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Earnings management to avoid earnings decreases and losses

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Abstract:

This study focuses on earnings management by investigating the frequency distribution of the reported earnings (changes) by use of the approach documented by Burgstahler & Dichev (1997). In this study, it is investigated whether Danish firms use earnings management to avoid earnings decreases (and losses) by examining the earnings (changes) frequency distribution. This approach captures neither the magnitude nor how earnings are managed. Consequently, the relation between main “manageable” elements of working capital, current assets (among these the key components inventory and accounts receivable) and current liabilities, and reported earnings (changes) is examined. To address the problem further the modified Jones (1991) model is used to identify and separate discretionary accruals in order to identify pre-managed earnings (changes). The frequency distribution of these calculated pre-managed earnings and the reported earnings are then compared.

The paper contributes to the literature on earnings management in three ways:

a) by investigating the frequency distribution of earnings (changes) in a small non-US country,

b) by comparing the irregularities in the frequency distribution with two specific “manageable” current asset accounts, and

c) by using the well known Jones model to “identify” the pre-managed earnings in order to compare these pre-managed earnings with the reported earnings.

It is shown that the combination of the research of earnings management based on studies of irregularities in the earnings frequency distribution and studies of discretionary accruals can be a powerful approach to examining the existence of earnings management.

The results in the paper support two aspects with respect to earnings management. First: also Danish firm managers engage in earnings management to avoid earnings decreases (and losses); and second: firm managers control “manageable” accounting accruals in anticipation of managing earnings.

JEL classification: C89; G14; M41; L14

Keywords: Discretionary accruals; Earnings management; Frequency distribution; Reported Earnings
1. Introduction.

During the last decades a popular research field has been the topic “earnings management”. Earnings management has been defined in several different ways, but the definition made by Schipper (1989, p. 92) remains very central in this research:

“… a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain (as opposed to merely facilitating the neutral operation of the process)”.

Even though this seems quite clear, one must admit Dechow & Skinner (2000) that “this definition is difficult to operationalize directly using attributes of reported accounting numbers, since they center on managerial intent, which by nature is unobservable”. In this section, these ideas will be discussed further.

When some time-period has passed, management will prepare corresponding financial statements, where the income statement (among other things) shows the company’s net earnings. However, the earnings figure can always be separated into a cash flow part and an accruals part, where the cash flow is perceived as a fact. This is contrary to the accruals, which reflect a natural development in the company’s working capital due to the company’s basic economic conditions, as well as some discretionary management behavior regarding valuation and estimation.

In this context, the level of earnings management can be defined as the relation between the accruals and the cash flow, suggesting that managerial intent affects the occurrence and magnitude of the accruals which requires assumptions and estimates of future cash flows. Since the presence of cash is always important, the purpose of computing accruals is simply a mean to shift or adjust the recognition of cash flows over time, so that the computed earnings better measure firm performance¹.

In the ideal world, this does not give rise to problems, but numerous studies suggest that firms manage their earnings more than they should over time, and several empirical studies have been made over the last few decades trying to identify managed earnings. These generally fall into two categories:

- Frequency studies, where the statistical distribution of the presented financial data is investigated.

- Incitements based studies, where the starting point is a given situation, in which management could be expected to have some interest in managing the reported data in order to obtain some (private)

gain. This is achieved by comparing a group of firms under suspicion of practicing earnings management with a group of firms not under suspicion, using an accrual accounting model².

Concerning the frequency studies, these often look at the reported net earnings and the changes in reported net earnings (scaled by lagged equity market value). In several studies, it has been found that relatively few firms report small losses and earnings decreases while relatively many firms report small positive earnings (increases), which is usually seen as an indication of earnings management³. In order to support this hypothesis, the actual levels of current assets and current liabilities can be investigated, since these two accounting components (and their respective sub-specifications) can be perceived as proxies for how easy earnings management can be made.

There is no doubt that the size and change in the reported earnings (changes) are very important to the firm’s numerous stakeholders. Consequently, it is usually seen as a very strong management incentive to avoid reporting earnings decreases or losses by controlling accounting accruals with discretion⁴. This paper will look closer at these aspects of earnings management by analyzing the frequency distribution of a large number of earnings (changes) observations representing a broad range of non-financial firms in a small non-US market, namely Denmark (DK). Briefly, the accounting environment in DK compared to that of the US is usually characterized as having more flexible accounting principles, leaving more accounting choices to management⁵. As a consequence it would be logical to expect that the extension of earnings management is more widespread in DK. However, nowadays the Danish accounting regulation of interest leaves really discretionary influence to only the two working capital components: inventory and accounts receivable. The relation between earnings management and the accounting regulation might be very important, for which reason this aspect is developed a little further: since (accounting) regulations tend to change over time the DK accounting regulation history has been examined, which leads to the conclusion that relevant changes during the last 30 years center around 1981 and 1990/91. Thereby we can compare the earnings management measures to the accounting regulation setup. Because of this, the levels of the above-mentioned two specific accounts are very interesting, both cross-sectional and across time, since the expected manipulative tendency should be more pronounced on the accounts where it a priori is easiest to do.

