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Summary

This paper address the question of whether Norwegian private firms engage in earnings management, and attempt to explore characteristics of firms engaging in earnings management practices. The empirical findings suggest that privately held firms in Norway manage earnings to avoid reporting small losses. We find that characteristics common for these firms is that they use a non-Big 4 auditor, have high accounts receivable to sales and are larger than those firms that do not engage in earnings decreasing earnings management. We further find that firms with high debt to equity and firms in financial distress do not engage in more earnings management. Finally, our results suggest that Norwegian private firms do not engage in earnings management to avoid earnings decreases. We attribute this finding to the absence of capital market pressures in privately held firms.
1. Introduction

Earnings are considered to be the single most important item in the financial statements issued by firms. In many cases managers have incentives to adjust earnings to maximize firm and/or manager wealth. The study of earnings management is of huge interest and a large amount of literature has emerged in this area. Earnings management is a worldwide phenomenon. Companies in different countries have different incentives to manage earnings, and the thresholds that they are trying to meet or beat are also different. This study examines earnings management practices in Norwegian private firms. In particular, this study aims to identify whether earnings are managed to avoid earnings decreases and losses, and attempt to explore characteristics of firms engaging in earnings management practices.

Most companies in Europe are privately held, however, empirical research in the area of earnings management have historically been limited to publicly held companies. The study of how management incentives affect private companies is essential (Arnedo, Lizarraga and Sánchez 2007), and despite its relevance, not well documented (Coppens and Peek 2005). To our knowledge, only a few studies of earnings management have been performed using data from privately held firms (e.g., Beatty and Harris 1998; Beatty, Ke and Petroni 2002; Coppens and Peek 2005; Ball and Shivakumar 2005; Burgstahler, Hail and Leuz 2006; Arnedo, Lizarraga and Sánchez 2007; Tendeloo and Vanstraelen 2008; Abdolmohammadi, Kvaal and Langli 2010).

An explanation for this low number of studies on earnings management in private firms is the lack of public available data (Coppens and Peek 2005). Such accounting data has become more available after the creation of EU and the following Amadeus database which contains data of all limited companies in the EU.

In Norway, all limited liability companies, both public and private, are obligated by law to issue financial statements. Thus, data availability on private firms is approximately as good as on public firms. To our knowledge, few studies have been focused on earnings management practices in Norway (see e.g., Kinserdal 2006; Abdolmohammadi, Kvaal and Langli 2010). Our study will contribute to the literature by further exploring earnings management practices in
private firms, and disclose the extent of earnings management in Norwegian firms. Our study is based on data from Center for Corporate Governance Research (CCGR), a unique database covering all companies with limited liability in Norway, both public and private. The database contains detailed accounting information as well as governance data and provides an exceptionally good opportunity to do research on privately held firms.

Our study is based on an earnings management study by Coppens and Peek (2005), performed on eight European countries (Norway is not one of them). They find empirical evidence that, in absence of capital market pressures, firms still have incentives to manage earnings. The structure of our study is as following; Section 2 present the prior research on earnings management, section 3 describes the research methodology, hypothesis and sample selection, section 4 presents the empirical findings and section 5 presents our conclusions.

2. Literature review

2.1. Earnings management

2.1.1 Introduction

To fully understand earnings management we will first view the theory behind the managers’ choice of accounting policies. This is the theory of positive accounting theory (PAT) that earnings management is an extension of. “PAT is concerned with predicting such action as the choices of accounting policies by firm managers and how managers will respond to proposed new accounting standards” (Scott 2009, 284). This theory was first introduced by Watts and Zimmerman (1978).

It appears to be no universally accepted definition of the term “earnings management”, probably due to its complexity which makes it difficult to define and measure. The definition of earnings management has been many and widespread. One frequently cited definition is that of Healy and Wahlen (1999, 368): “Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported
accounting numbers”. This definition will be used to further explain the theory behind the earnings management literature.

2.1.2 Judgment in financial reporting

The primary objective of financial reporting is to provide useful information to investors, creditors and others for rational decision making. In Norway, all private firms must follow the Norwegian Generally Accepted Accounting Principles (NGAAP) issued by the Norwegian Accounting Standards Board. However, listed companies follow international financial reporting standards (IFRS). The GAAP is considered to be less comprehensive and use more broadly based principles than IFRS (Abdolmohammadi, Kvaal and Langli 2010). The GAAP is a set of principles developed to guide managers in preparing financial statements. The accounting principles allow managers to exercise judgment in their financial reporting to best report the underlying economics and fully reflect a firm’s financial performance. Hence, accounting standards can provide a relatively low-cost and credible method for the management to communicate information about the firm to their capital providers and stakeholders (Healy and Wahlen 1999).

On some occasions, when it is unlikely that the firm will meet certain financial expectations (such as earnings, revenues, return on investments, debt covenants or other financial targets) and the costs of not meeting them are considered to be high, managers may use the flexibility in the GAAP to misstate the accounting numbers. Exploiting the flexibility allowed by the accounting principles in the GAAP is often called “within-GAAP earnings management” in the accounting literature, which can range from “conservative accounting” to more “aggressive accounting” (Dechow and Skinner 2000). These are acceptable ways in which managers can exercise accounting discretion. However, such reporting becomes a problem when financial statements reflect the desires of management rather than the underlying financial performance of the company. A second category of earnings management techniques are clearly violating the GAAP and are often called “without-GAAP earnings management”. This category involves management fraud and typically occurs in firms that have completely exploited the flexibility inherent in the accounting principles to manage earnings (Bauwhede and Willekens 2003). This is an extreme form of earnings management with extremely adverse consequences which are treated seriously by
the law. Over the last few years we have observed several cases of presumably extensive use of financial information manipulation\(^1\). Figure 1 tries to distinguish between choices that are within the GAAP and those that violate the GAAP. It is not easy to distinguish between “within-GAAP” and “without GAAP” earnings management or fraud (i.e. violating the GAAP), hence we do not investigate whether the firms have exercised legal or illegal judgment in the preparation of their financial statements.

![Diagram of Accounting Choices and Real Cash Flow Choices]

Fig. 1: The distinction between fraud and earnings management\(^2\)

Scott (2009) explains earnings management by distinguishing between managers choices of accounting policies and their use of real actions that influence earnings. He further divides accounting policies into two categories. The first category is the choice of accounting policy per se, for example the choice between straight-line and declining-balance depreciation. The second category is the use of discretionary accruals such as provisions for credit losses and inventory values. Real actions however, are timing of costs like asset disposals, R&D and

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\(^1\) Enron in the U.S; Parmelat in Italy; Finance Credit in Norway

\(^2\) Adapted from Dechow and Skinner (2000), p. 239
maintenance. Overall, this discussion highlights that the definition of earnings management and the behavior encompassed by it is quite important.

Within the GAAP managers have considerable flexibility to exercise judgment in the choice of inventory methods, expensing of research and development, recognition of sales not yet shipped, estimation of pension liabilities, capitalization of leases and marketing expenses, delay in maintenance expenditures and so on. All limited liability companies in Europe, public as well as private firms, are required to have their financial statements audited\(^3\). Since auditing is not perfect, the flexibility outlined above creates an opportunity for managers to engage in earnings management (Healy and Wahlen 1999; Aaker 2005).

2.1.3 Information asymmetry and agency costs

Earnings management arises from the game of information disclosure that executives and outsiders have to play. Managers may have incentives to mislead stakeholders and make them believe that the company’s financial position is either better or worse than it actually is. Due to information asymmetry, earnings management may not be visible to the stakeholders (Heally and Wahlen 1999).

Information asymmetry exists when the management knows more than the owners and other stakeholders about the business environment and the company’s actions. Due to different attitudes towards risk and the difficulty and costs of obtaining information, owners and managers will have conflicting interests. These factors create agency costs (Kaplan and Atkinson 1998). Agency costs are costs associated with structuring, monitoring and bonding a set of contracts among agents with diverging interests (Fama and Jensen 1983). Beatty and Harris (1998) argue that, when owners of a company are separated from the daily operations information asymmetry and agency costs will occur. Private firms tend to be more closely held and have greater managerial ownership (Tendeloo and Vanstraelen 2008). Hence, it has been argued that private firms experience less agency costs (Fama and Jensen 1983). Further, Ball and Shivakumar (2005) argue that private firms will reduce information asymmetries through “insider-access” that exists when separation is low.

\(^3\) In accordance with the Fourth Council Directive (78/660/EEC) of 25 July 1978 only small companies are excepted from a statutory audit.
2.1.4 Accounting quality and demand for accounting information

Accounting quality can be defined as the financial statements’ usefulness to companies’ stakeholders (Ball and Shivakumar 2005). There have been conducted several studies on quality and different approaches have been used to measure quality in accounting. Most studies have focused on the conservatism dimension on accounting quality (e.g., Ball, Kothari and Robin 2000; Ball, Robin and Wu 2003; Ball and Shivakumar 2005; Bushman and Piotroski 2006; Peek, Cuijpers and Buijink 2006). Burgstahler, Hail and Leuz (2006) use earnings management as an indication of accounting quality, based on three arguments: First, discretion and reporting incentives have effects on earnings management. Second, prior research on the use of earnings management as a measure of accounting quality has given plausible results (e.g., Lang, Raedy and Yetman 2003; Wysocki 2004; Lang, Raedy and Wilson 2006). Third, they use several measures to confirm their findings which reduce the probability of spurious relations. We accept these arguments and argue that the use of earnings management is an indication of low accounting quality.

