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Earnings management substitution

An analysis of European public and privately held firms

This study examines the trade-off between real and accrual-based earnings management for public and privately held firms. Based on differences in incentives and constraints, I argue that public firms are more likely to substitute real earnings management for accrual-based earnings management than privately held firms. Investor protection is expected to be the moderating factor of this substitution relationship. Using a sample of thirteen European countries, the aggregate results confirm that both types of firms substitute real for accrual-based earnings management, and that publicly held firms are more likely to do so. The results show inconsistencies under different forms of investor protection, which may infer that investor protection is not the discriminating factor when studying earnings management substitution for privately held firms. This is the first study that compares real and accrual-based earnings management among a sample of public and privately held firms. The conclusions and implications can be fruitful for other researchers who wish to study substitution of earnings management methods under the influence of investor protection.

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1 Introduction

This study examines earnings management practices for an international sample of public and privately held firms. Managing earnings impairs the quality of the financial statements, which in turn could lead to decisions being made on the basis of sub-optimal information. Efficient allocation of scarce resources becomes a problem when stakeholders have to rely on information that is of sub-optimal quality. It is therefore important to study the application of earnings management practices, and if these possibly differ between public and privately held firms.

When engaging in earnings management, managers can choose between real and accrual-based earnings management. Zang (2012) argues that public firms choose between both earnings management practices based on their relative costs. Because of its direct cash flow effects, and sub-optimal business consequences, real earnings management is considered to be costlier than accrual-based earnings management (Ge & Kim, 2014; Graham et al., 2005). Cohen et al. (2008) study earnings management around a period of big accounting scandals (e.g. Enron) in the United States. As a regulatory response to these scandals the Sarbanes-Oxley act is installed as of 2002. Cohen et al. (2008) observe a decrease in accrual-based earnings management; but also an increase in real earnings management after the instalment of SOx. The act is considered to be a very strong form of investor protection, which raises the question if investor protection limits accrual-based earnings management, or if it leads to substitution of the two earnings management methods. Leuz et al. (2003) investigate the former in an international setting and conclude that stronger forms of investor protection lead to less accrual-based earnings management.

Burgstahler et al. (2006) are one of the very few who investigate earnings management practices in a European setting for *privately* held firms, and conclude that accrual-based earnings management is more widespread for privately held firms when compared to public firms. In their analysis however, Burgstahler et al. do not include measures of real earnings management.
All former authors (with the exception of Burgstahler et al. 2006) have in common that they study publicly traded firms. Where Burgstahler et al. (2006) did however investigate earnings management among a sample of *privately* held firms; they did not include measures that could capture real earnings management, or highlight a possible substitution effect between the two earnings management practices. To better understand earnings management practices for privately held firms, and how these relate to public firms, both earnings management practices should be studied simultaneously.

This thesis aims to extend the research of Burgstahler (2006), Cohen et al. (2008) and Zang (2012); by examining the application of real and accrual-based earnings management practices in public and privately held firms in Europe. Based on a cost-benefit trade-off it is argued that privately held firms are less inclined to substitute real earnings management for accrual-based earnings management when compared to public firms; as both types of firms face different incentives with

regard to information provision, taxation, meeting or beating (analyst) forecasts, and management compensation.

In addition to incentives that favour one of the earnings management practices, there are several constraints that limit managers' choice of earnings management practices. These constraints differ between public and privately held firms, which make certain earnings management methods more preferred compared to others. One major constraint is the degree of investor protection, which has been investigated by Leuz et al. (2003). The results from the study of Leuz et al. can be seen in the light of the relative cost approach as adopted by Zang (2012) where higher levels of investor protection limit accounting discretion, which makes accrual-based earnings management costlier to apply when compared to real earnings management. Therefore, various factors (incentives and constraints) play a role when firms decide to engage in either form of earnings management.

Contemporary research has confirmed that publicly held firms face severe constraints on accrual-based earnings management (cost-wise), and that they therefore engage in real earnings management practices (Zang, 2012). It is however not documented if privately held firms trade-off earnings management practices in the same way as publicly held firms (on the basis of their relative costs). As constraints and incentives differ for privately held firms, it is argued that privately held firms are less likely to substitute real for accrual-based earnings management. This leads to the following research question.

