | | | Total: 226 |
| | | | Chi-square: 26.22 |

Variable $dAE_t$ is the change in preaccounting change EPS from year $t-1$ to $t$, divided by stock price at the beginning of year $t$, where $t$ is the year of accounting change.

for the income-decreasing change firms, their positive average prechange earnings increase (0.0106) suggests a tendency for these firms' managers to wait for a "good earnings year" to adopt an earnings-decreasing accounting method such as LIFO. The behavior of these two groups of firms is thus broadly consistent with earnings management.

The $2 \times 2$ comparison in Table 3 also strongly suggest earnings management by accounting changes. When the adjusted earnings change ($dAE_t$) is negative, 67 percent of the accounting changes are income-increasing, whereas when $dAE_t$ is positive, 61 percent of the accounting changes are income-decreasing. The $2 \times 2$ classification is highly significant as indicated by the large chi-square value. When accounting changes having an income effect of less than 3 percent of prechange earnings are excluded from the set, the resulting subset of significant accounting change firms show more clearly the use of income-increasing accounting change by firms having negative $dAE$.

The income management motive of accounting changes is frequently mentioned in the literature, particularly in the income-smoothing and the agency areas (effect of reported income on bonus plans and other contractual relationships). As noted in Section 1, there is anecdotal support for the view

that managers engage in accounting changes to alter investor perceptions in the year of the change and in subsequent years. This raises the question of whether investors are able to unravel the effect of the accounting change, to which we now turn.

## 4. Accounting Changes and Earnings Valuation

We examine the effect of accounting changes on the relationship between earnings and stock returns in the *year of the change*, using two alternative models of returns and earnings. The first is a conventional cross-sectional regression of annual abnormal stock returns, $R_{tk}$, for year $t$ (year of the accounting change) and firm $k$, on the price-deflated annual earnings per share change, $dE_{tk}$:

$$R_{tk} = a_1 + b_1 dE_{tk} + \epsilon_{tk}. \tag{1}$$

The return, $R_{tk}$, is measured from the fourth month of year $t$ to the third month of year $t+1$, to account for the approximate disclosure delay in reporting the annual data.[18] The "market model" from which $R_{tk}$ is derived was estimated on 36 monthly returns prior to year $j$, using the equally weighted market returns index.

The second model of returns and earnings relates earnings levels to stock returns, and is based on Ohlson (1989). He argues that price, $P_t$, relates to book value, $B_t$, and hence $(P_t - P_{t-1} + D_t)$ should be a function of $(B_t - B_{t-1} + D_t)$ the firm's earnings for year $t$ (where $D_t$ is the dividend for year $t$). Dividing both terms by $P_{t-1}$ implies that raw stock returns should be a function of the price-deflated earnings level.[19] The estimated cross-sectional regression equation is

$$\mathrm{RR}_{tk} = a_2 + b_2 E_{tk} + \epsilon_{tk}, \tag{2}$$

where $\mathrm{RR}_{tk}$ is the year $t$ (accounting change year) annual raw return for firm $k$, measured from the fourth month of year $t$ to the third month of year $t+1$, and $E_{tk}$ is the earnings per share in year $t$ divided by stock price at the beginning of $t$.

To control for influential (so-called outlier) observations in cross-sectional regressions (and in parametric tests such as $T$-ratio for mean comparison), variables with values larger than three standard deviations from the mean were excluded. Table 4 provides the regression results from es-