The accounting quality of financial statements will differ between public and private firms due to different market demand (Ball and Shivakumar 2005). Burgstahler, Hail and Leuz (2006) argue that capital forces are one factor that determines the informativeness and accounting quality of firms’ financial reporting. Due to the separation of ownership and control, discussed above, outside investors rely heavily on the information that is publicly available. They argue that if the information quality is poor the investors will be reluctant to invest in the firm. This will further raise the firm’s cost of capital (Abdolmohammadi, Kvaal and Langli 2010). As a consequence, Burgstahler, Hail and Leuz (2006) argue that public firms will have a greater incentive to provide high quality accounting information.

As outlined above, private firms are more closely held and tend to have more concentrated ownership, for example owners are often managers and board members. Shareholders of private firms will as a result have lower costs of obtaining information and will have smaller incentives to assess firm value continuously (Beatty, Ke and Petroni 2002). Further, lenders and other stakeholders often have direct access to the firm through private channels and an equity market that may be fooled by the financial statements does not exist (Abdolmohammadi, Kvaal and Langli 2010).
Another factor that determines the informativeness and the quality of financial reporting is a country’s institutional features (Burgstahler and Hail 2006). In particular they examine four factors they argue will have varying effects on private and public firms; financial accounting and tax alignment, accrual accounting rules, securities regulation and minority-shareholder protection and capital market structure. They find evidence implying that both market forces and institutional features have an effect on accounting quality. Further, they find that earnings management is more persistent in private firms opposed to public firms.

2.2 Earnings management and thresholds

Yu (2005) states that companies in various countries have different incentives to manage earnings, and the thresholds that they are trying to meet, or beat, are different. Further, he claims that managing earnings against loss, against earnings decrease and against negative earnings surprise are three common thresholds across countries. Degeorge, Patel and Zeckhauser (1999) argue that managers focus on thresholds for earnings because shareholders concerned with the firm’s performance care about these thresholds. Further, they state that there is something fundamental about positive and non-positive numbers in the human thought process. Based on this we believe that managers in general have strong incentives to report positive profits, and to sustain recent performance, i.e. make at least last year’s earnings. Several studies report that small reported losses and small declines in reported earnings are unusually rare, while small reported profits and small increases in reported earnings are unusually common (Burgstahler and Dichev 1997; Degeorge, Patel and Zeckhauser 1999; Beatty, Ke and Petroni 2002; Holland and Ramsay 2003; Coppens and Peek 2005; Brown and Caylor 2005). The authors of these studies interpret their findings as evidence that managers manage earnings to avoid reporting losses and earnings declines.

Burgstahler and Dichev (1997) present two reasons for avoidance of earnings decreases and losses. The first is based on the prospect theory of Kahneman and Tversky (1979). This theory states that the utility for the stakeholders of one positive dollar is smaller than the disutility of one negative dollar. The other reason is concerned with the transaction costs the firm incur in its relation with stakeholders. Transaction costs are costs tied to contracts the firm has with its lenders, suppliers, customers and employees.
Degeorge, Patel and Zeckhauser (1999) find support for earnings management driven by thresholds such as report positive profits and sustain recent performance. Further, they find that thresholds are hierarchically ordered; it is most important first to make positive profits, second to report profits at least equal to last years profits.

2.3 Managerial motivations for management incentives

Managers have strong interest in the bottom line and their incentives will influence their accounting choices. In the following we explore these incentives and the effect they have on accounting choices. According to the literature, such choices can be motivated for a variety of reasons. Healy and Wahlen (1999) divide these motivations into three categories: (1) Capital market motivations, (2) Contractual motivations and (3) Government regulations. In addition we will consider a fourth category; tax motivations. Capital market motivations are obviously not relevant in the study of private firms, leaving us with three groups of motivation described in more detail below.

2.3.1 Contracting motivations

Accounting data are often used to regulate contracts between the firm and its stakeholders. A literature has emerged to test whether the incentives created by management compensation contracts and lending contracts with creditors can explain earnings management. Watts and Zimmerman (1990) finds that such contracts create incentives for earnings management because it is likely to be costly for management and creditors to detect it.

2.3.1.1 Lending contracts

The debt-to-equity hypothesis states that the larger a firm’s debt-to-equity ratio is, the more likely the manager is to select income-increasing accounting procedures (Watts and Zimmerman 1986). The higher the debt-to-equity ratio is, the closer the firm is to the constraints in their debt covenants. Default on debt contracts is costly. Hence, contracts based on accounting numbers provide managers with incentives to choose accounting procedures to avoid violation. Managers will also avoid being close to violation because this can constrain their freedom of action in
operating the firm (Scott 2009). Earnings management in a debt covenant context has been investigated in a number of studies, with somewhat different results.

Sweeney (1994) finds that managers of firms close to debt covenant violation respond with income-increasing accounting changes. DeFond (1994) finds evidence consistent with income-increasing earnings management in the year prior to violation, and in the year of violation when firms with management changes were removed. A well known theory suggests that new managers have a tendency to “take a bath”, and by including these firms, the effect on the results will be significant. DeFond and Jiambalvo (1994) report significantly positive unexpected accruals in the year prior to violation, and suggest that managers manipulate earnings to prevent default on debt contracts. However, in the year of violation the result is not in line with the debt-to-equity hypothesis. Some studies do not find evidence supporting the debt-to-equity hypothesis (Healy and Palepu 1990; DeAngelo, DeAngelo and Skinner 1994). For example; DeAngelo, DeAngelo and Skinner (1994) argue that managers of financially distressed firms are not likely to inflate earnings in order to avoid debt covenant violations. Instead, their findings indicate that managers of financially troubled firms use negative abnormal accruals, which reduce the reported earnings even further. They suggest that managers of these firms have an incentive to highlight the firm’s financial difficulties by reducing the reported earnings to obtain better terms in their contract renegotiations.

2.3.1.2 Management compensation contracts

The bonus-plan hypothesis states that firm managers with bonus plans are more likely to use income-increasing discretionary accruals (Watts and Zimmerman 1986). Healy (1985) observes that managers use discretionary accruals to maximize bonuses under the firm’s compensation plan by moving reported earnings between periods; this is referred to as the bonus-maximization hypothesis. In contrast to Watts and Zimmerman (1986), Healy argues that managers may also have incentives to adopt income-decreasing accounting choices due to the upper and lower boundary for bonus payments in the contracts. When earnings exceed the upper boundary, managers will receive little reward for further increase in earnings. This generates an incentive to shift earnings forward, using income decreasing discretionary accruals, making future thresholds easier to meet. When earnings are lower than the targeted earnings, managers have
incentives to further reduce current earnings. This is also known as “taking a bath”. This will increase the probability of meeting future earnings' targets. Several studies have been performed as an extension to the study by Healy (1985). Guidry, Leone and Rock (1999) find results consistent with Healy’s bonus-maximization hypothesis, but only on a business-unit level.

Holthausen, Larcker and Sloan (1995) find that managers tend to manipulate earnings downwards when their bonuses are at maximum. However, contrary to Healy, they find no evidence that managers use income-decreasing discretionary accruals when earnings are below the lower boundary of the bonus target. They suggest that managers at the lower boundary have different incentives than the managers at the upper boundary. For example, managers below the lower boundary avoid earnings-decreasing discretionary accruals for job security reasons and because of potential technical violations of the firm’s lending agreements.

Gaver, Gaver and Austin (1995) find results inconsistent with Healy’s bonus-maximization hypothesis. More specific, they find that when earnings fall below the lower boundary, managers select income-increasing discretionary accruals and that the converse is true when earnings exceed the lower boundary. They state that the results are more consistent with income-smoothing than with Healy’s bonus maximization-hypothesis. This leads us to a discussion of another group of earnings management motivations that differ from the bonus-hypothesis; the income-smoothing hypothesis.

The income-smoothing hypothesis suggests that managers take action to reduce earnings fluctuations around some level considered normal for the firm, i.e. they wish to reduce volatility in earnings (Bartov 1993). Trueman and Titman (1988) find that managers may smooth income to reduce firms borrowing costs, while DeFond and Park (1997) find that job security concerns creates an incentive for managers to smooth earnings.

### 2.3.2 Regulatory motivations

The political cost hypothesis states that firms subject to potential wealth transfers in the political process, have incentives to adopt accounting procedures or make accounting choices that reduce the transfer (Watts and Zimmerman 1986). Literature suggests that visibility increases with reported earnings, and may result
in political actions against the firm’s interests. Hence, managers have incentives to engage in income-decreasing accounting practices to avoid these actions (Gill-de-Albornoz and Illueca 2005). Size is often used as a proxy variable for political attention, assuming that large firms, rather than small firms, are likely to use accounting choices that reduce reported profits. The size proxy has been criticized in several studies (e.g., Watts and Zimmerman (1986) consider size to be a noisy proxy for political cost).

The earnings management literature has explored several forms of regulations, creating motives to manage earnings in accordance with the political cost hypothesis. This is done to either induce a positive regulatory action or avoid a negative regulatory action. Cahan (1992) provides evidence that firms under anti-trust investigation choose income-decreasing accruals to appear less profitable. Similar, Makar and Alam (1998) suggest that firms choose income-decreasing accruals to reduce the political costs associated with merger-related antitrust investigations. Jones (1991) finds evidence of income-decreasing action in firms seeking regulatory relief from import. Navissi (1999) finds that firms under price control have incentives for income-decreasing accruals when they apply for price increase to gain relief from financial hardship. Key (1997) performs a study on the cable television industry, and finds that the firms use earnings-decreasing accruals when exposed to high political costs. Han and Wang (1998) analyze oil-companies and find similar results, that oil-companies tend to use accruals to decrease earnings when there is a sudden increase in oil prices.

