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The Implications of State Ownership on Earnings Management

Do State Enterprises Manage Earnings Less than Privately Owned Firms?

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Abstract

Earnings management refers to the practice of making discretionary choices in accounting with the intention to manipulate stated earnings. When used improperly it can distort the financial reports on which investors base their decisions, and thus impact the efficient allocation of capital. This study investigated whether the occurrence of earnings management is less prevalent in state-owned enterprises compared to listed enterprises, and whether the financial recession of 2008-2009 had an impact on this perceived divergence. Earnings management was identified through the use of two accruals-based models and the data sample is from the period 2005-2015. The study found conclusive evidence that there is no statistical difference in the occurrence of earnings management between state-owned enterprises and listed enterprises, and that the financial recession of 2008-2009 had no statistical impact on this finding. However, evidence indicating that the variance of earnings management within the two sample groups differed was found. These are important findings as current literature regarding the motivations for earnings management suggests that listed enterprises should face greater incentives to manipulate earnings, while the results suggest there are other factors providing important explanatory value.

Tutor: Florian Eugster
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1. Introduction

1.1 Background

Previous literature on accounting and financial management indicates that ownership structure correlates strongly with performance and has implications on the corporate governance of firms (Shleifer and Vishny, 1997). State ownership has often been heavily scrutinized due to inefficient bureaucracy, conflicting objectives and weak managerial incentives (Boardman & Vining 1989; Megginson et al., 1994; Shleifer, 1998). Furthermore, studies have shown that private firms perform better in multiple measurements, including profitability, capital investment and operating efficiency (Dewenter & Malantesta, 2001; D'Souza, Megginson, Nash, 2005; Megginson & Netter, 2001).

While several aspects of state ownership's impact on firm characteristics have been studied thoroughly, earnings management in relation to state ownership has not been investigated to the same extent. Earnings management refers to the practice of making discretionary choices in accounting. The definition of earnings management is often divided into the opportunistic perspective, implying that management uses discretion to deceive users of financial reports, and the beneficial perspective, suggesting that management instead uses discretion in order to increase the usefulness of the reports (Jiraporn et al., 2008). The occurrence of earnings management has been studied in public firms in both developed and developing countries and is according to current research considered to occur primarily due to capital market motivations, contracting motivations and regulatory motivations (Healy and Wahlén, 1999). The reason for research being primarily carried out on public firms is attributed to the availability of financial statements and the firms' perceived impact on the efficiency of capital markets on which investors base their capital allocation decisions. Previous studies of earnings management in relation to state-owned enterprises (SEs) have been conducted mainly in China, where many publicly listed firms still retain a large share of government ownership. These studies have shown conflicting results, some show that SEs to a large extent employ earnings management (Aharony et al., 2010; Chen and Yuan, 2004; Liu and Lu, 2002), while other studies show that SEs have a lower level of abnormal accruals, a proxy for earnings management (Wang & Yung, 2011; Ding et al., 2007). Wang & Yung (2011) serves as important literature in this study, their paper investigated this question in China while controlling for tunneling, with results indicating that privately owned enterprises employed earnings management to a larger extent than SEs.

The limited amount of studies on earnings management in SEs in developed countries such as the United States can be attributed to the low number of SEs and the low financial transparency of these. Since Sweden has both a relatively large number of SEs in relation to its size as well as transparent financial reporting of these entities, Sweden is a favorable delimitation for studies of this phenomenon in a developed country. Using similar research method as in the study by Wang and Yung (2011), this study employed accruals-based models to research whether there is a discrepancy in the occurrence of earnings management in SEs compared to publicly listed firms (LEs). Furthermore, the study investigated whether the hypothesized divergence becomes less evident during times of financial recession. This was done through mean and median tests of the two sample populations and multivariate regressions. This study found conclusive evidence in the multivariate regressions that there is no discrepancy between SE and LEs and that the financial recession of 2008-2009 had no implication on this finding. The mean and median results are more ambiguous, they do however indicate that the variance in earnings management is greater for LEs compared to SEs. The study is deemed relevant in the ongoing debate regarding the benefits and drawbacks of privatization as well as in providing insights and scrutiny to current research on the underlying motivations of earnings management.

1.2 Purpose

The purpose of this study was to identify whether there is a discrepancy in the occurrence of earnings management between SEs and LEs in Sweden. This was conducted by calculating proxies for earnings management using accruals-based models to estimate the occurrence of earnings management. Research on ownership structure and its implications for corporate governance further sheds light on some of the most fundamental political questions regarding state involvement in corporations. Furthermore, management in SEs and LEs were deemed to face differences in incentives for earnings management, which should affect their behavior in different parts of the economic cycle. The study aimed to provide insights on implications of these behaviors by examining the financial recession of 2008-2009, and the period of economic stability prior to the recession, 2006-2007.

1.3 Contribution

Prior research within the topic has to a great extent been contradicting. Several studies in China find evidence of SEs managing earnings to a greater extent than LEs (Liu and Lu, 2002; Chen and Yuan, 2004; Chen et al., 2008; and Aharony et al., 2010), while others find that SEs manage

earnings less (Ding et al., 2007; Wang & Yung, 2011). Furthermore, this subject has primarily been researched in developing countries, as in the reference study by Wang & Yung (2011). Firstly, this study contributes to existing literature by providing similar research in a developed country. Secondly, the study differs from Wang & Yung (2011) as it includes analyses on how the financial recession of 2008-2009 impacted earnings management for SEs and LEs, respectively. Prior studies have been conducted on the impact the financial recession of 2008-2009 had on earnings management for listed firms (Filip & Raffournier, 2014; Persakis & Iatridis, 2015), but there have not been studies on how the recession impacted earnings management in terms of different corporate governance structures, i.e. SEs and LEs. Lastly, the study provides new information relevant for the continuing debate about privatization of SEs and the debate regarding motivations for earnings management.

1.4 Delimitation

This study has been limited to the Swedish market in the years of 2005-2015, with data collected from 2004 to 2016, since the models employed need forward as well as lagging values. The sample of firms studied consist of SEs, where all SEs with relevant data have been used, and LEs, where a sample of firms from the Nasdaq Stockholm exchange have been used. The study has further limited the sample to only non-financial firms due to the differences in financial structures and reporting of cash flows in financial firms. The Swedish state currently has an ownership stake in 48 firms, in the majority of these the state is the sole or majority owner (Regeringskansliet, 2017). This study defined SEs as all firms were the Swedish state has an ownership stake. Research has been limited to firms incorporated in Sweden due to the availability of data for SEs and in the interest of homogeneity of reporting standards for firms in both groups. This study attempted only to identify potential discrepancies in the earnings management of SEs compared to LEs and did not try to discern how the earnings are manipulated, i.e. if they are deflated or inflated. In sections where the study attempted to discern whether a perceived difference between LEs and SEs was impacted by financial recession, the recession is defined to occur between the years 2008 and 2009 while the non-recession period refers to the preceding years of 2006 and 2007 in accordance with study done by Filip & Raffournier (2014).

Several models have been employed in previous research to identify earnings management. According to current research, accruals-based models are most accurate in identifying earnings management (Kighir et al., 2014; Healy & Wahlen, 1999), which is why they have been

employed in this study. The Modified Jones Model (Dechow et al., 1995) and the Accruals Quality Model (Francis et al., 2005) will be used exclusively to identify earnings management. The choice of models is discussed further in section 2.2.

1.5 Disposition

The study is divided into 8 sections. Section 2 contains a review of previous literature and the development of the hypotheses used as the basis for research. Section 3 explains the method and models employed in conducting the study. Section 4 contains a description of the data sample used in the study. Sections 5 and 6 contain the results and the analysis, respectively. Lastly, areas for future research is discussed section 7, followed by a conclusion in section 8.

2. Literature review

The following section provides an overview of previous research and theory on earnings management, implications of state ownership and implications of financial recession. Additionally, methods for identifying earnings management and the necessary adjustments in accounting data are described. Lastly, the research questions and hypotheses are presented.

2.1 Earnings Management

2.1.1 Definition

Earnings management has been defined in various ways in previous research. The definitions can primarily be divided into two different views, the pernicious *opportunistic perspective,* which implies that the purpose of *earnings management* is primarily to deceive users of financial reports (Schipper, 1989; Levitt, 1998, Healy and Wahlén, 1999; Tzur and Yaari 1999, Chtourou, Bédard and Courteu 2001; Miller and Bahnson, 2002) and the *beneficial perspective* shifting focus towards allowing management discretion in order to make reporting as informative and useful as possible (Ronen and Sadan, 1981; Demski, Patell and Wolfson, 1984; Suh, 1990; Demski, 1998; Beneish, 2001; Sankar and Subramanyam, 2001). The definition used in this study, aligned with current research, will focus on the opportunistic perspective and is defined by Healy and Wahlén (1999) as: *"(...) 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."*

2.1.2 Accruals Manipulation vs. Real Activities Manipulation

There are two ways in which managers can engage in *earnings management*. Either through *accruals manipulation* or *real activities manipulation. Accruals manipulation* stems from accounting rules, known as accrual accounting, where revenues and expenses should be attributed to the period when they are actually earned or incurred, with disregard to movement of cash. The difference between reported earnings and cash collected is then what constituents an accrual (Robinson et al., 2015). Considering that accrual accounting is deemed standard today (IFRS, 2014), accruals hence naturally appear in the financial statements of firms. Therefore, it is of importance to distinguish between non-discretionary accruals, relating to accruals arising through normal application of accounting guidelines, and discretionary accruals, resulting from decisions outside the normal, that could be made with the intent of distorting reported earnings or as a result of estimation errors. (Robinson et al., 2015; Dechow, 2010). *Real activities manipulation* is defined by Roychowdhury (2006) as *"(...) departures from normal operations practices, motivated by managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations"*. *Real activities manipulation* differs from *accruals manipulation* primarily as the activities have both a direct effect on the cash flow as well as a potential effect on accruals. Examples of *real activities manipulation* are price discounts to boost sales and aggressively cutting discretionary expenses to improve margins in short term. Research within *earnings management* has primarily focused on *accruals manipulation* (Roychowdhury, 2006).

2.2 Measuring Earnings Management

Previous research has primarily adapted two differing methods of identifying earnings management. The first method, defined as accruals-based models, attempts to determine the extent earnings management is prevalent in a firm by isolating accruals considered to be attributable to management discretion (Healy, 1985). The second approach focuses on accounting earnings and stock returns with the intention of discovering earnings management through stock prices under the assumption of an efficient market (Francis and Schipper, 1999). This study exclusively employed accruals-based models due to their widespread use and relatively high explanatory power (e.g. Francis et al., 2005; Healy, 1985; Dechow et al., 1997: Jones, 1991; Wang & Yung, 2011).

2.2.1 Modified Jones Model

According to accrual accounting, there are two factors of corporate earnings, cash flow from operations and accounting accruals. As stated previously, accounting accruals can further be divided into non-discretionary accruals, accounting adjustments deemed necessary, and discretionary accruals, adjustments that are subject to managerial discretion (Jones, 1991). The Jones Model is based on the theory of discretionary accruals serving as proxy for earnings management (Jones, 1991). The proxy is calculated by subtracting non-discretionary accruals from total accruals, the model is then regressed by lagged total assets, property, plant and equipment (PPE), and changes in revenue in order to control for changes in a firm's non-discretionary accruals. Subsequent research has criticized this model for implicitly assuming that all revenues are non-discretionary and as a result the model has been modified to reduce revenue by the difference in receivables with the implicit assumption that differing credit sales is a result of earnings management (Dechow et al., 1995). The Modified Jones Model specified in Dechow et al. (1995) was used in this study, a choice further supported by Dechow et al. (2010) which suggests that this modified model has higher explanatory power and lower risk of committing type II errors. Additionally, all variables were scaled to lagged assets in order to account for size differences and mitigation of heteroscedasticity (Kothari et al., 2005).

