Lancaster University Management School
Working Paper
2002/018

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13th June 2002

We wish to thank participants in sessions at the British Accounting Association Annual Conference 2001, Nottingham, the European Accounting Association Annual Congress 2001, Athens, and the American Accounting Association Annual Meeting 2001, Atlanta for comments. We are grateful to the Institutional Brokers Estimate System, a service of I/B/E/S International Inc., for providing us with analyst earnings forecast data as part of a broad academic program to encourage earnings expectations research. All other data we use are available from public sources.
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Earnings Management and the Distribution of Earnings Relative to Targets: U.K. Evidence

ABSTRACT

In this paper we provide the first international evidence on discontinuities in the distribution of reported earnings, using a large sample of UK firms. We examine the discontinuity phenomenon in the context of earnings management. We report that the empirical distribution of earnings before discretionary working capital accruals does not reflect the unusually high frequencies of small surpluses and unusually low frequencies of small deficits relative to targets found in the distribution of actual (reported) earnings, i.e. after discretionary working capital accruals. We find that discretionary working capital accruals have the effect of significantly increasing the frequencies of firms achieving earnings targets both overall and by small margins. Thus, we document an explicit link between working capital accruals-based earnings management and the discontinuities observed in the empirical distribution of earnings relative to targets.

Key words: *accounting manipulation, discretionary accruals, earnings management.*

Data availability: *Data are available from the public or commercial sources identified in the paper.*

1. INTRODUCTION

The finding that the empirical distribution of earnings relative to basic targets displays a discontinuity at zero has become widely accepted following Hayn (1995), Burgstahler and Dichev (1997) and Degeorge et al. (1999).[1] In particular, small negative earnings levels, changes and surprises have been found to occur with unexpectedly low frequency and small positive earnings levels, changes and non-negative surprises occur with unexpectedly high frequency. Hayn (1995, 132). This suggests that the discontinuities in the distribution of earnings are associated with earnings management. However, there is little evidence on the specific methods by which firms successfully manage earnings to achieve targets. This paper reports evidence on the association between working capital accruals manipulation and the distributions of earnings relative to targets.

Accounting manipulation of working capital accruals (WCA) suggests itself as a potentially popular technique for achieving earnings targets. Healy (1985, 103) points out that accrual manipulation is less costly and more feasible on a multi-period basis than accounting method changes as a means of transferring earnings between periods. Further, DeFond and Jiambalvo (1994, 158) view WCA as more susceptible to manipulation than non-working capital accruals. In this study, we investigate the links between the discretionary component (DACC) of WCA, the frequency of earnings target achievement and the observed discontinuity in the distribution of earnings relative to basic targets.[2] The targets we consider are the achievement of positive earnings levels and changes and the avoidance of negative earnings surprises. Our

[1] Studies replicating or extending this result include Beaver et al. (2000), Cheng (2000), Dechow et al. (2000) and Payne and Robb (2000).

[2] We define DACC as the discretionary component of total working capital accruals. DACC are also defined, elsewhere in the literature, as the discretionary component of total accruals including long-term accruals such as depreciation. We use the expression DACC in referring to other studies that use that expression even if they define it differently from us. In Section IV, we explain our definition of DACC and the estimation technique we use.

primary objective is to determine whether DACC, a frequently used proxy for earnings management, contribute significantly to the unexpectedly high frequencies of positive, particularly small positive, earnings levels, changes and surprises.[3] We also wish to obtain an insight into the overall impact of DACC on the distribution of earnings relative to targets.

This issue is interesting because studies have typically used DACC as a proxy for earnings management without specific reference to the manner in which firms use DACC to manage earnings. For example, Becker et al. (1998) and Francis et al. (1999) both expect that Big 5 (then Big 6) auditors constrain earnings management more effectively than non-Big 5 auditors. Becker et al. (1998) interpret this prediction as implying that *signed* DACC are negatively associated with the presence of Big 5 auditors. In contrast, Francis et al. (1999) interpret the same prediction as implying that *absolute* DACC are negatively associated with the presence of Big 5 auditors. This reflects different underlying assumptions about the manner in which firms use DACC to manage earnings.[4] Our study provides specific evidence on the manner in which firms use DACC with reference to basic earnings targets.

A further contribution of the paper is to provide initial evidence on whether the phenomenon of discontinuities in the distribution of earnings extends beyond the U.S. corporate environment and GAAP regime. Recently, there has been heightened interest in the impact of different economic environments and GAAP regimes on the attributes of accounting earnings (Pope and Walker 1999; Ali and Hwang 2000; Ball et al. 2000), and on the incidence of earnings

[3] For the purpose of efficient expression, we use the terms negative and positive to describe earnings and non-discretionary earnings relative to target. Strictly, our usage of positive (negative) in the context of earnings levels, non-discretionary earnings levels, earnings changes and non-discretionary earnings changes refers to observations greater than (less than or equal to) zero. Our usage of positive (negative) in the context of earnings surprises and non-discretionary earnings surprises refers to observations greater than or equal to (less than) zero. This is in accordance with our assumption that firms seek to achieve positive earnings levels and changes and avoid negative earnings surprises, and with the consequential design of our empirical tests.

[4] Alternatively, or additionally, it implies different assumptions on the loss function of auditors.

and forecast management (Brown and Higgins 1999; Leuz et al. 2000). This paper contributes to this growing international accounting literature by reporting evidence based on a large sample of U.K. firms.

The U.K. context is particularly interesting for a number of reasons. Ball et al. (2000, 25-29) point out that the U.K. has the least regulated and least litigious accounting environment among the common-law countries they study, and that corporate debt is primarily private in the U.K. According to Ball et al. (2000), these factors imply a reduced demand for timely incorporation of bad news into accounting earnings reported by U.K. firms. Such lower demand for timely reporting of bad news allows managers greater flexibility to manage earnings through timing of recognition. However, Brown and Higgins (1999) cite evidence that U.K. managers have vastly smaller holdings of stock options than their U.S. counterparts, and infer that U.K. managers are consequently less likely to manipulate earnings to avoid reporting bad news than U.S. managers.

Another U.K.-specific feature is the regime change that occurred regarding the reporting of extraordinary items. One of the reasons for the issuance of FRS 3 (Accounting Standards Board, 1992) was to eliminate the use of extraordinary items as a means of earnings management. We examine the use of extraordinary (later special) items as an earnings management tool, both pre- and post-FRS 3.

Our results indicate that the earnings levels, changes and surprises of U.K. firms, like those of U.S. firms, are distributed discontinuously around zero. Specifically, we observe unusually low incidence of small negative earnings levels, changes and surprises, and unusually high incidence of small positive earnings levels, changes and surprises. However, non-discretionary earnings levels, changes and surprises for the same sample are distributed without this discontinuity at zero, suggesting that the discontinuity in the earnings distribution is

attributable to DACC.[5] We further document that DACC have the effect of significantly increasing the incidence of small positive earnings levels, changes and surprises. DACC also have the effect of reducing the incidence of both positive and negative earnings levels, changes and surprises of large magnitude.

Further, we report evidence that exact zero earnings surprises are associated with unusual variance in DACC, suggesting idiosyncratic use of DACC to meet forecasts exactly. We also find that exact zero earnings surprises are associated with relatively low average extraordinary items, high incidence of negative extraordinary items, and low incidence of positive extraordinary items. This result is consistent with exact zero earnings surprises being achieved with the aid of misclassification of extraordinary items.

The main contributions of this paper can be summarized as follows. Firstly, we provide a previously undocumented empirical explanation of the discontinuity observed at zero in the distribution of earnings relative to targets. Specifically, we report that accounting manipulation through DACC is a significant contributor to this discontinuity. Secondly, we quantify the extent to which firms achieve earnings targets with the aid of DACC. The evidence we report provides strong support for the use of DACC as a proxy for earnings management. However, this evidence also indicates that the extent to which, and direction in which, firms use DACC to manage earnings varies with the relationship between earnings before DACC and basic earnings targets. This has implications for the interpretation of previous studies, and design of future studies, using DACC to proxy for earnings management. The evidence we report also contributes to the literature examining the circumstances under which firms seek to manage earnings (e.g., Nelson et al. 2000).

2. PREVIOUS LITERATURE

[5] We use the term non-discretionary earnings to mean earnings before DACC, or unmanaged earnings ignoring earnings management effected other than through DACC.

Hayn (1995) is the first widely cited study to have documented that unusually many firms report earnings just above zero and unusually few report earnings just below zero. Her tests indicate that the distribution of earnings departs from normality in the region closest to zero. Based on this observation, Hayn (1995) suggests that many firms expecting to report small losses manage earnings upward to report small profits. Burgstahler and Dichev (1997) extend the Hayn (1995) result by, *inter alia*, documenting that unusually many firms also report small earnings increases and unusually few report small earnings decreases. Burgstahler and Dichev (1997) further examine the components of earnings for portfolios based on ranked earnings. They find that both operating cash flow and WCA rise sharply when reported earnings is just above zero, and conclude that this is evidence of firms managing these components to achieve small profits.

DeFond and Park (1999) report that firms use DACC to achieve earnings in excess of forecasts by 2 to 3 cents per share. They find that DACC are income-increasing on average if the earnings surprise is less than 2 cents, income-decreasing if the earnings surprise is more than 3 cents, and insignificantly different from zero if the earnings surprise is 2 or 3 cents. Cheng (2000) also investigates the relationship between DACC and earnings surprises and observes that firms with non-discretionary earnings below forecasts report positive DACC on average, while firms with non-discretionary earnings above forecasts report negative DACC on average.

Dechow et al. (2000) examine two earnings targets, analyst forecasts and avoiding losses. When they compare small profit firm-years with all others, they find that the former have higher average DACC and WCA than the latter. However, when they compare small profit firm-years with small loss firm-years, they find insignificant differences between the two groups. Dechow et al. (2000) also compare zero earnings surprise firm-years with all others and with small negative surprise firm-years. They find that zero surprise firm-years have higher DACC and WCA than all other firm-years and higher WCA than small negative surprise firm-years. However, Dechow et al. (2000) find that the difference between average DACC for zero and small negative surprise firm-years is statistically insignificant.

In the U.K. context, Peasnell et al. (2000a, 2002) report evidence on average DACC conditional on non-discretionary earnings relative to targets. They find that firm-years with non-discretionary earnings below either zero or prior year earnings report positive DACC on average. On the other hand, firm-years with non-discretionary earnings above zero or prior year earnings report negative DACC on average.

From the above it is evident that the literature has typically approached the question of whether firms use DACC to achieve earnings targets by examining average DACC conditional on either earnings or non-discretionary earnings relative to target. This approach does not address the extent to which DACC are used to manage earnings successfully from below to above targets. It also does not answer the question of whether the discontinuity in the distribution of earnings relative to targets is specifically caused by DACC. To argue that a particular earnings management method causes the observed discontinuity in the earnings distribution, it is necessary to demonstrate that that method is used by more firms to move from below to above target than in the opposite direction. The finding that firms with small surpluses have higher DACC than firms with small deficits does not preclude the possibility that at least as many firms move from non-discretionary surpluses to actual deficits as move from non-discretionary deficits to actual surpluses. Similarly, the finding that firms with non-discretionary surpluses (deficits) have negative (positive) DACC on average does not necessarily imply that the number of firms with non-discretionary deficits reporting actual surpluses is greater than the number of firms with non-discretionary surpluses reporting actual deficits.

The study we report in this paper is most closely related to Beaver et al. (2000). They find that the distribution of earnings in a sample of property-casualty insurers displays the predicted discontinuity at zero, but that the distribution of earnings before a discretionary loss reserve accrual does not have this discontinuity. They further find that the tested accrual is relatively high in the portfolio of firms with earnings just above zero. Our study is distinct from Beaver et al. (2000) in a number of important respects. We address the use of DACC by all non-financial

firms, while they address the use of a particular accrual specific to the insurance industry. In this regard, we provide a direct test of a popularly used proxy for earnings management. The results we report are therefore more widely generalizable, and have design implications for future research using the DACC proxy. Further, our analysis quantifies the extent to which firms appear to use DACC to achieve earnings targets or to achieve other earnings management objectives such as the smoothing of earnings.