In addition, literature suggests that industry specific regulations create incentives for earnings management. Among others, Moyer (1990), Scholes, Wolfson and Wilson (1990) and Beatty, Chamberlain and Magliolo (1995), find evidence that banks manage earnings to meet capital requirements. Such incentives arise because regulators monitor banks using accounting numbers. Deviation from capital requirements induces regulatory costs. More specific, Scholes, Wolfson and Wilson (1990) find empirical evidence that banks choose to realize security gains or defer losses to increase regulatory capital, and thus reduce probability of regulatory costs.
2.3.3 Tax motivations


3. Research design

3.1 Method and hypothesis

Several methods have been used to detect earnings management. Research designs commonly used in the earnings management literature are; those based on aggregate accruals, those based on specific accruals and those based on the earnings distribution. McNichols (2009) presents an overview of the research designs used in previous studies. The most frequently employed methodology is the accruals approach, from which several specific models have derived.

In this study we will focus on distributional properties of earnings to detect earnings management, a method introduced by Burgstahler and Dichev (1997) and Degeorge, Patel and Zeckhauser (1999). This method suggests that firms manage earnings to beat benchmarks, such as zero earnings and zero earnings changes. Following previous studies, we claim that the cross-sectional distribution of
earnings and change in earnings should be normally distributed in absence of earnings management. If firms do indeed manage earnings to avoid or beat a certain benchmark, we expect the smoothness of the distribution to break and observe "too few" observations directly below it and "too many" at or directly above it. This method avoids issues that affect inferences drawn from discretionary accruals studies (McNichols 2000). According to McNichols (2000), an advantage of the distribution approach is that it allows us to make strong predictions about the frequency of earnings management. However, the distribution approach does not tell how earnings management is carried out and is silent on the incentives for management to achieve specific benchmarks.

We suggest that executives in private firms care about two thresholds when they report earnings: (1) To report positive profits (earnings above zero) and (2) to sustain recent performance (make at least last year’s earnings). Hence, to determine whether earnings management to avoid earnings decreases and losses exist, we will explore the distributional properties of earnings and earnings change, and present statistical tests of the following hypothesis (in alternative form):

\[ H_1: \quad \text{Private firms manage earnings to avoid reporting losses.} \]
\[ H_2: \quad \text{Private firms manage earnings to avoid reporting earnings decreases.} \]

### 3.2 Histogram and interval width

In the distribution approach two primary methods are used to detect earnings management; the use of histograms and statistical tests. Histograms are constructed to illustrate the pooled cross-sectional earnings data graphically. This allows us to look for possible evidence of discontinuities in the earnings and earnings changes around zero. Both histograms and the subsequent statistical tests require a choice of interval width. This choice must balance the need for precise density estimate with the need for fine resolution (Degeorge, Patel and Zeckhauser 1999). When the interval width is too small, spurious fine structure becomes visible, if it is too large, essential detail is masked (Holland and Ramsay 2003). There are several methods for determining the interval width as
3.3 Statistical test

There are developed two methods to test for statistical significance under the earnings distribution approach. Both test whether there is a discontinuity in the distribution of the data. The first was introduced by Degeorge, Patel and Zeckhauser (1999). They developed a t-like statistic which approximately follows a Student’s t-distribution. This test statistic extrapolates from neighborhood densities to compute expected density at the threshold assuming no unusual behavior there, i.e. it measures the change in the slope of the near intervals by calculating the mean and standard deviation and excluding the interval to be tested. Several other studies have used this method (Coppens and Peek 2005; Charoenwong and Jiraporn 2009). However, some concerns have been raised with this approach (Holland and Ramsay 2003). First, it exacerbates the linear assumption by expanding the number of intervals required to calculate a test statistic. By observing a normal curve, it is obvious that the wider the cross section taken, the less likely it is to represent a linear function. Second, Holland and Ramsay (2009) raise concerns about the asymmetrical method for testing intervals near the peak of distribution, as the method eliminates any possibility of larger gradients above the interval to be tested averaging out smaller gradients below.

Burgstahler and Dichev (1997, 102) construct a test statistic “whose only assumption is that, under the null hypothesis of no earnings management, the cross-sectional distributions of earnings changes and earnings levels are relatively smooth”. Their definition of smoothness is that the expected number of

\[ \tau_n = \frac{[\Delta p_n - \text{MEAN}(\Delta p)]}{\text{STD}(\Delta p)} \]

\[ 3.5\sigma n^{-\frac{1}{3}} \] (Scott, 1979), \[ 2(IQR)n^{-\frac{1}{3}} \] (Freedman and Diaconis 1981), \[ 1.06\sigma n^{-\frac{1}{3}} \] (Silverman, 1986), \[ 0.73(IQR)n^{-\frac{1}{3}} \] (Silverman, 1986) and \[ 0.9(\min(\sigma, IQR))n^{-\frac{1}{3}} \] (Silverman, 1986). Where \( \sigma = \) standard deviation, IQR = Inter-quartile range, \( n = \) number in sample.
observations in an interval of the distribution equals the average of the number of observations in the two immediately adjacent intervals.

When considering the null hypothesis the assumption is that the earnings levels and changes are relatively smooth and standardized differences are distributed approximately normally, i.e. with mean 0 and standard deviation 1. Further, the test statistics are calculated for the interval immediately above zero and for the interval immediately below zero. Several issues have been raised by Holland and Ramsay (2003) concerning this method. A normal curve is non-linear and an assumption of the opposite will lead to noise in the test statistics. This noise is reduced by using smaller interval widths and limiting the number of intervals used to calculate the expected number of observations in the given interval. However, this imposes another problem. If, for instance, a company shifts earnings from what should have been a small loss to a small profit, this shift may be in only one interval width. Burgstahler and Dichev (1997) consider two alternatives to overcome this problem by calculating the expected number of observations in an interval using: (1) the average of the next-to-adjacent intervals and (2) the average of the numbers in four adjacent intervals. They found that this did not alter their qualitative results.

Based on the discussion above and the fact that several recent studies use this method (Holland and Ramsay 2003; Brown and Caylor 2005; Habib and Hossain 2008), we choose the method introduced by Burgstahler and Dichev (1997). The mentioned statistical test is produced by calculating the difference between the actual number of observations and the expected number of observations in an interval divided by the estimated standard deviation of this difference. More precisely, the statistical test is formulated in the following way:

\[
\text{Test statistic} = \frac{AQ_i - EQ_i}{SD_i}
\]

Where \( AQ_i \) is the actual number of observations for interval \( i \), and \( EQ_i \) is the expected number of observations for interval \( i \), \( SD_i \) is the estimated standard deviation of the difference between the actual and expected number of observations around interval \( i \). If the smoothness does not hold at zero, the

\[
SD_i = \left[ Np_i(1-p_i) + \frac{1}{2} N(p_{i-1} + p_{i+1}) (1-p_{i-1} - p_{i+1}) \right]^{1/2}, \quad \text{Where } N \text{ is the total number of observations in the sample and } p_i \text{ is the probability that an observation will fall into interval } i.
\]
standardized difference for the interval immediately left of zero and immediately right of zero will be simultaneously affected and are not independent. We therefore compute the standardized differences for the interval immediately left of zero for each threshold, and report the standardized differences for the interval immediately right of zero in parenthesis. Operationally, for the “avoid loss” threshold, we compare very small negative earnings to very small positive earnings to determine how many small losses have been shifted rightward to become small profits, and in similar manner for the “avoid earnings decrease” threshold. Consistent with Burgstahler and Dichev (1997) we consider test statistics equal or superior in absolute value to 2.33 to indicate evidence of earnings management to achieve thresholds (using a significance level of 1% in a normalized distribution, one tailed).

3.4 Logistic regression analysis

The method discussed above is useful when studying whether earnings management is present or not. However it is inadequate when we want to look at variables that are used to manage earnings and discover managerial motivations for firms to engage in earnings management. A better approach is to use logistic regression analysis (logit). The approach is appropriate for estimating a model with a dichotomous dependent variable. McFadden (1973) indicates that this method yields estimators that are asymptotically efficient and normally distributed, even in small samples. In earnings management studies the dependent variable of these logistic models normally takes the value of 1 for firms where earnings management is present and 0 for firms where earnings management is absent. Spathis (2002) developed a model focusing on financial ratios to find out which of the ratios were related to firms that manipulate financial information, and implemented logistic regression for his analysis. In his study, Spathis (2002) examines firms that allegedly manipulate financial information (FFS firms) up against firms that do not (non-FFS firms). This is also applicable for our study, given that earnings manipulators move from slightly negative earnings to slightly positive earnings. Firms with slightly positive earnings are likely to represent earnings management firms. We will therefore use a dichotomous dependent variable that take the value 1 for firms with earnings just above zero (who presumably manage earnings), and 0 for firms with earnings just below zero. This type of variable is called a binary variable. We apply an interval width of 0.005
for scaled earnings as described in section 3.2 above. The following logit model is estimated:

\[
E(y) = \frac{\exp(b_0 + b_1x_1 + b_2x_2 + \cdots + b_kx_k)}{1 + \exp(b_0 + b_1x_1 + b_2x_2 + \cdots + b_kx_k)} \tag{2}
\]

Where:

- \( y = 1 \) if scaled value is in the interval just above zero
- \( y = 0 \) if scaled value is in the interval just below zero
- \( E(y) = p \) (AZ firms occurs) = \( \Pi \)
- \( \Pi \) = probability of \( y = 1 \)
- \( b_0 \) = intercept term
- \( b_1, b_2, \ldots, b_k \) = the regression coefficients of independent variables
- \( x_1, x_2, \ldots, x_k \) = the independent variables