2.2.2 Accruals Quality Model

According to extant literature, another widespread measure of earnings management is accruals quality (Dechow and Dichev 2002; Francis et al. 2005; and Francis et al.; 2008). The Accruals Quality (AQ) Model is based on the cash flow statements and defines accruals quality as the standard deviation of the estimated residuals. It regresses total accruals on lagged, current and future values of cash flow from operations (CFFO), changes in revenue and PPE. The AQ Model served as a complement to the Modified Jones Model since it examines earnings management behavior stemming from inconsistencies over time in reporting rather than absolute values. The dependent variable is the firms' standard deviation of the residual attained for each firm-year observation, meaning that if a firm has continuously high residuals in its accruals quality, the financial reporting of the firm is then predictable and thus does not present an uncertainty. The AQ Model was also adapted due to its accepted use (Dechow & Dichev, 2002; Francis et al., 2005; Wang & Yung, 2011). Again, all variables were scaled to lagged assets in order to account for size differences and mitigation of heteroscedasticity (Kothari et al., 2005). Furthermore, Dechow & Dichev (2002) establish relations between accruals quality and certain firm characteristics, which was helpful in establishing control variables.

2.3 Adjustments Attributable to Accounting Standards

The accounting data collected for all the firms are either presented according to IFRS or Swedish GAAP (K3, K2). One major difference between the two accounting formats is that Swedish GAAP allows for appropriations. Appropriations allow firms to smooth earnings or get a tax credit by postponing the taxation of up to 25% positive net income and allocate it in the balance sheet as an untaxed reserve. The reserve has to be recognized and reallocated to the income statement within 6 years (Inkomstskattelagen, 1999). In order to make the data comparable between firms with different accounting standards, adjustments for firms employing such appropriations were made. The adjustments were made by allocating the respective proportion of the appropriations to equity and debt.

2.4 Previous Research on Earnings Management

The prevalence of earnings management has been thoroughly researched in developed economies. Burgstahler & Dichev (1997) finds evidence that firms actively manage earnings to avoid reporting lower earnings and losses. Chaney and Lewis (1995) finds that in a world of asymmetric information, firms manage earnings to increase firm value. Bergstrasser and Phillipon (2006) provides evidence of positive correlation between earnings management and to which extent CEO compensation is tied to the value of the stock and option holdings. DuCharme, Malatesta and Sefcik (2001) indicates that earnings management pre-initial public offering (IPO) leads to increased IPO proceeds and decreases subsequent stock performance. DeFond and Jiambalvo (1994) shows that in the year prior to violation of debt covenants, firms are observed having abnormal total and working capital accruals. The above research showcases that earnings management in developed countries in LEs primarily seem to stem from either externally motivated incentives such as meeting earnings expectations, increase share price and avoid violation of debt covenants, or internally motivated such as when management incentives are closely tied to financial performance.

Healy and Wahlén (1999) summarizes the research on incentives for managing earnings into three categories: *Capital market motivations, contracting motivations* and *regulatory motivations.*

Capital market motivations suggests that, given the widespread use of financial information by investors and equity analysts, managers may be incentivized to manipulate short-term stock performance. Teoh, Wong and Rao (1998) showcases that firms preparing for IPOs have a median discretionary accrual in the offer year of 4-5 percent of total assets. Furthermore,

Dechow (1994) finds that current earnings are better predictors of future cash flows than current cash flows, suggesting that earnings are still given significant relevance in valuation of firms even though investors are aware of issues relating to earnings management.

Contracting motivations is based on the fact that accounting data is used in monitoring and regulating contracts between a firm and its stakeholders. Management incentive contracts are for example used to align management and shareholder incentives, while debt contracts are used to limit managers from taking excessive risk at the expense of creditors (Healy and Wahlén, 1999). The cost of revising potential earnings management for compensation committees and creditors are deemed high and should incentivize managers to undertake such behavior (Watts and Zimmerman, 1978). Sweeney (1994) finds that firms violating covenants make income-increasing accounting changes, suggesting that violators make the changes with intention of reducing the likelihood of future violations. Cheng and Warfield (2005) investigates management contracts with relatively high equity incentives and its implication on earnings management. The result indicates that managers with high equity incentives are more likely to report earnings consistent with or slightly above expectations and less likely to report large positive earnings surprises, suggesting they potentially reserve earnings through discretionary accounting choices with the aim of decreasing stock volatility.

Regulatory motivations suggest that managers and firms are incentivized to manage earnings in order to avoid certain regulation, primarily industry-specific and antitrust (Healy and Wahlén, 1999). For example, the banking industry is being monitored extensively and regulated regarding capital requirements, where evidence of managing accounting figures have been identified. Barth, Gomez-Biscarri, Kasznik, López-Espinosa (2017) provides evidence of banks using *realized available for sale (AFS)* securities to smooth earnings and increase low regulatory capital. Furthermore, Watts and Zimmerman (1978) suggests that firms under investigation of anti-trust violations or similar alleged offences with political consequences are likely to manage earnings to appear less profitable. Cahan (1992) finds evidence that firms investigated for antitrust violations reports a higher share of income decreasing discretionary accruals during the years of investigation.

2.5 Implications of State Ownership

In contradiction to firms listed in developed markets, one can argue that managers in Swedish SEs do not to face the same incentives to manage earnings as managers in LEs. Firstly, the vast majority of the SEs are not listed (only SAS & Telia), suggesting that *capital market pressures*,

that are given high explanatory value in prior research on earnings management, do not exist to the same extent in SEs. Secondly, *contracting motivations* arising from management incentives are also mitigated in Swedish SEs since, in accordance with the guidelines of governance in state owned firms in Sweden, management of SEs should not be given any variable compensation in relation to performance (Regeringskansliet, 2016). Furthermore, although no relevant research is available on SEs in developed countries, studies in China find SEs to face less pressure from creditors as they are less worried about downside risk (Chen, Chen, Lobo, and Wang, 2010). As the Swedish state, the ultimate owner of the firms, is given the highest rating by Moody's, S&P and Fitch (Riksgälden, 2017) the pressure from creditors should, in accordance with Chinese research, be lower for SEs than for LEs, suggesting further mitigation of *contracting motivations.* Finally, in terms of *regulatory motivations* for earnings management, Regeringskansliet (2016) clearly states that SEs should function as role models when it comes to corporate social responsibility and are hence considered less likely to try to manage earnings with the aim of avoiding regulation. The potential downside of having SEs evading regulation set by the state itself further strengthens this reasoning. Moreover, Wang & Yung (2011) argues that SEs receive state protection in the form of guaranteed sales and investments which should reduce the incentives for management to manipulate firm-specific information.

Although the above research and facts support the argument that SEs should be less incentivized to manage earnings, several studies from China showcase that SEs manage earnings to a greater extent than their privately held counterparts (Liu and Lu, 2002; Chen and Yuan, 2004; Chen et al., 2008; and Aharony et al., 2010). Tunneling, described by Johnson et al. (2000) as the transfer between related firms with the aim to benefit the controlling party, is also identified as the primary method used to manage earnings in SEs (Aharony et al., 2010). Tunneling activities are further considered more present in emerging economies where corporate governance mechanisms are less developed. (Johnson et al., 2000; Liu and Lu, 2002). The results from the research conducted in China is however not consistent, Ding et al. (2007) finds that Chinese SEs have lower levels of non-discretionary accruals than LEs. Furthermore, Wang and Yung (2011) provides evidence that SEs are observed having lower levels of accruals-based earnings management when controlling for tunneling.

There are several underlying reasons for why researchers hypothesize that SEs manage earnings more. One stems from the fact that state ownership has persistently been associated with poor corporate governance, misallocation of resources, low stock price informativeness and

unethical actions as a result from factors such as weak incentives, bureaucratic interference and lack of competition (Boardman and Vining, 1989; Megginson et al., 1994; Shleifer, 1998; Dewenter and Malatesta, 2001; Megginson and Netter, 2001; Ben-Nasr and Cosset, 2014). Wang and Yung (2011) argues that in an environment exposed to such governance inefficiency and absent market discipline, managers are more inclined to use discretion in financial reporting. Furthermore, extant literature argues that due to the extensive number of stakeholders in a SE, such as taxpayers, voters, investors and more (Paulsson, 2006), as well as the widespread use of financial information from such firms, information asymmetry becomes an inevitable issue and potential agency problems are more probable to thrive (Wang and Yung, 2011). Finally, one argument often cited is based on the entrenchment argument presented by Shleifer and Vishny (1989), proposing that with high concentration of ownership follows increased private control benefits. Research indicates that controlling owners with high private control benefits have incentives to hide these from other stakeholders since they would otherwise risk losing them (Zingales, 1994; Shleifer and Vishny, 1997). Leuz et al. (2003) further finds evidence of these controlling owners using earnings management in order to conceal these incentives to outsiders. Since states' ownership stake in SEs often is significant, this has been cited as one of the reason for why SEs are more likely to engage in managing earnings (Wang & Yung, 2011).

2.6 Implications of Financial Recession

In terms of measuring the effects of the financial recession during 2008-2009 on earnings management, several studies have been conducted on LEs with inconsistent results. Persakis and Iatridis (2015) finds that from a global perspective, earnings management increased during the recession. Iatridis and Dimitras (2013) investigates how the recession affected the scope of earnings management in listed firms in five of the most exposed European countries (Portugal, Ireland, Italy, Spain and Greece). The authors find that in three out of five countries earnings management increased, while there were conflicting results in one and another showed decreasing earnings management. Filip and Raffournier (2014) studies 16 European countries, the result shows that earnings management decreased for the majority of countries during the recession 2008-2009 compared to the period of stability between 2006-2007.

To begin with, several studies argue that earnings management should increase during financial recession. Ahmad-Zaluki, Campbell & Goodacre (2011) finds that firms turn to earnings management to compensate for lower operational performance during troubled periods when

they experience lower earnings. Additionally, research argues that managers should be more incentivized during such times to manage earnings in order to mitigate effect on the stock price, which would have a negative effect on their compensation (Charitou, Lambertides, & Trigeorgis, 2007). Furthermore, several studies find that firms employ earnings management to avoid violations of debt covenants stemming from poor economic performance (DeFond & Jiambolvo, 1994; Sweeney, 1994; and Iatridis & Kadorinis, 2009). In contradiction, some firms may be incentivized to deflate earning, in order to obtain concessions from creditors during debt restructuring (Filip & Raffournier, 2014). The above research hence argues that earnings management, regardless of whether the earnings are inflated or deflated, should intensify during financial recession.

In contradiction, several arguments have been put forward suggesting that the prevalence of earnings management should decrease in times of recession. Chia et al. (2007) argues that during recessions, firms are under greater scrutiny by stakeholders and hence have less discretion for earnings management. Furthermore, the litigation risk is deemed to increase during financial recessions and should therefore increase earnings conservatism (Jenkins et al., 2009; Filip & Raffournier, 2014). Lastly, the value relevance of earnings over different business cycles has showed that earnings in financial recessions are more volatile and hence increasingly uncertain which should drive the demand for conservative earnings (Ball & Shivakumar, 2005; Brown, He, & Teitel, 2006; Jenkins et al., 2009). Additionally, market participants are considered to be more accepting of poor performance during times of recession which mitigates incentives for income-increasing earnings management (Ahmad-Zaluki et al., 2011; Filip & Raffournier, 2014).

2.7 Research Question and Hypothesis

Extant research shows conflicting results on whether earnings management is more prevalent in SEs than in LEs in developing countries (Liu and Lu, 2002; Chen and Yuan, 2004; Ding et al., 2007; Chen et al., 2008; Aharony et al., 2010 and Wang and Yung 2011). However, considering that current research on earnings management in developed countries is based on the *opportunistic approach* with motivations stemming from *capital market pressures, contracting motivations* and *regulatory motivations* (Healy and Walhén, 1999), and that these incentives should be less prevalent for managers in SEs (see section 2.5), the following was hypothesized:

H1: Swedish SEs exhibit a lower level of accruals-based earnings management than Swedish LEs.