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² See among many others Roosenboom et al (2003), who investigate if earnings are managed at the time of a company’s initial public offering in the Netherlands.
⁴ See Hayn (1995) for documentation of this statement. Further, a study by Barth et al (1999) shows that firms with continuing earnings increases are valued relatively higher on the stock market, measured by higher price-to-earnings ratios (controlled for earnings levels).
⁵ Denmark is a member of the European Union for which reason the Danish accounting legislation does not counteract the different EU-directives. But until now, the International Accounting Standards, IAS, have only partly been implemented in the Danish accounting legislation.
Concerning the incitements based studies, a number of these use models of “discretionary accruals” to investigate the potential manipulation of accruals to achieve earnings management goals by using the accruals aggressively to shift or adjust the recognition of cash flows intentionally over time. The motivation to practice earnings management could be to avoid (small) negative earnings numbers if possible (which is usually of management interest). In order to observe earnings management of firms, the now classical Jones (1991) model approach forms the theoretical basis and puts focus on discretionary accruals. This approach involves two steps: First, the non-discretionary accruals are calculated using ordinary least squares regression based on the Jones (1991) time-series model, as modified by Dechow et al (1995). Second, the discretionary accruals are estimated as total accruals (working capital) less the calculated non-discretionary accruals.

Provided the fundamental model assumptions are (approximately) correct, the use of the modified Jones (1991) model makes it possible to use the parameter estimates to reverse the identified management discretion and calculate the pre-managed earnings. Subsequently, it is expected that the frequency distribution of these pre-managed earnings is bell-shaped and smooth (like the reported earnings frequency distribution), but without any irregularities around zero, since the philosophy is that these irregularities are due to management discretion.

The remainder of the paper is organized as follows: Section 2 presents, defines and describes the approaches to earnings management used in the paper. Section 3 describes the sample selection and descriptive statistics. Empirical results are provided in Section 4 - the first part concerns observation of earnings management to avoid earnings decreases (and losses), while the last two parts concern how the reported earnings are managed through discretionary behaviour. Section 5 concludes the paper.

2. Approaches to earnings management and calculation of metrics.

The approach in Burgstahler & Dichev (1997) is used when assessing the earnings (changes) frequency distribution and discussing earnings management by reference to discontinuities in the distribution of earnings (changes) outcomes around some target, here zero. The approach relies on existing associations between accruals and some accounting fundamentals, which makes it possible to separate the accruals into normal and abnormal components. The earnings (changes) measures of interest are calculated as the net earnings (changes) scaled by lagged market value. Positive values of earnings changes then express an increase in the firm’s reported earnings.

The different accruals-related measures are calculated by use of information from the balance sheet and income statement, rather than from the statement of cash flows, as it ensures a complete and stringent
dataset – the (older) cash flow statement data are less complete than balance sheet and income statement data. The definitions follow those of Francis et al (2002):

\[ \Delta \text{TWC}_{jt} = (\Delta \text{CA}_{jt} - \Delta \text{CL}_{jt} - \Delta \text{Cash}_{jt} + \Delta \text{STDEBT}_{jt} - \text{Depr}_{jt}) \]

\[ \text{Earn}_{jt} = \text{CFO}_{jt} + \Delta \text{TWC}_{jt} \]

where \( \Delta \text{TWC}_{jt} \) = change in firm j’s total accruals (the working capital) in year t,
\( \Delta \text{CA}_{jt} \) = firm j’s change in current assets between year t-1 and year t, (which can be separated into inventory, accounts receivable and other current assets)
\( \Delta \text{CL}_{jt} \) = firm j’s change in current liabilities between year t-1 and year t,
\( \Delta \text{Cash}_{jt} \) = firm j’s change in cash between year t-1 and year t,
\( \Delta \text{STDEBT}_{jt} \) = firm j’s change in debt in current liabilities between year t-1 and year t,
\( \text{Depr}_{jt} \) = firm j’s depreciation in year t,
\( \text{Earn}_{jt} \) = firm j’s net earnings in year t,
\( \text{CFO}_{jt} \) = firm j’s cash flow from operations in year t,

In this setting, although \( \Delta \text{TWC} \) might be a quite small (net) number, the components in the relation above might be (very) large gross numbers. For this reason it is interesting to go into details with the specific, manageable \( \Delta \text{TWC} \)-components, like change in inventory size, by looking at the levels of these working capital components. In other words: How much does it take to deliberately affect the change in \( \Delta \text{TWC} \)?

Applying the modified Jones approach to the earnings management setting, earnings management is related to the extent to which accruals are not well explained by earnings adjusted for receivables and property, plant and equipment, whether this misspecification is due to discretionary or non-discretionary behaviour. To estimate not-expected or abnormal accruals using the modified Jones model, the following OLS regression for each of the firms with at least 6 firm-years is estimated.\(^6\)

\[ \Delta \text{TWC}_{jt} = a_1(1/\text{TA}_{jt-1}) + a_2 \Delta \text{Sales}_{jt} + a_3 \text{PPE}_{jt} + \varepsilon_{jt} \]

where \( \text{TA}_{jt-1} \) = firm j’s total assets at the beginning of year t,
\( \Delta \text{Sales}_{jt} \) = firm j’s change in sales between year t-1 and year t,
\( \text{PPE}_{jt} \) = firm j’s gross value of property, plant and equipment in year t.