The independent or predictor variables in logistic regression can take any form. That is, logistic regression makes no assumption about the distribution of the independent variables. They do not have to be normally distributed, linearly related or of equal variance within each group. Some of the explanatory (independent) variables in our model are picked from Spathis’ study (2002), in addition, two variables other than those in the financial statements enters the model. Based on previous research we consider auditor and size to be characteristics that can be predictors of earnings management firms. We exclude highly correlated variables in order to avoid possible multicollinearity problems in the model. The model is presented as:

\[
AZ = b_0 + b_1 \left( \frac{TD}{EQ} \right) + b_2 \left( \frac{SAL}{TA} \right) + b_3 \left( \frac{REC}{SAL} \right) + b_4 \left( \frac{WC}{TA} \right) + b_5 \left( \frac{INV}{SAL} \right) + b_6 \left( \frac{TD}{TA} \right) + b_7 (AUDITOR) + b_8 (LNTA) + b_9 (Z) + e \tag{3}
\]

Where \( AZ = 1 \) if firm is above zero in earnings, 0 otherwise

Notes:
- TD/EQ: total debt/total equity
- SAL/TA: sales/total assets
- REC/SAL: receivable/sales
- WC/TA: working capital/total assets
- INV/SAL: inventories/sales
- TD/TA: total debt/total assets
- AUDITOR: dummy-variable (Big 4 auditor = 1; non-Big 4 auditor = 0)
- LNTA: natural logarithm of book value of total assets end of fiscal year
- Z: Z-score
3.4.1 The variables

3.4.1.1 Debt

We argue in section 2.3.1.1 that firms with a high debt-to-equity ratio are more likely to engage in earnings management than firms with a low debt-to-equity ratio, i.e. managers may manage earnings to meet certain debt covenants. Spathis (2002) states that high debt structure may increase likelihood of false financial statements since it shift the risk from equity holders and managers to debt owners. To test the debt covenant hypothesis we use the ratio of debt to equity (DEBT/EQ) and total debt to total assets (TD/TA). We expect that firms with high scores on these ratios are more likely to report a small profit than a small loss.

\[ H_3: \text{ Firms that have high financial leverage are more likely to use earnings management.} \]

3.4.1.2 Z-score

Prior literature provides evidence that firms in financial distress have a stronger economic incentive to manage earnings than less financial distressed firms. Poor financial condition may motivate firms to take action to improve the appearance of the company’s financial position. Loebbecke, Eining and Willingham (1989) find that 19 percent of the fraud companies in their sample were experiencing solvency problems. To capture the financially distressed firms’ effect on earnings management, Altman Z-score (Altman, 1968, 1983) is included in the regression. The Altman Z-score has been found to be a good predictor of financial distress (Foster 1986). Persons (1995) finds evidence that fraud firms have lower Z-scores (worse financial condition) than non-fraud firms. The adjusted Z-score for private firms is calculated as a linear combination of five common financial ratios which are given different weights\(^7\):

\[ Z = 0.717R_1 + 0.847R_2 + 3.107R_3 + 0.420R_4 + 0.998R_5 \quad (4) \]

\[ H_4: \text{ Firms in financial distress, i.e. with lower Z-score, are more likely to use earnings management.} \]

\(^7\) The five Z-score ratios; \((R_1):\) Working Capital / Total Assets, \((R_2):\) Retained Earnings / Total Assets, \((R_3):\) Earnings Before Interests and Taxes (EBIT or operating profit), \((R_4):\) Book Value of Equity / Total Liabilities, \((R_5):\) Sales / Total Assets.
3.4.1.3 Working capital

Working capital includes several variables that could be used as a tool for earnings management and suggests itself as a potential popular technique for achieving earnings targets (Gore, Pope and Singh 2007). The accrual method of accounting, working capital included, has been criticized as allowing too many opportunities to use discretionary accounting choices to manage earnings (Karacaer, et al. 2009). If the discontinuity in the earnings distribution is due to earnings management, it would be reasonable to assume that managers would use the flexibility offered by accruals to achieve this (Dechow, Richardson and Tuna 2003).

Burgstahler and Dichev (1997) find evidence that both cash flow from operations and changes in working capital have been used to manage earnings. However, the results of these tests are inconsistent and difficult to interpret. Consistent with their predictions on changes in working capital they find a positive shift in the conditional distribution between the cases immediately below zero and the cases immediately above zero, meaning that firms with small profits have higher increases in working capital than firms with small losses. Firms may choose to increase their credit sales resulting in an increase in accounts receivable and a decrease in inventory. However, the sum of change in working capital becomes positive because of the cash flow delay.

Inconsistent with Burgstahler and Dichev’s (1997) prediction, the lower quartile of the distribution shifts downward between firms with small losses and firms with small profits. In practice, firms may increase their sales and cash flow from operations, but with the decrease in inventory the result is a negative change in working capital.

Despite these diverging results when considering quartiles of change in working capital, the median of Burgstahler and Dichev’s (1997) results show a slightly positive change in working capital at the zero reference point. However, these findings are not surprising, since there is a well-known positive relation between working capital and earnings (Dechow, Richardson and Tuna 2003).

Spathis (2002) include working capital as an explanatory variable when he examines the factors associated with false financial statements. He finds a significant difference in the working capital to total assets (WC/TA) for FFS firms compared to non-FFS firms. Firms with high WC/TA have an increased probability of being classified with non-FFS firms. Consequently FFS firms have
lower WC/TA, which indicate current liquidity problems such that they cannot meet their obligations. Low working capital to total assets is often associated with financial distress (Bonner, Palmrose and Young 1998) and may provide an incentive for managers to engage in earnings management. Kreutfeldt and Wallace (1986) find that firms with liquidity problems have a higher degree of errors in their financial statements.

Based on the discussion above, we expect working capital to be low for firms just above zero in scaled earnings indicating earnings management, and we include the working capital to total assets ratio (WC/TA) in the regression.

\[ H_5: \text{Firms with low WC/TA are more likely to use earnings management.} \]

3.4.1.4 Accounts receivable and inventories
Accounts receivable and inventories are both part of the firm’s working capital and the determination of these variables are highly dependent on management’s own judgment. As a result earnings management is more likely to occur (Loebbecke, Eining and Willingham 1989; Wright and Ashton 1989; Green 1991; Shilit 1993; Spathis 2002). The study by Persons (1995) seeks to identify factors associated with fraudulent financial reporting. His results show that fraud firms had a higher proportion of current assets, especially inventories and accounts receivables. Feroz, Park and Pastena (1991) examine the 224 Accounting Enforcement Releases (AAERs), issued between April 1982 and April 1989, describing the investigations against 188 firms. They find that SEC often pursued overstatements of accounts receivable and inventories resulting from premature sales recognition and delayed write-offs, respectively. The effect of the publication of these results was reduced earnings estimates by financial analysts, which highlights the importance of accounts receivable and inventory when considering earnings management.

Inventory valuation offers tremendous potential for earnings management (Bauwhede and Willekens 2003). A firm may restate the amount of units in its inventory, i.e. choose not to record the right amount of obsolete inventory. Firms may also change valuation method, hence not matching sales with corresponding cost (FIFO to LIFO). If a firm wishes to increase earnings in a period of increasing prices it could change to LIFO, sell out its existing inventory to keep costs low and not buy additional materials or goods. Bauwhede and Willekens
(2003) review the empirical evidence found on earnings management in Belgian companies and conclude that earnings management carried out through inventory valuation is quite common. Further, Spathis’ (2002) findings indicate that FFS firms keep high inventories and cost of goods sold. In addition, inventories to sales (INV/SAL) has a significant positive effect, which means that firms with high inventories to sales are more likely to be classified as FFS firms. This is also in accordance with earlier studies on the area (Loebbecke, Eining and Willingham 1989; Schilit 1993; Summers and Sweeney 1998).

Spathis (2002) finds no significant difference in the usage of accounts receivable between FFS firms and non-FFS firms. He argues that this is a difficult area due to the subjective nature of accounts receivable and therefore additional time is needed for auditing these accounts. He further argues that these results reflect the ability to manipulate the values in accounts receivable. Marquardt and Wiedman (2004) argue that the benefits of managing specific accruals are situational, because these benefits depend on the context in which earnings are being managed. They examine earnings management for firms in three contexts: equity offerings, management buyouts, and the avoidance of earnings decreases. They argue that these firms will have diverging motives in using accounts receivable for earnings management, which is also supported by their findings. One possible reason for these inconclusive results could be explained by the reversal effect accruals have on future earnings. The use of accounts receivable to manage earnings involves overstating current earnings and thereby increasing the amount of accounts receivable. This situation will eventually reverse and future earnings will be understated.

We expect that earnings management firms have on average higher accounts receivable. That is, firms with just below zero in scaled earnings have high incentives to prematurely recognize sales to boost up earnings in the end of the fiscal year. We also expect to find higher share of inventory for firms with small profits compared to firms with small losses. We form the following hypotheses based on the ratio of accounts receivable to sales (REC/SAL) and inventory to sales (INV/SAL):

\[ H_6: \quad \text{Firms with high REC/SAL are more likely to use earnings management.} \]
\[ H_7: \quad \text{Firms with high INV/SAL are more likely to use earnings management.} \]
3.4.1.5 Capital turnover
We include the sales to total assets ratio (SAL/TA), which can act as a red flag in the detection of earnings management (Spathis 2002). Persons (1995) describes this ratio to measure management’s ability to deal with competitive situations, and that the inability to compete successfully may provide an incentive for engaging in fraudulent activity. According to his results, fraud firms have smaller capital turnover than non-fraud firms. Spathis (2002) finds no significant difference between FFS firms and non-FFS firms for this ratio. Based on the study by Persons (1995), we expect this ratio to be lower for firms directly above zero in earnings.

\[ H_6: \text{Firms with low capital turnover are more likely to use earnings management.} \]

3.4.1.6 Auditor
The task of the auditor is to provide a high quality audit for their clients. Auditing reduces information asymmetries that exist between managers and firm stakeholders by allowing outsiders to verify the validity of financial statements (Becker, et al. 1998). The effectiveness of auditing, and its ability to constrain the management of earnings is expected to vary with the quality of the auditor and is subject to a numerous of studies. A large numbers of these studies use auditor size as a proxy for auditor quality (Davidson and Neu 1993).