Furthermore, as discussed under section 2.6 regarding implications of financial recession, the results have been contradicting in terms of whether earnings management increases or decreases during such times. In the study conducted by Filip and Raffournier (2014), Sweden was one of the countries where they found evidence of decreasing earnings management in LEs during the recession years (2008-2009) compared to the years of economic stability (2006-2007). Furthermore, aligned with the discussion that SEs should not face the same motivations for earnings management as LEs, and that SEs in Sweden in general are not listed and hence should not face the same capital market pressure, it was argued that their behavior in terms of earnings management should be less dependent on the overall business cycle. Due to the fact that LEs in Sweden have been shown to decrease their use of earnings management during the recession of 2008-2009, and that SEs behavior was considered to be more constant over the business cycle, the following was hypothesized:

H2: The divergence of earnings management between SEs and LEs is less evident during the financial recession of 2008-2009 than the period of economic stability of 2006-2007.

3. Method

This section provides a detailed mathematical description of the applied models, followed by background to the choices made in this study on how to apply these models. The multivariate regression models are presented, along with a thorough description of the dependent variables and the independent control variables. Lastly, the mean and median tests used to examine the characteristics of the sample are presented.

3.1 Description of Applied Models

3.1.1 Modified Jones Model

The process to estimate discretionary accruals according to the Modified Jones Model is outlined below.

Total accruals (TA_{it}) were calculated using data from the income statement and cash flow statement. $EXBI_{it}$ refers to earnings before extraordinary items and discontinued operations, and $CFFO_{it}$ refers to cash flow from operations.

$$TA_{it} = EXBI_{it} - CFFO_{it} \quad (1)$$

Normal levels of accruals were calculated according to a cross-sectional approach and regressed according to the ordinary least squares (OLS) method. $A_{i,t-a}$ refers to total lagged assets, ∆REV refers to change in revenue between years t and t-1, ∆REC refers to change in receivables between years t and t-1, ∆PPE refers to change in Property, Plant & Equipment between years t and t-1. All variables are scaled by total assets.

$$\frac{TA_{it}}{A_{i,t-1}} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\triangle REV - \triangle REC_{it}}{A_{i,t-1}} + \alpha_3 \frac{\triangle PPE_{it}}{A_{i,t-1}} + \varepsilon_{it} \quad (2)$$

The coefficients $\alpha 1$, $\alpha 2$ and $\alpha 3$ from the previous step were used to calculate non-discretionary accruals (NDA).

$$NDA_{it} = \alpha_1 \frac{1}{A_{i,t-1}} + \alpha_2 \frac{\triangle REV_{it} - \triangle REC_{it}}{A_{i,t-1}} + \alpha_3 \frac{\triangle PPE_{it}}{A_{i,t-1}} \quad (3)$$

Discretionary accruals (DA) were defined as the difference between total accruals and non-discretionary accruals, this served as the proxy for earnings management according to the Modified Jones Model:

$$DA = \frac{TA_{it}}{A_{i,t-1}} - NDA_{it} \quad (4)$$

3.1.2 Accruals Quality Model

TA_{it}, $EXBI_{it}$, $CFFO_{it}$ were defined as in the Modified Jones Model. See below:

$$TA_{it} = EXBI_{it} - CFFO_{it} \quad (1)$$

Accruals quality was defined as the standard deviation of the residual σ(e) in the below equation. $CFFO_{i,\,t-1}$, $CFFO_{i,\,t}$, $CFFO_{i,\,t+1}$ refers to lagged, current and future cash flow from operations. TA_{it}, $A_{i,t-a}$, ∆REV, ∆PPE were defined as in the Modified Jones Model.

$$\frac{TA_{it}}{A_{i,t-1}} = y_0 + y_1 \frac{CFFO_{i,t-1}}{A_{i,t-1}} + y_2 \frac{CFFO_{i,t}}{A_{i,t-1}} + y_3 \frac{CFFO_{i,t+1}}{A_{i,t-1}} + y_4 \frac{\triangle REV_{it}}{A_{i,t-1}} + y_5 \frac{\triangle PPE_{it}}{A_{i,t-1}} + \varepsilon_{it} \quad (5)$$

3.2 Study Specific Adoptions

3.2.1 Cross-Sectional vs. Time Series Analyses

Coefficients in regression analyses are primarily estimated through two different methods, the time-series approach and the cross-sectional approach. In terms of accruals-based models, the methods differ in the way accruals are normalized in order to compare the data. Dechow et al., (1995) originally used the time-series method in their study, whereby variations in total accruals are measured over several time periods and the relevant year's accruals are normalized in relation to the previous year's. This method has in subsequent research been met with criticism, most importantly that time-series models lower the power of tests due to overlapping estimation and treatment periods (Subramanyam, 1996). The cross-sectional method estimates the coefficients by normalizing accruals for one point in time for each industry. According to Peasnell et al., (2000), the cross-sectional approach allows high power tests for detecting earnings management upwards of 5% of lagged total assets, compared to rejection rates of 20-30% when using time-series models for the same data. The cross-sectional approach is not entirely without fault, according to Peasnell et al., (2000) due to the cross-sectional high detection rates of earnings management, the method can lead to false indications when the value of cash flow is extreme.

As evidenced by the above discussion, the cross-sectional method, despite flaws, was better suited for this study. The aim to discover the occurrence of earnings management, irrespective of changes happening continually over time reinforces the choice of the cross-sectional method.

3.2.2 Balance Sheet Method vs. Cash Flow Method

Both of the models employed in this study require cash flow from operations in order to calculate total accruals (Jones Model 1991; Francis et al., 2005). The balance sheet method employs the connection between working capital changes and accrued revenues and expenses in order to estimate cash flow from operations and thus calculate total accruals. This approach has faced scrutiny in previous research due to the possibility that measurement errors occur if non-operating activities such as divestitures, mergers and acquisitions are present in the data Collins & Hribar, 2002). Therefore, the cash flow method, where cash flow from operations is collected directly from the financial reports was used, as in accordance with Collins & Hribar (2002). This choice is further supported as it is commonly used in literature (Wang & Yung, 2011; Filip & Raffournier, 2014).

3.2.3 Absolute Value of Discretionary Accruals

As the study aimed to investigate the extent of earnings management, with disregard to whether it was used for inflating or deflating earnings, this study used the absolute value of discretionary accruals, in accordance with Wang & Yung (2011).

3.3 Multivariate Regressions

In order to assess the effect of state ownership on earnings management, the two models of earnings management were regressed on a state ownership variable as well as a selected number of control variables. The dependent variable in the Modified Jones Model (Dechow et al., 1995) was the absolute value of discretionary accruals, $|DA|_{it}$, while AQ_{it} was employed in the Accruals Quality Model (Francis et al., 2005; Wang & Yung, 2011). The multivariate regressions are presented below:

$$|DA_{it}| = \lambda_0 + \lambda_1 SE_{it} + \lambda_2 Lev_{it} + \lambda_3 ROA_{it} + \lambda_4 Size_{it} + \lambda_5 MI_{it} + \lambda_6 Growth_{it} + \lambda_7 Loss + \varepsilon_{it} \quad (6)$$

$$AQ_{it} = \lambda_0 + \lambda_1 SE_{it} + \lambda_2 Lev_{it} + \lambda_3 ROA_{it} + \lambda_4 Size_{it} + \lambda_5 MI_{it} + \lambda_6 Growth_{it} + \lambda_7 Loss + \varepsilon_{it} \quad (7)$$

Where SE refers to a dummy variable which equals one for SEs and zero for LEs, *Lev* refers to the leverage ratio, *ROA* refers to the return-on-assets, *Size* refers to the logarithm of total assets, *MI* refers to management incentives (i.e. bonus in relation to salary) and *Growth* refers to growth in terms of assets. *Loss* refers to losses in the previous year. To account for dependency among firm year observations, all standard errors were clustered on a firm level, in accordance with Petersen (2009).

3.3.1 Main Independent Variable

The first hypothesis of this study, H1, claims that SEs are less likely to employ earnings management compared to LEs. Hence, firstly this study researched the result of the coefficient for state ownership in comparison to the dependent variable $|DA|$ or AQ. In order provide evidence in support of our H1, the state ownership variable coefficient needed to have a significant negative value. In order to find evidence of H2, the coefficient would have to be lower with the same or greater statistical significance in the period of non-recession compared to the period of recession.

3.3.2 Control variables

Leverage (Lev) - Leverage ratio was defined as the relation between debt to equity. Research has shown that there is a positive correlation between increased leverage and earnings management since earnings management often is used by covenant violators to avoid future violations (DeAngelo, 1994; Sweeney, 1994; Becker et al., 1998). This suggests that higher levels of leverage increases prevalence of earnings management in accruals-based models. The coefficient for *Lev* was hence expected to be positive.

ROA (ROA) - The definition of *ROA* applied in this study is aligned with Kothari et al. (2005) which defines it as earnings before extraordinary income (EXBI) divided by average assets during the year. This variable was included as a control variable due to previous research which suggests that there exists a positive correlation between *ROA* and accruals manipulation, implying either that profitable firms tend to manage earning more, or, that firms are more profitable because of earnings management (Wang & Yung, 2011, Kothari et al. 2005). The coefficient for *ROA* was hence expected to be positive.

Size (Size) - Defined as the natural logarithm of total assets. *Size* has been chosen as a control variable due to previous research indicating a correlation between firm size and earnings management. This correlation has been found to be negative in several previous studies (Zimmerman, 1990; Wang & Yung, 2011; Francis et al., 2005; and Dechow & Dichev, 2002). There exist several methods to use as a proxy for size, including market value of equity (Ali & Zhang, 2015), but given that many SEs are not publicly listed, total assets were deemed the most relevant proxy to use in this study. The coefficient for *Size* was hence expected to be negative.

Management Incentives (MI) - Previous studies have concluded that higher incentives in the form of bonuses and stock options correlates positively with earnings management. (Guidry et al. 1999; Bergstrasser & Philippon, 2006 and Healy & Wahlén, 1999). For the purpose of this study, management incentives were chosen to be estimated as bonus in relation to salary for board members and management. The coefficient for *MI* was hence expected to be positive.

Growth (Growth)- Measured as the percentage change in assets between the current year and the previous year. Prior research (Ashbaugh-Skaife et al. 2008) has indicated that rapidly

growing firms face a higher risk of lower quality of earnings reporting. The coefficient for *Growth* was hence expected to be positive.

Loss (Loss) - Dechow & Dichew (2002) has found that the greater the frequency of reporting negative earnings, the lower the accrual quality is expected to be. Hence, firms who report losses are more likely to employ earnings management. Therefore, a dichotomous variable *Loss* was included as a control variable, which will have the value 1 if the firm during the year t has reported a negative net income. The coefficient for *Loss* was expected to be positive.

3.4 Additional Tests of Sample Characteristics

To gain further insight on the divergence of earnings management between the two samples and implications of the financial recession of 2008-2009, mean-difference t-tests between SEs and LEs using the values of $|DA|$ and AQ were conducted in accordance with Wang & Yung (2011). A variance ratio comparison test was conducted, see Appendix 1, which showed that the unmatched sample were of unequal variances at a significance level of 1% for the Modified Jones Model and 5% for the Accruals Quality Model, hence the independent samples t-tests were adjusted for degrees of freedom using the Welch-Satterthwaite formula to correct for the violation. Furthermore, in order to increase robustness, the t-tests were supplemented with a Mann-Whitney U-test to test if the medians were significantly differing between the two groups. In order to be prudent and aligned with prior literature, two-tailed t-tests were conducted. (Wang & Yung, 2011).

3.4.1 Matched Sample

As the full sample is skewed due to the larger number of LEs in relation to SEs, the multivariate regressions as well as the tests described above were performed on both the full sample as well as a matched sample. The matched sample of LEs were identified by finding the nearest neighbor in the same sector and year, in terms of size defined as the logarithm of total assets. By conducting the test on a matched sample, the effect of state ownership was considered to become more isolated.

3.4.2 Testing Characteristics of Matched Sample

When testing the matched samples, the above tests discussed in section 3.4 were adjusted as the sample becomes dependent. The t-tests for means were performed under the assumption of equal variances and the Wilcoxon-signed-rank test were used instead of the Mann-Whitney U-

test when testing median differences. Again, all tests were two-tailed in accordance with prior literature and the aspiration of being prudent (Wang & Yung, 2011).