18. A one-month delay period was also tried: the results are not sensitive to the delay period assumed.

19. Empirical support for the role of earnings levels in explaining returns is provided by Penman (1991).

## TABLE 4

### Returns versus Earnings Change

| *Independent Variable* | *Firms* | $a_1$ | $b_1$ | $R^2$ |
|---|---|---|---|---|
| | | *A. All Accounting Changes* | | |
| *dE* | 249 | 0.0183 | 0.7500 | 0.0500 |
| | | 0.89 | 3.61 | |
| *dAE* | 254 | 0.0204 | 0.8731 | 0.0732 |
| | | 1.00 | 4.46 | |
| | | *B. Income-Decreasing Changes* | | |
| *dE* | 123 | 0.0085 | 1.1737 | 0.1356 |
| | | 0.32 | 4.36 | |
| *dAE* | 124 | −0.0047 | 1.3830 | 0.1873 |
| | | −0.17 | 5.31 | |
| | | *C. Income-Increasing Changes* | | |
| *dE* | 126 | 0.0227 | 0.3100 | 0.0077 |
| | | 0.74 | 0.98 | |
| *dAE* | 130 | 0.0253 | 0.4262 | 0.0157 |
| | | 0.82 | 1.43 | |
| | | *D. Control Firms (no accounting change in year* t*)* | | |
| *dE* | 231 | 0.0184 | 1.1547 | 0.1027 |
| | | 0.91 | 5.12 | |

The estimated equation was either $R_{ik} = a_1 + b_1 dE_{ik}$ or $R_{ik} = a_1 + b_1 dAE_{ik}$, where $t$ refers to the year of accounting change, $k$ denotes firm, $R_{ik}$ is the annual abnormal return, $dE_{ik}$ is the change in reported earnings per share from year $t - 1$ to $t$, deflated by price per share at the beginning of year $t$, and $dAE_{ik}$ is the change in adjusted (i.e., preaccounting change) earnings per share, deflated by price. $T$-ratios are presented below the coefficient estimates.

timating eq. (1). Results for eq. (2) are similar. The regression estimates indicate that the earnings response coefficient and regression $R^2$ of income-increasing firms (panel C) are substantially worse, both relative to the control group (panel D) and relative to the firms making income-decreasing accounting changes (panel B). In particular, the $R^2$ for the returns-earnings relation for the income-increasing change firms is essentially zero, compared to 13.56 percent for the income-decreasing group and 10.27 percent for the control firms. In other words, although the regression results for the income-decreasing sample and the control sample are virtually identical, the income-increasing change firms clearly stand out with smaller response coefficients and $R^2$ values. These differences in regression estimates for the income-increasing accounting change firms suggest an overall decrease in the in-

formation ''quality of earnings'' due to the accounting change, where quality is defined in terms of earnings persistence (Lev and Thiagarajan [1993]). Surprisingly, the reduction in earnings persistence in the year of the accounting change cannot be explained away as an ''errors-in-variable'' statistical problem from using the reported earnings (*dE*) instead of the adjusted, preaccounting change earnings (*dAE*) as the explanatory variable. As seen in Table 4, the response coefficient for the income-increasing firms is only marginally better when adjusted earnings are used instead of reported earnings. The decline in the response coefficient for these firms can thus be viewed as an indication of increased noise in the *aggregate* earnings message. This inference is also suggested by the fact that the results in Table 4 are substantially unchanged if 59 firms with insignificant accounting changes (income effect of accounting change is less than 3 percent of prechange earnings) are excluded. It can thus be concluded that income-increasing accounting changes decrease the informativeness of earnings in the year of the change.

## 5. The Valuation Relevance of the Earnings Impact of Accounting Changes

The regressions of eqs. (1) and (2) estimate the overall relation between reported earnings (including the impact of accounting changes) and stock returns. An important question is: how do investors react specifically to the dollar impact of the accounting change on earnings? To address this question we regressed annual abnormal returns, $R_{tk}$, on the *adjusted* (i.e., preaccounting change) earnings change, $dAE_{tk}$, and the earnings impact of the accounting change, $AC_{tk}$, both deflated by beginning price:

$$R_{tk} = a_3 + b_3 dAE_{tk} + b_4 AC_{tk} + \epsilon_{tk}. \quad (3)$$

Estimates of eq. (3) for the year of the accounting change are reported in Table 5. The coefficient of the accounting change impact, $b_4$, is statistically insignificant at the 10 percent level for the two subsamples examined. Results are unchanged when the regressions include significant accounting changes only. Thus, investors appear to discount heavily, perhaps ignore altogether, the dollar impact of accounting changes in the year of the change. This result is consistent with the inference from Table 4 that the observed differences in the earnings response coefficient between the income-increasing and income-decreasing groups in year *t* is due to a change in the information quality in that year rather than to the earnings impact of the change.