Theoretical support for quality differentiation is provided by DeAngelo (1981). She argues that larger audit firms have greater incentives to detect and reveal management misreporting because they have more client-specific rents to lose if their reports are inaccurate. Dye (1993) finds support for the deep pocket hypothesis and argues that large auditors will be more accurate because they have greater wealth, which is exposed to risk in case of litigation. In addition large auditor firms tend to have more experienced auditors that can prevent earnings management.

Van Tendeloo and Vanstraelen (2008) argue that the audit quality varies dependent on several factors. First, since financial statements of private firms are less scrutinized by investors, the quality of the audit is assumed to be lower. Second, firms that operate in countries with high book-tax alignment are more scrutinized by the authorities for tax purposes than firms in countries with low
book-tax alignment, and are therefore expected to have higher quality in the audit. They find that private firms with a Big 4 auditor engage less in earnings management compared to a private firm with a non-Big 4 auditor. We construct a dummy variable (AUDITOR) to check for the effect of a Big 4 auditor compared to a non-Big 4 auditor.

\[ H_0: \text{Firms with a Big 4 auditor are less likely to engage in earning management compared to firms with a non-Big 4 auditor.} \]

3.4.1.7 Size

There are limited studies analyzing the effect firm size has on earnings management practices in private firms (e.g., Abdolmohammadi, Kvaal and Langli 2010). Kim, Liu and Rhee (2003) highlight several factors that affect the usage of earnings management when considering firm size. They argue that size has a positive effect on the use of earnings management because large firms usually have strong internal control systems and governance mechanisms. Beasley et al. (2000) study fraudulent accounting activity within three industries; technology, health care, and financial service. For each of the industries examined, the fraud firms had very weak governance structure compared to non-fraud firms. Further, fraud firms in the technology and financial-services industries had fewer audit committees, while all fraud firms in all industries had less independent audit committees and less independent board.

The discussion on the implications of having a Big 4 auditor on earnings management revealed that these firms engage in less earnings management, i.e. non-Big 4 firms allows for more earnings management than Big 4 firms. Since large firms are often audited by a Big 4 auditor, that tend to have more experienced auditors employed, the quality of their financial reporting are assumed to be higher (Kim, Liu and Rhee 2003).

Further, Kim, Liu and Rhee (2003) argue that large firms care more about their reputation due to usually longer history and better knowledge about the market. In addition, large firms may have established credibility and social responsibility in the community, and credibility in the financial statements they issue. Therefore, disclosure of fraudulent activity in large firms could potentially be very destructive to their reputation and financial condition.
Contrary, Kim, Liu and Rhee (2003) argue that large firms may experience higher pressure to report positive profits. Supporting this argument, Barton and Simko (2002) find evidence of larger firms (measured in market capitalization) having higher probabilities of meeting expected earnings than small firms, indicating more earnings management for large firms.

Nelson, Elliott and Tarpley (2002) argue that, since audit fees increase with client size (Francis and Simon 1987), the probability of adjustments in the financial statements by the auditor becomes lower when increasing the client size. Larger clients are more likely to have resources to structure transactions carefully and defend aggressive positions effectively. This is also supported by their results, which indicate that small firms’ attempts to increase current-year income are more likely to be adjusted than large firms’ attempts. Hence, large firms are assumed to have more bargaining power when negotiating with auditors.

Burgstahler and Dichev (1997) find statistical evidence of more earnings management to avoid earnings decreases for medium and large firms than small firms. In addition they find visual (but no clear statistical evidence) that large and medium firms engage in more earnings management to avoid losses.

Kim, Liu and Rhee (2003) find evidence of earnings management for both small and large firms; small firms engage more in earnings management to avoid losses while big firms engage more in earnings management to avoid earnings decreases. Persons` (1995) analysis of fraud reveals evidence of more fraudulent activity in smaller firms.

Based on our discussion above, we expect larger firms to engage in less earnings management. First, we have already argued that earnings management occur less for firms using a Big 4 auditor and that large firms often are audited by a Big 4 auditor. Hence we would expect higher quality of their financial reporting. Second, we assume that the negative effect of disclosed frauds is more extensive for large firms because they care more about their reputation. Third, large firms tend to have stronger internal control systems and governance mechanisms. Our hypothesis becomes:

\[ H_{10}: \text{ Larger firms are less likely to engage in earnings management. } \]
3.5 Sample selection and construction of variables

This study is based on data from 2000 to 2009 collected from the CCGR database. The database contains accounting information as well as governance data for all limited liability companies in Norway. The database therefore provides a unique opportunity to perform study on privately held firms.

The sample selection criteria and the sample size are shown in appendix 1. The sample consists of 1,631,065 firm-year observations of limited liability companies. In order to obtain high quality data this sample is shaved; firms that are public limited companies are excluded. More than 1,200,000 observations are excluded because they relate to very small companies. We further remove subsidiaries of another firm from our sample in order to exclude firms where the major financing and reporting decision are made by its parent company, which also may be listed. In addition, firms controlled by the government (more than 50 percent ownership) are excluded. Finally, some observations had to be excluded due to technical calculations in the data. This screening results in a sample of 229,806 firm-year observations in panel A and 215,558 in panel B. In the results reported below, we focus on net income from the unconsolidated financial reports.

Since earnings and earning change observations are drawn from a broad range of firm sizes we need to address the potential heterogeneity problem, and the observations are therefore scaled. A variety of variables to scale earnings have been used in the earnings management literature; total assets (Coppens and Peek 2005), stock price (Brown and Caylor 2005) and market value (Burgstahler and Dichev 1997). In the results reported below, earnings are scaled by opening balance of total assets to test $H_1$, and change in earnings is scaled by average total assets to test $H_2$.

---

8 Companies with less than NOK 1,000,000 in revenue and less than NOK 1,000,000 in total assets
9 Earnings are scaled by opening balance of total assets: \( \text{Scaled earnings} = \frac{NI_t}{TA_{t-1}} \)
Change in earnings are scaled by average total assets: \( \text{Scaled change in earnings} = \frac{NI_t - NI_{t-1}}{(TA_{t-1} + TA_t)/2} \)
$TA_t$ = Ending balance of total assets, fiscal year $t$
$NI_t$ = Net income fiscal year $t$
### 4. Results

#### 4.1 Evidence on the existence and frequency of earnings management

#### 4.1.1 Descriptive statistics

**Table 1: Descriptive statistics by year for scaled earnings and scaled change in earnings**

Panel A: Scaled Earnings

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>Mean</th>
<th>Std. dev</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>22,158</td>
<td>0.0752</td>
<td>0.13871</td>
<td>0.0041</td>
<td>0.0632</td>
<td>0.1485</td>
</tr>
<tr>
<td>2001</td>
<td>22,449</td>
<td>0.0720</td>
<td>0.13476</td>
<td>0.0027</td>
<td>0.0616</td>
<td>0.1441</td>
</tr>
<tr>
<td>2002</td>
<td>22,518</td>
<td>0.0807</td>
<td>0.13377</td>
<td>0.0074</td>
<td>0.0692</td>
<td>0.1532</td>
</tr>
<tr>
<td>2003</td>
<td>23,035</td>
<td>0.0779</td>
<td>0.13353</td>
<td>0.0059</td>
<td>0.0660</td>
<td>0.1509</td>
</tr>
<tr>
<td>2004</td>
<td>22,931</td>
<td>0.0998</td>
<td>0.13667</td>
<td>0.0190</td>
<td>0.0861</td>
<td>0.1761</td>
</tr>
<tr>
<td>2005</td>
<td>22,159</td>
<td>0.0961</td>
<td>0.13727</td>
<td>0.0162</td>
<td>0.0794</td>
<td>0.1711</td>
</tr>
<tr>
<td>2006</td>
<td>23,162</td>
<td>0.1027</td>
<td>0.14145</td>
<td>0.0195</td>
<td>0.0868</td>
<td>0.1834</td>
</tr>
<tr>
<td>2007</td>
<td>20,595</td>
<td>0.1132</td>
<td>0.14378</td>
<td>0.0245</td>
<td>0.0976</td>
<td>0.1972</td>
</tr>
<tr>
<td>2008</td>
<td>21,135</td>
<td>0.0823</td>
<td>0.14742</td>
<td>0.0020</td>
<td>0.0686</td>
<td>0.1667</td>
</tr>
<tr>
<td>2009</td>
<td>22,215</td>
<td>0.0705</td>
<td>0.13919</td>
<td>-0.009</td>
<td>0.0591</td>
<td>0.1460</td>
</tr>
<tr>
<td>Total</td>
<td>222,357</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel B: Scaled change in earnings