3. EMPIRICAL PREDICTIONS

We examine whether earnings levels, changes and surprises are distributed with a discontinuity at zero, similar to that reported by Burgstahler and Dichev (1997) and Degeorge et al. (1998). This discontinuity would be consistent with, but not necessarily proof of, earnings management to achieve targets. Thus, we test the following prediction:

H1: *The frequency of small negative earnings levels (changes, surprises) is lower than expected and the frequency of small positive earnings levels (changes, surprises) is higher than expected under a smooth distribution*

To the extent that DACC cause the discontinuity in the earnings distribution, the removal of DACC from earnings is expected to reduce the discontinuity. Specifically, we predict that non-discretionary earnings will not be distributed discontinuously around earnings targets, thus:

H2: *The frequencies of small negative non-discretionary earnings levels (changes, surprises) and small positive non-discretionary earnings levels (changes, surprises) are equal to the frequencies expected under a smooth distribution*

Further, the use of DACC to achieve targets will be reflected in DACC having the effect of increasing the proportion of firm-years achieving earnings targets. This implies the following prediction:

H3: *The proportion of firm-years with positive earnings levels (changes, surprises) is larger than the proportion of firm-years with positive non-discretionary earnings levels (changes, surprises)*

The previous evidence on the distribution of earnings relative to targets suggests that earnings management to achieve targets occurs most extensively when the shortfall from target is small. In particular, it is suggested that firms seek to manage earnings to transform small deficits into small surpluses relative to targets. Thus, we test the following predictions:

H4: The proportion of firm-years with small positive earnings levels (changes, surprises) is larger than the proportion of firm-years with small positive non-discretionary earnings levels (changes, surprises)

H5: The proportion of firm-years with small negative earnings levels (changes, surprises) is smaller than the proportion of firm-years with small negative non-discretionary earnings levels (changes, surprises)

One important caveat must be noted with respect to the last prediction. It is based on the assumed earnings management objectives of achieving positive earnings levels and changes and avoiding negative earnings surprises. It does not take account of other earnings management strategies, e.g., reducing the magnitude of earnings changes or surprises, which firms might simultaneously pursue. This would have implications for H5. Specifically, the use of DACC to smooth income might result in DACC increasing the proportion of firm-years with small negative earnings changes and reducing the proportion of firm-years with large negative earnings changes. We regard the question of whether firms use DACC to dampen earnings levels, changes or surprises as an empirical issue to be taken into account when presenting and discussing our results.

4. SAMPLE AND DATA

We test the above empirical predictions, and provide related evidence, on a sample comprising all U.K. quoted non-financial firms over the years 1989 to 1998.[6] We exclude

[6] We use DATASTREAM live and dead U.K. quoted equity lists, UKQI and DEADUK. These lists are based on issued securities and include a number of instances where individual firms are listed more than once as a result of multiple issues. We identify these cases and retain in the sample only one equity class per firm-year.

financial firms because of our interest in working capital accruals. The accrual generating process is considerably different in financial firms (Peasnell et al. 2000b, 318). We further restrict the sample to accounting periods of approximately one year in duration, defined as not less than 350 or more than 380 days. We impose this requirement because accounting flow variables such as earnings are incomparable if they relate to periods of different duration.[7]

Our primary data source for tests on earnings levels and changes is DATASTREAM. For these tests, we measure earnings (EARN) in a hybrid manner across implementation of an important U.K. reporting standard, FRS 3.[8] In pre-FRS 3 accounting periods, we measure EARN as earnings before extraordinary items. In post-FRS 3 accounting periods, we measure EARN as earnings before extraordinary and special or non-operating exceptional items.[9] The special items we exclude are items that could have been extraordinary pre-FRS 3, are exceptional post-FRS 3, and are required by FRS 3 to be disclosed separately on the face of the income statement.[10] We measure scaled earnings level (E) as $EARN_t/TA_{t-1}$, and scaled earnings change (ΔE) as $(EARN_t - EARN_{t-1})/TA_{t-1}$.

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[7] Of our final earnings level sample of 10,197 firm-years, 1,561 (15.3 percent) observations have less than 365 or more than 366 days.

[8] FRS 3 was issued on 29 October 1992, voluntary compliance being immediately optional and mandatory compliance required in relation to accounting periods ending on or after 22 June 1993. FRS 3 redefined ordinary and extraordinary activities with the effect of abolishing extraordinary items in the U.K.

[9] Our pre-FRS 3 EARN is DATASTREAM account code (DS) 625, and our post-FRS 3 EARN is DS625-(DS1083-DS1094-DS1097). We measure other variables in terms of DATASTREAM account codes as follows. WCA is Δ(DS376-DS375)-Δ(DS389-DS309), REV is DS104, TA is DS392, XI is DS193 and SI is DS1083-DS1094-DS1097.

[10] These items, listed in Paragraph 20 of FRS 3, are profits or losses on sale or termination of operations, costs of fundamental reorganisations or restructuring, and profits or losses on sale of fixed assets. Ernst and Young (1999) uses the terminology non-operating exceptional to describe these items. Exclusion of these items from our post-FRS 3 measure of earnings closely resembles the adjustments made by Lin and Walker (2000) in their post-FRS 3 construct of headline earnings.

Our analysis of earnings *before* extraordinary items is consistent with Degeorge et al. (1999) but contrasts with Burgstahler and Dichev (1997) who examine earnings *after* extraordinary items. Theory is unclear about which earnings measure managers seek to manipulate, or how this measure is identified. We focus on earnings before extraordinary items because the investment analyst community would appear to make wider use of earnings measured before extraordinary items.[11] This increases the incentive for firms to manage earnings before extraordinary items relative to basic targets. Further, there is U.K. evidence that earnings before extraordinary items is less timely in reflecting bad news than earnings after extraordinary items (Pope and Walker, 1999). The fact that classification of extraordinary items can be used as a means to manage earnings before extraordinary items makes it especially interesting to study whether DACC are also used to manage this earnings measure. For completeness, we also report evidence on the use of extraordinary and special items to achieve earnings targets.

For the purposes of tests on earnings surprises, we obtain actual and forecasted earnings from I/B/E/S.[12] We restrict the sample to those consensus forecasts based on at least three individual forecasts, and use the median forecast from the last available month before the earnings announcement as the proxy for forecasted earnings. We require at least three individual forecasts so as to ensure that the median is a reliable measure. We use the median instead of the mean so as to minimize the effect of individual forecasts with unusual errors having excessive influence on the measure of central tendency. Thus, we measure the earnings surprise (ES) as actual earnings minus the median forecast scaled by opening TA.

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[11] I/B/E/S International Inc. (1996, 6) points out that analysts generally make forecasts of earnings on a continuing basis, i.e., excluding extraordinary and other non-operating items. Similarly SIP 1 excludes extraordinary and several other non-maintainable items from the definition of headline earnings. Lin and Walker (2000) report that, in terms of explaining stock prices, headline or maintainable earnings performs generally better than FRS 3 earnings, which includes non-operating exceptional or formerly extraordinary items.

[12] We only have access to I/B/E/S data for 1990 onwards.

We estimate DACC by applying the Jones (1991) model to working capital accruals. Under this model, normal or non-discretionary accruals are assumed to be a function of designated factors or drivers. The component of accruals not explained by these drivers is denoted as abnormal or discretionary. In the original Jones (1991) formulation, total accruals are modeled as a function of the change in total sales (ΔREV) and gross property, plant and equipment (PPE). The former is argued to drive short term accruals or WCA and the latter to drive long term accruals, most notably depreciation.

Our focus is on the discretionary component of WCA. We believe that long term accruals such as depreciation are unlikely to be an effective means of managing earnings given their visibility and the ability of the market to observe, and unwind the earnings implications of, any attempt to manipulate them (Young 1999, 842). We measure total WCA as the change in non-cash working capital.[13] We then estimate the following cross-sectional OLS regression for each DATASTREAM level-6 industry-year, using all valid firm-years with available data but requiring a minimum of six observations per regression:[14]

$$WCA_{ijt} / TA_{ijt-1} = \beta_{0jt} + \beta_{1jt} \Delta REV_{ijt} / TA_{ijt-1} + \varepsilon_{ijt} \quad (1)$$

[13] Collins and Hribar (1999) express the concern that measuring accruals as the change in balance sheet accounts introduces measurement error into total accruals, primarily as a result of mergers, acquisitions and discontinued operations. They state that the error in total accruals measured through the balance sheet approach is unlikely to be correlated with the assumed drivers of accruals in the Jones (1991) model, resulting in the measurement error being captured entirely by the residual or discretionary accruals estimate. We believe their conjecture on the correlation between the measurement error and change in revenue, in particular, is counter-intuitive. Change in total consolidated revenue is, *a priori*, no less susceptible to influence by mergers, acquisitions and discontinued operations than change in working capital balances. In any case, measuring total accruals using the cash flow statement, which is the approach preferred by Collins and Hribar (1999), is itself not unproblematic. The difference between operating profit and operating cash flow usually includes a number of idiosyncratic accruals that cannot be classified systematically as either discretionary or non-discretionary.

[14] DeFond and Jiambalvo (1994) and Young (1999) also require a minimum of 6 observations.

where i, j and t are firm, industry and time subscripts respectively. This regression facilitates partitioning of WCA into non-discretionary accruals (NDACC) and DACC. NDACC are measured as the predicted component of WCA and DACC as the residual resulting from this regression. Thus:

$$\begin{aligned} DACC_{ijt} &= WCA_{ijt} / TA_{ijt-1} - NDACC_{ijt} \\ &= WCA_{ijt} / TA_{ijt-1} - (\hat{\beta}_{0jt} + \hat{\beta}_{1jt} \Delta REV_{ijt} / TA_{ijt-1}) \end{aligned} \quad (2)$$

where $\hat{\beta}_0$ and $\hat{\beta}_1$ are the industry-year OLS parameters estimated above.

In our use of the Jones (1991) model rather than available alternatives, we are guided by Peasnell et al. (2000b). They evaluate the specification and power of alternative methods of estimating DACC using U.K. data. The results they report suggest that, on the whole, alternative models currently available are not superior to the Jones (1991) model in terms of ability to detect plausible levels of earnings management. Our measure of WCA and the DACC estimation technique closely resemble those used by Peasnell et al. (2000b).

Having estimated DACC as described above, we measure non-discretionary earnings (NDE), non-discretionary earnings change (NDΔE) and non-discretionary earnings surprise (NDES) as E - DACC, ΔE - DACC and ES - DACC respectively. Our earnings levels tests are conducted on an earnings level sample defined as all observations from the above-described main sample for which E, NDE and DACC are available, and having deleted the extreme percentiles of E, NDE and DACC. Our earnings change and surprise samples are defined in a similar manner, with E (NDE) being replaced by ΔE (NDΔE) and ES (NDES) respectively.

These criteria result in earnings level, change and surprise samples of 10,197, 10,209 and 4,380 observations respectively. Basic descriptive statistics on these samples are presented in Table 1. Mean (median) E, ΔE and ES are 0.055 (0.062), 0.007 (0.008) and –0.001 (0.001) for the earnings level, change and surprise samples respectively. As expected, mean (median) DACC is

zero (zero) for both the earnings level and change samples.[15] However, the earnings surprise sample has mean (median) DACC of –0.003 (-0.002).

TABLE 1 ABOUT HERE

5. RESULTS

Distribution of earnings and non-discretionary earnings relative to target

We predict in H1 that earnings relative to targets will be distributed discontinuously around zero, consistent with firms managing earnings to avoid small deficits and achieve small surpluses. We further predict in H2 that the exclusion of discretionary accruals from current period earnings will cause the discontinuity around zero to disappear. The evidence on these hypotheses is reported in Figure 1 and Table 2. Figure 1 presents histograms of reported and non-discretionary earnings levels, changes and surprises. It also shows the differences between the frequency of reported earnings and non-discretionary earnings relative to target in each class, thus illustrating the impact that DACC have on the distribution of earnings relative to targets. Table 2 reports the Burgstahler and Dichev (1997) standardized difference statistics relating to the classes at both immediate sides of zero in the distributions reported in Figure 1.[16]

FIGURE 1 ABOUT HERE

TABLE 2 ABOUT HERE

The distribution of earnings levels, shown in Figure 1 Panel A1 reveals a distinct discontinuity at zero. The frequency at the immediate left of zero is low and that on the immediate right of zero is high relative to expected frequencies under a smooth distribution. As predicted, Panel A2 shows that the distribution of non-discretionary earnings levels is relatively smooth around zero. There is little disparity between the frequencies immediately adjacent to

[15] Given that DACC is estimated as an OLS residual, the population average is zero by construction.