3.5 Differences to Replicated study

The first hypothesis in this study, namely that SEs will employ earnings management to a lower extent than LEs was inspired from Wang & Yung (2011) which studied a similar research question for Chinese firms. While Wang & Yung (2011) further investigated the impact of post liberalization of the Chinese economy on earnings management, this study rather attempted to compare the divergence of earnings management between SEs and LEs with regards to the financial recession of 2008-2009.

This study chose to complement the mean difference tests with Mann-Whitney U-tests and Wilcoxon-Signed-Rank-tests in order to add robustness. The main regression model from Wang & Yung (2011) was employed in this study, however there are some key differences. Mainly, this study did not attempt to correct for tunneling as a source of earnings management for SEs since previous research states that this phenomenon is less prevalent in developed economies (Liu & Lu, 2002). Furthermore, this study changed some of the control variables to better work in the context of the Swedish market. Leverage and ROA were included and defined in accordance with Wang & Yung (2001). Managerial Ownership employed in Wang & Yung (2011) was replaced with Management Incentives due to the reasons explained in 3.3.2. Size, defined by Wang & Yung (2011) as book to market radio, was changed to the natural logarithm of assets as the majority of SEs were not listed. Lastly, this study added Growth and Loss as control variables due to their expected explanatory value while board independence was removed due to lack of sufficient data.

4. Empirical data

This section presents a description of the selection process of the data sample as well as an overview of the data collection process. Due to the fact that the data gathering process differ between LEs and SEs, each process have been described separately. The processes are summarized in Appendix 2.

4.1 Description of Data Selection Process

4.1.1 LEs

Data was collected for Swedish firms listed on the Nasdaq Stockholm Exchange between 2004-2016. This generated ten years of data between 2005-2015 as the models required one-year lagging and one-year forward-looking data. The initial sample of data consisted of firms incorporated in Sweden listed on the Nasdaq Stockholm Stock Exchange in December 2015. Firms delisted in the period of 2005-2015 were manually added to the data sample. The requirement of incorporation in Sweden was made due to the fact that firms in other jurisdictions may report under different regulations, which would negatively affect the comparability of the study. The final sample, before firms were removed due to reasons specified below, consisted of 397 firms. In order to have relevant, comparable and sufficient data, some observations had to be removed: Firms had to be available in the WRDS Compustat database, and identifiable by a unique ISIN number. This led to the removal of 81 firms, giving a new total of 316. Furthermore, firms in the financial industry were removed since the specified models rely heavily on cash flow from operations to estimate earnings management. In a financial firm these numbers become distorted as a large share of their income stem from interest income (Damodaran, 2009). The sample was reduced by 28 to a new total of 283. To apply the models employed in the study, one-year lagging and one-year forward values were required. Furthermore, to calculate the standard deviation of accruals per firm, at least two years of observations per firm were required. Thus, firms have had to been listed for at least four consecutive years. Therefore, all firms listed shorter than this during the period of 2005-2015 were removed. This dropped 20 firms, and the sample was reduced to 263 firms. Lastly, all observations with missing values on one or more of the required variables were removed. This led to a decrease of 16 firms from the sample. The final number of firms in the LE list was 249, yielding 2054 firm year observations.

4.1.2 SEs

There are 48 state-owned enterprises in Sweden (Regeringskansliet, 2017). In order to have relevant, comparable and sufficient data, some observations had to be removed. Firstly, as previously specified only firms incorporated in Sweden were included in the final sample, hence three firms were removed. Secondly, as the cash flow method required cash flow from operations, two firms lacking this information in their annual reports were excluded. Thirdly, five financial firms were removed. Lastly, all observations with missing values on one or more

of the required variables were removed. This caused one firm to be removed from the sample. The final number of firms in the SE list was 36, yielding 316 firm-year observations.

4.1.3 Definition of Industry

According to Kothari et al. (2005) each industry needs approximately ten yearly observations in order to estimate accurate coefficients for the industries using a cross-sectional approach. This requirement was lowered to six in order to include important firms, such as Vattenfall and Systembolaget. The majority of industries had a sufficient number of firm-year observations, but the Telecom and the Utilities industry did not. However, when these industries were put at greater scrutiny, it was chosen to combine Energy and Utilities together, and Telecom and IT together. This gave at least six observations per industry and year for the combined industries, see Appendix 3 for specification of observations per industry and year. The underlying reasoning behind this was that the industries were defined at a high level, and when examining specific firms in the combined sectors, they shared many similarities. This can be exemplified by Vattenfall, which was classified in the Utilities sector while it could reasonably be classified in the Energy sector.

4.2 Data Collection

Accounting data used for LEs was collected using WRDS Compustat, while it was collected from Serrano for SEs. Certain firms in the SE category were available in both databases and were thus cross checked between WRDS and Serrano in order to ensure coherence across the two databases. These checks presented identical values for the accounting measures available in both databases. Data on operating cash flow had to be collected manually from annual reports for the SEs. Data on management incentives were collected from Serrano for both LEs and SEs.

4.3 Descriptive Statistics

Table 1 presents descriptive statistics for the data used in the study. It is divided into data for SEs and LEs. The data in the table show that the mean of both $|DA|$ and AQ were lower for SEs compared to both the full and matched sample of LEs. The median was however higher for $|DA|$ in SEs than both samples of LEs, and in terms of AQ the median of SEs was the same as for the full sample but higher than the matched sample of LEs. However, in order to determine whether these differences were statistically significant, tests had to be conducted. Examining the control variables, the mean and median of *Lev* and *Growth* were higher for the matched sample of LEs compared to SEs, meaning that the matched LEs on average used debt as a source of financing to a greater extent as well as obtained higher levels of growth. The mean of *Size* was higher for

the full sample of LEs while the median was higher for SEs. Lastly, the *ROA* ratio provided interesting results as the mean was higher for SEs compared to LEs, while the median was lower. This seems to contradict the prediction that LEs are more profitable than SEs. However, examining the results closer, the standard deviation and the median were higher for LEs which indicates that there were unprofitable firms that decreased the mean for LEs. As was discussed in theory, this may be due to the state protection, such as guaranteed sales, that SEs potentially receive. (Wang & Yung, 2011).

Appendix 4 presents Pearson correlations coefficients for Discretionary accruals and Accruals quality. It can be inferred from Appendix 4 that most of the control variables were significantly correlated with the dependent variables |*DA*| and *AQ*. Furthermore, most of the control variables were correlated with one another. Therefore, it is appropriate to test for multicollinearity among the key independent variables and control variables. This is further discussed in section 6.2.3. It is worth noting that the results in Appendix 4 does not correct for industry and year fixed effects, which the regressions in the results section do.

Table 1

Descriptive statistics

Panel A: Descriptive statistics of LEs (Full Sample)

Variables	**n**	**Mean**	**Median**	**Std. Deviation**	**Percentiles**	
					25%	**75%**
|*DA*|	2054	0.064	0.045	0.067	0.021	0.083
AQ	2054	0.048	0.041	0.031	0.026	0.065
Lev	2054	1.569	1.219	1.805	0.664	1.934
ROA	2054	0.019	0.049	0.163	0.006	0.093
Size	2054	21.295	21.097	2.027	19.828	22.747
MI	2054	0.077	0.000	0.134	0.000	0.117
Growth	2054	0.156	0.065	0.465	-0.027	0.192
Loss	2054	0.229	0.000	0.420	0.000	0.000

Panel B: Descriptive statistics of SEs (Full Sample)

Variables	**n**	**Mean**	**Median**	**Std. Deviation**	**Percentiles**	
					25%	**75%**
|*DA*|	316	0.060	0.048	0.051	0.022	0.084
AQ	316	0.044	0.041	0.028	0.022	0.069
Lev	316	1.590	1.212	1.784	0.746	2.018
ROA	316	0.042	0.032	0.091	0.001	0.062
Size	316	21.154	21.320	2.541	19.541	22.974
MI	316	0.008	0.000	0.031	0.000	0.000

Growth	316	0.031	0.020	0.162	-0.036	0.087
Loss	316	0.218	0.000	0.414	0.000	0.000

Panel C: Descriptive statistics of LEs (Matched Sample)

Variables	**n**	**Mean**	**Median**	**Std. Deviation**	**Percentiles**	
					25%	**75%**
|*DA*|	316	0.062	0.042	0.079	0.020	0.076
AQ	316	0.045	0.035	0.032	0.022	0.061
Lev	316	1.973	1.391	2.400	0.760	2.111
ROA	316	0.022	0.049	0.141	-0.004	0.096
Size	316	21.186	21.611	2.204	19.594	22.854
MI	316	0.060	0.000	0.120	0.000	0.077
Growth	316	0.232	0.069	0.727	-0.016	0.234
Loss	316	0.259	0.000	0.439	0.000	1.000

5 Results

5.1 Characteristics of Data Sample

Table 3 shows the absolute value of discretionary accruals, |DA| and the accruals quality, AQ. Note that for both of these models, a lower value indicated less occurrence of earnings management. |*DA*| and *AQ* were 6,32% and 4,75% of lagged assets, respectively, among the full sample of Swedish firm. This is lower than in the Chinese study conducted by Wang & Yung (2011), where |*DA*| was 10,3% of lagged assets and AQ 7,7% of lagged assets. The results in previous studies in developed countries have indicated values of about 5% of lagged assets, which is more in line with the results from this study (Bergtresser and Philippon, 2006; Francis et al., 2005; and Yu, 2008). It has been suggested that this discrepancy between emerging markets and developed markets stems from lower regulatory and disclosure standards in combination with weaker investor protection (Wang & Yung, 2011).

Panel A displays the results of mean and median difference tests for SEs and LEs for the whole sample period 2005-2015 and for the full sample between the periods defined as recession and non-recession. Examining first the results from the Modified Jones Model, the mean for SEs was smaller than LEs for the full sample period, but the difference was not statistically significant. The median for |*DA*| was higher for SEs than LEs without statistical significance. The AQ Model had lower values for SEs in both mean and median, and the differences were statistically significant in both cases. This is consistent with the prediction in H1. Continuing

with the full sample compared between the two defined periods: recession and non-recession, the results are hard to interpret. The mean for |*DA*| was lower in the recession period compared to the non-recession period but looking at the median for |*DA*| as well as both tests for *AQ*, the observed values were higher during period of recession. As none of the results between the two defined time periods were statistically significant, no conclusion regarding differences in the behavior of all firms in recession compared to non-recession can be concluded. To summarize, the result from Panel A are suggestive in favor of our H1 regarding the results in the AQ Model. The AQ Model measures the volatility of the standard error in the regression, and this thus indicates that SEs have a lower volatility in its accruals, defined to be a proxy for less earnings management. However, since the results from the Modified Jones Model were not statistically significant this means that the evidence is suggestive, but not conclusive, in favor of H1. No statistically significant difference was found regarding the full sample between the two defined time periods.

Panel B displays mean and median tests for SEs and LEs over the two defined periods. Examining first the recession period, the mean and median for both models were lower for SEs compared to LEs. Only the *AQ* mean difference test was statistically significant. The non-recession period results show that SEs have lower mean in both models and a lower median in the AQ Model. The mean difference test for *AQ* indicated a less evident divergence during times of recession between SEs and LEs as the difference was smaller with lower statistical significance during recession compared to non-recession, which is aligned with H2. However, in contradiction of the theory behind H2, the decrease in divergence seems to stem from increasing levels of *AQ* for SEs rather than decreasing levels for LEs. To summarize, as the divergence between SEs and LEs in all cases but the mean difference test for the AQ Model cannot be statistically established in either period, the results are deemed inconclusive and no coherent evidence is found in favor of H2.