To examine the robustness of the above results, two alternatives to eq. (3) were estimated (but not reported in Table 5). In one, raw returns, $RR_{tk}$,

## TABLE 5

## Returns versus Adjusted Earnings Change and Accounting Change Effect

*A. All Accounting Change Firms*

| *Subset* | *Firms* | $a_3$ | $b_3$ | $b_4$ | $R^2$ |
|---|---|---|---|---|---|
| All firms | 249 | 0.0181 | 0.7559 | −0.0210 | 0.0531 |
| | | 0.88 | 3.63 | −0.02 | |
| Income-decreasing changes | 123 | −0.0321 | 1.1945 | −1.5702 | 0.1635 |
| | | −0.96 | 4.49 | −1.12 | |
| Income-increasing changes | 126 | 0.0291 | 0.3209 | −0.1218 | 0.0082 |
| | | 0.74 | 1.00 | −0.07 | |

*B. Significant Accounting Change Firms*

Note: Accounting changes having an income effect less than 3% of prechange net income are excluded in this panel.

| *Subset* | *Firms* | $a_3$ | $b_3$ | $b_4$ | $R^2$ |
|---|---|---|---|---|---|
| All firms | 196 | 0.0282 | 0.7793 | −0.0748 | 0.0473 |
| | | 1.20 | 3.00 | −0.08 | |
| Income-decreasing changes | 93 | −0.0193 | 1.2888 | −1.2533 | 0.1500 |
| | | −0.47 | 3.75 | −0.84 | |
| Income-increasing changes | 103 | 0.0393 | 0.3928 | −0.3903 | 0.0112 |
| | | 0.84 | 1.02 | −0.21 | |

The estimated equation was $R_{tk} = a_3 + b_3 dAE_{tk} + b_4 AC_{tk}$, where $t$ refers to the year of accounting change, $k$ denotes firm, $R_{tk}$ is the annual abnormal return for year $t$, $dAE_{tk}$ is the change in preaccounting change annual earnings per share from year $t-1$ to $t$, and $AC_{tk}$ is the earnings per share impact of accounting change in year $t$, both deflated by price per share at the beginning of $t$. $T$-ratios are presented below the coefficient estimates.

were regressed on price-deflated adjusted earnings level ($AE_{tk}$) and the earnings impact of accounting change ($AC_{tk}$). In the second estimation, the price-to-book ratio at the end of year $t$ was regressed on the adjusted (prechange) earnings-to-book ratio and the ratio of the accounting change impact to book value. The objective of these two alternative regressions, where the dependent variables were raw returns and book values rather than abnormal returns, was to examine for possible value relevance of the earnings impact of the accounting change. For example, if the impact of the change is to a large extent expected in the year of change, it might not be correlated with abnormal returns, yet it could be correlated with the stock price (price-to-book ratio). The results from the two alternative regressions were similar to those in Table 5: the coefficient of the accounting change impact is insignificant in all these regressions.

Overall, the cross-sectional regressions reported in Tables 4 and 5 sug-

gest three inferences: (1) income-increasing accounting changes result in lower quality of earnings as expressed by relatively small earnings response coefficient and $R^2$ in the returns-earnings relation, (2) income-decreasing accounting change firms are indistinguishable from the control firms in terms of the returns-earnings relation, and (3) the earnings impact of the accounting change itself does not affect the returns for either type of accounting change. The latter means that investors are clearly unimpressed with the current year earnings effect of income-increasing accounting changes. But how are stock returns in the subsequent years affected by the accounting change? Is it possible that managers undertake accounting changes with a view to influence long-term returns and not current year returns? The next section examines this "subsequent years" conjecture.