<table>
<thead>
<tr>
<th>Year</th>
<th>N</th>
<th>Mean</th>
<th>Std. dev</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>20,944</td>
<td>0.0018</td>
<td>0.13265</td>
<td>-0.0611</td>
<td>-0.0012</td>
<td>0.0605</td>
</tr>
<tr>
<td>2001</td>
<td>21,340</td>
<td>0.0037</td>
<td>0.12796</td>
<td>-0.0546</td>
<td>0.0018</td>
<td>0.0624</td>
</tr>
<tr>
<td>2002</td>
<td>21,435</td>
<td>0.0130</td>
<td>0.12456</td>
<td>-0.0466</td>
<td>0.0089</td>
<td>0.0702</td>
</tr>
<tr>
<td>2003</td>
<td>21,952</td>
<td>0.0021</td>
<td>0.12206</td>
<td>-0.0582</td>
<td>0.0001</td>
<td>0.0586</td>
</tr>
<tr>
<td>2004</td>
<td>22,044</td>
<td>0.0283</td>
<td>0.12541</td>
<td>-0.0346</td>
<td>0.0185</td>
<td>0.0850</td>
</tr>
<tr>
<td>2005</td>
<td>21,110</td>
<td>0.0101</td>
<td>0.13104</td>
<td>-0.0553</td>
<td>0.0059</td>
<td>0.0724</td>
</tr>
<tr>
<td>2006</td>
<td>21,995</td>
<td>0.0185</td>
<td>0.13323</td>
<td>-0.0475</td>
<td>0.0121</td>
<td>0.0815</td>
</tr>
<tr>
<td>2007</td>
<td>19,304</td>
<td>0.0290</td>
<td>0.13476</td>
<td>-0.0387</td>
<td>0.0202</td>
<td>0.0922</td>
</tr>
<tr>
<td>2008</td>
<td>19,924</td>
<td>-0.0189</td>
<td>0.13611</td>
<td>-0.0874</td>
<td>-0.0157</td>
<td>0.0489</td>
</tr>
<tr>
<td>2009</td>
<td>20,796</td>
<td>-0.0091</td>
<td>0.13439</td>
<td>-0.0775</td>
<td>-0.0075</td>
<td>0.0556</td>
</tr>
<tr>
<td>Total</td>
<td>210,844</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1 presents the descriptive statistics for scaled earnings and scaled change in earnings by year. In panel A the total number of observations is 222,357. The number of available observations per year is quite stable around 22,000 and the mean earnings are exclusively positive throughout the sample period. Panel B has a total of 210,844 observations. The mean change in earnings is primarily positive, except for the last two years in the sample period which have negative means.

4.1.2 Earnings management to avoid losses

The histogram presented in figure 1 shows the distribution of earnings scaled by the opening balance of assets, with interval widths of 0.005 for the range from -0.10 to 0.10.

Panel A: N = 222,357; interval width = 0.005

Fig. 2. Empirical distribution of annual earnings in Norwegian private firms scaled by opening balance of total assets. The interval width are 0.005, hence the first interval to the right of zero (black bar) contains observations in the interval [0.000, 0.005), the second interval contains [0.005, 0.010), and so on. Frequency is the number of observation in the earnings interval.

---

Some observations take on extreme values, so descriptive statistics are calculated after removing observations with net profits scaled by total assets or changes in net profit scaled by average total assets above 0.5 or below −0.5.
The distribution have tendencies of a single-peaked, bell-shaped form, however it has large irregularities around zero. We observe too many earnings reports directly above zero and too few earnings reports directly below zero compared to what we would have expected from the smoothness assumption. We also see a considerable jump in the earnings reports between the interval immediately below zero and the interval immediately above zero. This visual tendency is confirmed by the statistical tests. The Burgstahler and Dichev (1997) test statics (the standardized difference) for the interval immediately below zero is calculated to be -17.82 (and 21.25 for the interval immediately above zero). This clearly indicates existence of a discontinuity around zero. The standardized difference is extremely statistically significant for all generally accepted significance levels. We therefore reject the hypothesis $H_1$, that the distribution is relatively smooth and we accept the alternative hypothesis, that in general, Norwegian private firms manage earnings to avoid losses.

4.1.3 Frequency of earnings management to avoid losses

Further, we calculate the frequency of earnings management. That is the difference between observed frequencies of earnings levels, and the expected frequencies of earnings levels when earnings management is not present. In section 4.2 we find clear evidence of earnings management to avoid losses resulting in the rejection of the null-hypothesis. The model used is not appropriate to estimate the frequency of earnings management (Burgstahler and Dichev 1997). In addition, the model only considers irregularities around the two adjacent intervals to zero and does not include possible earnings management in the remaining intervals. For these reasons, Burgstahler and Dichev (1997) developed an additional model for estimating the frequency of earnings management. They assume that the distribution of earnings levels is approximately symmetric. Further they assume that in absence of earnings management, the observations above zero is unaffected by earnings management to avoid losses.

To find the expected number of observations in the interval below zero we use the equivalent interval lying above zero, i.e. we assume that the distribution of earnings levels is symmetric around zero. We chose three negative intervals with increasingly widths near zero ([-0.010, 0.000), [-0.020, 0.000) and [-0.030, 0.000)) which gives us the observed frequency of earnings levels. The equivalent
intervals above zero ([0.010, 0.020), [0.010, 0.030) and [0.000, 0.040)) yield the expected number of observations in the negative intervals. The difference is the frequency of earnings management. The results are presented in appendix 2. The last column shows the frequency of earnings management as a share of the expected observations in the intervals when earnings management is absent. The cases of earnings management to avoid earnings losses are calculated to be 40%, 44% and 48% of the observations expected in the absence of earnings management. Clearly, these results indicate that earnings management to avoid losses is commonly used by Norwegian private firms.

4.1.4 Earnings management to avoid earnings decrease

The histogram in figure 2 presents the distribution of the change in earnings scaled by total average assets, with interval widths of 0.004 for the range from -0.10 to 0.10.

Panel B: N = 210,844; interval width = 0.004

Fig. 3. Empirical distribution of change in annual earnings in Norwegian private firms scaled by average total assets. The interval width are 0.004, hence the first interval to the right of zero (black bar) contains observations in the interval [0.000, 0.004), the second interval contains [0.004, 0.008), and so on. Frequency is the number of observation in the earnings interval.
The form of this distribution is somewhat different from the histogram for earnings levels in figure 1. It has a clearer single-peaked, bell-shaped distribution around zero, but still with some noticeable irregularities. We would expect as for the histogram for earnings levels that, in absence of earnings management, the number of change in earnings reports directly above zero would be lower than we observe. The same expectation, but with the opposite sign and to lesser extent, is valid for the earnings reports below zero, i.e. that the number of change in earnings reports should be higher than we observe. The standardized difference is calculated to be -0.78 for the interval immediately below zero (and 5.32 for the interval immediately above zero). The standardized difference is not statistical significant. We therefore fail to reject the hypothesis H₂, that Norwegian private firms manage earnings to avoid earnings decreases.

4.1.5 Test for size-effect

To test whether differences in firm size affect our results we divide the sample into three groups with approximately equal numbers of observations, based on end-of-year total assets.

Table 2: Descriptive statistics

<table>
<thead>
<tr>
<th>Panel A: Earnings</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev.</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>74,088</td>
<td>0.0774</td>
<td>0.1505</td>
<td>0.0000</td>
<td>0.0671</td>
<td>0.1645</td>
</tr>
<tr>
<td>Medium</td>
<td>74,143</td>
<td>0.0960</td>
<td>0.1380</td>
<td>0.0135</td>
<td>0.0815</td>
<td>0.1729</td>
</tr>
<tr>
<td>Large</td>
<td>74,126</td>
<td>0.0873</td>
<td>0.1279</td>
<td>0.0145</td>
<td>0.0718</td>
<td>0.1525</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Panel B: Change in earnings</th>
<th>N</th>
<th>Mean</th>
<th>Std Dev.</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>70,265</td>
<td>0.0017</td>
<td>0.1433</td>
<td>-0.0730</td>
<td>0.0000</td>
<td>0.0748</td>
</tr>
<tr>
<td>Medium</td>
<td>70,296</td>
<td>0.0106</td>
<td>0.1297</td>
<td>-0.0551</td>
<td>0.0054</td>
<td>0.0723</td>
</tr>
<tr>
<td>Large</td>
<td>70,283</td>
<td>0.0116</td>
<td>0.1184</td>
<td>-0.0422</td>
<td>0.0065</td>
<td>0.0618</td>
</tr>
</tbody>
</table>

Panel A of table 2 shows the results on earnings levels for the three groups. The standardized differences are calculated to be -9.95, -7.98 and -12.88 for the interval immediately below (and 12.03, 9.77 and 14.84 for the interval immediately above zero) for small, medium and large firms respectively. There is
clear statistical evidence of earnings management to avoid losses for all three size
groups. The results for earnings changes are presented in panel B of table 4. The
standardized differences are calculated to be -0.19, -1.73 and 0.44 for the interval
immediately below zero (and 2.31, 2.94 and 3.85 for the interval immediately
above zero) for small, medium and large firms respectively.

This implies no statistical evidence of earnings management to avoid
reporting earnings decreases when controlling for firm size. Figure 3 below
presents the empirical distribution of earnings levels and change in earnings of all
three groups.

Panel A: Scaled earnings for small firms (N = 74,088; interval width = 0.0050; τ-statistic = -9.95
and = 12.03 for the interval immediately below and above zero, respectively).

Panel B: Scaled earnings for medium firms (N = 74,143; interval width = 0.0050; τ-statistic = -
7.98 and = 9.77 for the interval immediately below and above zero, respectively).