[16] We use increasingly narrow bands or bin widths as we move from earnings levels to changes to surprises because of the degree of concentration around zero in these respective distributions.

zero. Panel A3 confirms that DACC have the effect of increasing the frequency of small positive earnings and decreasing the frequency of small negative earnings. In addition, DACC have the effect of reducing the frequency of both large positive and large negative earnings.

Table 2 Panels A1 and A2 confirm the visual impressions regarding the impact of DACC around zero earnings. Panel A1 indicates that the actual frequency of the class to the immediate left of zero in the earnings distribution is significantly less than the expected frequency of that class under the null hypothesis of a smooth distribution. On the other hand, Panel A2 indicates that the actual frequency of the class to the immediate left of zero in the non-discretionary earnings distribution is insignificantly different from its expected frequency. This confirms our H1 and H2 predictions that earnings is distributed discontinuously around zero, while non-discretionary earnings is not.

Figure 1 Panel B1 shows the distribution of earnings changes. This histogram reveals a discontinuity at zero, caused by the frequency at the immediate right of zero appearing to be higher and that at the immediate left of zero lower than expected. As predicted, the distribution of non-discretionary earnings changes shown in Panel B2 does not have a similar discontinuity at zero. The frequencies at the immediate sides of zero appear indistinguishable from each other, and the entire distribution appears symmetrical around zero. The distribution of actual earnings changes has relatively heavy density over a range of small positive earnings changes. Panel B3 shows that DACC have the effect of increasing the frequency of small positive earnings changes, increasing the frequency of small negative earnings changes to a lesser extent, and reducing the frequency of large positive and negative earnings changes.

Evidence confirming our H1 and H2 predictions regarding the effect of DACC on the discontinuity in the distribution of earnings changes is presented in Table 2. Panel B1 indicates that the frequency of the class to the immediate left of zero in the earnings change distribution is significantly less than expected had the distribution been smooth. However, this is not the case in

the distribution of non-discretionary earnings changes. Panel B2 shows that the frequency to the immediate left of zero is insignificantly different from that expected under a smooth distribution.

In Figure 1 Panel C1, we present the distribution of earnings surprises. This distribution reveals high concentration around zero, with more than 85 percent of all firm-years reporting earnings surprises within a 1.25% of TA band around zero. Consistent with our H1 prediction the frequency to the immediate right of zero is markedly greater than that at the immediate left of zero. Panel C2 reports the distribution of non-discretionary earnings surprises, with little observable disparity between frequencies immediately either side of zero. This distribution is dispersed over a wide range, consistent with DACC being used to manage earnings towards forecast and with analysts anticipating a significant part of DACC. This is confirmed in Panel C3, which indicates that DACC have the effect of causing convergence of earnings and forecasts. Specifically, DACC increase the frequency of small magnitude surprises and reduce the frequency of large magnitude surprises. It is also clear from this panel that DACC increase the frequency of small positive surprises to a greater extent than small negative surprises.

Table 2 Panel C1 confirms that the frequency of the class to the immediate left of zero in the earnings surprise distribution is significantly less than expected under the null hypothesis of a smooth distribution. In contrast, the actual frequency of this class in the non-discretionary earnings surprise distribution (Panel C2) is insignificantly different from the expected frequency. This is consistent with our H1 and H2 predictions that earnings surprises are distributed discontinuously around zero while non-discretionary earnings surprises are not.

In summary, therefore, we find that earnings levels, changes and surprises are distributed with visible and statistically significant discontinuities around zero. Specifically, in each of these distributions, the frequency to the immediate right of zero is greater than expected and the frequency to the immediate left of zero lower than expected under a smooth distribution. We find, further, that the distributions of non-discretionary earnings levels, changes and surprises are

not discontinuous in this manner around zero. This suggests that the discontinuity in the distribution of earnings relative to basic targets is caused by DACC.

Proportions of firm-years achieving and missing earnings targets as a result of DACC

We predict in H3 that DACC have the effect of increasing the proportion of firm-years reporting positive earnings levels, changes and surprises. We further predict in H4 and H5 that DACC increase the proportion of small positive earnings levels, changes and surprises, and reduce the proportion of small negative earnings levels, changes and surprises. These predictions are based on the hypothesized use of DACC to achieve basic earnings targets.

Preliminary evidence on these predictions is obtained from Figure 1 as discussed above. This figure indicates that DACC increase the proportion of positive and, particularly, small positive earnings levels, changes and surprises, consistent with prediction. Also consistent with prediction, DACC reduce the proportion of small negative earnings levels. However, contrary to prediction, DACC increase the proportion of small negative earnings changes and surprises. While the graphical evidence in Figure 1 clearly illustrates the effects of DACC, it does not indicate the statistical significance of these effects.

TABLE 3 ABOUT HERE

Table 3 reports the results of formal tests of the predictions we make in H3, H4 and H5. Panel A shows that DACC have the effect of significantly increasing the proportion of positive earnings levels from 74.8 to 85.2 percent. DACC also significantly change the proportions of firm-years with positive and negative earnings levels within 0.05 of opening TA. In the case of positive earnings levels within this range, the proportion increases from 20.8 to 26.4 percent. In the case of negative earnings levels within the same range, the proportion decreases from 12.1 to 6.5 percent. These changes are consistent with the prediction that DACC are used to manage earnings to achieve positive earnings levels and, in particular, to transform small negative earnings into small positive earnings.

TABLE 4 ABOUT HERE

Table 4 Panel A presents further details on the frequency with which firms move from specific broad classes of non-discretionary earnings to specific broad classes of actual earnings. This panel reveals that 14 percent of the entire sample move from negative non-discretionary earnings to positive earnings as a result of DACC. On the other hand, only 3.6 percent of the sample move from positive non-discretionary earnings to negative earnings as a result of DACC.[17] Similarly 5.4 percent of the entire sample move from negative non-discretionary earnings within 0.05 of opening TA to positive earnings within the same range. This represents 44.5 percent of the 1,235 firm-years with non-discretionary earnings within 0.05 of opening TA.

Table 3 Panel B reports the impact of DACC on the proportion of firm-years achieving and missing positive earnings changes. DACC significantly increase the proportion of firm-years achieving positive earnings changes from 52.7 to 62.6 percent. DACC also significantly increase the proportion of firm-years with positive earnings changes within 0.025 of opening TA from 14.4 to 35.3 percent. Both of these predictions are consistent with DACC being used to achieve positive earnings changes. However, contrary to prediction, DACC significantly increase the proportion of negative earnings changes within 0.025 of opening TA from 13.7 to 18.6 percent. This result reflects the visual impression conveyed by Figure 1.

One potential reason for DACC increasing the proportion of firm-years with small negative earnings changes is the use of DACC to smooth earnings. Smoothing would be reflected by the use of DACC to dampen fluctuations in earnings, i.e., to reduce the magnitude of earnings changes. Table 4 Panel B shows that 789, or 41.5 percent, of the 1,903 firm-years with actual negative earnings changes within 0.025 of opening TA use DACC to reduce the magnitude of a larger negative earnings change. If these observations were excluded, the proportion of firm-years

[17] To clarify interpretation of this table, the 14 percent comprise those observations in the upper right quadrant of the panel, i.e., (113+191+550+65+84+261+42+36+88)/10197. The 3.6 percent comprise those observations in the lower left quadrant, i.e., (20+7+7+49+14+13+166+57+39)/10197.

with small negative earnings change would move from 13.7 to 10.9 percent as a result of DACC. In other words, if firm-years dampening the magnitude of large negative earnings change are excluded, DACC have the effect of reducing the proportion of firm-years with small negative earnings changes, as predicted.

It is important to note that, even if firm-years dampening the magnitude of large positive earnings change are excluded, DACC still have the predicted effect of increasing the proportion of firm-years with small positive earnings changes. In this case, the proportion concerned increases from 14.4 to 22.3 percent.

Table 4 Panel B also indicates that 20.2 percent of the entire sample appear to use DACC to move from negative to positive earnings changes. This 20.2 percent represents 42.6 percent of all firm-years with negative non-discretionary earnings changes. Of the entire sample, 6.2 percent of all firm-years move from negative non-discretionary earnings changes within 0.025 of opening TA to positive earnings changes within a similar range. Of the 1,395 firm-years with small negative non-discretionary earnings changes within this range, 58.5 percent actually report positive earnings changes with the aid of DACC.

In Table 3 Panel C, we test the significance of the impact of DACC on the proportion of firm-years meeting and missing analyst forecasts. This panel indicates that DACC significantly increase the proportion of firm-years with positive earnings surprises from 51.8 to 59.3 percent. As predicted, DACC also increase the proportion of firm-years with small positive earnings surprises, within 0.0125 of opening TA, from 10.8 to 55.3 percent. However, contrary to prediction, DACC increase the proportion of firm-years with negative earnings surprises within a similar range from 10.8 to 31.7 percent.

As suggested earlier, this is potentially explained by the use of DACC to reduce the magnitude of large negative earnings surprises. Table 4 Panel C shows that DACC have the effect of facilitating 12 percent of the sample moving from a larger negative surprise to one within 0.0125 of opening TA. This indicates that, even if these observations are excluded, DACC still

have the effect of increasing the proportion of small negative earnings surprises from 10.8 to 19.6 percent, contrary to prediction. Clearly, however, the increase is less dramatic when these observations are excluded.

Table 4 Panel C also indicates that 6.6 percent of the sample appear to use DACC to move from a negative surprise within 0.0125 of opening TA to a positive surprise within the same range. This 6.6 percent represent 61.2 percent of all firm-years with negative non-discretionary earnings surprises within 0.0125 of opening TA. Further, 58.3 percent of all firm-years with negative non-discretionary earnings surprises report positive actual surprises with the help of DACC.

In summary, DACC significantly increase the proportions of firm-years reporting positive earnings levels, changes and surprises, as predicted. DACC also have the effect of significantly increasing the proportion of firm-years reporting small positive earnings levels, changes and surprises, and reducing the proportion of firm-years reporting small negative earnings levels. This is consistent with DACC being used to achieve positive earnings levels, changes and surprises, and with DACC causing the discontinuity in the distribution of earnings. However, contrary to prediction, DACC result in increases in the proportions of firm-years with small negative earnings changes and surprises. We show that this is largely due to the fact that DACC also serves the purpose of dampening the magnitude of large negative earnings changes and surprises in significant numbers of firm-years.

Sensitivity analysis

To assess the robustness of our results to the choice of discretionary accruals model, we re-estimated non-discretionary earnings using five alternative models and recomputed the results reported in Figure1 and Tables 2, 3 and 4. We used two versions of the modified-Jones model (Dechow et al, 1995) based on working capital accruals and three others, versions of both the original Jones and the modified-Jones models, based on total accruals.

The results achieved were consistent with those reported above. Examination of graphical representations of reported and non-discretionary earnings relative to targets, per Figure 1, confirmed our main results. Examining the results statistically revealed for reported earnings a discontinuity around zero in all (30) cases, i.e. five discretionary accruals models, each for levels, changes and surprises, examining one bin either side of zero for each. For non-discretionary earnings, no statistically significant discontinuity was found in the 30 cases examined except when using the Total Accruals MJ1 model for surprises (below zero bin p value 0.085).

Replicating for earnings levels, changes and surprises the tests of proportion reported in Table 3, i.e. achieving and missing earnings targets, both overall and for each of small positive and small negative movements, revealed no instances contradicting the main results. Of 45 tests conducted (five discretionary accruals models, each for levels, changes and surprises, and each for overall, small positive and small negative) only two gave results with a p value other than 0.000 and these were each 0.005.

Our conclusion is that our main results are robust to alternative discretionary accruals model specifications.

Use of extraordinary items in the pre-FRS 3 period and special items in the post-FRS3 period

As discussed earlier, we assume that the object of earnings management is earnings before extraordinary items and, following implementation of FRS 3, before special items. This implies that, apart from using income-increasing DACC, firms wishing to manage earnings upward can either classify ordinary expenses as extraordinary expenses or extraordinary revenues as ordinary revenues. Having already reported evidence that DACC are extensively used by firms to meet earnings targets, we also report evidence on the distribution of extraordinary (XI) and

special items (SI) conditional on earnings relative to targets. This enables us to evaluate whether firms also widely use misclassification of XI and SI as a means of achieving earnings targets.