\(^6\) Consistent with prior literature and throughout this paper, all variables are scaled by lagged total assets and the extreme 1% values (outliers) are truncated.
The specific parameter estimates obtained from the equation above are used to estimate the firm-specific normal non-discretionary accruals, $\text{NDA}_{jt} = \hat{\alpha}_1 (1/\text{TA}_{jt-1}) + \hat{\alpha}_2 (\Delta \text{Sales}_{jt} - \Delta \text{AR}_{jt}) + \hat{\alpha}_3 \text{PPE}_{jt}$ where $\Delta \text{AR}_{jt}$ = firm $j$’s change in accounts receivable between year $t-1$ and year $t$, and to calculate abnormal discretionary accruals in year $t$, $\text{DA}_{jt} = \Delta \text{TWC}_{jt} - \text{NDA}_{jt}$.

These discretionary accruals (DA) are generally accepted as the influence, management has had on preparing the financial statements, since they represent the part of the total accruals which cannot be explained by the natural development in certain key accounting item. Whether management has managed the discretionary accruals (and thereby also the earnings) due to what ever might be the reason cannot be concluded. Likewise, it is difficult to conclude whether the discretionary accruals thereby reflect real changes in the firm’s underlying economic conditions. If making corrections to the net earnings figures which represent these discretionary accruals, one will obtain what could be called pre-managed earnings – that is the net earnings as they would have been, if management made no discretion. These pre-managed earnings (PME) are defined as net earnings (Earn) minus discretionary accruals (DA):

$$\text{PME}_{jt} = \text{Earn}_{jt} - \text{DA}_{jt}$$

Assuming the fundamental assumptions in the setup are correct, namely that the modified Jones (1991) model captures management discretion, it is expected that the frequency distribution of the pre-managed earnings is bell-shaped and smooth (like the reported earnings frequency distribution), but without any irregularities around zero.

3. **Sample selection and descriptive statistics.**

The accounting data are mainly retrieved from the database “Account Data”, owned by the Copenhagen Business School, and supplemented by some official financial statements published by the individual firms. Adjustments to the figures in this database are made in order to improve the comparability, where the Danish authorities allow different accounting practices. The sample consists of all non-financial Danish firms listed on the Copenhagen Stock Exchange during the period from 1983 to 2002, available in the “Account Data” database. The sample is restricted to firms with complete data for earnings, assets and other relevant balance sheet items for at least 6 years in a row, and the most extreme are truncated.

Since the time period 1983 to 2002 provides us with time series data from up to 20 years’ financial statements, one can question whether the data are really comparable over time. When answering this
question, it must be realized that Denmark is a member of the European Union, and therefore, is obliged to implement the different EU-resolutions passed in relevant national legislation. In fact, this centre around the years 1981 and 1990/91, both was resulting in some regulation tightening. In 1981 the 4th EU-directive, primarily dealing with the content and format of financial reports was implemented in DK. In 1990/91 the 7th EU-directive dealing with consolidated financial statements and the directive regarding majority shareholders and branches of foreign companies, in addition to some specific provisions relating to disclosure (among other things change of auditors and change of financial year) was implemented in DK. Viewed in the light of these facts, the initial time period is subdivided into two time periods, each of which is long enough to cover a complete business cycle, and inside which the legislative conditions are by and large uniform.

All this yields a sample of 2,229 firm-years, divided by 149 firms in the two time periods, 117 in the first time period from 1983 to 1992, and 148 in the second time period from 1993 to 2002.

*** Insert Table 1 ***

Descriptive statistics are provided in Table 1, where the two sub-periods are shown in Panels A and B respectively. Here, as in the rest of the paper, all variables are scaled by lagged market value of equity or by lagged total assets in order to ensure that the data are at the same level, and in order to make it relatively easy to compare findings with other similar studies. When comparing the similar statistics in the two sub-periods, the variation in the scaled earnings in the two samples is much higher in the second period than in the first period. The average economic conditions seem to improve from the first to the second period as indicated by much higher mean scaled earnings in the second period than in the first, while the quartiles have decreased slightly. Despite this, an examination of Table 1 reveals that the descriptive statistics are generally in line with those of other studies using similar variables and time periods, e.g. Hayn (1995), Burgstahler & Dichev (1997) and Barth et al (2001).

In the second period, the earnings, and earnings changes, scaled by lagged equity market value have mean and standard deviation of 0.1094 / 1.9961 and 0.0516 / 0.6879 respectively. The number of positive observations is 82% and 58% respectively. The difference between the total accruals and the non-discretionary accruals determined using time series OLS-regression on each firm is a proxy for the discretionary accruals, as defined by the modified Jones (1991) model, are on average negative (mean –0.0494). Analogously, the mean pre-managed earnings (0.0938) exceed the mean reported earnings (0.0444) scaled by lagged total assets. Interesting is that the reported earnings observations have a clear tendency to be less skewed and much more centered around the median (0.0425) than the pre-managed earnings observations (median 0.0588). As shown in Panel B in Table 1, the standard deviation for the
reported earnings and the pre-managed earnings are 0.1795 respectively 0.4934, and the number of positive reported earnings (changes) observations respectively pre-managed earnings (changes) are 82% (58%) respectively 77% (55%). The figures in Panel A in Table 1 representing the first period are qualitatively identical. This implies that one of the observable effects of discretion is a clear reduction of the earnings variation, which leads to more homogeneous reported earnings and enlarging the number of positive observations.