Panel C: Scaled earnings for large firms (N = 74,126; interval width = 0.0050; τ-statistic = -
12.88 and = 14.84 for the interval immediately below and above zero, respectively).
Panel D: Scaled change in earnings for small firms ($N = 70,265$; interval width $= 0.0040$; $\tau$-statistic $= -0.19$ and $= 2.31$ for the interval immediately below and above zero, respectively).

Panel E: Scaled change in earnings for medium firms ($N = 70,296$; interval width $= 0.0040$; $\tau$-statistic $= -1.73$ and $= 2.94$ for the interval immediately below and above zero, respectively).

Panel F: Scaled change in earnings for large firms ($N = 70,283$; interval width $= 0.0040$; $\tau$-statistic $= -0.44$ and $= 3.85$ for the interval immediately below and above zero, respectively).

Fig.4. Empirical distribution of scaled earnings and scaled change in earnings for small, medium and large private Norwegian firms, respectively.

4.2 Evidence on characteristics of firms engage in earnings management practices to avoid losses

In section 4.1 we find statistical evidence of earnings management practices by Norwegian private firms. In this section we aim to expose characteristics of firms that engage in earnings management. We choose to focus solely on avoidance of losses since the evidence in section 4.1 indicates that earnings management to
avoid earnings decreases is absent in our data. As mentioned in section 3.1 the earnings distribution approach basically gives us an indication of the existence and frequency of earnings management. To further explore earnings management we apply logistic regression analysis.

4.2.1 Descriptive statistics

Table 3: Means and t-tests of key values

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Not EM (below zero)</th>
<th>EM (above zero)</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total assets</td>
<td>15,610</td>
<td>17,727</td>
<td>0.382</td>
</tr>
<tr>
<td>Inventories</td>
<td>2,390</td>
<td>2,253</td>
<td>-0.487</td>
</tr>
<tr>
<td>Net income</td>
<td>-33</td>
<td>38</td>
<td>5.682*</td>
</tr>
<tr>
<td>Working capital</td>
<td>1,981</td>
<td>1,597</td>
<td>-1.214</td>
</tr>
<tr>
<td>Sales</td>
<td>23,294</td>
<td>26,782</td>
<td>1.218</td>
</tr>
<tr>
<td>Equity</td>
<td>46,845</td>
<td>40,874</td>
<td>-0.405</td>
</tr>
<tr>
<td>Total debt</td>
<td>10,924</td>
<td>13,639</td>
<td>0.634</td>
</tr>
<tr>
<td>Account receivable</td>
<td>2,643</td>
<td>3,036</td>
<td>1.099</td>
</tr>
<tr>
<td>Operating Income</td>
<td>253</td>
<td>726</td>
<td>1.034</td>
</tr>
<tr>
<td>Account payable</td>
<td>2,391</td>
<td>2,314</td>
<td>-0.248</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>1,009</td>
<td>2,071</td>
<td>1.275</td>
</tr>
</tbody>
</table>

Notes:
The amounts are reporting in thousand NOK

- t-test (two-tailed): df = 8,852
- * Significance at 1 % level

Table 3 presents some of the key numbers of the full sample. There is a statistically significant difference between average profits for firms just below zero in scaled earnings (henceforth earnings) with loss of 33,000 NOK, and firms just above zero in earnings with profit of 38,000 NOK \((t = 5.682, p < 0.000)\). None of the other variables are significant different between the groups. However, we observe that firms with just above zero in earnings have on average higher total assets \((t = 0.609, p < 0.702)\), sales \((t = 1.218, p < 0.223)\), total debt \((t = 0.634, p < 0.526)\), accounts receivable \((t = 1.099, p < 0.272)\), operating income \((t = 1.034, p < 0.301)\) and retained earnings \((t = 1.275, p < 0.202)\). In contrast, firms with just below zero in earnings have on average higher inventories \((t = -0.487, p \)
< 0.626), working capital ($t = -1.214, p < 0.225$), equity ($t = -0.405, p < 0.685$) and accounts payable ($t = -0.248, p < 0.804$).

### 4.2.2 Results and discussion

Table 4 below reports mean, standard deviation and t-statistics of the variables for firms with just below zero in earnings and just above zero in earnings.

#### Table 4: Test for the differences in means of each group

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std.dev</th>
<th>t-test</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TD/EQ</td>
<td>7.800</td>
<td>8.204</td>
<td>10.564</td>
<td>11.736</td>
</tr>
<tr>
<td>SAL/TA</td>
<td>2.425</td>
<td>2.544</td>
<td>2.081</td>
<td>2.312</td>
</tr>
<tr>
<td>REC/SAL</td>
<td>0.105</td>
<td>0.113</td>
<td>0.134</td>
<td>0.122</td>
</tr>
<tr>
<td>WC/TA</td>
<td>0.165</td>
<td>0.167</td>
<td>0.247</td>
<td>0.245</td>
</tr>
<tr>
<td>INV/SAL</td>
<td>0.139</td>
<td>0.150</td>
<td>0.273</td>
<td>0.973</td>
</tr>
<tr>
<td>TD/TA</td>
<td>0.793</td>
<td>0.794</td>
<td>0.203</td>
<td>0.223</td>
</tr>
<tr>
<td>LNTA</td>
<td>15.415</td>
<td>15.477</td>
<td>1.059</td>
<td>1.070</td>
</tr>
<tr>
<td>Z</td>
<td>2.887</td>
<td>3.077</td>
<td>2.098</td>
<td>2.903</td>
</tr>
</tbody>
</table>

**Notes:**
The amounts are reporting in thousand NOK  
t-test (two-tailed): df = 7,741 for all variables except TD/EQ (df = 7,185) and Z (df = 7,740)  
* Significance at 5 % level  
** Significance at 1 % level

The univariate tests (t-test of the ratios) show that a number of variables can be helpful in describing firms that engage in earnings management. Two variables are statistical significant at the 1 percent level: REC/SAL ($t = 2.771, p < 0.006$) and Z-score ($t = 2.979, p < 0.003$). As we expected, the REC/SAL ratio is significantly higher for firms directly above zero in earnings than for firms directly below zero in earnings. This indicates that firms move from having small losses to small profits by increased accounts receivable, i.e. prematurely recording of sales to increase earnings. The Z-score is much more difficult to explain, because we expected this to be lower for firms just above zero in earnings than firms just below zero in earnings. These results implies that, in fact, firms directly above zero in earnings are on average in a healthier economic condition than firms
directly below zero in earnings, i.e. firms below zero in earnings seem to experience a higher degree of financial distress.

SAL/TA and LNTA are statistical significant at the 5 percent level. The higher SAL/TA for firms directly above zero in earnings is in accordance with the results on the Z-score. These firms have on average higher assets turnover which indicate higher competitive abilities (Persons 1995). The difference in LNTA implies that firms just above zero in scaled earnings are on average larger compared to those just below zero in scaled earnings. TD/EQ is the closest to be significant of the other variables ($t = 1.426, p < 0.154$), which indicate that firms directly above zero in earnings have on average higher leverage than firms directly below zero in earnings.

The additional test on the difference for firms using a Big 4 auditor compared to firms using a non-Big 4 auditor result in a non statistical significant relation ($\chi^2 = 0.755, p = 0.385$).

The univariate tests provide valuable information, but the results are based on examination of variables at an aggregate level which do not allow for detection of interaction effects and should therefore be viewed cautiously. Consequentially we apply stepwise logistic regression to perform multivariate testing on the variables. Stepwise regression is a semi-automated process of building a model by successively adding or removing variables based on the t-statistics of their estimated coefficients. A Wald test is used to test the statistical significance of each coefficient ($\beta$) in the model to determine whether a variable should be added or removed. Table 5 reports the results for the stepwise logistic regression model.

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Unstandardized coefficients ($\beta$)</th>
<th>S.E</th>
<th>Sig</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>REC/SAL</td>
<td>.618</td>
<td>.223</td>
<td>.006</td>
<td>1.855</td>
</tr>
<tr>
<td>Auditor</td>
<td>-.125</td>
<td>.062</td>
<td>.042</td>
<td>1.133</td>
</tr>
<tr>
<td>LNTA</td>
<td>.062</td>
<td>.025</td>
<td>.015</td>
<td>1.064</td>
</tr>
<tr>
<td>Z-score</td>
<td>.049</td>
<td>.012</td>
<td>.000</td>
<td>1.050</td>
</tr>
<tr>
<td>Constant</td>
<td>-.590</td>
<td>.411</td>
<td>.151</td>
<td>.554</td>
</tr>
</tbody>
</table>

$\chi^2_{null}$: 9.220, $p = .324$

$\chi^2$: 29.334, $p = .000$

$R^2$: .004

Table 5: stepwise logistic regression results
The Hosmer-Lemeshow Test is the recommended test for overall fit of a binary logistic regression model, and is a formal test for whether the predicted probabilities for a covariate, match the observed probabilities. A large p-value indicates a good fit, while a small p-value indicates a poor fit. The test statistic is a chi-square statistic, and the result ($\chi^2_{HL} = 9.220, p = 0.324$) indicates non-significance and a medium-efficient good model fit. An alternative to the Hosmer-Lemeshow Test is the Omnibus Test which may be interpreted as a test of the capability of all predictors in the model jointly to predict the response (dependent) variable. The omnibus statistics for overall model fit is statistically significant ($\chi^2_{O} = 29.334, p < 0.000$), indicating that there is adequate fit of the data to the model, i.e. at least one of the predictors are significantly related to the response variable. The association strength between the dependent and independent variables are measured by Cow and Snell $R^2$ and Nagelkerke $R^2$, which are pseudo R-squares. Such statistics have different meaning than in OLS regression, and are not intuitively easy to explain, they should therefore be interpreted with great caution (Hosmer and Lemeshow 2000).