A new financial reporting standard, FRS 3 (Accounting Standards Board, 1992) was, in part, intended to prevent the use of extraordinary items as an earnings management tool. It had been noted that under the extant regime, a large majority of extraordinary items, i.e. those outside the normal course of business and thus shown 'below the line', were income-decreasing whilst the majority of exceptional, i.e. within the normal course of business items and thus 'above the line', were income-increasing. This *prima facie* evidence of the misuse of extraordinary items led to their virtual elimination by FRS 3.

The main prior expectation we have on the relationship between earnings and XI or SI is that large negative earnings would be associated with low average XI or SI and high (low) incidence of negative (positive) XI or SI. This prediction is based on previous evidence that the incidence of negative XI and SI is greater in periods of financial distress or extremely poor performance (Elliott and Shaw 1988; Hanna 1999). To the extent that firms transform small deficits into small surpluses by misclassifying XI or SI, we expect small surplus firm-years to have unusually low average XI or SI, unusually high frequency of negative XI or SI, and unusually low frequency of positive XI or SI.

FIGURE 2 ABOUT HERE

FIGURE 3 ABOUT HERE

Figure 2 reports average XI and the incidence of negative and positive XI for equal-sized portfolios based on ranked negative and positive earnings relative to targets. This figure relates to the pre-FRS 3 period, defined in this section as all accounting periods ending on or before 30 June 1992, FRS 3 having been issued on 29 October 1992. Figure 3 reports average SI, and the incidence of negative and positive SI relating to post-FRS 3 accounting periods. We define post-FRS 3 in this section as those accounting periods ending on or after 22 June 1993, the date from

which mandatory compliance was required.[18] Our earnings levels and changes portfolios comprise 200 observations each, while our pre- and post-FRS 3 earnings surprise portfolios have 127 and 118 observations respectively, these being the numbers of exact zero surprises in the samples concerned.

Figure 2 Panel A1 presents a plot of average XI by earnings portfolios. A broadly positive relationship between XI and earnings is observable. Panels A2 and A3 present the plots of the proportion of observations in each portfolio reporting negative and positive XI, respectively. The incidence of negative XI decreases steadily as earnings increase, while the incidence of positive XI is relatively stable over the range of earnings. We do not observe around zero any evidence consistent with the use of XI classification to transform small deficits into small surpluses.

Similarly, Panels B1, B2 and B3 present average XI and the incidence of negative and positive XI conditional on earnings change. As before, there is a broadly positive relationship between XI and earnings changes. The incidence of negative XI falls as earnings change increases, but the incidence of positive XI is relatively stable as earnings change varies. This pattern is broadly consistent with the expectation that the incidence of negative XI is associated with poor (or distressed) performance. We do not observe around zero earnings changes any variation in XI that suggests the use of XI classification to achieve positive earnings changes. However, it does appear that the smallest negative earnings change portfolio has relatively high incidence of negative XI and low incidence of positive XI. This is consistent with the use of XI classification to minimize earnings decreases.

[18] We exclude accounting periods ending in the period during which compliance with FRS 3 was voluntary. This is to avoid any bias caused by self-selection in compliance. Accountancy (1993) reports that firms were voluntarily adopting FRS 3 in financial statements issued as early as November 1992. It quotes the chairman of one such firm as saying "(Early adoption of FRS 3) does not have a major impact on the results of the company for the half year or for the previous year, but it does have the consequence of increasing marginally our earnings per share in both periods as the result of including within ordinary activities certain items previously classified as extraordinary."

Panels C1, C2 and C3 present plots of average XI and the incidence of negative and positive XI by earnings surprise portfolio. Extreme negative earnings surprises are associated with extremely low average XI, relatively high incidence of negative XI and relatively low incidence of positive XI, as predicted. Strikingly, apart from the extreme negative earnings surprise portfolio, the zero earnings surprise portfolio has the lowest average XI. Further related evidence is presented in Panels C2 and C3. Of all portfolios, the zero surprise portfolio has the highest proportion of negative XI and lowest proportion of positive XI. This is consistent with ordinary expenses being classified as extraordinary and extraordinary revenues being classified as ordinary so as to facilitate achievement of exact zero earnings surprises.

In Figure 3, we conduct a similar analysis of the use of SI subsequent to implementation of FRS 3. Panels A1, A2 and A3 report average SI and the incidence of negative and positive SI by portfolios based on ranked earnings. As expected, firm-years with large losses have relatively low average SI, high incidence of negative SI and low incidence of positive SI. We do not observe that small profit firm-years have unusually many negative SI or unusually few positive SI.

Panels B1, B2 and B3 report similar plots but conditional on earnings changes. As with the plots conditional on earnings levels, we do not observe that small positive earnings changes portfolio have unusually many negative SI or unusually few positive SI. However, to the left of zero, we note that the smallest negative earnings change portfolio appears to have relatively many negative SI and few positive SI. This result suggests the use of SI classification as a means of minimizing negative earnings changes.

Average SI and the incidence of negative and positive SI are plotted by earnings surprise portfolio in Panels C1, C2 and C3. These plots indicate that the zero earnings surprise portfolio have unusually few negative and positive SI. The low incidence of positive SI would be consistent with firm classifying positive special revenues as ordinary to manage earnings upwards. However, the low incidence of negative SI is contrary to the classification of ordinary expenses as special to manage earnings upward to meet forecasts exactly. One plausible reason for this occurrence is

that firms might also be managing earnings downward to meet forecasts exactly. In this case, the low incidence might reflect the presence of firms classifying special expenses as ordinary to manage earnings downward in order to meet forecasts exactly. However, the plausibility of this argument depends on the conjecture that firms managing earnings upward to meet forecasts misclassify special revenues as ordinary, while firms managing earnings downward to meet forecasts misclassify special expenses as ordinary. We are not aware of theoretical support for this conjecture.

In summary, we do not find evidence consistent with the achievement of positive earnings levels, changes and surprises being facilitated by misclassification of XI or SI. However, we do observe evidence that exact zero earnings surprises are associated with relatively frequent occurrence of negative XI and infrequent occurrence of positive XI. This is consistent with misclassification of positive and negative XI as a means of managing earnings upward to meet forecasts exactly.

6. CONCLUSION

We study a large sample of U.K. firm-years and document that earnings is distributed discontinuously around basic targets while non-discretionary earnings is not. We report that discretionary accruals have the effect of increasing the frequency of achievement of positive earnings levels, changes and surprises. In particular, discretionary accruals have the effect of increasing the incidence of small positive earnings levels, changes and surprises, and decreasing the incidence of small negative earnings levels. We therefore conclude that discretionary accruals are a significant cause of the discontinuity observed in the distribution of earnings relative to basic targets. In addition, we report evidence consistent with the use of discretionary accruals to reduce the magnitude of large negative and positive earnings changes and surprises.

This evidence confirms that discretionary accruals are used in managing earnings to achieve targets, and validates the use of such accruals as a proxy for earnings management. However, the evidence we report indicates that it is not reasonable to assume that firms invariably seek to increase earnings when using discretionary accruals, an assumption implicit in some of the previous literature. We show that the directional use of discretionary accruals as an earnings management mechanism varies with the relationship between unmanaged earnings and basic earnings targets. The specific manner in which firms use discretionary accruals must be considered when using them to proxy for earnings management.

We further report that exact zero earnings surprises are associated with relatively high variance in discretionary accruals. This suggests extensive earnings management to meet forecasts exactly. In addition, we find that exact achievement of forecasts is associated with relatively low average extraordinary items, high incidence of negative extraordinary items and low incidence of positive extraordinary items. This is consistent with misclassification of extraordinary items as a method of managing earnings upward to meet forecasts exactly. However, we do not observe evidence of misclassification of extraordinary or special items to facilitate achievement of positive earnings levels or changes. We therefore conclude that discretionary working capital accruals are prime among methods used by firms to achieve basic earnings targets.

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TABLE 1
Descriptive statistics

Panel A Earnings level sample N=10,197					
	Mean	*Median*	*Q3*	*Q1*	*Std. Dev.*
E_t	0.055	0.062	0.101	0.024	0.089
NDE_t	0.055	0.059	0.117	-0.001	0.114
$DACC_t$	0.000	0.000	0.039	-0.040	0.078

Panel B Earnings change sample N=10,209					
	Mean	*Median*	*Q3*	*Q1*	*Std. Dev.*
ΔE_t	0.007	0.008	0.028	-0.014	0.063
$ND\Delta E_t$	0.007	0.005	0.055	-0.045	0.100
$DACC_t$	0.000	0.000	0.039	-0.041	0.078

Panel C Earnings surprise sample N=4,380					
	Mean	*Median*	*Q3*	*Q1*	*Std. Dev.*
ES_t	-0.001	0.001	0.003	-0.001	0.013
$NDES_t$	0.002	0.002	0.034	-0.030	0.060
$DACC_t$	-0.003	-0.002	0.029	-0.034	0.058

a E = Earnings scaled by opening total assets
NDE = Non-discretionary earnings scaled by opening total assets
ΔE = Change in earnings scaled by opening total assets
NDΔE = Non-discretionary earnings change in earnings scaled by opening total assets
ES = Earnings surprise scaled by opening total assets
NDES = Non-discretionary earnings surprise scaled by opening total assets
DACC = Discretionary working capital accruals scaled by opening total assets, estimated using Jones(1991) model

TABLE 2
Distribution of near-zero earnings and non-discretionary earnings relative to targets

Panel A1 Earnings level N=10,197			Panel A2 Non-discretionary earnings level N=10,197		
Class	$-0.01<E_t\leq 0$	$0<E_t\leq 0.01$	*Class*	$-0.01<NDE_t\leq 0$	$0<NDE_t\leq 0.01$
n	190	356	*n*	300	325
Std. Diff.	-3.516	1.942	*Std. Diff.*	-0.144	-1.144
p value	*0.000*	*0.052*	*p value*	*0.885*	*0.253*

Panel B1 Earnings change N=10,209			Panel B2 Non-discretionary earnings change N=10,209		
Class	$-0.005<\Delta E_t\leq 0$	$0<\Delta E_t\leq 0.005$	*Class*	$-0.005<ND\Delta E_t\leq 0$	$0<ND\Delta E_t\leq 0.005$
n	503	763	*n*	286	289
Std. Diff.	-3.380	2.463	*Std. Diff.*	-0.538	-0.705
p value	*0.001*	*0.014*	*p value*	*0.590*	*0.481*

Panel C1 Earnings surprise N=4,380			Panel C2 Non-discretionary earnings surprise N=4,380		
Class	$-0.0025\leq ES_t<0$	$0\leq ES_t<0.0025$	*Class*	$-0.0025\leq NDES_t<0$	$0\leq NDES_t<0.0025$
n	734	1415	*n*	98	111
Std. Diff.	-3.442	21.225	*Std. Diff.*	-0.209	1.085
p value	*0.001*	*0.000*	*p value*	*0.835*	*0.278*

a E = Earnings scaled by opening total assets
NDE = Non-discretionary earnings scaled by opening total assets
ΔE = Change in earnings scaled by opening total assets
NDΔE = Non-discretionary earnings change in earnings scaled by opening total assets
ES = Earnings surprise scaled by opening total assets
NDES = Non-discretionary earnings surprise scaled by opening total assets
DACC = Discretionary working capital accruals scaled by opening total assets, estimated using Jones(1991) model

b This table shows the Burgstahler and Dichev (1997) standardized difference statistic for the classes at the immediate left and right of zero in the distributions of actual and non-discretionary earnings levels, changes and surprises scaled by opening total assets. This statistic is measured as the difference between the actual and expected frequencies in the class concerned, standardized by the standard deviation of this difference. The expected frequency of each class is assumed to be the mean of the two immediately adjacent classes. In other words, If the number of observations in class i is denoted by n_i, the probability of an observation occurring in class i denoted by p_i, and the total number of observations in the sample denoted by N, the test statistic for class i is given by:

$$\frac{n_i - \frac{(n_{i-1} + n_{i+1})}{2}}{\sqrt{Np_i(1-p_i) + \frac{N(p_{i-1} + p_{i+1})(1 - p_{i-1} - p_{i+1})}{4}}}$$

c This statistic is evaluated against the standardized normal distribution.

d All *p values* reported are two-tailed.