*** Insert Table 2 ***

Table 2 provides descriptive statistics for the firm specific OLS-regressions used in the second period to identify the pre-managed earnings. In general the coefficients have the expected sign, respectively 50%, 79% and 55% are positive. The mean (median) adjusted $R^2$ of the estimation model in the second period is 0.0513 (0.0357), having a lot of firms where the modified Jones (1991) model fits the data (almost) perfectly and some other firms where the Jones model is hardly applicable. Data from the first period are not shown here, but qualitatively identical.

4. **Results of testing the earnings distribution.**

4.1 **Existence of earnings management to avoid earnings decreases and losses.**

Graphical evidence in the form of histograms of the pooled cross-sectional empirical distributions of scaled earnings changes in the second period is presented here. Earnings management to avoid earnings decreases is likely to be reflected in cross-sectional distributions of earnings in the form of unusually low frequencies of small earnings decreases and unusually high frequencies of small increases in earnings.

Figure 1 shows the distribution of earnings changes scaled by the lagged equity market value $(\text{Earnings}_t - \text{Earnings}_{t-1}) / \text{Marketvalue}_{t-1}$. Positive values of earnings changes consist of the firms’ reporting increases in earnings. If managers are trying to avoid earnings decreases, we expect to observe unusually few observations immediately to the left of zero, and an unusually large number of observations immediately to the right of zero.

*** Insert Figure 1 ***

Figure 1 is a histogram of the scaled earnings with histogram interval widths of 0.01 for the range –0.50 to +0.50. The figure shows a single-peaked, bell-shaped distribution with an irregularity near zero. The result is quite similar to Burgstahler & Dichev (1997). The irregularity means that earnings changes
slightly less than zero occur less frequently than would be expected given the smoothness of the remainder of the distribution, and earnings changes slightly higher than zero occur more frequently than would be expected. This empirical distribution with an irregularity near zero is consistent with earnings management to avoid earnings decreases. The significance of this irregularity near zero is confirmed by a statistical test, namely the standardized differences test based on Burgstahler & Dichev (1997) to test the significance of the irregularity. The standardized differences is the difference between the actual number of observations in an interval and the expected number of observations in the interval (operationally defined as the average of the number in the two adjacent intervals) divided by the estimated standard deviation of the difference. This test relies on the assumptions that the distribution of scaled earnings (changes) is relatively smooth. For smooth earnings distribution not affected by earnings management, the distribution of standardized differences should be approximately normal with mean 0 and standard deviation 1. Therefore, the critical value of a one-tailed test of significance at level 0.05 is 1.645.

The standardized differences corresponding to the intervals immediately adjacent to zero provide two alternative tests for earnings management, but the relative power of the two alternative tests will depend on what pattern describes the effect of earnings management on the empirical distribution of earnings. In this study, the result below focus on standardized differences for the interval left of zero as the primary test of statistical significance.

The standardized differences for Figure 1 are summarized in Panel A in Table 3 for both periods. The two left side columns report the values of test intervals: standardized difference for the interval immediately left of zero and standardized difference for the interval immediately right of zero. Values for standardized differences for the remaining intervals in Table 3 include standardized differences for all the remaining intervals shown in each of the figures.

The standardized difference for the interval immediately to the left of zero (right of zero) in the second period is –2.4953 (1.1957). These results suggest that there are significantly less (more) observations than expected under the smoothness assumption in the interval immediately left of zero (right of zero).

**Insert Table 3**

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7 Tests based on the standardized differences usually assume the number of observations in an interval is a random variable, which is independent of the number of observation in adjacent intervals. Thus, the variance of this difference is approximately the sum of the variances of the components of the difference. Denoting the probability that an observation will fall into interval i by \( p_i \), the variance of the differences between the observed and expected number of observation for interval i is approximately \( n p_i (1-p_i) + \frac{1}{4} n (p_{i-1} + p_{i+1}) (2 - p_i - p_{i+1}) \).

8 The standardized differences for most extreme intervals are undefined because there is an adjacent interval on only one side. Note that the expected number of observations in any given interval of the distribution is the average of the number in the two adjacent intervals.
In addition, these standardized differences are quite large in absolute magnitude compared to the standardized differences for the remaining intervals in Figure 1. Similar qualitative results are shown for the first period. Indeed, comparing the calculated standardized differences with the critical value (at a 5% level) we observe in the two periods respectively one of the two intervals right and left of zero as significant – in the first period this is the only significant while we have one other significant standardized difference in the second period. Thus, the statistical tests confirm that there is an empirical irregularity near zero which is consistent with the hypothesis of managerial actions to avoid earnings decreases.

It is often stated that incentives to avoid earnings decreases become stronger with the length of the previous run of earnings increases, which should lead to a more pronounced effect of earnings management in the intervals around zero. To investigate this, the data in the above Figure 1 were categorized in three groups depending on the preceding string of earnings increases, a) following earnings decreases, b) following one or two years of earnings increases, and c) following three or more years of earnings increases, and the above standardized differences test procedure was repeated in all cases. The results (not presented here) in general show quite significant (on a 5% level) evidence of earnings management to avoid decreases, and since the test shows more pronounced significant results for the dataset in category c), earnings management behaviour after three or more years of earnings increases, the original data (in Figure 1) confirms an increased tendency the longer the run of earnings increases, which is in line with previous studies. The results for the first time-period are by and large qualitatively identical.