## 6. Longitudinal Returns Behavior

To test the "subsequent years" hypothesis, we employ a longitudinal examination of the stock returns in the postchange years—a procedure that does not require knowledge (or estimation) of the accounting change impacts in the postchange years.[20]

The methodology involves examining the behavior of abnormal returns from a buy-and-hold strategy over extended periods following the year of the accounting change. If firms undertake income-increasing accounting changes with a view to manipulate long-term firm value, and succeed in doing it, then the abnormal returns of the firms in the postchange years should be positive (relative to the basis over which the abnormal return is computed). For comparison, we also examine the long-run abnormal returns from a buy-and-hold strategy applied to firms undertaking income-decreasing changes and applied to the control sample.

The abnormal returns are computed using the Dimson and Marsh (1986) methodology, which controls for both market-wide and firm-size effects—a procedure that appears preferable (for buy-and-hold strategy evaluation) to conventional market model and market adjustment procedures.[21] Under the Dimson-Marsh procedure, for each month and each firm, abnormal returns are defined as the raw returns of the stock less the equally weighted returns of the NYSE/ASE size-decile firms to which the firm belongs by size. Our buy-and-hold strategy involves adding an accounting change firm to the portfolio on the fourth month of year $t + 1$ (the year *after* the

20. We are grateful to John Hand for this suggestion.

21. We did, however, replicate all our results reported in this section using a simple market-adjusted excess return methodology. Thus the distortion caused by the firm size effect seems minimal in the case of our sample.

## TABLE 6

## Mean Holding Period Abnormal Returns for Buy-and-Hold Strategy

| | *All Accounting Changes* | | | *Significant Accounting Changes* | | |
|---|---|---|---|---|---|---|
| *Holding Period* | *Income Decreasing* | *Income Increasing* | T-*Ratio* | *Income Decreasing* | *Income Increasing* | T-*Ratio* |
| $t+1$ | −0.0467 | −0.0344 | −0.36 | −0.0357 | −0.0379 | 0.06 |
| | 134 | 151 | | 100 | 126 | |
| $t+1$ to $t+2$ | −0.0447 | −0.0538 | 0.19 | −0.0054 | −0.0420 | 0.65 |
| | 134 | 151 | | 100 | 126 | |
| $t+1$ to $t+3$ | −0.0406 | −0.1164 | 1.25 | −0.0011 | −0.1110 | 1.53 |
| | 131 | 143 | | 98 | 117 | |
| $t+1$ to $t+4$ | −0.0115 | −0.1313 | 1.67 | 0.0572 | −0.1530 | 2.51 |
| | 117 | 125 | | 88 | 101 | |
| $t+1$ to $t+5$ | 0.0280 | −0.0545 | 0.78 | 0.1112 | −0.1019 | 1.75 |
| | 98 | 110 | | 77 | 90 | |

The mean size-adjusted abnormal returns for various holding periods were computed using the Dimson-Marsh (1986) methodology: For each month, abnormal returns of a firm are equal to the raw returns of the firm minus the raw returns of the corresponding NYSE/ASE size-decile portfolio to which the firm belongs by size. Abnormal returns for each year are computed from the fourth month of the year to the third month of the following year. Year $t$ is the year of the accounting change. For each holding period, line 1 has the equally weighted mean portfolio returns based on a buy-and-hold strategy, and line 2 has the number of firms in the portfolio. The $T$-ratios are for differences in means between income-decreasing change and income-increasing change firms.

accounting change) and holding it in the portfolio for up to five years (third month of year $t+6$), unless the firm drops out earlier for other reasons (e.g., merger). Note that this investment strategy does not involve foreknowledge of the accounting change and thus is an implementable trading strategy in event-time; that is, where all firms are aligned on the fiscal year of accounting change. (Implementation of a calendar-time trading strategy is discussed below.) The monthly mean abnormal returns of a portfolio are defined as the equally weighted abnormal returns of the firms in the portfolio in that event-month (implying monthly rebalancing). For longer periods, portfolio mean abnormal returns are computed using the geometric average of applicable monthly mean returns.