TABLE 3
Proportions of observations achieving and missing earnings targets before and after discretionary accruals

Panel A Earnings levels N=10,197			
	Proportion	Z	*p value*
$NDE_t>0$	0.748	25.718	*0.000*
$E_t>0$	0.852		
$0<NDE_t\leq0.05$	0.208	10.832	*0.000*
$0<E_t\leq0.05$	0.264		
$-0.05<NDE_t\leq0$	0.121	-15.075	*0.000*
$-0.05<E_t\leq0$	0.065		

Panel B Earnings changes N=10,209			
	Proportion	Z	*p value*
$ND\Delta E_t>0$	0.527	18.480	*0.000*
$\Delta E_t>0$	0.626		
$0<ND\Delta E_t\leq0.025$	0.144	38.461	*0.000*
$0<\Delta E_t\leq0.025$	0.353		
$-0.025<ND\Delta E_t\leq0$	0.137	10.170	*0.000*
$-0.025<\Delta E_t\leq0$	0.186		

Panel C Earnings surprises N=4,380			
	Proportion	Z	*p value*
$NDES_t\geq0$	0.518	7.168	*0.000*
$ES_t\geq0$	0.593		
$0\leq NDES_t<0.0125$	0.108	51.101	*0.000*
$0\leq ES_t<0.0125$	0.553		
$-0.0125\leq NDES_t<0$	0.108	24.647	*0.000*
$-0.0125\leq ES_t<0$	0.317		

a
E	=	Earnings scaled by opening total assets
NDE	=	Non-discretionary earnings scaled by opening total assets
ΔE	=	Change in earnings scaled by opening total assets
NDΔE	=	Non-discretionary earnings change in earnings scaled by opening total assets
ES	=	Earnings surprise scaled by opening total assets
NDES	=	Non-discretionary earnings surprise scaled by opening total assets
DACC	=	Discretionary working capital accruals scaled by opening total assets, estimated using Jones(1991) model

b This table evaluates the impact of DACC on the frequency of observations of positive, small positive and small negative earnings levels, changes and surprises. The Z statistic shown relates to the Z test for correlated proportions described by Kanji (1993, 48-49). This test evaluates the impact of a given intervention on the proportion of observations satisfying a given criterion by measuring and comparing the proportion before and after the intervention. If the number of observations moving from no to yes relative to the criterion of interest

is denoted by b, the number moving from yes to no denoted by c, and the total number of observations denoted by N, the test statistic is given by:

$$\frac{(b-c)/N}{\sqrt{\frac{(b+c)-(b-c)^2/N}{N(N-1)}}}$$

c This statistic is evaluated against the standardized normal distribution.
d All *p values* reported are two-tailed.

TABLE 4
Transition matrices indicating the frequency of movement of observations from classes of non-discretionary earnings to classes of earnings relative to target

Panel A
Earnings level sample

	$E_t \leq -0.1$	$-0.1 < E_t \leq -0.05$	$-0.05 < E_t \leq 0$	$0 < E_t \leq 0.05$	$0.05 < E_t \leq 0.1$	$E_t > 0.1$	Total
$NDE_t \leq -0.1$	362	88	82	113	65	42	752
	0.036	*0.009*	*0.008*	*0.011*	*0.006*	*0.004*	*0.074*
$-0.1 < NDE_t \leq -0.05$	59	98	110	191	84	36	578
	0.006	*0.010*	*0.011*	*0.019*	*0.008*	*0.004*	*0.057*
$-0.05 < NDE_t \leq 0$	47	82	207	550	261	88	1235
	0.005	*0.008*	*0.020*	*0.054*	*0.026*	*0.009*	*0.121*
$0 < NDE_t \leq 0.05$	20	49	166	957	755	170	2117
	0.002	*0.005*	*0.016*	*0.094*	*0.074*	*0.017*	*0.208*
$0.05 < NDE_t \leq 0.1$	7	14	57	587	1248	432	2345
	0.001	*0.001*	*0.006*	*0.058*	*0.122*	*0.042*	*0.230*
$NDE_t > 0.1$	7	13	39	299	995	1817	3170
	0.001	*0.001*	*0.004*	*0.029*	*0.098*	*0.178*	*0.311*
n	502	344	661	2697	3408	2585	10197
proportion	*0.049*	*0.034*	*0.065*	*0.264*	*0.334*	*0.254*	*1*

Panel B
Earnings change sample

	$\Delta E_t \leq -0.05$	$-0.05 < \Delta E_t \leq -0.025$	$-0.025 < \Delta E_t \leq 0$	$0 < \Delta E_t \leq 0.025$	$0.025 < \Delta E_t \leq 0.05$	$\Delta E_t > 0.05$	Total
$ND\Delta E_t \leq -0.05$	753	390	468	504	153	107	2375
	0.074	*0.038*	*0.046*	*0.049*	*0.015*	*0.010*	*0.233*
$-0.05 < ND\Delta E_t \leq -0.025$	102	161	321	362	81	36	1063
	0.010	*0.016*	*0.031*	*0.035*	*0.008*	*0.004*	*0.104*
$-0.025 < ND\Delta E_t \leq 0$	69	121	389	629	126	61	1395
	0.007	*0.012*	*0.038*	*0.062*	*0.012*	*0.006*	*0.137*
$0 < ND\Delta E_t \leq 0.025$	49	80	298	779	211	56	1473
	0.005	*0.008*	*0.029*	*0.076*	*0.021*	*0.005*	*0.144*
$0.025 < ND\Delta E_t \leq 0.05$	28	54	196	543	250	90	1161
	0.003	*0.005*	*0.019*	*0.053*	*0.024*	*0.009*	*0.114*
$ND\Delta E_t > 0.05$	48	62	231	789	663	949	2742
	0.005	*0.006*	*0.023*	*0.077*	*0.065*	*0.093*	*0.269*
n	1049	868	1903	3606	1484	1299	10209
proportion	*0.103*	*0.085*	*0.186*	*0.353*	*0.145*	*0.127*	*1*

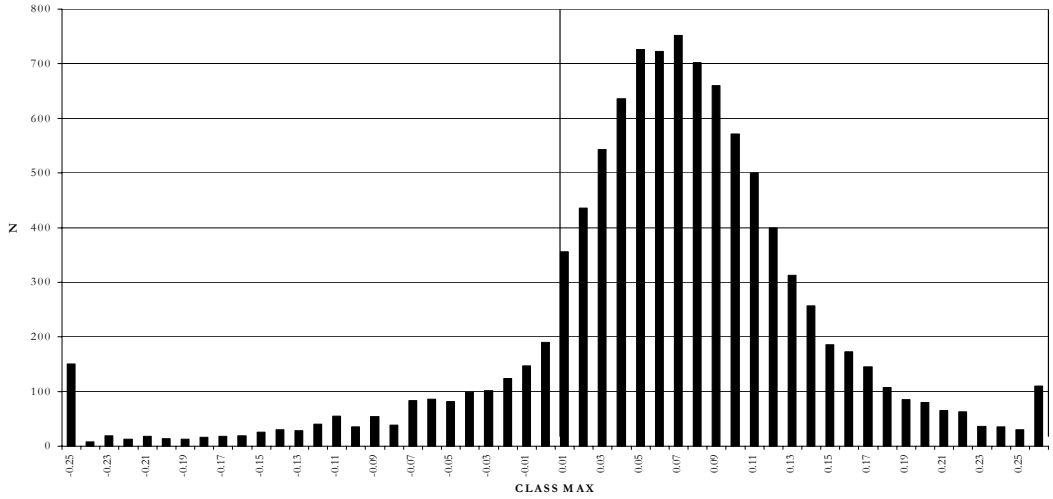
Panel C
Earnings surprise sample

	$ES_t<-0.025$	$-0.025 \leq ES_t<-0.0125$	$-0.0125 \leq ES_t<0$	$0 \leq ES_t<0.0125$	$0.0125 \leq ES_t<0.025$	$ES_t \geq 0.025$	Total
$NDES_t<-0.025$	93	65	398	642	28	8	1234
	0.021	*0.015*	*0.091*	*0.147*	*0.006*	*0.002*	*0.282*
$-0.025 \leq NDES_t<-0.0125$	14	14	129	243	3	0	403
	0.003	*0.003*	*0.029*	*0.055*	*0.001*	*0.000*	*0.092*
$-0.0125 \leq NDES_t<0$	9	12	147	290	12	4	474
	0.002	*0.003*	*0.034*	*0.066*	*0.003*	*0.001*	*0.108*
$0 \leq NDES_t<0.0125$	6	14	147	286	19	1	473
	0.001	*0.003*	*0.034*	*0.065*	*0.004*	*0.000*	*0.108*
$0.0125 \leq NDES_t<0.025$	5	12	123	281	11	0	432
	0.001	*0.003*	*0.028*	*0.064*	*0.003*	*0.000*	*0.099*
$NDES_t \geq 0.025$	29	120	445	681	67	22	1364
	0.007	*0.027*	*0.101*	*0.155*	*0.015*	*0.005*	*0.311*
n	150	150	1275	2608	158	39	4380
proportion	*0.034*	*0.034*	*0.291*	*0.595*	*0.036*	*0.009*	*1*

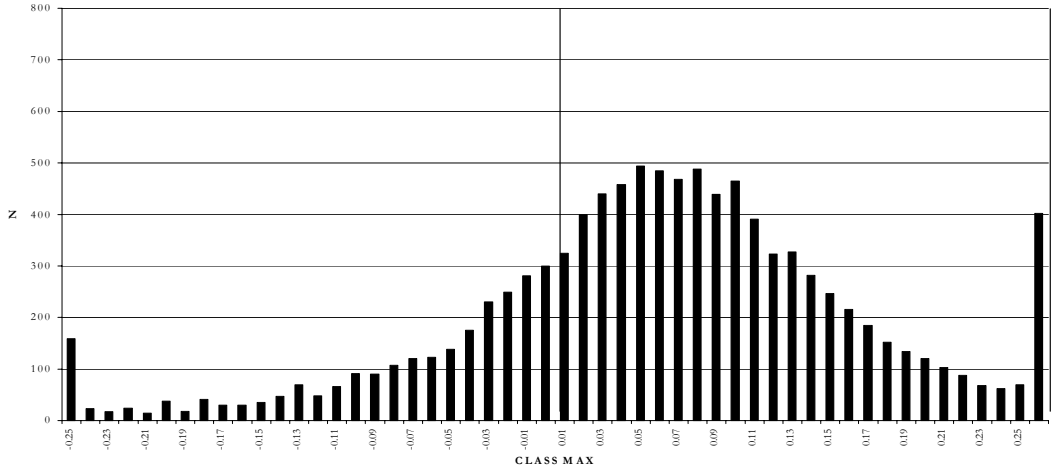
a
E	=	Earnings scaled by opening total assets
NDE	=	Non-discretionary earnings scaled by opening total assets
ΔE	=	Change in earnings scaled by opening total assets
NDΔE	=	Non-discretionary earnings change in earnings scaled by opening total assets
ES	=	Earnings surprise scaled by opening total assets
NDES	=	Non-discretionary earnings surprise scaled by opening total assets
DACC	=	Discretionary working capital accruals scaled by opening total assets, estimated using Jones(1991) mode