Panel C and D displays the same data as A and B, respectively, but with the matched sample. This further isolates the effect of state ownership by comparing the SEs to their closest match of LEs on sector, size and year. In almost all periods and models, with the exception of |*DA*| mean in *Panel D* the sign of the difference was the same as in the full sample. No statistical significance was however obtained. This is expected due to the decrease of the sample size and variance in the matched. To summarize, the result from *Panel C and D* do not have any statistically significant tests, suggesting that there is no difference between SEs and LEs in

terms of earnings management. In addition, no statistical significance was obtained for the tests in the recession and non-recession resulting in no evidence found in favor of H2.

Table 3
Full Sample Tests

Panel A: Earnings Management in Terms of Discretionary Accruals & Accruals Quality

		SEs & LEs (2005-2015)			***Full Sample during periods of Recession (R) and Non-Recession (NR)***		
	Full Sample	*SE*	*LE*	*Diff. (SE-LE)*	*R (2008-2009)*	*NR (2006-2007)*	*Diff. (R-NR)*
|*DA*| Mean (σ)	0.0632 (0.0648)	0.0599 (0.0508)	0.0637 (0.0667)	-0.0038	0.0641 (0.0562)	0.0678 (0.0731)	-0.0038
|*DA*| Median	0.0452	0.0479	0.0449	0.0029	0.0481	0.0463	0.0019
AQ Mean (σ)	0.0475 (0.0305)	0.0439 (0.0280)	0.0480 (0.0309)	-0.0041**	0.0491 (0.0320)	0.0486 (0.0319)	0.0005
AQ Median	0.0410	0.0405	0.0413	-0.0008*	0.0417	0.0415	0.0002

Panel B: Earnings Management in SEs & LEs during Periods of Recession (R) and Non-Recession (NR)

		R (2008-2009)			***NR (2006-2007)***		
	Full Sample	*SE*	*LE*	*Diff. (SE-LE)*	*SE*	*LE*	*Diff. (SE-LE)*
|*DA*| Mean (σ)	0.0632 (0.0648)	0.0566 (0.0495)	0.0651 (0.0571)	-0.0084	0.0585 (0.0494)	0.0692 (0.0759)	-0.0107
|*DA*| Median	0.0452	0.0428	0.0492	-0.0064	0.0523	0.0460	0.0063
AQ Mean (σ)	0.0475 (0.0305)	0.0428 (0.0272)	0.0500 (0.0325)	-0.0072*	0.0410 (0.0253)	0.0497 (0.0326)	-0.0088**
AQ Median	0.0410	0.0377	0.0422	-0.0046	0.0348	0.0421	-0.0073

Notes:
The above table showcases the level of earnings management in terms of both the absolute value of discretionary accruals, |*DA*| and accruals quality, *AQ*. |*DA*| is calculated using the Modified Jones Model (1991) defined in section 3.1.1, and *AQ* is measured as the standard deviations of residuals from the AQ Model presented in section 3.1.2. Mean differences are tested using independent samples t-test and median differences are tested using Wilcoxon ranksum test (Mann-Whitney U-test). Standard deviations are in parentheses of mean value. ***, **, * denote significance levels at 0.01, 0.05 and 0.1, respectively. All variables have been winsorized to the 1st and 99th percentiles.

Matched Sample Tests

Panel C: Earnings Management in Terms of Discretionary Accruals & Accruals Quality

		SEs & LEs (2005-2015)			***Matched Sample during periods of Recession (R) and Non-Recession (NR)***		
	Matched Sample	*SE*	*LE*	*Diff. (SE-LE)*	*R (2008-2009)*	*NR (2006-2007)*	*Diff. (R-NR)*
|DA| Mean (σ)	0.0610 (0.0665)	0.0599 (0.0508)	0.0620 (0.0791)	-0.0021	0.0549 (0.0473)	0.0548 (0.0441)	-0.0001
|DA| Median	0.0442	0.0479	0.0422	0.0057	0.0473	0.0442	0.0031
AQ Mean (σ)	0.0446 (0.0302)	0.0439 (0.0280)	0.0453 (0.0323)	-0.0014	0.0428 (0.0275)	0.0441 (0.0292)	0.0013
AQ Median	0.0378	0.0405	0.0351	0.0054	0.0349	0.0292	0.0057

Panel D: Earnings Management in SEs & LEs during Periods of Recession (R) and Non-Recession (NR)

		R (2008-2009)			***NR (2006-2007)***		
	Matched Sample	*SE*	*LE*	*Diff. (SE-LE)*	*SE*	*LE*	*Diff. (SE-LE)*
|DA| Mean (σ)	0.0610 (0.0665)	0.0566 (0.0495)	0.0531 (0.0455)	0.0351	0.0585 (0.0494)	0.0512 (0.0383)	0.0073
|DA| Median	0.0442	0.0428	0.0420	0.0008	0.0523	0.0461	0.0062
AQ Mean (σ)	0.0446 (0.0302)	0.0428 (0.0272)	0.0429 (0.0280)	-0.0002	0.0410 (0.0253)	0.0473 (0.0326)	-0.0063
AQ Median	0.0378	0.0377	0.0349	0.0028	0.0348	0.0414	-0.0066

Notes:

The above table showcases the level of earnings management in terms of both the absolute value of discretionary accruals, $|DA|$ and accruals quality, AQ. $|DA|$ is calculated using the Modified Jones Model (1991) defined in section 3.1.1, and AQ is measured as the standard deviations of residuals from the AQ Model presented in section 3.1.2 Mean differences are tested using dependent samples t-test and median differences are tested using Wilcoxon Signed Rank Test. Standard deviations are in parentheses of mean value. ***, **, * denote significance levels at 0.01, 0.05 and 0.1, respectively. All variables have been winsorized to the 1st and 99th percentiles.

5.2 Multivariate Regression

To further investigate whether SEs manage earnings less than LEs, and if the divergence between the two becomes less evident during the recession of 2008-2009 compared to 2006-2007, multivariate regressions were performed using the models specified in equation 6 and 7.

The results from the main regression are presented in Table 4. The dependent variables are |*DA*| and *AQ*, the key independent variable is SE and the control variables are *Lev*, *ROA*, *Size*, *MI*, *Growth* and *Loss*. The main independent variable SE was not statistical significant in any of the models or sample periods. This leads to the conclusion that according to multivariate regressions SEs do not manage earnings to a lower extent than LEs, and thus H1 and H2 cannot be confirmed. In contradiction, Wang & Yung (2011) finds evidence that earnings management occurs less in SEs than LEs in China. To summarize, the results from the multivariate regressions conclusively indicate that Swedish SEs do not manage earnings to a lower extent than LEs and thus H1 cannot be confirmed. In terms of H2, since no statistical significance was found in terms of the non-recession period and the recession period, it cannot be concluded whether the divergence becomes less evident and thus H2 is not confirmed either.

Examining the control variables, the variable *Lev* has a small coefficient, which differs between negative and positive for each of the models. None of the values for any model or period are significant. *ROA* has a negative coefficient for all the periods and both models and is statistically significant for both models during the full sample period and during recession for *AQ*. *Size* had a negative and significant coefficient for both models during all periods. *MI* had differing negative and positive coefficient with the only significant coefficient being negative for the AQ Model during non-recession. *Growth* had a positive coefficient for both models across all periods with significant values for the full period as well as for *AQ* during non-recession. *Loss* was positively correlated in both models and all periods, but the values are only significant for the full sample period. The results of control variables and their deviations from the expected coefficients will be further commented in 6.2.3.

Explanatory power is measured as adjusted $R^{2,}$ where a value closer to 1 indicates a higher explanatory power of the model. The R^2 values for the AQ Model were 0.278, 0.161, 0.259 for the full sample period, non-recession period and recession period, respectively. This can be compared to Wang & Yung (2011) where the R^2 of the AQ Model ranges from 0.0613 to 0.0879. Thus, the employed models had a higher explanatory value for the sample data in this study. The R^2 values for the |DA| regression models were 0.155, 0.287 and 0.050 for the full sample period, non-recession period and recession period, respectively. In comparison, Wang & Yung's (2011) observes R^2 ranges from 0.094 to 0.159 leaving the values overall aligned with a spike in explanatory power during non-recession.

To further isolate the apparent difference between LEs and SEs, a regression with a matched sample was performed. As the result in Table 5 shows, the matched sample regression provided overall similar results, with statistical significance dropping in *ROA*, *Size* and *Growth* and increasing in *Loss*. This result shows that when regressing a matched sample, which should mitigate effects from the larger sample of LEs and their different characteristics compared to SEs, there exists no statistically significant difference in the occurrence of earnings management between SEs and LEs. Hence this further supports that H1 cannot be confirmed. Since no evidence of divergence is found in the period of non-recession or the period recession, H2 is not confirmed either.

Table 4

Impact of State Ownership on Earnings Management during different time periods

	Full Sample (283 firms, 2005-2015)		**Non-Recession (230 firms, 2006-2007)**		**Recession (234 firms, 2008-2009)**	
Variable (Expected sign)	$\|DA\|$	AQ	$\|DA\|$	AQ	$\|DA\|$	AQ
Constant	0.160***	0.175***	0.186***	0.208***	0.159***	0.187***
	(8.21)	(10.48)	(9.20)	(5.41)	(5.11)	(9.07)
SE (-)	0.001	-0.004	-0.008	-0.007	-0.009	-0.006
	(0.24)	(-0.71)	(-1.34)	(-0.85)	(-0.93)	(-0.99)
Lev (+)	0.001	0.000	0.001	-0.001	-0.000	-0.000
	(0.69)	(0.17)	(1.21)	(-0.81)	(-0.56)	(-0.03)
ROA (+)	-0.071***	-0.027**	-0.025	-0.051	-0.020	-0.027*
	(-3.16)	(-2.41)	(-1.26)	(-1.06)	(-0.62)	(-1.65)
Size (-)	-0.005***	-0.006***	-0.007***	-0.007***	-0.004***	-0.007***
	(-5.40)	(-7.84)	(-6.91)	(-3.84)	(-3.21)	(-6.96)
MI (+)	-0.012	0.001	-0.002	-0.046**	-0.007	0.007
	(-1.25)	(0.14)	(-0.18)	(-2.16)	(-0.48)	(0.67)
Growth (+)	0.038***	0.003*	0.003	0.029***	0.017	0.004
	(5.31)	(1.69)	(0.78)	(2.79)	(1.17)	(0.65)
Loss (+)	0.009*	0.007**	0.007	0.018	0.004	0.004
	(1.90)	(2.16)	(1.17)	(1.28)	(0.47)	(0.96)
Observations	2,370	2,370	430	430	442	442
R-squared	0.155	0.278	0.287	0.161	0.050	0.259
Industry FE:	Yes	Yes	Yes	Yes	Yes	Yes
Year FE:	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

This table shows the results from our cross-sectional regressions on the full sample concerning the impact of state ownership on earnings management. The effect is measured in terms of absolute discretionary accruals and accruals quality defined in equations 6 and 7, for the full sample over the periods of recession and non-recession. The independent variables include state ownership, SE; leverage ratio, *Lev*; return on assets, *ROA*; firm size, *Size*; management incentives, *MI*, growth in terms of assets, *Growth*, and loss as a dichotomous variable, *Loss*.

The number of firms vary across the different periods as not all firms have been listed during the full time period. All variables are winsorized to the 1st and 99th percentiles and standard errors have been clustered by firm. T-statistics are in parentheses and ***, **, * denote significance levels of 0.01, 0.05 and 0.1 respectively.