Table 6 reports the results of this buy-hold strategy applied to all accounting change firms and to firms making significant accounting changes only. In each case, results are presented separately for the income-decreasing and income-increasing subgroups. Examining the all-changes columns, portfolio mean abnormal returns of income-decreasing accounting change firms are negative for the first year after the accounting change (−0.0467) but for each of the longer periods, the annual mean portfolio return is positive, leading to an improving trend for the cumulative return. The cumulative

mean return for five years is +2.8 percent. By contrast, the income-increasing change firms generally experience negative abnormal returns in all but the fifth year. The difference in the cumulative portfolio returns between the two groups is 14 percent at the end of year 4 ($T$-ratio significant at 10 percent) and about 8 percent at the end of year 5.

The differences in the portfolio returns of the two groups are somewhat more clear-cut, although qualitatively unchanged, when the investment strategy involves firms making only significant accounting changes. The cumulative portfolio returns of the two groups differ by as much as 21 percent at the end of four years. The $T$-ratio is significant at 10 percent at the end of both four years and five years. This implies that going long on income-decreasing change firms and short on income-increasing change firms over four or five years would have yielded an abnormal return of about 21 percent. Given that these are abnormal returns based on public information, the results are striking.[22] Moreover, the returns accumulate gradually and consistently over the five years rather than being concentrated in any one year.

Are the results driven by the particular years examined? To address this question, we broke the sample period and compared the results for the firms that had accounting changes in 1978–82 with the results for the 1983–88 subsample. The results turn out to be basically similar for both subsamples. These results also indicate that the observed abnormal returns are not driven by the fact that for some firms in the 1983–88 period the five-year holding period could not be fully implemented given that 1990 was our last year of available returns.

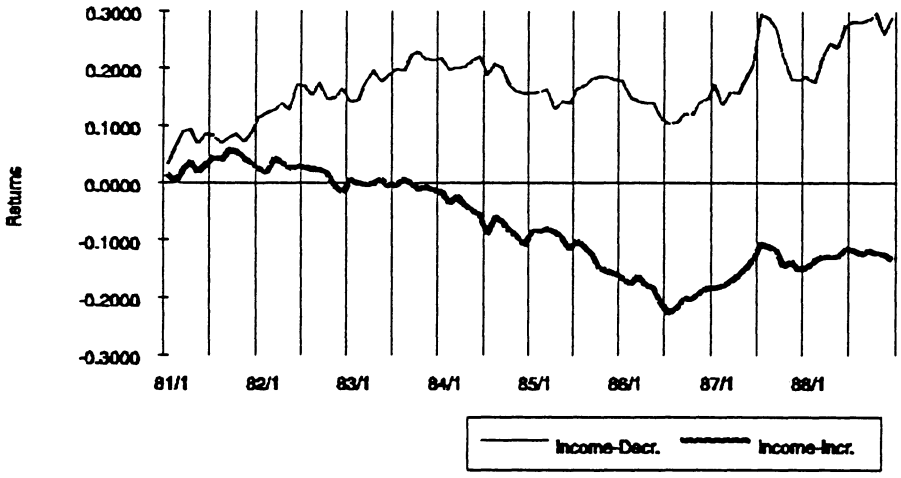
Is the investment strategy underlying Table 6 replicable in calendar time? In Table 6, firms were aligned by accounting change year, and hence the returns are not strictly replicable by an investor. We tried an alternative investment strategy that, in calendar time, invests in companies from the fourth month of the year after an accounting change is announced and holds these stocks for up to 60 months. Figure 1 presents a plot of the resulting cumulative monthly returns, starting from January 1981 (arbitrary kickoff month) to December 1988. Plots are presented separately for the income-decreasing and income-increasing portfolios. It can be seen that the abnormal returns for income-increasing change firms declined almost continually over the examined period, except during parts of 1986 and 1987 when the entire stock market experienced very large gains. By contrast, the abnormal returns for income-decreasing accounting change firms increased continually during the entire period, while those of the control firms (not reported) remained