FIGURE 1 (Panel A)
Histograms of earnings and non-discretionary earnings levels

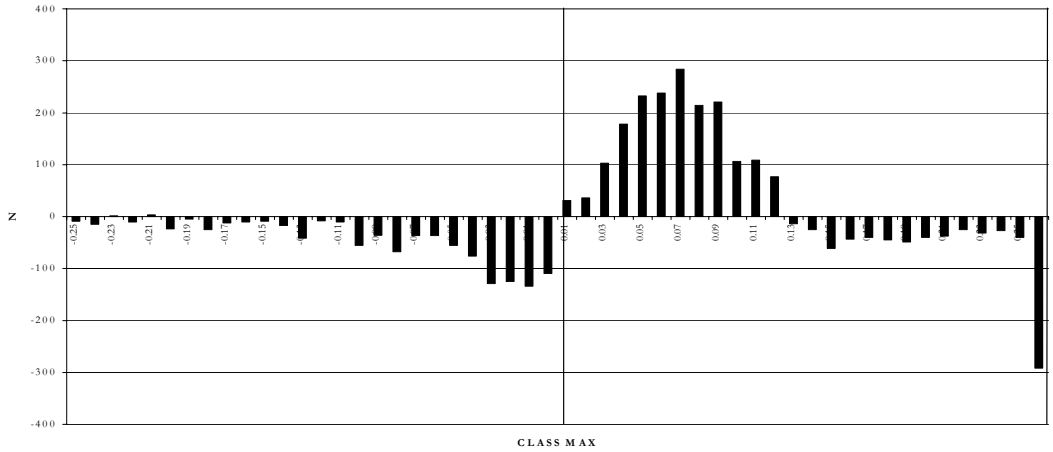
Panel A1 Earnings Levels



Panel A2 Non-discretionary Earnings Levels



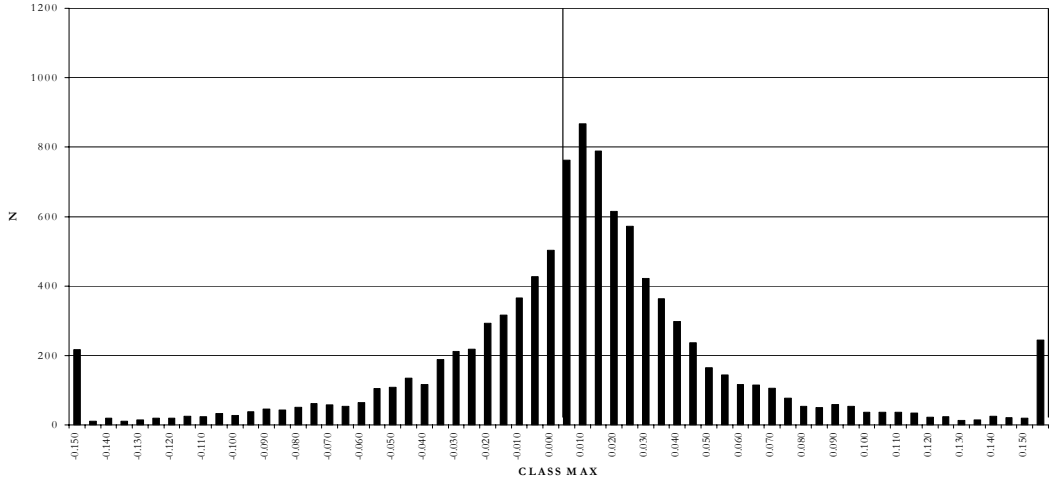
Panel A3 Difference in frequency of earnings and non-discretionary earnings level



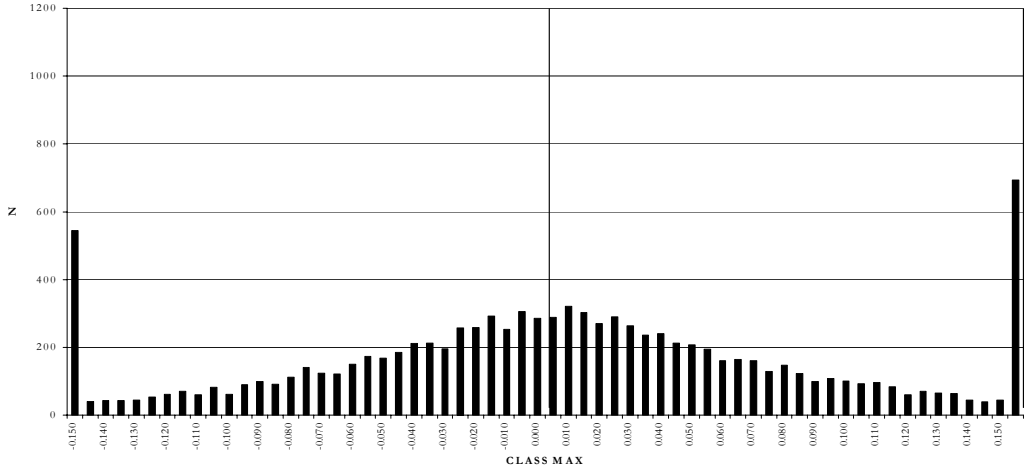
N=10,197 Class width 0.01

FIGURE 1 (Panel B)
Histograms of earnings and non-discretionary earnings changes

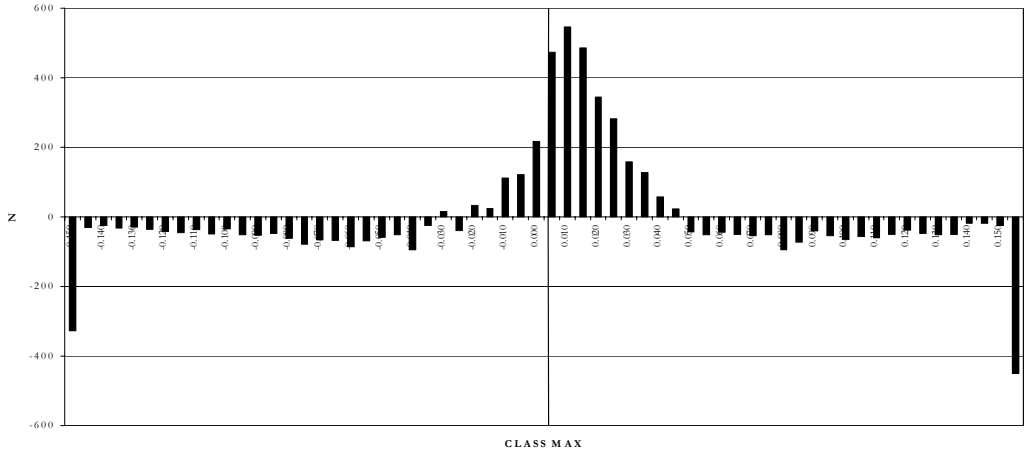
Panel B1 Earnings Changes



Panel B2 Non-discretionary Earnings Changes



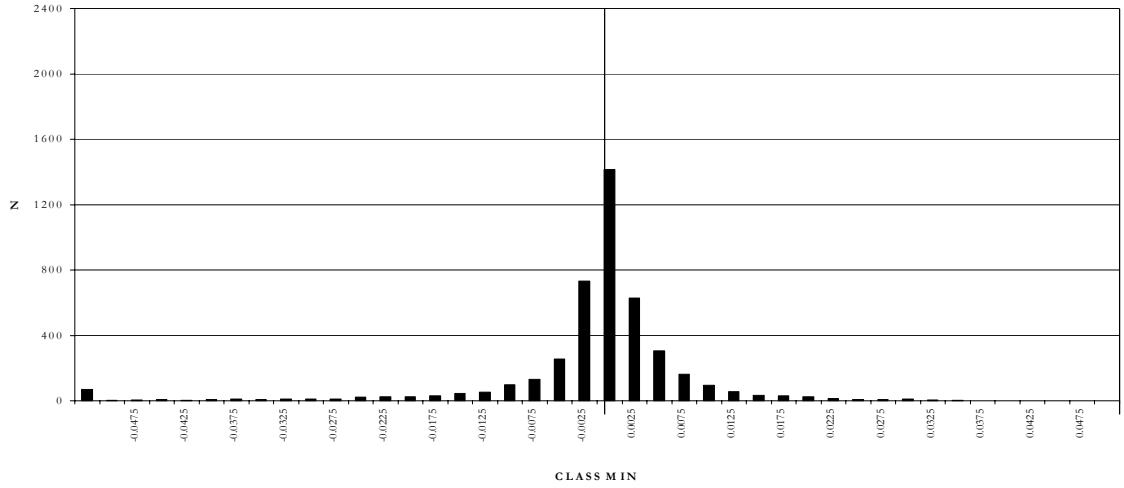
Panel B3 Difference in frequency of earnings change and non-discretionary earnings change



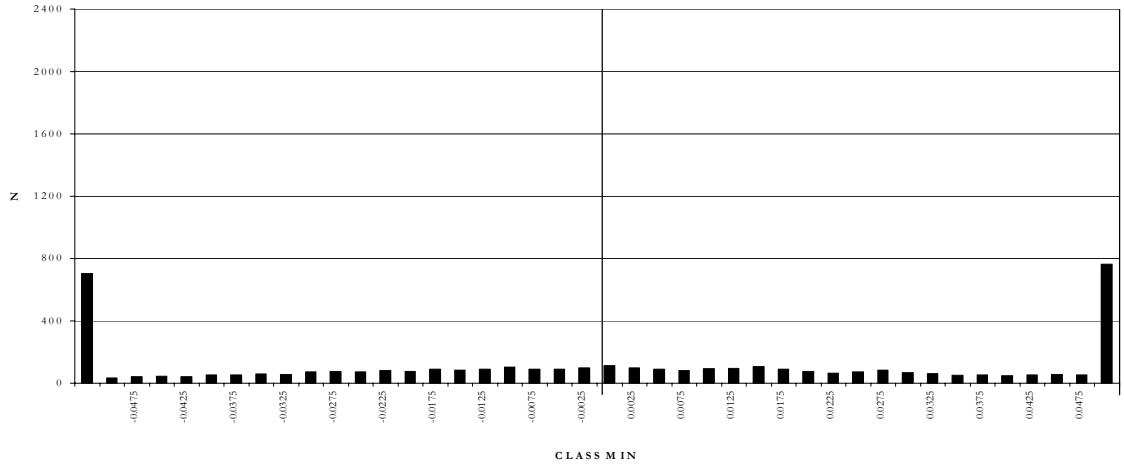
N=10,209 Class width 0.005

FIGURE 1 (Panel C)
Histograms of earnings and non-discretionary earnings surprises

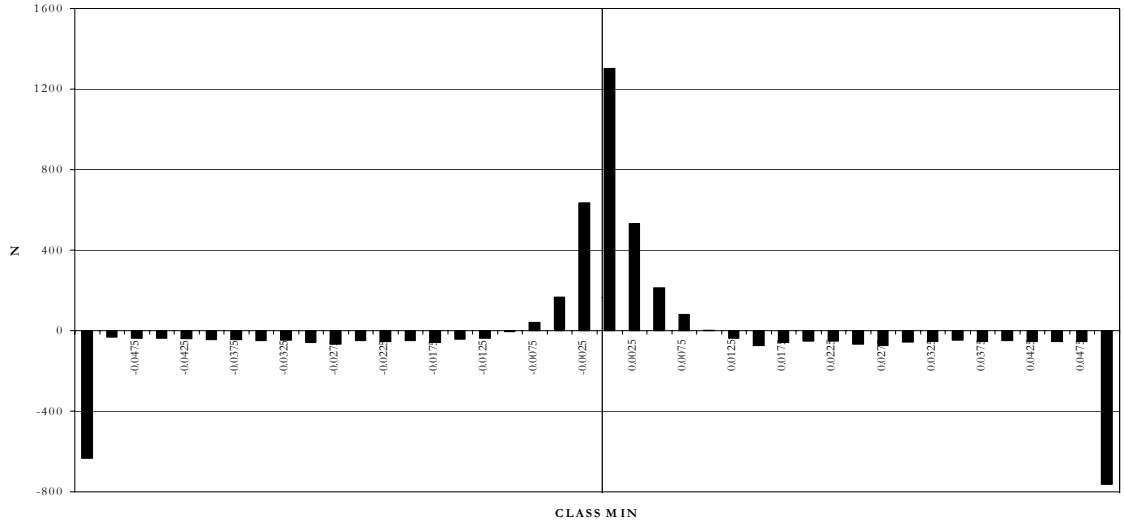
Panel C1 Earnings surprises



Panel C2 Non-discretionary earnings surprises



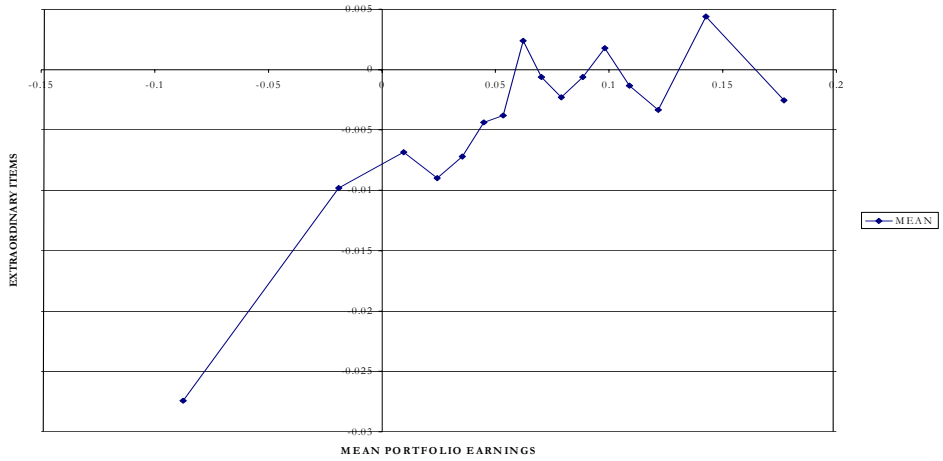
Panel C3 Difference in frequency of earnings surprise and non-discretionary earnings surprises