A completely equivalent study of the pooled cross-sectional empirical distributions of scaled earnings in order to investigate whether earnings management is conducted to avoid losses was made. Key results regarding the expected unusually low frequencies of small losses and unusually high frequencies of small positive earnings reflected in cross-sectional distributions of earnings are presented in Table 3. The distributions in both periods are approximately a bell-shaped distribution with some irregularities. The discontinuity below zero, however, is not as pronounced as what is seen for the US firms in similar studies. Earnings decreases are observed in 42% of the firms in the second period, and one could expect especially these firm managers to have very strong incentives to avoid losses, but as shown in Table 3, the statistical tests do not confirm the significance of the irregularity near zero. The standardized difference for the interval immediately left of zero in the second (first) period is \(-0.4317\) \((-0.2552\)), and the standardized difference for the interval immediately right of zero is \(0.0000\) \((-0.0510\)) - neither value is significant. Thus, the results do not statistically confirm the hypothesis that firms manage reported earnings to avoid losses.
Despite earnings management to avoid losses in general could not be found, it could be hypothesized that incentives to avoid losses are increasing in the length of the preceding string of positive earnings. This is investigated by categorizing the data in three groups depending on the preceding string of (positive) earnings, d) following negative earnings (loss), e) following one or two years of positive earnings, and f) following three or more years of positive earnings. In both time-periods the data do not support the earnings management assumption.

Indeed, since the few significant standardized differences, all are observed in category d), following loss, the run-length incentive hypothesis is rejected based on the present data. On the contrary it is evidenced that management will avoid having losses two (or more) years in a row – apparently it is acceptable for management to have a loss in one year, but not more years in succession.

Summarizing the combined evidence suggest that the distribution of earnings and change in earnings scaled by lagged equity market value in general show some abnormal patterns around zero, telling that earnings management is also taking place in DK. But although there are (some) supporting evidence, of using earnings management to avoid decreases (and losses), the tendency is not as clear as in similar US-data studies.

4.2 Evidence on the methods of earnings management to avoid earnings decreases.

Since the above evidence of earnings management provided in the previous section is not completely unequivocal, some additional evidence will be provided here. It is often stated that what earnings management basically is all about when looking at the financial statements is manipulation of working capital accruals (see e.g. DeFond & Jiambalvo (1994) or Burgstahler & Dichev (1997)). Since working capital consists of current assets and current liabilities, one could expect that firms with high levels of current assets and current liabilities before the eventual earnings manipulation are likely to find it relatively easy to manage earnings through changes in working capital, than firms with low levels of current assets and current liabilities. In other words, it is assumed that firms that can manage earnings easily are more likely to manage earnings changes to move from negative pre-managed earnings changes to positive post-managed, or reported, earnings changes. If the level of beginning-of-the-year current assets and current liabilities can serve as a proxy for how easy earnings management can be done, it is expected that one would observe lower pre-managed levels of current assets and current liabilities in the intervals immediately to the left of zero reported earnings changes and high levels in the interval immediately to the right of zero.
The distributions of beginning-of-the-year current assets in total (and divided into the three components, inventory, accounts receivable and other current assets), and current liabilities, all conditional on the level of earnings changes are examined. In each of the periods, the observations are sorted on the earnings changes variable to form equal-sized portfolios of 38 observations per portfolio in the second period (27 in the first period). The portfolio boundaries are defined relative to zero, so that the first portfolio right of zero consists of the 38 (27) smallest positive earnings changes observations, the second portfolio right of zero consists of the 38 (27) next smallest positive earnings, and so on. Similarly procedure is followed on the negative side of zero. Thus, within each portfolio, the earnings changes variable is approximately constant, and since the portfolios have equal numbers of observations, the variance of the quartile statistics across portfolios is equalized, making it easier to compare quartiles across portfolios.

*** Insert Figure 2 ***

In Figure 2 results for the three quartiles (25%, 50% and 75%) of the conditional distributions of the beginning-of-the-year level of current liabilities scaled by lagged market value for each portfolio in the second period are plotted against the median earnings changes for each portfolio. Figure 3 shows analogously results for the medians of the conditional distributions of the scaled beginning-of-the-year level of the three current asset components: inventory (INV) accounts receivable (AR) and other current assets (OREC), of each portfolio plotted against the median earnings changes for the portfolio.

*** Insert Figure 3 ***

Both figures show a clear downward shift in the conditional distributions for the portfolio immediately to the left of zero, and an upward shift in the distributions for the portfolio to the right of zero. This tendency is especially pronounced for the two current assets components, inventory and accounts payable, of the distributions. This confirms the assumption that firms which had a higher level of beginning-of-year current assets (components) and/or current liabilities were more likely to manage earnings changes from a negative to a positive level, showing an increase instead of a decrease. While the data in the first period qualitatively show the same, this suggests that changes in working capital, and especially in the manageable components, inventory and accounts receivable, play a central role in earnings management to avoid earnings decreases. In summary this tells that as earnings management in section 4.1 is evidenced to take place, it seems to be done where is easiest to practice.
4.3 Tests of pre-managed earnings distribution.