To what extent are privately held firms less likely to substitute real earnings management for accrual based earnings management than public firms?

By providing an answer to the research question, this thesis contributes to the literature in several ways: first by providing a better understanding of how earnings management practices are applied at both public and privately held firms, and which firm specific incentives play a role. Second, by including privately held firms, this thesis adds to the largely neglected area of earnings management research in privately held firms. Privately held firms are however of great importance, as they account for a much greater portion of economic activity that publicly held firms. Third, by investigating privately held firms, it can be observed if these firms also engage in (the possibly value destroying) substitution of real for accrual-based earnings management, as is the case for publicly held firms under strong investor protection.

The structure of the thesis is as follows; chapter two starts with agency theory and information asymmetry, followed by a literature review about earnings management and incentives faced by public and privately held firms to engage in earnings management. Chapter three discusses the sample and research method. Chapter four provides the results of the analysis, and chapter five concludes, followed by a discussion.

2 Literature Review

2.1 Agency theory

In most common businesses, there is a separation between ownership and control, most often by means of issued share capital. The shareholder (principal) appoints an agent to run the business on his behalf. Because the agent is not the owner of the firm, interests of the agent do not necessarily coincide with the interests of the principal. This separation between ownership and control gives rise to two control difficulties; moral hazard and adverse selection. These difficulties arise because there is information asymmetry between the principal and the agent, where the agent possesses more information about the day-to-day operations of the business than the principal. The agent can exploit this information asymmetry to act in a way that enhances his self-interest, at the expense of the principal. One way to reduce this information asymmetry is by issuing financial statements. Within these financial statements, the total level of earnings is an important aspect; as it is often used in compensation contracts and debt agreements (Schipper & Vincent, 2003). However, earnings are not an objective measure as it involves estimations, judgement and assessments by management (Scott, 2012). Agents thus have discretion in determining the level of earnings by deciding on policies that affect net income, like accounting choices, depreciation expenses, R&D expenses and SG&A expenses. Agents may therefore manage reported earnings, which may therefore not necessarily reflect true firm performance. Therefore, earnings management practices may increase information asymmetry between the principal and the agent, which diminishes the usefulness of financial statements, and reduces the effectiveness of the contracting agreement between the two parties.

2.2 Earnings management

In academic literature, several definitions of earnings management can be named, For example, Healy and Wahlen (1999) adopt the following definition:

"Earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company, or to influence contractual outcomes that depend on reported accounting numbers".

Former definition however only considers the negative impact of earnings management. Dechow and Skinner (2000) adopt a broader view and emphasize that earnings management can be used to communicate insider information to external stakeholders; it therefore enhances the informativeness of the financial statements. Scott (2012, p. 305) argues that contracts that leave some discretion for earnings management, keeps managers motivated. More fundamentally, there is a need for judgments and estimates in accrual accounting. Eliminating this flexibility would diminish the

usefulness of using earnings as a measure of economic performance (Dechow & Skinner, 2000). This flexibility granted to managers is however limited by accounting standards. There is a thin line between earnings management and fraudulent reporting, where the latter involves management accounting choices that violate the Generally Accepted Accounting Principles (GAAP).

As earnings management has positive and negative implications, both should be considered. Where ´good´ earnings management is enhancing informativeness, and ´bad´ earnings management is considered to give a biased view of the reported figures in the financial statements. Regulators and policy makers are considered with limiting earnings management, as it lowers the (accounting) quality of the financial reports. When firms adopt higher quality accounting standards, such as IFRS, it is found that managers have less discretion when choosing accounting policies, and therefore engage less in earnings management (Barth et al., 2008; Houqe et al., 2012). The following picture visualizes the full spectrum of earnings management, and the distinction between the two methods of applying earnings management; accrual-based, and real earnings management (Dechow & Skinner, 2000).