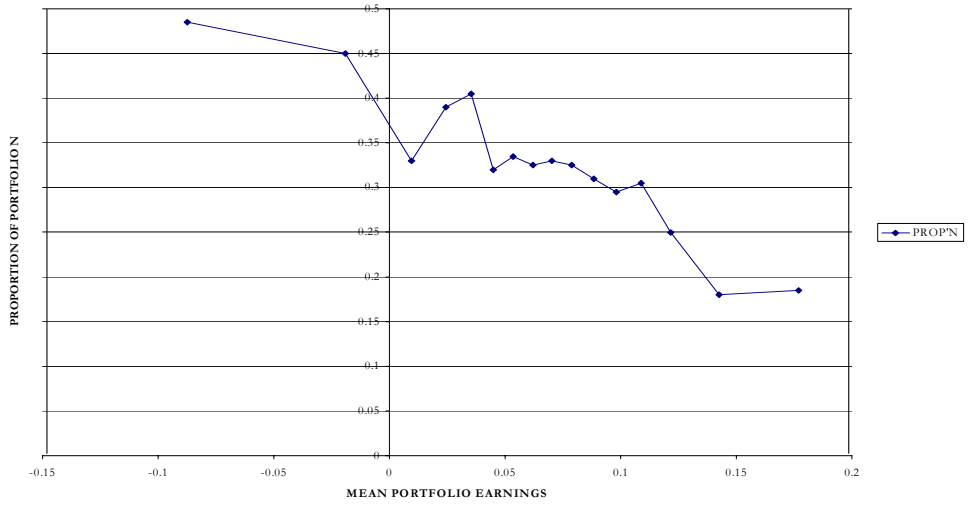
N=4,380 Class width 0.0025

FIGURE 2
Use of extraordinary items pre-FRS 3
Panel A – Earnings levels portfolios

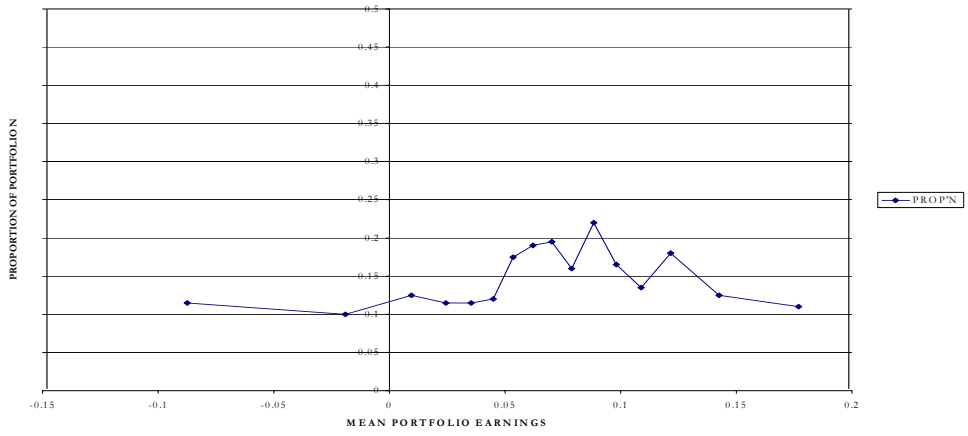
Panel A1 Average extraordinary items



Panel A2 Proportion of observations with negative items



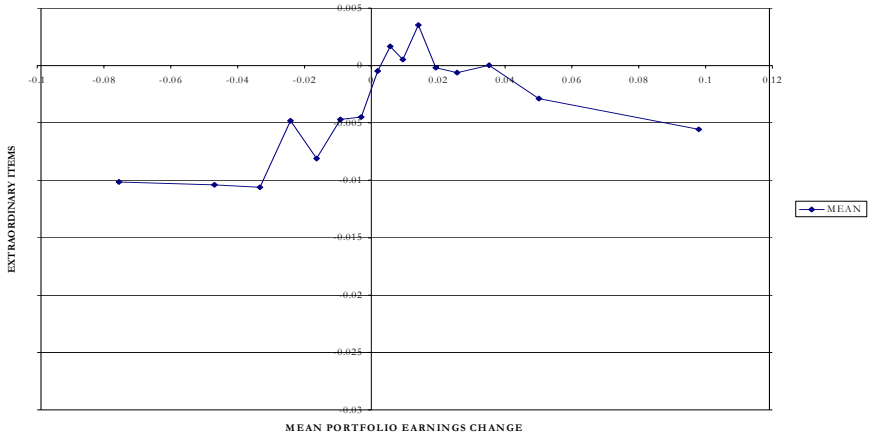
Panel A3 Proportion of observations with positive items



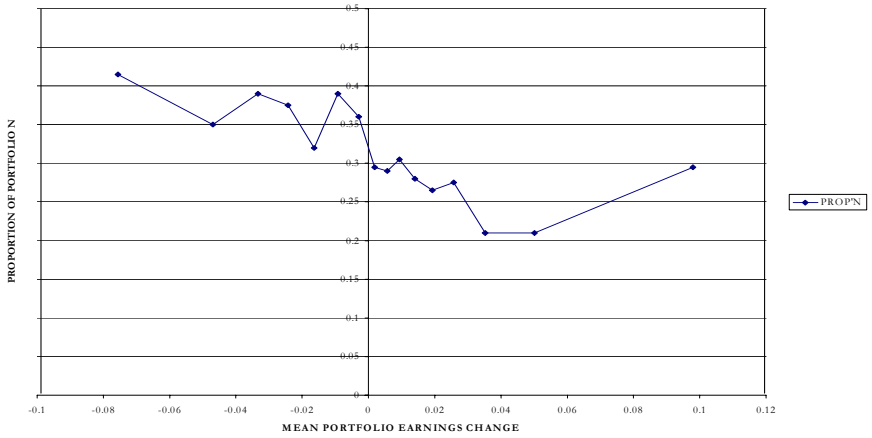
16 portfolios of 200 observations each

FIGURE 2
Use of extraordinary items pre-FRS 3
Panel B – Earnings changes portfolios

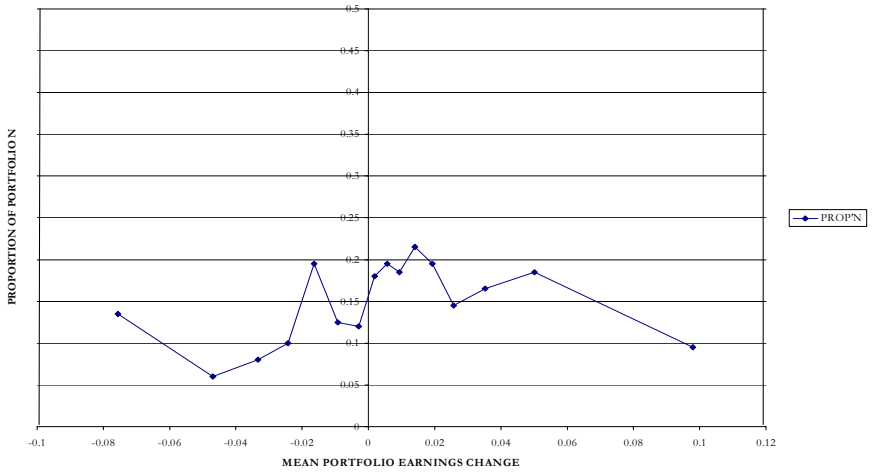
Panel B1 Average extraordinary items



Panel B2 Proportion of observations with negative items



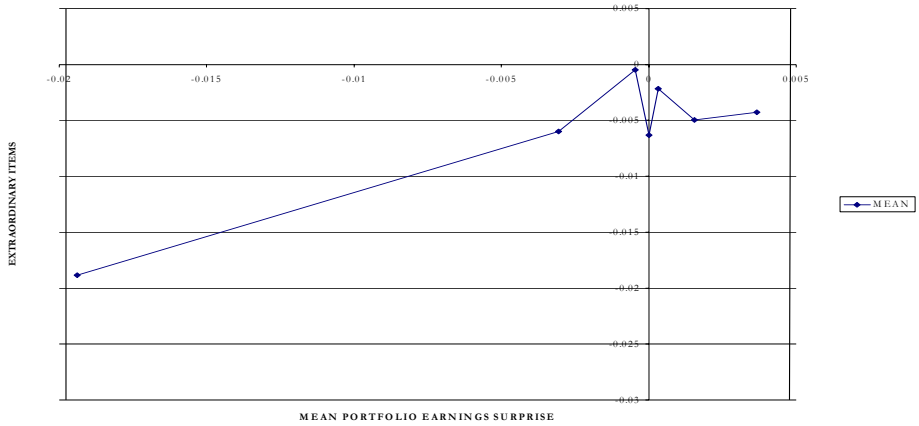
Panel B3 Proportion of observations with positive items



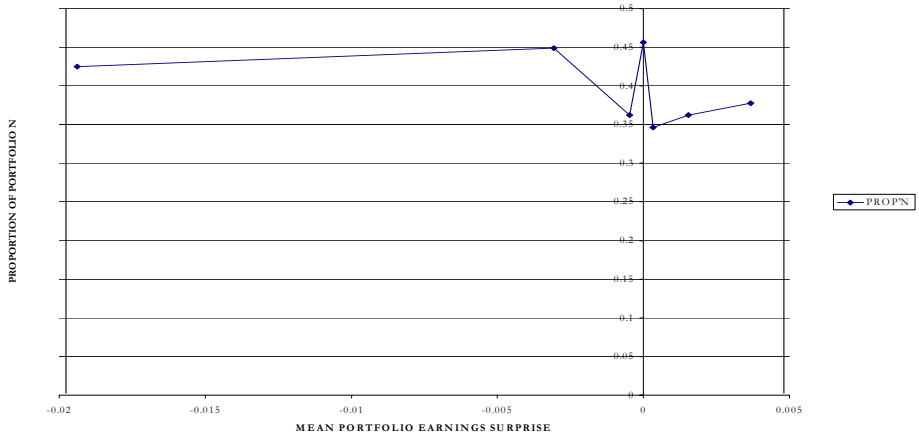
16 portfolios of 200 observations each

FIGURE 2
Use of extraordinary items pre-FRS 3
Panel C – Earnings surprises portfolios

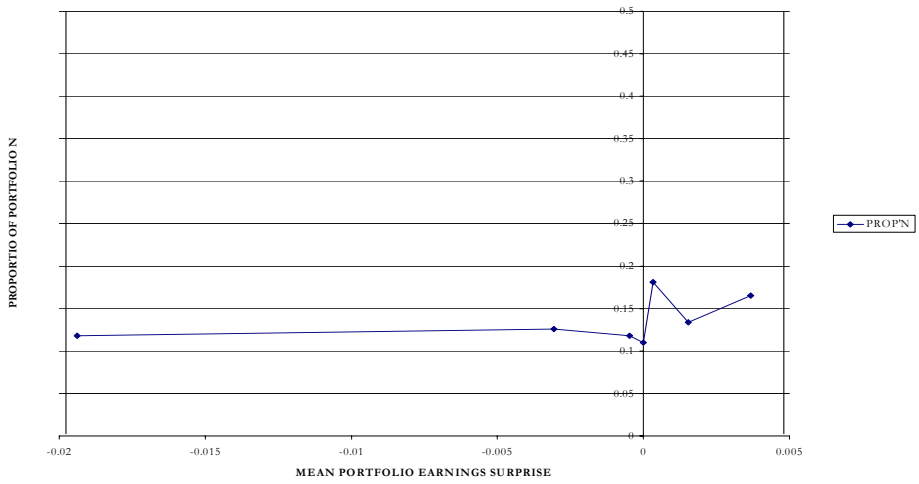
Panel C1 Average extraordinary items



Panel C2 Proportion of observations with negative items



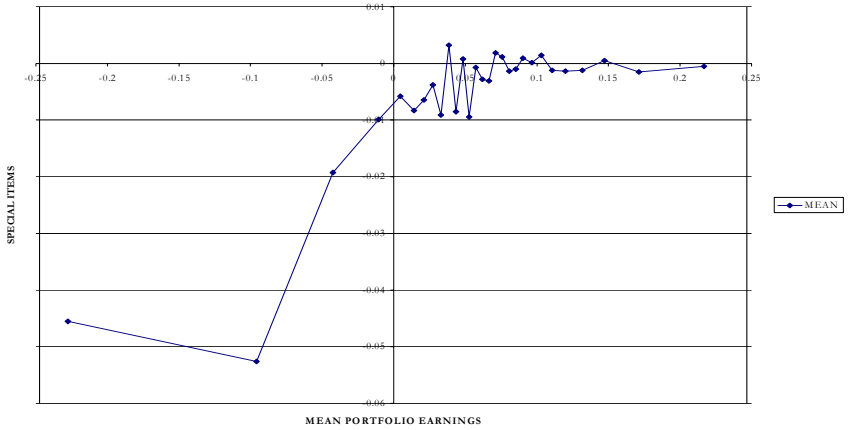
Panel C3 Proportion of observations with positive items