22. The data restrictions we placed on the sample selection, described earlier, eliminated firms that merged within two years after an accounting change. Inclusion of such firms in an earlier draft resulted in much larger differences in observed cumulative returns between the two portfolios.

## FIGURE 1

### Cumulative Abnormal Returns for Real-Time Buy-and-Hold Trading Strategy

The plot has the cumulative (equally weighted) mean portfolio abnormal returns starting January 1981. The top curve is for the portfolio of all firms making income-decreasing accounting changes. The bottom curve is for the portfolio of firms with income-increasing accounting changes. The trading strategy was to buy companies on month 4 of year $t+1$ and hold them up to month 3 of year $t+6$, where $t$ is the year of the accounting change. The abnormal returns were computed using the Dimson-Marsh (1986) methodology: For each month and each firm, they are the raw returns of the firm less the returns of the NYSE/ASE size-decile portfolio to which the firm belongs by size.




flat, as expected. A strategy of investing long in the income-decreasing group and short in the income-increasing group would have yielded a cumulative difference in abnormal return of over 41 percent in eight years. As in the case of Table 6, the results (not shown) are slightly more clear-cut when the trading strategy involves only firms with significant accounting changes.

The above findings for income-increasing firms are puzzling with respect to market efficiency, given that our portfolio strategy is based on publicly available information about accounting changes. For example, it is not clear why investors failed to incorporate the information in their valuation of firms in the accounting change year, rather than wait to see the stock price go down (or up) steadily over an extended period. Perhaps the overall lowering of the quality of earnings disclosures affected by accounting changes, reported in Table 4, masks this information signal. Although the results are interesting, it is important to note that the returns results in Table 6 and

Figure 1 do not, however, support the "subsequent years" hypothesis discussed earlier. In fact, in the case of income-increasing accounting change firms, the results are actually the opposite of what one would expect from the "subsequent years" hypothesis, namely the possibility that managers undertake income-increasing accounting changes with an intention to positively influence investor valuation of the firm during the postchange years.

## 7. Conclusion

It has been suggested by both academics and practitioners that a possible motive for accounting changes stems from managers' belief that investors are not aware of the changes subsequent to the year in which they were made and, therefore, will regard the earnings impact of these changes as regular earnings. The findings reported here, based on a variety of accounting changes and on alternative specifications of earnings valuations, do not support this conjecture. Overall, investors appear cognizant of the "low quality" of the earnings components generated by nonsubstantive accounting changes and largely ignore these components in the year of the change. There is no evidence that accounting changes positively influence stock returns in the year of the change. Indeed, as discussed, the evidence from the longitudinal test indicates that firms effecting income-increasing changes undergo a steady decline in stock prices over extended periods following the year of the change. This evidence raises intriguing questions concerning market efficiency. In particular, it appears that investors *underreact* to the negative information conveyed by income-increasing accounting changes.

If income-increasing accounting changes are not increasing stock returns, why do firms undertake them? Our data provide evidence in support of active earnings management by firms, with income-increasing accounting changes instituted mainly by firms that would have otherwise reported reduced earnings relative to the previous year. This, then, raises once more the fundamental question: why do managers appear to engage in accounting changes aimed at managing earnings when investors ignore the impact of these changes? Perhaps one should look for explanations such as managers' disbelief in investor rationality.

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