FIGURE 1
The Distinction between Fraud and Earnings Management

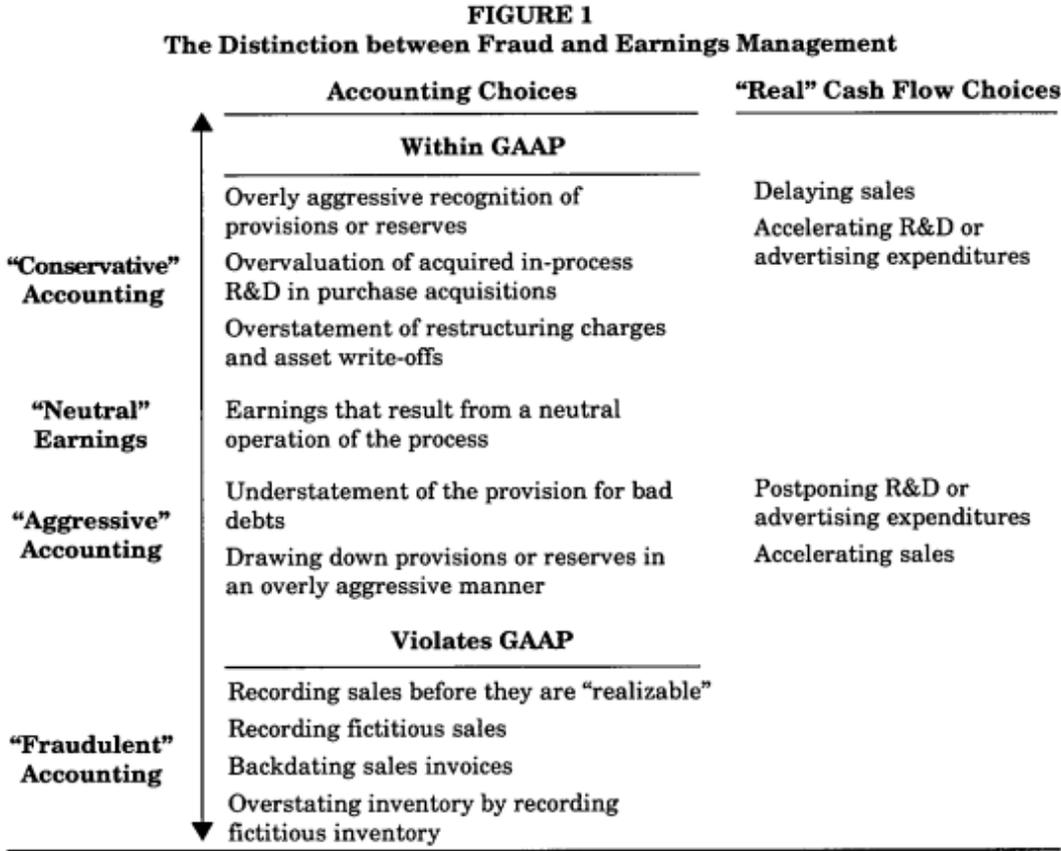|	Accounting Choices	"Real" Cash Flow Choices
	Within GAAP	
"Conservative" Accounting	Overly aggressive recognition of provisions or reserves	Delaying sales
	Overvaluation of acquired in-process R&D in purchase acquisitions	Accelerating R&D or advertising expenditures
	Overstatement of restructuring charges and asset write-offs	
"Neutral" Earnings	Earnings that result from a neutral operation of the process	
"Aggressive" Accounting	Understatement of the provision for bad debts	Postponing R&D or advertising expenditures
	Drawing down provisions or reserves in an overly aggressive manner	Accelerating sales
	Violates GAAP	
"Fraudulent" Accounting	Recording sales before they are "realizable"	
	Recording fictitious sales	
	Backdating sales invoices	
	Overstating inventory by recording fictitious inventory	

Figure 1 (Dechow & Skinner, 2000, p. 239)

The two columns in the picture on the previous page show two methods of applying earnings management. Accrual-based earnings management is conducted by managing discretionary accruals to alter the representation of transactions in the financial statements. Accrual-based earnings management shifts earnings between periods. These accruals reverse in future periods, and therefore only have a temporary income increasing or decreasing effect. Earnings management through accruals has no direct cash flow effect, and is considered to be less costly when compared to real earnings management (Defond & Park, 2001; Graham et al., 2005). Real earnings management does however directly affects business operations and therefore has an effect on (future) cash flows. Zang, (2012) adopts the following definition of real earnings management: *"a purposeful action to alter reported earnings in a particular direction, which is achieved by changing the timing or structuring of an operation, investment or financing transaction, and which has suboptimal business consequences"* (p.676). Real earnings management could have sub-optimal long term implications, as the firm departs from optimal business practices. Therefore real earnings management is considered to be more costly than accrual-based earnings management.