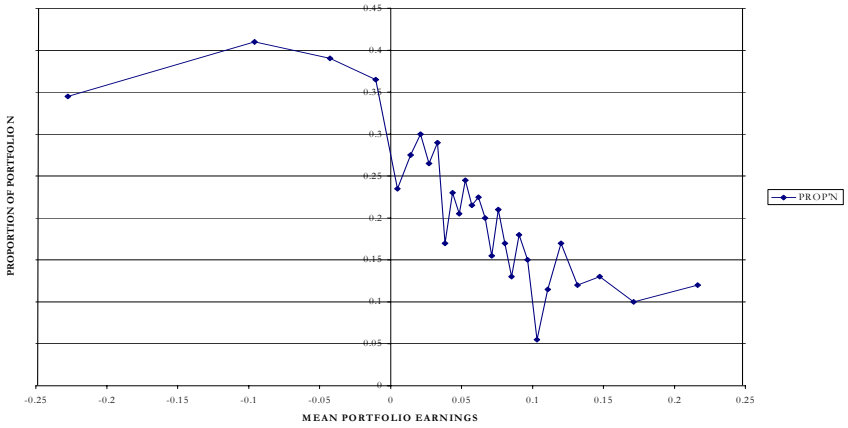
7 portfolios of 127 observations each

FIGURE 3
Use of special items post-FRS 3
Panel A - Earnings levels portfolios

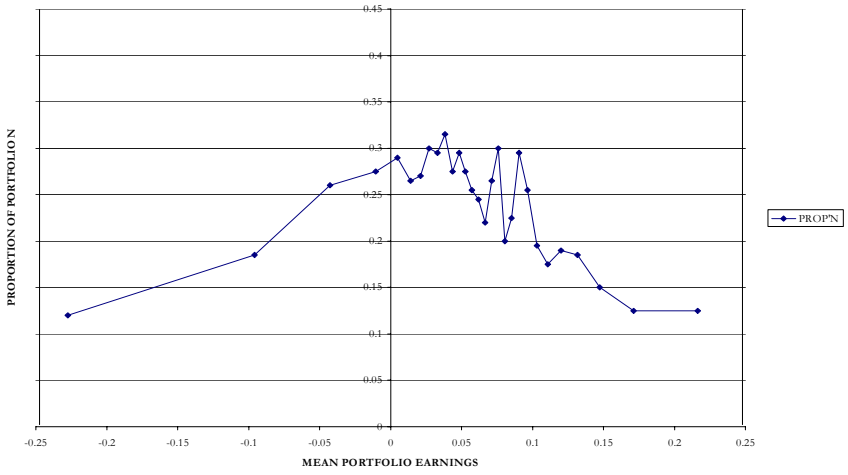
Panel A1 Average special items



Panel A2 Proportion of observations with negative items



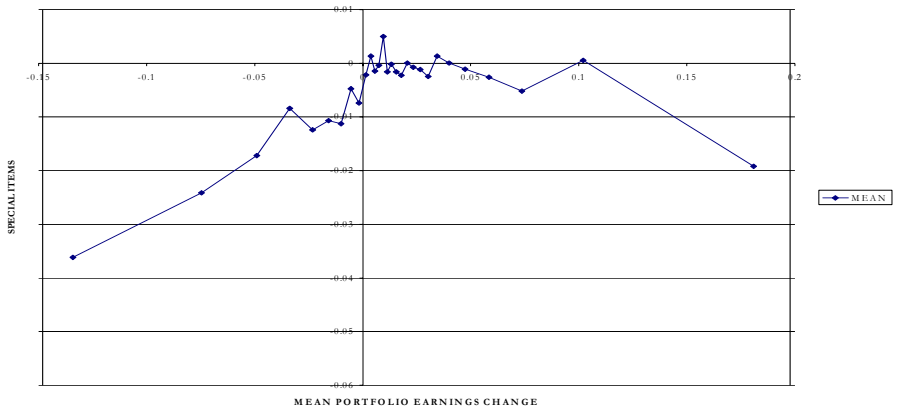
Panel A3 Proportion of observations with positive items



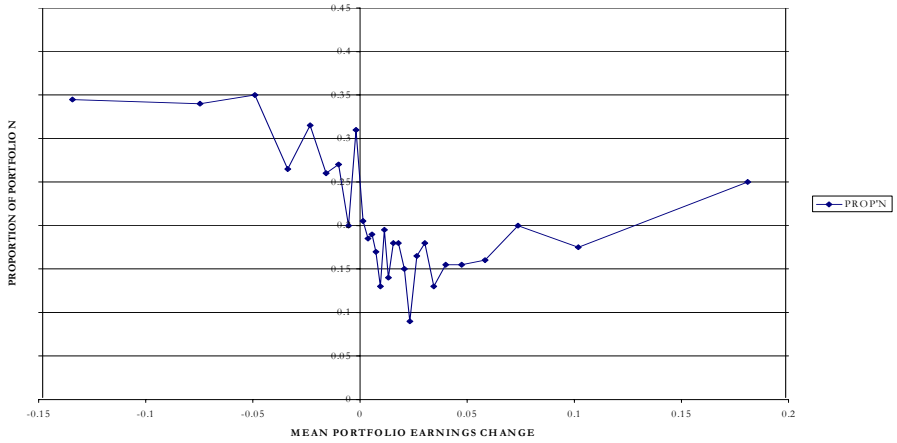
29 portfolios of 200 observations each

FIGURE 3
Use of special items post-FRS 3
Panel B - Earnings changes portfolios

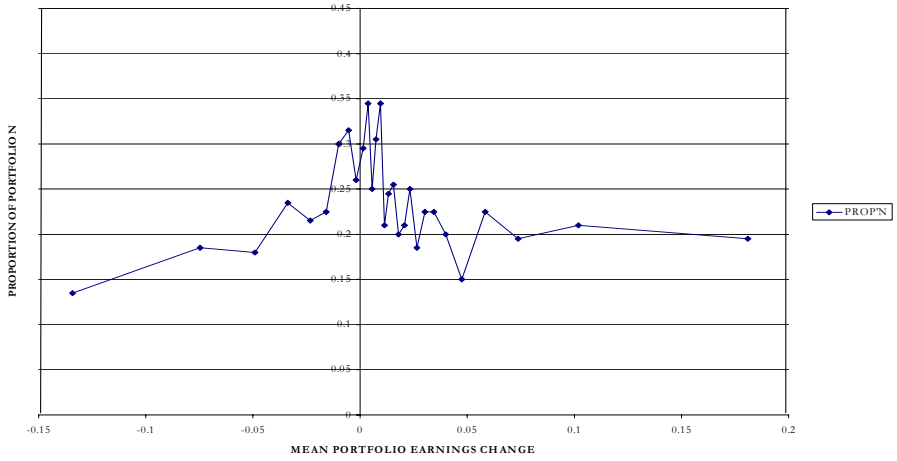
Panel B1 Average special items



Panel B2 Proportion of observations with negative items



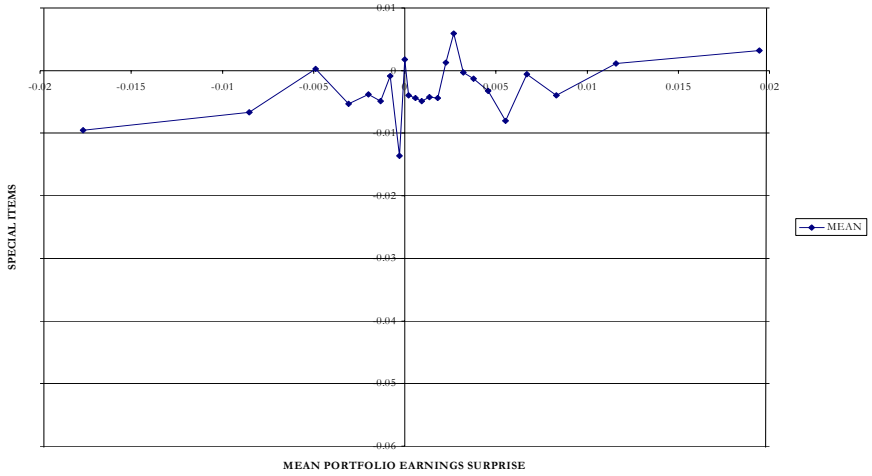
Panel B3 Proportion of observations with positive items



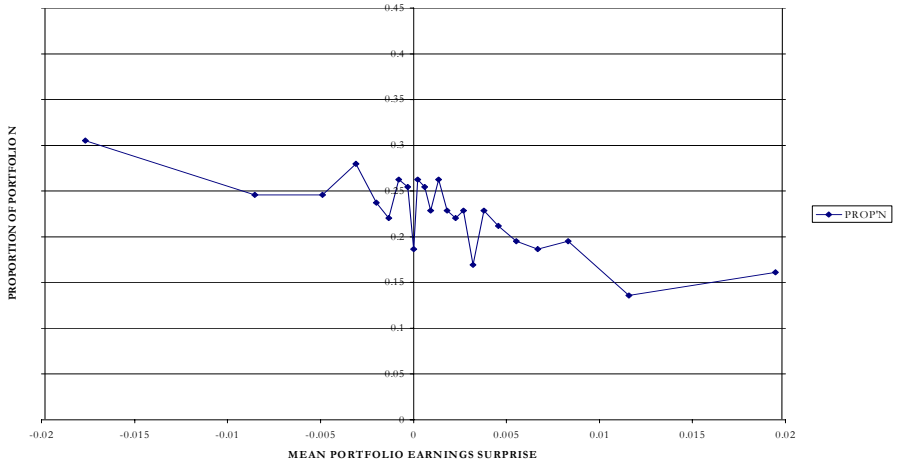
29 portfolios of 200 observations each

FIGURE 3
Use of special items post-FRS 3
Panel C - Earnings surprises portfolios

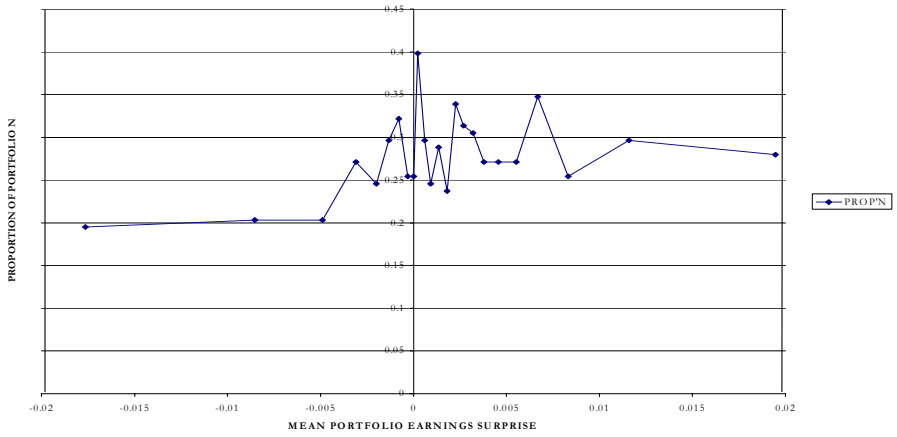
Panel C1 Average special items



Panel C2 Proportion of observations with negative items



Panel C3 Proportion of observations with positive items



24 portfolios of 118 observations each