Table 5

Impact of State Ownership on Earnings Management during different time periods

	Matched sample (136 firms, 2005-2015)		**Non-Recession (58 firms, 2006-2007)**		**Recession (63 firms, 2008-2009)**	
Variable (Expected sign)	$\|DA\|$	AQ	$\|DA\|$	AQ	$\|DA\|$	AQ
Constant	0.107***	0.144***	0.147***	0.159***	0.080	0.124***
	(3.81)	(5.10)	(2.89)	(4.72)	(1.41)	(3.59)
SE (-)	0.008	-0.002	-0.005	-0.009	0.008	0.002
	(1.30)	(-0.29)	(-0.50)	(-1.12)	(0.69)	(0.25)
Lev (+)	0.000	0.001	-0.001	0.001	-0.001	0.001
	(0.21)	(0.83)	(-0.41)	(0.86)	(-0.40)	(0.75)
ROA (+)	-0.049	0.020	0.002	0.060	-0.076	0.037
	(-1.33)	(0.67)	(0.05)	(1.01)	(-0.89)	(0.90)
Size (-)	-0.003**	-0.005***	-0.004*	-0.005***	-0.002	-0.004***
	(-2.18)	(-3.77)	(-1.83)	(-3.66)	(-0.63)	(-2.76)
MI (+)	-0.012	-0.010	-0.096**	-0.043	0.056	-0.003
	(-0.49)	(-0.50)	(-2.65)	(-0.96)	(1.58)	(-0.10)
Growth (+)	0.051***	-0.002	-0.011	-0.004	0.032	-0.004
	(4.32)	(-0.44)	(-1.47)	(-0.54)	(1.00)	(-0.38)
Loss (+)	0.019**	0.012**	0.018	0.015	0.005	0.006
	(2.44)	(2.15)	(0.96)	(1.56)	(0.36)	(0.78)
Observations	590	590	100	100	102	102
R-squared	0.187	0.197	0.127	0.252	0.071	0.160
Industry FE:	Yes	Yes	Yes	Yes	Yes	Yes
Year FE:	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

This table shows the results from our cross-sectional regressions on the matched sample concerning the impact of state ownership on earnings management. The effect is measured in terms of absolute discretionary accruals and accruals quality defined in equations 6 and 7, for the matched sample over the periods of recession and non-recession. The independent variables include state ownership, SE; leverage ratio, *Lev*; return on assets, *ROA*; firm size, *Size*; management incentives, *MI*, growth in terms of assets, *Growth*, and loss as a dichotomous variable, *Loss*. The number of firms vary across the different periods as not all firms have been listed during the full time period. All variables are winsorized to the 1st and 99th percentiles and standard errors have been clustered by firm. T-statistics are in parentheses and ***, **, * denote significance levels of 0.01, 0.05 and 0.1 respectively.

6 Analysis

6.1 Research Method

6.1.1 Data Selection

As described under section 4, data has been removed for several reasons during the process. Furthermore, the data was winsorized at the 1st and 99th percentile in order to mitigate effects from extreme observations. These filters can possibly have removed or affected relevant data points and thus impacted the significance of the study.

The final data sample contained 249 LEs and 34 SEs during the time period of 2005-2015. Considering specifically the case of SEs, this can be scrutinized for lacking a larger number of observations. One option would have been to extend the study to cover the other Nordic countries as well. This was deemed outside the delimitation for this study due to differences in accounting practices, the number of SEs in other Nordic countries and the availability of data. Furthermore, due to lacking data in some industries, IT & Telecom and Energy & Utilities were conjoined. This could also potentially have affected the results of the study. Additionally, when estimating the coefficients of the applied models on an industry level, the GICS sector level was accepted without greater scrutiny for LEs while the industries for SEs were manually added to what was considered the corresponding sector. These sectors are defined on a high level which could have affected the result. In order to account for this, one way would have been to identify peer groups manually, however this was not conducted due to time constraints. Although enough observations for the full sample were obtained, the approximations of the coefficients had to be made employing data both from LEs and SEs, and not in isolation. This could have impacted the results since the sample of LEs is significantly larger than the sample of SEs.

The sources of the data should have a negligible impact since it was collected from known and respected sources who themselves use the annual reports of firms as their data source. In the specific cases where data was available from both sources of data, Serrano and WRDS Compustat, observations were compared and found identical.

6.1.2 Issues Relating to Measuring Discretionary Accruals

It is of importance to highlight the challenges with accruals-based models themselves. A primary criticism of these models is that they aim to quantify non-discretionary and

discretionary accruals, which are measures unobservable by nature. Thus, as the calculations are not possible to verify, estimation of expected levels of non-discretionary accruals can contain errors and bias (Young, 1999). Francis, Nanda & Olsson (2008) identifies several factors which help explain the estimated value of discretionary accruals. It is therefore of importance to include relevant control variables to capture these factors in a multivariate regression, which has been done in this study.

The choice of using the cross-sectional approach can also be scrutinized. The cross-sectional approach adjusts firms' discretionary accruals to those of firms in the same industry and year. McNichols (2002) shows that this can lead to both under- and over-estimation of the level of discretionary accruals since natural variations of accruals in industries occur, and hence certain accruals might be classified as discretionary when they are not. This could have an effect on the accuracy of results in the study.

The cross-sectional approach works under the assumption that all firms in the same industry handle discretionary accruals in the same manner. This assumption becomes less realistic the broader the definition of an industry becomes as discrepancies in firm characteristics increase. This is relevant for the conducted study as some industries were merged and a high-level sector definition was applied. In this case, these issues were weighed against the importance of an adequate number of observations per industry and year in order to increase likelihood of statistically significant data (Kothari et al., 2005). Due to already accepting a broad sector definition, the number of observations per industry and year were deemed more important than issues stemming from merging certain industries.

Lastly, it is important to recognize the implications of gathering the data from the cash flow statement rather than the balance sheet. Prevalent research such as Collins & Hribar (2002) argues that the cash flow approach followed in the conducted study is more accurate since the balance sheet approach might distort values in the face of divestitures and mergers & acquisitions.

6.1.3 Variability in Sample

The coefficient of variation is defined as the standard deviation divided by the mean. If the coefficient of variation is close to 1, the probability of finding statistical power in tests decreases (Rusticus & Lovato, 2014). Studying the results in Table 3, many of the coefficients of

variations were close to 1. To find statistical power in such cases, a large sample is often required which is difficult to obtain due to the limited numbers of SEs in Sweden. Furthermore, as evident by the larger standard deviation for LEs in |DA| and AQ, there seem to be a larger variation of earnings management in LEs compared to SEs. This could be attributable to the state protection that Wang & Yung (2011) argues that SEs have, which should result in lower volatility in accounting figures over time. To further investigate the existence of such protection, a test of variability of accounting measures was conducted as a robustness test in section 6.3.3. With the above discussion as background this could explain why the AQ Model, based on standard deviation of the residual, was more prone to identifying mean or median discrepancies with statistical significance compared to the Modified Jones Model.

Another important issue relating to variance is heteroscedasticity. It occurs when the residuals of a model do not share the same variance. This reduces the effectiveness of the regression. As was mentioned in 2.2.1 and 2.2.2, the use of lagging assets as a deflator mitigate problems with heteroscedasticity in accordance with Kothari et al. (2005).

6.1.4 Validity

The hypotheses of this study aimed to identify whether earnings management is less prevalent in SEs than in LEs and if such a divergence becomes less evident during times of financial recession. To test this, earnings management was attempted to be identified only with the help of accruals-based models. In this process two accruals-based models were chosen out of a larger available number of models. This means that other models could have been better proxies in this study. However, the two models applied are the models primarily being used in current research (Wang & Yung, 2011; Francis et al., 2005; Dechow et al., 2010). For the purpose of this study, earnings management was deemed to only be a function of the manipulation of accruals. As discussed earlier, earnings management can take different forms such as real earnings management. It is indeed possible that another definition of earnings management, possibly relating to real earnings management, would have increased the validity of this study.

In previous research on earnings management employing accruals-based models, the R^2 value has often been relatively low suggesting rather low explanatory value. This can question the validity of accruals-based models overall as it signifies that there are other factors which have explanatory value for the dependent variables in the models. Worth noting is that the R^2 values

in the estimated models in this study have been in line, and in some cases, higher than in previous literature such as Wang & Yung (2011) and Filip & Raffournier (2014).

Given the discussion above, this study is still considered to be relatively valid. The models applied are widely used within the earnings management field and the study is considered to have enough observations per industry and year when estimating the relevant coefficients.

6.1.5 Comparability

The comparability of this study is restricted in terms of regulatory environment and transparency of data for SEs. It is important to note that regulations and rules with regards to accounting can differ significantly between countries and hence this study should not be considered applicable in environments where the regulatory environment differs significantly. Furthermore, as this study relies on both the existence of a significant number of SEs in the first place, and that the data for them is available, the comparability of the study is affected.

6.1.6 Reliability

The method and theoretical background rest on previous literature that has been published in widely known and peer reviewed journals. Furthermore, the data has been collected using the established databases WRDS Compustat and Serrano with additional data collected from the respective annual reports of firms and Nasdaq Stockholm. However, the quality of data is always a risk and hard to verify when having large quantities of observations. A minor risk that might occur is the fact that LEs have their data sourced from WRDS Compustat while SEs have their data sourced from Serrano, method of data collection might differ between the two databases. Random tests were made on firms existing in databases which showed that the data in the two respective databases were similar if not identical. The study is therefore considered to be of high reliability.

6.2 Analysis of Results

6.2.1 Hypothesis 1

When taking the results from all tests into account, the evidence suggest that SEs do not manage earnings to a lower extent than LEs and thus H1 cannot be confirmed. Examining first the results from the t-tests and Mann-Whitney U-tests, they primarily tend to indicate that variance in earnings management is larger in LEs than SEs. The AQ Model measures earnings management based on variance and affirms this conclusion as the mean differences between

SEs and LEs were significant in all tests of the full sample. However, given that neither the |*DA*| mean and median tests nor the median test of *AQ,* except for the full sample, were significant this points to no confirmation of H1. This is further supported by the fact that when testing a matched sample, the significance in the *AQ* tests was lost, suggesting conclusive results that there exists no statistical significant difference between SEs and LEs in terms of earnings management. Furthermore, the independent variable, SE, did not have a significant coefficient in the regression models which further leads to the conclusion that H1 cannot be confirmed. Examining the results in the context of other studies on the subject, the values for both |*DA*| and *AQ* were lower than the studies performed in China (Wang & Yung, 2011), but aligned with studies in developed countries (Bergtresser and Philippon, 2006; Francis et al., 2005; and Yu, 2008). It can be hypothesized that developed countries generally have better regulations and a larger public scrutiny on firms making it harder for both SEs and LEs to manage earnings.

The opportunistic approach to earnings management, where motivations for earnings management stem from capital market pressures, contracting motivations and regulatory motivations, provided the background for the formulation of H1. It was deemed that these incentives would be less prevalent for managers in SEs and therefore SEs would have less occurrence of earnings management. Since H1 is not confirmed, it can be hypothesized that in Sweden the incentives from capital market pressures, contracting motivations and regulatory motivations do not warrant large enough motivations for LEs to pursue earnings management in excess of SEs resulting in a statistical significant divergence. Instead, other motivations for earnings management present in both SEs and LEs might exist that are yet to be identified. This is further supported by the fact that models on earnings management have relatively low R^2 values.

6.2.2 Hypothesis 2

It was hypothesized that the potential divergence in levels of earnings management should become less evident in the period defined as recession compared to the period defined as non-recession. It is important to note that in order to confirm H2, an evident divergence between SEs and LEs was required in the period of non-recession. Examining the results, the mean tests for both models indicated that the gap between SEs and LEs decreased as predicted during the recession, however only *AQ* had a significant difference. Note that while the mean converged, it was a combination of both values for SEs and LE changing, rather than primarily LEs doing

so, as predicted. With that being said, in terms of the AQ Model the significance decreased for the t-test between the period of non-recession and recession which could be viewed as some evidence in favor of H2. However, as the median test for *AQ*, both |*DA*| tests and the main independent variable in the multivariate regressions were not statistically significant in neither recession nor the non-recession period, the result is deemed inconclusive and H2 not confirmed.