In section 4.1, it was documented that also Danish firms to some extent manage earnings to avoid earnings decreases (and losses). As to how the earnings are managed, evidence on interesting patterns regarding the two key working capital elements, inventory and accounts receivable, that can be influenced by discretionary behaviour, was provided in section 4.2. These combined results indicate that management control accounting accruals with discretion in order to avoid earnings decreases (and losses) but the evidence is not final. However, if we were able to role the eventual discretionary behaviour back-wards in order to see what the earnings (changes) would have been if management did not influence the reported earnings (changes), we could come to a clearer conclusion. Unfortunately, since this is not possible, we have to live with the next best solution, which is to use the recognized and generally used modified Jones (1991) model backwards to identify the pre-managed earnings (changes). This will be done by comparing the frequency distribution of reported earnings changes with calculated pre-managed earnings changes.

Since the calculations of pre-managed earnings are based on the modified Jones (1991) model including the relevant assumptions, where the data usually are scaled by lagged total assets, both measures are scaled by lagged total assets in order to ensure comparability between the two sets of measurements as well as to other similar studies.\(^9\)

*** Insert Figure 4 ***

In Figure 4 the frequency distribution of the set of scaled earnings changes, reported earnings changes and pre-managed earnings changes in the second period, are shown. Since the number of observations are the same for both measures, a simple visual inspection makes it obvious that even though both distributions are nicely bell-shaped, the reported earnings changes observations are much more centered around the median than the pre-managed earnings changes observations are, indicating that management, by controlling accounting accruals with discretion, do manage reported earnings changes upward (downward) when pre-managed earnings changes are decreases (large increases). This is also documented by the descriptive statistics in Table 1 in the two time-periods. The standardized differences matching Figure 4 for both periods are also documented in Table 3, part 2.a.

Repeating the standardized differences tests in the previous sections, making the comparison of the statistics in the two intervals left and right of zero in the two periods, the differences for the reported earnings changes are significant on a 5% significance level in 3 out of 4 cases, while the pre-managed

\(^9\) Burgstahler & Dichev (1997) used lagged equity market value to scale the earnings, but states in their paper that they also did the analysis, scaling by lagged total assets, which qualitatively lead to the same conclusions.
earnings changes are not significant at all. These findings are consistent with the prediction that managers use income-increasing discretionary accruals to avoid reported earnings decreases when pre-managed earnings changes are decreases. And similarly, they use income-decreasing discretionary accruals to avoid large reported income increases when pre-managed earnings changes are very high.

As to the frequency distribution of the set of scaled earnings, the results of the standardized differences tests are shown in Table 3, part 2.b. These results do not statistically support the earnings changes conclusion, but apparently in the second period the signs are as assumed. Looking at the values for standardized differences for remaining intervals there are other intervals where the bell-shaped frequency distribution is not supported – which is also the case in Table 3, part 2.a. Some minimums and maximums tend to be larger than what can be observed around zero. However, what remains when rolling the identified management discretionary acts back by using the modified Jones (1991) model is that we have an interesting pattern around zero, supporting the hypothesis that managers do manage earnings changes by using the means accounting regulation leaves them.

5. Summary and conclusion.

Most of the findings in this study confirm the Dechow et al (2003), Burgstahler & Dichev (1997) and Hayn (1995) findings that reported earnings (changes) are managed.

The evidence in the paper supports two aspects with respect to earnings management. The first aspect is that firm managers engage in earnings management to avoid earnings decreases (and losses), which was confirmed by tests of reported earnings changes frequency distribution showing abnormal frequencies of small earnings decreases/increases and small negative/positive earnings. These findings are interpreted as evidence that also Danish firm managers do engage in earnings management to avoid earnings decreases (and losses).

The second aspect is that the average firm manager control accounting accruals with discretion to manage reported earnings changes where he can. Evidence is provided indicating that management control accounting accruals with discretion to manage reported earnings changes upward when pre-managed earnings changes decreases and downward when pre-managed earnings changes are very high increases. The results also suggest that firms, who can manage earnings relatively easy because of high accruals levels on the central manageable accruals, inventory and accounts receivable, are more likely to manage earnings to move from negative pre-managed earnings changes to positive reported earnings changes.
Not surprisingly, since the management’s most significant degrees of freedom in the accounting choices and estimates occurs in connection with the valuation of accounts receivable and inventory, these two specific assets contributes the most to the relationship in the present study. Further, even though we see a regulation tightening in the Danish accounting regulative environment in the second period relative to the first period, this change does not influence the results significantly in any direction. This is also in line with the fact that the findings are quite comparable to similar US-studies (recalling the US accounting regulative environment is even tighter). In other words, the findings indicate that how tight accounting regulative environment is, does not have significant influence on the results. So, where ever we are, management use the influence they have and they do what they can when reporting the earnings (changes).

**Literature.**


## TABLE 1
Descriptive statistics for 2,229 basic firm-year observations 1983 - 2002 divided in two sub-periods
The first period contains data from 924 firm-years in 1983-1992, and
the second period contains data from 1,305 firm-years in 1993 - 2002.