Given that earnings manipulators move from slightly negative earnings to slightly positive earnings, firms with slightly positive earnings are likely to represent earnings management firms (EM firms). The results reported in the table suggest that EM firms differ from non-EM firms in four aspects: REC/SAL, auditor, LNTA and Z-score.

Firms using a Big 4 auditor has an increased probability of being classified with non-EM firms ($\beta = -0.125, p < 0.062$). We find support for our hypothesis $H_0$, i.e. that firms using a Big 4 auditor are less likely to engage in earning management compared to firms using a non-Big 4 auditor. The REC/SAL ratio has a positive effect ($\beta = 0.618, p < 0.006$), meaning that firms with high receivables to sales have an increased probability of being classified with EM firms. Hence, we find support for our hypothesis $H_0$. This finding can relate to the activity of recording sales before they are actually earned. LNTA enters the model with a positive effect implying that large firms have an increased probability of being classified as EM-firms ($\beta = 0.062, p < 0.015$). This is contrary to what we expected in light of previous findings on the area. We fail to reject our hypothesis $H_{10}$, i.e. that larger firms are less likely to engage in earnings management. However, several studies have found significant results on the opposite, i.e. that large firms engage in more earnings management than small firms (Burghstahler
and Dichev, 1997; Barton and Simko 2002; Nelson, Elliott and Tarpley 2002). These results may be explained by higher pressure on large firms to report positive earnings, higher bargaining power for large firms in relation to auditors and stronger management power which could be used to override internal control systems (Kim, Liu and Rhee 2003).

The Z-score has a positive effect, meaning that firms with high Z-score have an increased probability of being classified as EM-firms ($\beta = 0.049, p < 0.000$). This is contrary to what we expected, and we fail to reject our hypothesis $H_4$, that firms in financial distress are more likely to use earnings management. In fact, our results indicate that firms with just above zero in earnings (who presumably manage earnings) tend to have higher Z-score, signaling that these firms are in fact healthier and not in financial distress. In addition, the TD/EQ ratio and TD/TA ratio did not enter the model as significant variables, implying that there are no significant differences in these ratios for EM firms and non-EM firms. We therefore fail to reject our hypothesis $H_3$, that firms with high financial leverage are more likely to use earnings management. Hence, firms in financial distress and with high financial leverage do not seem to be characteristics of Norwegian private firms engaging in earnings management.

The variables WC/TA, INV/SAL and SAL/TA, did not enter the model as significant explanatory variables and we fail to reject our hypothesis $H_5$, $H_7$ and $H_8$. This suggests that WC/TA, INV/SAL and SAL/TA do not represent characteristics of Norwegian private firms engaging in earnings management.

5. Conclusion

We find evidence of discontinuities in the earnings distribution that indicate threshold-based earnings management. Earnings losses are frequently managed away; the evidence suggests that in 40 percent to 48 percent of the cases, firms with small pre-managed earnings exercise discretion to report positive earnings. Hence, we find support for our hypothesis that Norwegian private firms manage earnings to avoid losses. This finding is consistent with several studies performed on both private and public firms. The prospect theory introduced by Kahneman and Tversky (1979) discussed above may be a possible explanation of why we observe too many earnings observations directly above zero and too few directly below zero.
Further, we find no evidence of earnings management to avoid earnings decreases. Hence, it seems that to sustain or beat last year’s performance is something Norwegian private firms do not strive to achieve. This is in line with Coppens and Peek (2005), who find no evidence that European private firms in low-tax alignment countries manage earnings to avoid earnings decreases. In contradiction, several studies on public firms find support for earnings management to sustain last year’s performance (Bursthaler and Dichev 1997; Degeorge, Patel and Zeckhauser 1999; Holland and Ramsay 2003). Beatty, Ke and Petroni (2002) compare publicly and privately held banks and find that public banks report fewer small declines in earnings and more small increases in earnings than expected. In contrast, they find that private banks report only marginally fewer small declines in earnings than expected. These results are consistent with public shareholders’ reliance on simple earnings-based heuristics serving as a driver of earnings management, and might explain why we do not find evidence of earnings increasing activities in private firms. Coppens and Peek (2005) also conclude that earnings decrease avoidance must mainly be driven by capital-market-based earnings management motives. They find that only firms publicly listed firms, in a country with well-developed capital markets and no financial and tax accounting alignment avoid reporting earnings decreases.

Our result is consistent with the hierarchically order presented by Degeorge, Patel and Zeckhauser (1999), stating that it is more important to report positive profits than to sustain recent performance. Our result is also robust to firm size, as we obtain qualitatively similar results when controlling for firm size.

Through logistic regression analysis we find several characteristics common for the firms’ using earnings management to avoid small losses. First, we find support for firms using a non-Big 4 auditor engage in more earnings management than firms using a Big 4 auditor. Second, we find that firms with high accounts receivable to sales are more likely to represent an earnings management firm. This may indicate that firms move from small losses to small profits by increased accounts receivable, i.e. prematurely record sales to increase current year’s earnings. Third, we find that large firms are more likely to engage in earnings management than small firms. Finally, we find that financial distressed firms do not engage in more earnings management than healthy firms. In addition, our results suggest that leverage is not a characteristic of earnings management firms. Hence, we do not find support for the debt covenant.
hypothesis and conclude that high leverage, which potentially can lead to debt covenant violation, do not create an incentive for earnings management in Norwegian private firms.

6. Limitations

In contrast to Spathis (2002), we do not have access to reliable information for fully separating EM firms from non-EM firms. We assume that EM firms move from what should have been a small loss to a small profit, resulting in a discontinuity around zero. However, not all firms lying in the interval immediately above zero engage in earnings management and conversely some firms lying in the interval immediately below zero may engage in earnings management. The logistic regression may therefore be biased. Many of the firms lying in these intervals may do so as a part of the normal distribution and not because of earnings management. Spathis (2002) uses a well-justified method of separating FFS firms from non-FFS firms and can therefore test whether these two groups differ on the selected variables. Similar information is difficult to obtain for firms engaging in earnings management due to its nature. The GAAP offer management flexibility in preparation of financial statements, and much of the earnings management practices are therefore legal and not reported in the same manner as fraud and manipulation. Our results on characteristic of EM firms must therefore be interpreted with caution, i.e. they only give an indication of which factors that are associated with probable earnings management practice.

A second limitation is that we don’t have access to appropriate data for testing the bonus-plan hypothesis, which is considered to be an important area in the earnings management literature. The only variable available on management compensation, in the CCGR database, is the CEO salary. First, the database does not separate between fixed and variable pay. Second, it does not provide information regarding which parameters management’s compensation is based on.

A third limitation in our paper is that we do not test for the effect of different ownership structures. Information asymmetry and agency costs arise from the separation of ownership and management and could lead to increased opportunity for earnings management. There is limited research on this area for private firms and could potentially explain significant more of the difference between EM firms and non-EM firms (see e.g., Abdolmohammadi, Kvaal and Langli 2010).
Bibliography


Appendix 1

Panel A: earnings

<table>
<thead>
<tr>
<th>Sample selection criteria</th>
<th>Firm-years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited liability companies 2000-2009</td>
<td>1,631,065</td>
</tr>
</tbody>
</table>

**Exclusion criteria**

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Public limited liability companies (including listed)</td>
<td>4,547</td>
</tr>
<tr>
<td>Companies with revenue less than 1,000,000 NOK in at least one year</td>
<td>1,125,730</td>
</tr>
<tr>
<td>Companies with total assets less than 1,000,000 NOK in at least one year</td>
<td>140,815</td>
</tr>
<tr>
<td>Subsidiaries</td>
<td>99,589</td>
</tr>
<tr>
<td>Missing information on ownership structure</td>
<td>14,716</td>
</tr>
<tr>
<td>Firms controlled by the government (&gt;50 %)</td>
<td>2,992</td>
</tr>
<tr>
<td>Firms with missing information on scaled earnings</td>
<td>12,870</td>
</tr>
<tr>
<td>Number of firm-years in sample A</td>
<td>229,806</td>
</tr>
</tbody>
</table>

Panel B: change in earnings

<table>
<thead>
<tr>
<th>Sample selection criteria</th>
<th>Firm-years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firm-years in sample A</td>
<td>229,806</td>
</tr>
</tbody>
</table>

**Exclusion criteria**

<table>
<thead>
<tr>
<th>Exclusion criteria</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Firms with missing information on scaled change in earnings</td>
<td>14,248</td>
</tr>
<tr>
<td>Number of firm-years in sample B</td>
<td>215,558</td>
</tr>
</tbody>
</table>
Appendix 2

Frequency of earnings management

<table>
<thead>
<tr>
<th>Interval</th>
<th>Observed frequency of observations</th>
<th>Expected frequency of observations</th>
<th>Frequency of EM</th>
<th>EM as percent of total observations in the interval</th>
<th>EM as percent of total negative observations</th>
<th>EM as percent of the expected cases when EM is absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>[-0.010, 0.000)</td>
<td>5,739</td>
<td>9,568</td>
<td>3,829</td>
<td>1.72 %</td>
<td>8.40 %</td>
<td>40 %</td>
</tr>
<tr>
<td>[-0.020, 0.000)</td>
<td>10,444</td>
<td>18,605</td>
<td>8,161</td>
<td>3.67 %</td>
<td>17.89 %</td>
<td>44 %</td>
</tr>
<tr>
<td>[-0.030, 0.000)</td>
<td>14,428</td>
<td>27,550</td>
<td>13,122</td>
<td>5.90 %</td>
<td>28.77 %</td>
<td>48 %</td>
</tr>
</tbody>
</table>