As discussed under section 2.8, the theory behind the formulation of H2 was to a great extent based upon the study done by Filip & Raffournier (2014) who found that Swedish LEs decreased earnings management during the financial recession of 2008-2009. In addition, it was argued that SEs benefits from state protection and less capital market pressure that should decrease the potential implications of a financial recession on earnings management behavior. These two effects were hypothesized to result in the divergence between SEs and LEs becoming less evident during times of financial recession. No coherent evidence was found in favor of this. To further examine the two effects, SEs and LEs were isolated and tested for differences during the two periods. The result presented in Appendix 5 contradicts the result found by Filip & Raffournier (2014). No significant evidence was found indicating that LEs decreased their earnings management during the recession of 2008-2009 compared to the period of stability between 2006-2007. There are several factors that differ between the studies that could explain the discrepancy. Filip & Raffournier (2014) estimates industry coefficients using firms from 16 countries yielding at least 20 observations per industry, which is higher than this study, however it fails to capture potential country specific variations in accruals. Furthermore, they use a two-digit SIC code for industry definitions while this study applies GICS sector codes. Furthermore, as shown in Appendix 5, SEs did not have a significant mean difference in any of the two models between the time periods and the F-values were insignificant, which suggests that the hypothesis of equal variances between the periods cannot be rejected. In contrast, LEs had a significant F-value for the Modified Jones Model but not for the AQ Model. This supports the argument that earnings management in SEs are less affected by the macroeconomic environment. To summarize, the argument that LEs should decrease their level of earnings management during recession is not confirmed by our study, however suggestive evidence of SE's use of earnings management being less dependent on the overall business cycle is found.

6.2.3 Control Variables

Lev measures the leverage ratio of the firms, defined as debt to equity. The regression indicated that there is no significant difference between SEs and LEs as the results were of varying signs

and all very close to zero. This is in contradiction to the expected results from previous literature, which indicated that *Lev* should be positively related to earnings management (DeAngelo, 1994; Sweeney, 1994; Becker et al., 1998). There could be many explanations for this, such as differing levels of leverage on a country-wide basis in Sweden compared to for example USA where many studies have been conducted. Furthermore, the results in Wang & Yung (2011) were not in agreement with previous literature, implying perhaps that the leverage ratio might be hard to interpret for this kind of study.

ROA was overall negatively correlated with earnings management with the exception in some cases for the matched sample. The only significant results were in the full sample for both models and in the AQ Model for the recession period. This indicates that *ROA* has explanatory power and that profitable firms are less likely to engage in earnings management, or alternatively, that firms that do not employ earnings management generally become more profitable. This contradicts the expected results according to previous literature (Boardman and Vining, 1989; Megginson et al., 1994; Shleifer, 1998; Dewenter and Malatesta, 2001; Megginson and Netter, 2001; Ben-Nasr and Cosset, 2014). The contradiction can perhaps be explained by the fact that these studies have been conducted in other countries, where the regulations might differ from Sweden. Furthermore, this result can be contrasted to Wang & Yung (2011), which found *ROA* to be positively related to earnings management according in the Modified Jones Model and negatively correlated in the AQ Model.

Size was negatively correlated with both models at a 1% significance level for all periods in the full sample and significant at least at a 10% level in all but one in the matched sample. Hence, the result indicated that larger firms tend to engage in earnings management less than do smaller firms or alternatively, that firms that do not engage in earnings management tend to grow larger. This is aligned with previous research (Watts & Zimmerman, 1990; Dechow & Dichev, 2002; Francis et al., 2005) and consistent with the study done by Wang & Yung (2011). It can be speculated that the results for both *ROA* and *Size*, are due to shareholders diverting capital to firms which are believed to conduct less earnings management.

Management incentives were generally negatively correlated with earnings management, but the variable was only statistically significant in the AQ Model during non-recession for the full sample and for the matched sample in the Modified Jones Model during non-recession. Since the coefficient was not significant in the other periods, it is hard to draw any broader

conclusions regarding management incentives effect on earnings management in this study. This is aligned with Wang & Yung (2011), which also had mixed results, but in contrast to other studies where management incentives were found to be positively correlated to earnings management (Guidry et al., 1999; Bergstrasser & Philippon and, 2006; Cheng and Warfield 2005). Management incentives are not easily defined, and it is worth noting that the definition tend to vary in different studies. Hence, had another proxy been used the results might have been different.

Growth was overall positively related with earnings management, and statistically significant in several of the models and periods. This is in agreement with the study Ashbaugh-Skaife et al. (2008) which deemed growth to be positively correlated with earnings management.

Loss was introduced as a dichotomous variable and according to previous literature (Dechow & Dichew, 2002) should be positively correlated with earnings management. This is aligned with the results in this study as the results are statistically significant for the full sample in both models and both the full and matched sample.

6.3 Robustness tests

6.3.1 Multicollinearity

Multicollinearity refers to when two or more independent variables used in a study are highly correlated to one another. While multicollinearity does not render a model invalid, it becomes more difficult to correctly interpret the results as the contribution to the explanatory value of the model from a specific variable will be hard to distinguish (Farrar & Glauber, 1967). In order to account for this potential issue, the variance inflation factors (VIF) were calculated on equations 6 and 7. The results are shown in Appendix 6. Woolridge (2012) argues that values under ten are acceptable while O'Brien (2007) deems it to be varied depending on the data and the study. However, since the values of VIF range from 1 to 2 the effect from multicollinearity has been deemed to not be significant enough to warrant an effect on the results from this study.

6.3.2 Volatility of Accounting Measures

It was concluded that LEs had a higher variance in both the |DA| and the AQ measure. One possible explanation for this result is that SEs enjoy government protection such as guaranteed revenue. In order to investigate this, the volatility of common accounting measures was assessed. The measures used were Cash, Accounts Receivable, Inventory, Accounts Payables,

Revenues, EBIT and Net Income. The results presented in Appendix 9 show that SEs have a lower variance in four out of the seven measures, Net income, EBIT, Accounts Payable and Inventory. The lower levels of inventory among SEs could imply a lower need for them to stockpile inventory due to the government guaranteeing a supply, or otherwise that SEs engage in business that do not need large inventories. Although the higher variance of revenue for SEs could seem contradicting at first, the results were in line with Wang & Yung (2011) who speculate that this is because the economic goals of the state are more likely to be related to political considerations, and that SEs thus can receive purchase orders from state agents when new goals are set. Comparing the non-recession period with the recession period the variance increases for Revenue, EBIT, Net income and Inventory during the recession period. Overall the results in Appendix 9 indicated that SEs might enjoy state protections, which reinforces the statement that managers in SEs face different incentives compared to managers in LEs. The results were however not as conclusive as in Wang & Yung (2011).

6.3.3 Altering the Proxy for Size

As showcased by above regressions, *Size* proved to be one of the most important control variables due to its statistical significance. As a robustness test, it is hence deemed appropriate to test another proxy for firm size in the models defined in equations 6 and 7. Extensive research within accounting has used total sales as a proxy for firm size (M. Al-Khazali, Osamah and Zoubi, 2005). Total sales scaled by lagged assets was hence introduced as a proxy and used as a control variable instead of the natural logarithm of total assets in equation 6 and 7. Results are presented in Appendix 7. The change in proxy for firm size had no effect on the main independent variable SE resulting in no implication for either hypothesis 1 or 2. The R^2 values of the models also dropped in most cases, suggesting that the initial definition of firm size had higher explanatory value.

6.3.4 Altering the Proxy for Discretionary Accruals

As stated in section 6.1.4, several models exist that proxy earnings management in different ways than the models employed in this study. To be consistent with prior literature on the prevalence of earnings management in SEs, the Modified Jones Model and Accruals Quality Model were deemed most appropriate to use (Wang & Yung, 2011). However, one of the currently most applied accruals-based models within the field is the model defined by Kothari et al. (2005), which adds the performance-based measure earlier defined as ROA to the cross-sectional estimation of discretionary accruals. To add further robustness to the study, the

multivariate regressions defined in equation 6 and 7 were hence regressed with the estimated discretionary accruals obtained by employing the Kothari et al. (2005) model. The results are presented in Appendix 8. The main independent variable SE remained statistically insignificant during all periods, which further supports the earlier conclusion regarding no divergence in earnings management being found between SEs and LEs.

7. Further research

It would be of interest to conduct this study in other developed countries to make generalized comments about differences in earnings management between SEs and LEs in that environment. However, this can be difficult due to the widespread privatization of firms in developed countries leaving researchers with few SEs to study. Another approach to examine the effect of state ownership would be to apply a time series method on firms that have undergone privatization to study the effect on earnings management prior and post privatization. As discussed in section 6.1.3, there might exist common incentives for SEs and LEs to manage earnings that not yet have been identified, it would therefore be interesting to further investigate the incentive structure for earnings management in a Swedish context. This could be done through a qualitative research method as it would generate in-depth insight to motives behind earnings management rather than purely measuring its occurrence with quantitative research methods. The fact that the hypotheses in this study are not confirmed indicate either that there is not any discernible difference between the occurrence of earnings management for SEs compared to LEs in Sweden or that the method used in this study was not robust enough to identify these differences. Hence, conducting a similar study while employing other methods such as real earnings management (Roychowdhury, 2006) could provide insight.

8. Conclusion

The conducted study aims to distinguish discrepancies in levels of earnings management between different governance structures, i.e. SEs and LEs. In addition, the study further examines this in the context of the financial recession of 2008-2009 in order to discern whether any perceived divergence between the governance structures would become less evident between the periods defined as recession and non-recession. These questions have been tested by running multivariate regressions and conducting difference tests of means and medians based on accruals models. The mean and median tests conducted under the Accruals Quality Model provided statistically significant results for the full sample in favor of the first hypothesis but given that the tests for the Modified Jones Model were not statistically significant and that

the significance was lost when performing the tests on the matched sample, the results are considered to not confirm H1. The fact that the Accruals Quality Model was statistically significant do however indicate that LEs have a higher variation of earnings management than SEs. The multivariate regressions did not produce statistically significant results for the main independent variable, defined as SE, in any examined time period. Hence the results from the multivariate regression indicate no statistically significant difference in the occurrence of earnings management between SEs and LEs. The results from the study thus show that there is no statistically significant difference in the occurrence of earnings management between SEs and LEs in Sweden and that the financial recession of 2008-2009 had no implication on this finding. This leads to H1 and H2 not being confirmed. This contradicts studies conducted in China where discrepancies in the occurrence of earnings management between SEs and LEs have been confirmed, although the direction of the discrepancy have differed due to differences in conducted research methods (Chen and Yuan, 2004; Ding et al., 2007; Chen et al., 2008; Aharony et al., 2010 and Wang & Yung, 2011).

The subject of this study is considered to be of interest to all stakeholders dependent on financial statements for capital allocation decisions, as understanding what drives earnings management also helps stakeholders to identify potential situations where the risk of earnings management is high. Specifically related to the research question, it is interesting to note that according to extant literature, managers in state enterprises should be less incentivized to manage earnings (see section 2.5). However, the result from this study shows that earnings management did not occur less in SEs, which suggests that there are still many aspects concerning earnings management that needs further research. The study also contributes to the current debate on privatization, where one common argument opposing privatization is that it leads to malicious corporate behavior by the management. Since the results suggest that there is no statistically significant difference regarding earnings management between SE and LE, this aspect of malicious behavior is yet to be statistically confirmed in Sweden.

The study has identified two future directions for research in the subject. Firstly, to conduct more studies in developed countries to confirm or challenge the result from this study regarding the discrepancies in the earnings management between SEs and LEs. Secondly, to further identify the motivations behind earnings management, reasonably conducted in qualitative research in order to help develop the accruals-based models of earnings management, which generally have low explanatory power.