### Panel A: First period:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Scaling</th>
<th>Mean</th>
<th>Median</th>
<th>Std.Deviat.</th>
<th>25% Quartile</th>
<th>75% Quartile</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings changes</td>
<td>Lagged marketvalue</td>
<td>0.0517</td>
<td>0.0044</td>
<td>1.2443</td>
<td>-0.0296</td>
<td>0.0360</td>
<td>56.0%</td>
</tr>
<tr>
<td>Earnings</td>
<td>Lagged marketvalue</td>
<td>0.0389</td>
<td>0.0735</td>
<td>0.6035</td>
<td>-0.0272</td>
<td>0.1161</td>
<td>84.3%</td>
</tr>
<tr>
<td>Earnings changes</td>
<td>Lagged total assets</td>
<td>0.0083</td>
<td>0.0032</td>
<td>0.1615</td>
<td>-0.0145</td>
<td>0.0198</td>
<td>56.2%</td>
</tr>
<tr>
<td>Earnings</td>
<td>Lagged total assets</td>
<td>0.0282</td>
<td>0.0421</td>
<td>0.2431</td>
<td>0.0144</td>
<td>0.0674</td>
<td>84.4%</td>
</tr>
<tr>
<td>Discretionary accruals (DA)</td>
<td>Lagged total assets</td>
<td>-0.0195</td>
<td>-0.0112</td>
<td>0.1516</td>
<td>-0.0514</td>
<td>0.0254</td>
<td>41.5%</td>
</tr>
<tr>
<td>Pre-managed earnings (PME)</td>
<td>Lagged total assets</td>
<td>0.0477</td>
<td>0.0524</td>
<td>0.2877</td>
<td>0.0009</td>
<td>0.1093</td>
<td>75.3%</td>
</tr>
<tr>
<td>Pre-managed earnings changes</td>
<td>Lagged total assets</td>
<td>-0.1196</td>
<td>0.0065</td>
<td>3.5557</td>
<td>-0.0561</td>
<td>0.0722</td>
<td>52.3%</td>
</tr>
<tr>
<td>Non-discretionary accruals (NDA)</td>
<td>Lagged total assets</td>
<td>0.0530</td>
<td>0.0113</td>
<td>0.8827</td>
<td>-0.0092</td>
<td>0.0423</td>
<td>63.7%</td>
</tr>
</tbody>
</table>

### Panel B: Second period:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Scaling</th>
<th>Mean</th>
<th>Median</th>
<th>Std.Deviat.</th>
<th>25% Quartile</th>
<th>75% Quartile</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings changes</td>
<td>Lagged marketvalue</td>
<td>0.0516</td>
<td>0.0061</td>
<td>0.6879</td>
<td>-0.0258</td>
<td>0.0458</td>
<td>58.2%</td>
</tr>
<tr>
<td>Earnings</td>
<td>Lagged marketvalue</td>
<td>0.1094</td>
<td>0.0633</td>
<td>1.9961</td>
<td>0.0216</td>
<td>0.1062</td>
<td>81.5%</td>
</tr>
<tr>
<td>Earnings changes</td>
<td>Lagged total assets</td>
<td>0.0404</td>
<td>0.0048</td>
<td>0.8498</td>
<td>-0.0155</td>
<td>0.0294</td>
<td>58.4%</td>
</tr>
<tr>
<td>Earnings</td>
<td>Lagged total assets</td>
<td>0.0444</td>
<td>0.0426</td>
<td>0.1796</td>
<td>0.0133</td>
<td>0.0767</td>
<td>84.4%</td>
</tr>
<tr>
<td>Discretionary accruals (DA)</td>
<td>Lagged total assets</td>
<td>-0.0494</td>
<td>-0.0139</td>
<td>0.4003</td>
<td>-0.0537</td>
<td>0.0157</td>
<td>38.3%</td>
</tr>
<tr>
<td>Pre-managed earnings (PME)</td>
<td>Lagged total assets</td>
<td>0.0938</td>
<td>0.0588</td>
<td>0.4934</td>
<td>0.0066</td>
<td>0.1185</td>
<td>77.3%</td>
</tr>
<tr>
<td>Pre-managed earnings changes</td>
<td>Lagged total assets</td>
<td>0.0664</td>
<td>0.0117</td>
<td>1.5049</td>
<td>-0.0559</td>
<td>0.0750</td>
<td>55.1%</td>
</tr>
<tr>
<td>Non-discretionary accruals (NDA)</td>
<td>Lagged total assets</td>
<td>0.0573</td>
<td>0.0132</td>
<td>0.7246</td>
<td>-0.0067</td>
<td>0.0479</td>
<td>67.0%</td>
</tr>
</tbody>
</table>

## TABLE 2
Descriptive statistics from OLS estimation of the (Jones) accruals model in the second sub-period, data from 148 companies in 1993 - 2002.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Median</th>
<th>Std.Deviat.</th>
<th>25% Quartile</th>
<th>75% Quartile</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>( a_1 )</td>
<td>1.8565</td>
<td>-0.0266</td>
<td>438.2463</td>
<td>-39.9352</td>
<td>38.4817</td>
<td>50.0%</td>
</tr>
<tr>
<td>( t )-statistic</td>
<td>-0.2654</td>
<td>0.0017</td>
<td>2.1082</td>
<td>-1.0794</td>
<td>0.6142</td>
<td>38.3%</td>
</tr>
<tr>
<td>( a_2 )</td>
<td>0.2563</td>
<td>0.1128</td>
<td>1.0413</td>
<td>0.0127</td>
<td>0.2868</td>
<td>79.1%</td>
</tr>
<tr>
<td>( t )-statistic</td>
<td>1.3492</td>
<td>0.9744</td>
<td>2.7684</td>
<td>0.1338</td>
<td>2.3319</td>
<td>79.1%</td>
</tr>
<tr>
<td>( a_3 )</td>
<td>0.1175</td>
<td>0.0428</td>
<td>3.6383</td>
<td>-0.1425</td>
<td>3.0060</td>
<td>55.4%</td>
</tr>
<tr>
<td>( t )-statistic</td>
<td>0.3227</td>
<td>0.2369</td>
<td>1.8891</td>
<td>-0.5020</td>
<td>1.0770</td>
<td>55.4%</td>
</tr>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.0513</td>
<td>0.0357</td>
<td>0.4185</td>
<td>-0.2546</td>
<td>0.3959</td>
<td>55.4%</td>
</tr>
</tbody>
</table>

## TABLE 3
Results of different standardized differences tests

<table>
<thead>
<tr>
<th>Part</th>
<th>Variables</th>
<th>Scaling by lagged:</th>
<th>Period</th>
<th>Obs</th>
<th>Values for test intervals</th>
<th>Values for standardized differences for remaining intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Standardized difference left of zero</td>
</tr>
<tr>
<td>1.a</td>
<td>Earnings changes</td>
<td>Marketvalue</td>
<td>First</td>
<td>910</td>
<td>-1.6225</td>
<td>1.9175</td>
</tr>
<tr>
<td></td>
<td>Earnings changes</td>
<td>Marketvalue</td>
<td>Second</td>
<td>1,291</td>
<td>-2.4953</td>
<td>1.9175</td>
</tr>
<tr>
<td>1.b</td>
<td>Earnings</td>
<td>Marketvalue</td>
<td>First</td>
<td>910</td>
<td>-2.3522</td>
<td>-0.0510</td>
</tr>
<tr>
<td></td>
<td>Earnings</td>
<td>Marketvalue</td>
<td>Second</td>
<td>1,291</td>
<td>-0.4317</td>
<td>0.0000</td>
</tr>
<tr>
<td>2.a</td>
<td>Pre-man. earn. changes</td>
<td>Total assets</td>
<td>First</td>
<td>839</td>
<td>-0.9599</td>
<td>0.4000</td>
</tr>
<tr>
<td></td>
<td>Managed earn. changes</td>
<td>Total assets</td>
<td>First</td>
<td>839</td>
<td>-2.1598</td>
<td>0.1600</td>
</tr>
<tr>
<td></td>
<td>Pre-man. earn. changes</td>
<td>Total assets</td>
<td>Second</td>
<td>1,247</td>
<td>1.1199</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>Managed earn. changes</td>
<td>Total assets</td>
<td>Second</td>
<td>1,247</td>
<td>-5.1995</td>
<td>13.1988</td>
</tr>
<tr>
<td>2.b</td>
<td>Pre-man. earnings</td>
<td>Total assets</td>
<td>First</td>
<td>839</td>
<td>-0.2980</td>
<td>-0.5959</td>
</tr>
<tr>
<td></td>
<td>Managed earnings</td>
<td>Total assets</td>
<td>First</td>
<td>839</td>
<td>-0.3724</td>
<td>-0.0745</td>
</tr>
<tr>
<td></td>
<td>Pre-man. earnings</td>
<td>Total assets</td>
<td>First</td>
<td>839</td>
<td>-0.5959</td>
<td>-0.5959</td>
</tr>
<tr>
<td></td>
<td>Managed earnings</td>
<td>Total assets</td>
<td>Second</td>
<td>1,247</td>
<td>-1.1918</td>
<td>0.1490</td>
</tr>
</tbody>
</table>
Change in earnings, second period

Figure 1: Empirical distribution of changes in net earnings scaled by lagged market value.
Figure 2: Three quartiles (25%, 50% and 75%) of the distribution of beginning-of-the-year current liabilities scaled by lagged market value for each earnings changes portfolio (of 38 obs.) plotted against the median earnings changes for each portfolio.
Figure 3: The 50% quartiles of the distribution of three different beginning-of-the-year current asset components scaled by lagged market value plotted against the median earnings changes for each portfolio.
Figure 4: Empirical distribution of changes in reported earnings-change and in pre-managed earnings-change computed by means of the Jones (1991) model, both scaled by lagged total assets.
### Working Papers from Financial Reporting Research Group

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
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<tr>
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<td>Earnings management to avoid earnings decreases and losses.</td>
<td>Finn Schøler</td>
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<tr>
<td>R-2005-02</td>
<td>The effects of two auditors and non-audit services on audit fees: evidence from a small capital market.</td>
<td>Frank Thinggaard &amp; Lars Kiertzner</td>
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<td>Lars Kiertzner</td>
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<td>Claus Holm &amp; Bent Warming-Rasmussen</td>
</tr>
<tr>
<td>R-2004-01</td>
<td>The quality of accruals and earnings – and the market pricing of earnings quality.</td>
<td>Finn Schøler</td>
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