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Appendix:

Appendix 1

Variance ratio test for dependent variables

Variance ratio test for |DA|

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Intervall]
LEs	2054	0.0637	0.0015	0.0667	0.0608	0.0666
SEs	316	0.0599	0.0029	0.0508	0.0543	0.0655
Combined	**2370**	**0.6321**	**0.0013**	**0.0648**	**0.0606**	**0.0658**

Ratio = SD(LEs)/SD(SEs) f: 1.721
Ho: Ratio = 1 Degrees of freedom: 2053.32
Ha: ratio < 1 Ha: ratio! = 1 Ha: ratio > 1
Pr(F < f) = 1.0000 2*Pr(F > f) = 0.0000 Pr(F > f) = 0.0000

Variance ratio test for AQ

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Intervall]
LEs	2054	0.0480	0.0007	0.0309	0.0467	0.0494
SEs	316	0.0439	0.0016	0.0280	0.0408	0.0470
Combined	**2370**	**0.0475**	**0.0006**	**0.0305**	**0.0408**	**0.0470**

Ratio = SD(LEs)/SD(SEs) f: 1.2189
Ho: Ratio = 1 Degrees of freedom: 2053.32
Ha: ratio < 1 Ha: ratio! = 1 Ha: ratio > 1
Pr(F < f) = 0.9873 2*Pr(F > f) = 0.0254 Pr(F > f) = 0.0127

Appendix 2

Sample selection

LEs

Criteria	**Removals**	**Total**
Listed on Nasdaq between 2004-2015		392
Available in WRDS database	81	311
Financial firms	28	283
3 or more observations	18	265
Removal of missing values	16	249
Sum	**143**	**249**

SEs

Criteria	**Removals**	**Total**
State-owned enterprises		48
Operations in Sweden	3	45
Cash Flow	2	43
Financial firms	6	37
Removal of missing values	3	34
Sum	**14**	**34**

Appendix 3

Distribution of observations by industry and year

GICS Code	Sector Name	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	**Total**
25	Information Technology	47	50	47	47	47	46	40	43	41	39	33	**480**
20	Industrials	63	65	63	63	63	63	62	60	60	61	61	**684**
15	Materials	12	12	11	11	13	13	14	10	10	11	12	**129**
25	Consumer Discretionary	31	29	32	34	32	36	32	29	36	36	36	**363**
60	Real Estate	16	19	20	21	20	20	21	20	21	23	24	**225**
30	Consumer Staples	6	6	6	6	7	7	7	7	6	8	8	**74**
35	Health Care	23	26	29	29	36	36	32	32	31	34	31	**339**
10	Energy	6	7	8	6	7	8	7	7	6	7	7	**76**

Appendix 4

Pearson correlations by sample groups

Panel A: Pearson Correlations for SEs (Full Sample)

	|DA|	AQ	LEV	ROA	SIZE	MI	GROWTH	LOSS
|DA|	1							
AQ	0.308***	1						
Lev	0.0826	0.0465	1					
ROA	-0.0345	0.127**	-0.250***	1				
Size	-0.199***	-0.265***	-0.0864	0.259***	1			
MI	0.0146	-0.121**	-0.00726	0.0675	-0.367***	1		
Growth	0.0100	-0.120**	0.0493	0.192***	0.157***	0.0251	1	
Loss	0.154***	0.124**	0.187***	-0.546***	-0.273***	-0.126**	-0.208***	1

Notes:
Number of observations for SEs: 316. *, **, *** indicate significance levels for 0.1, 0.05, 0.01 levels respectively. All variables have been winsorized to the 1st and 99th percentiles.

Panel B: Pearson Correlations for LEs (Full Sample)

	|DA|	AQ	LEV	ROA	SIZE	MI	GROWTH	LOSS
|DA|	1							
AQ	0.354***	1						
Lev	0.0100	-0.0373*	1					
ROA	-0.253***	-0.355***	-0.0878***	1				
Size	-0.246***	-0.529***	0.170***	0.304***	1			
MI	-0.0969***	-0.124***	0.118***	0.133***	0.264***	1		
Growth	0.252***	0.0436**	0.00658	0.0912***	-0.0405*	-0.0222	1	
Loss	0.229***	0.344***	0.0497**	-0.707***	-0.333***	-0.157***	-0.0434**	1

Notes:
Number of observations for LEs: 2054. *, **, *** indicate significance levels for 0.1, 0.05, 0.01 levels respectively. All variables have been winsorized to the 1st and 99th percentiles.

Appendix 5

Sample groups during periods of Recession (R) and Non-Recession (NR)

Sample group	*Variable*	*Full Period*	*R (2008-2009)*	*NR (2006-2007)*	*Mean Diff. (R-NR)*	*Equality of variance (F-value)*
SEs	|*DA*| Mean (σ)	0.0599 (0.0508)	0.0566 (0.0495)	0.0585 (0.0494)	-0.0018	0.9990
	AQ Mean (σ)	0.0439 (0.0280)	0.0428 (0.0272)	0.0410 (0.0253)	0.0018	0.8620
LEs	|*DA*| Mean (σ)	0.0637 (0.0667)	0.0651 (0.0571)	0.0692 (0.0759)	-0.0041	1.7654***
	AQ Mean (σ)	0.0480 (0.0309)	0.0500 (0.0325)	0.0497 (0.0326)	0.0003	1.0066

Notes:
The above table showcases the level of earnings management in terms of both the absolute value of discretionary accruals, |*DA*| and accruals quality, *AQ*. The result is presented by sample groups. |*DA*| is calculated using the Modified Jones Model (1991) defined in section 3.1.1, and *AQ* is measured as the standard deviations of residuals from the model presented in section 3.1.2. Mean differences is tested using dependent samples t-test. Standard deviations are in parentheses of mean value. ***, **, * denote significance levels at 0.01, 0.05 and 0.1, respectively. All variables have been winsorized to the 1st and 99th percentiles.

Appendix 6

Multicollinearity test for dependent variables

Dependent variable: |DA|			***Dependent variable: AQ***		
Variable	**VIF**	**Tolerance**	**Variable**	**VIF**	**Tolerance**
Loss	1.96	0.51011	*Loss*	1.96	0.51011
ROA	1.95	0.51288	*ROA*	1.95	0.51288
Size	1.2	0.83630	*Size*	1.2	0.83630
MI	1.11	0.90298	*MI*	1.11	0.90298
SE	1.05	0.94858	*SE*	1.05	0.94858
Lev	1.05	0.95245	*Lev*	1.05	0.95245
Growth	1.02	0.97724	*Growth*	1.02	0.97724

Appendix 7

	Full Sample (283 firms, 2005-2015)		**Non-Recession (230 firms, 2006-2007)**		**Recession (234 firms, 2008-2009)**	
Variable (Expected sign)	|*DA*|	*AQ*	|*DA*|	*AQ*	|*DA*|	*AQ*
SE (-)	0.002	-0.003	-0.007	-0.007	-0.009	-0.007
	(0.37)	(-0.62)	(-0.78)	(-1.32)	(-0.96)	(-1.25)
Size (-)	0.008***	0.008***	0.003	0.009***	0.010***	0.008***
	(3.21)	(3.53)	(0.74)	(3.29)	(2.74)	(2.85)
Observations	2,370	2,370	430	430	442	442
R-squared	0.144	0.173	0.133	0.191	0.047	0.131
Industry FE:	Yes	Yes	Yes	Yes	Yes	Yes

Year FE:	Yes	Yes	Yes	Yes	Yes	Yes

Notes:
The table above showcases the result from running our regressions with revenue scaled by lagged assets instead of the natural logarithm of total assets as proxy for firm size. The other control variables are included, and fixed effects are accounted for both year and industry. The number of firms vary across the different periods as not all firms have been listed during the full time period. All variables are winsorized to the 1st and 99th percentiles and standard errors have been clustered by firm. T-statistics are in parentheses and ***, **, * denote significance levels of 0.01, 0.05 and 0.1 respectively.

Appendix 8

Impact of State Ownership on Earnings Management during different time periods

	Full Sample (283 firms, 2005-2015)	**Non-Recession (216 firms, 2005-2006)**	**Recession (228 firms, 2007-2008)**
Variable (Expected sign)	*Kothari*	*Kothari*	*Kothari*
Constant	0.213***	0.232***	0.259***
	(9.81)	(5.92)	(6.31)
SE (-)	0.001	-0.001	-0.005
	(0.20)	(-0.14)	(-0.54)
Lev (+)	0.001	-0.002	0.003
	(0.68)	(-0.79)	(1.03)
ROA (+)	-0.013	-0.084**	0.018
	(-0.65)	(-2.01)	(0.49)
Size (-)	-0.008***	-0.008***	-0.010***
	(-7.64)	(-4.55)	(-5.03)
MI (+)	0.000	0.009	-0.024
	(0.03)	(0.32)	(-1.42)
Growth (+)	0.020***	0.021**	0.028**
	(3.51)	(2.08)	(2.51)
Loss (+)	0.006	-0.001	0.001
	(1.14)	(-0.07)	(0.12)
Observations	2,370	418	433
R-squared	0.111	0.170	0.127
Industry FE:	Yes	Yes	Yes
Year FE:	Yes	Yes	Yes

Notes:
This table shows the results from our cross-sectional regressions on the full sample concerning the impact of state ownership on earnings management. The effect is measured in terms of absolute discretionary accruals according to Kothari et al. (2005), for the full sample over the periods of recession and non-recession. The independent variables are state ownership, SE; leverage ratio, *Lev*; return on assets, *ROA*; firm size, *Size*; management incentives, *MI*, growth in terms of assets, *Growth*, and loss as a dichotomous variable, *Loss*. The number of firms vary across the different periods as not all firms have been listed during the full time period. All variables are winsorized to the 1st and 99th percentiles T-statistics are in parentheses and ***, **, * denote significance levels of 0.01, 0.05 and 0.1 respectively.

Appendix 9

Summary statistics of related Accounting Variables

	Panel A: Full Sample period (2005-2015)				**Panel B: Non-Recession Period (2006-2007)**				**Panel C: Recession Period (2008-2009)**			
	SE	*LE*	*Mean diff. (SE-LE)*	*Equality of variance (F-value)*	*SE*	*LE*	*Mean diff. (SE-LE)*	*Equality of variance (F-value)*	*SE*	*LE*	*Mean diff. (SE-LE)*	*Equality of variance (F-value)*
Cash	0.1582 (0.1723)	0.1198 (0.1413)	0.0383***	1.4854***	0.1534 (0.1719)	0.1244 (0.1383)	0.2900	1.5451**	0.1572 (0.1595)	0.1197 (0.1370)	0.0375	1.3567
A/R	0.1119 (0.1363)	0.0868 (0.0727)	0.0251**	3.5155***	0.1045 (0.1401)	0.0921 (0.0817)	0.0124	2.9459***	0.1111 (0.1344)	0.0853 (0.0721)	0.0259	3.4717***
INV	0.0334 (0.0651)	0.2021 (0.1468)	-0.1687***	0.1967***	0.0365 (0.0556)	0.2163 (0.1502)	-0.1799***	0.1370***	0.0369 (0.0706)	0.2028 (0.1423)	-0.1659***	0.2427***
AP	0.0933 (0.1129)	0.1146 (0.1258)	-0.0213**	0.8054**	0.0960 (0.1137)	0.1131 (0.1229)	-0.0171	0.8556	0.0966 (0.1188)	0.1144 (0.1255)	-0.0178	0.8966
REV	1.1263 (1.016)	1.0829 (0.7086)	0.0434	2.0371***	1.1460 (1.050)	1.1181 (0.7073)	0.0279	2.2024***	1.1028 (1.0780)	1.0950 (0.7319)	0.0077	2.1693***
EBIT	0.0420 (0.0993)	0.0446 (0.1650)	-0.0026	0.3620***	0.0657 (0.0840)	0.0647 (0.1606)	0.0010	0.2736***	0.0239 (0.1002)	0.0214 (0.1890)	0.0025	0.2811***
NI	0.0399 (0.0856)	0.0132 (0.1691)	0.0267***	0.2566***	0.0545 (0.0656)	0.0345 (0.1569)	0.0201*	0.1746***	0.0219 (0.0867)	-0.0042 (0.1958)	0.0261*	0.1926***

Notes: The above table shows the summary statistics of related accounting variables. Panel A is for the full sample period, while Panel B reports the period defined as non-recession and Panel C the period defined as recession. The variables in the table are defined as follows: *Cash* is the cash balance reported in the books, A*/R* is accounts receivable, *INV* is the level of inventory, *AP* is the level of accounts payable, *REV* is the total revenue, *EBIT* is earnings before interests and taxes and *NI* is the Net Income. All variables have been scaled to total assets. Standard deviations are in parentheses. *, **, *** denote significance levels of 0.1, 0.05 and 0.001 respectively. All variables are winsorized 1st and 99th percentiles.