The rows in picture one specify what is allowed under GAAP, and what is considered fraudulent accounting; where within GAAP different gradations of earnings management exist. Conservative accounting is considered with lowering reported earnings, by accelerating costs or delaying sales; aggressive accounting on the other hand is considered with boosting reported earnings, by drawing down provisions or accelerating sales. As this paragraph discussed how managers can engage in earnings management, further paragraphs discuss why managers are incentivized to engage in earnings management.

2.3 Earnings management incentives

As there are many methods to apply earnings management, be it either accrual-based or real, the question arises what drives managers to engage in earnings management. Building on agency theory, managers may want to hide real economic performance from outsiders, and protect their privately acquired control benefits. These control benefits may be hidden from outsiders by increasing information asymmetry to avoid disciplining action from shareholders (Leuz et al., 2003). But agency theory may not always be an explanation for earnings management practices, even in privately held firms which bear much less agency costs, earnings management can be observed (Burgstahler et al., 2006). As privately held firms differ from public firms by having different ownership structures, financing, governance and management compensation plans, incentives to engage in earnings management might also diverge. Therefore, incentives of both types of firms are discussed; starting with incentives faced publicly held firms. Healy & Wahlen (1999) identify in their literature review three important motives for public firms to engage in earnings management: Capital market expectations and valuation, contracts written in accounting numbers and antitrust or government regulation.

2.3.1 Incentives for publicly held firms

Investors and financial analysts use accounting information to value stocks, which creates an incentive for managers to manage earnings to influence short-term stock performance. Also, the market places a greater premium on firms that are consistently beating forecasts, and therefore managers have greater incentives to keep doing so (Zang, 2012). Healy and Wahlen (1999) refer to these incentives as capital market motivations. The focus lies on earnings management surrounding capital market transactions (stock issuance or buybacks) and earnings management related to meeting or beating analyst' forecasts. Regarding the latter, Graham et al. (2005) surveyed many CFO's and found that they were willing to reject a positive net present value project in order to meet analyst' earnings forecasts. A different approach with the same underlying incentive is found by Dhaliwal et al. (2004), as they provide evidence that firms lower their projected effective tax rates to meet earnings forecasts. Cohen and Zarowin (2010) investigate real and accrual-based earnings management practices around seasoned equity offerings. They find evidence that post-SEO operating underperformance is driven by accrual reversals and by the consequences of real earnings management activities prior to the SEO. This further strengthens the notion that real earnings management has sub-optimal business consequences. Lastly, Hribar et al. (2006) find that managers boost earnings per share (EPS) by means of share buybacks when they are close to meeting an analyst EPS forecast. In sum, capital market forces are strongly incentivising managers to engage in earnings management.

Healy and Wahlen (1999) elaborate further on earnings management incentives with regard to contracting motivations. Contracts are used to align the interests of the managers and external stakeholders. These contracting motivations can be explained from the perspective of the manager, by positive accounting theory (PAT). This theory predicts the choice of accounting policies by managers, and how managers respond to changing or new accounting standards (Scott, 2012, p.304).

The bonus plan hypothesis, as the first of three, predicts that managers choose accounting policies that shift future earnings to current periods. If a managers' bonus depends on reported earnings, he or she can choose accounting policies that maximize earnings for a certain period. However, managers do not always engage in income increasing accruals to boost reported earnings. Healy (1985) found that managers who were short of reaching the lower bound of their bonus engaged in income decreasing accruals, to 'save' earnings for future periods. When earnings were between the lower and upper bound of their bonus, managers engaged in income increasing earnings management to increase their compensation. When earnings were higher than the upper bound of the bonus, managers adopted income decreasing accruals, again to save earnings for future periods. Further research by Gaver, Gaver and Austin (1995) extended Healy's work with a more precise measurement method and found that when income fell below the lower bound of the bonus scheme, managers appear to manage earnings upward by income increasing accruals, which is more consistent with the earnings smoothing hypothesis than with the bonus plan hypothesis (Sun, 2012).

In addition to bonus schemes based on reported earnings, shareholders incentivise managers to act in the shareholders' best interest by providing equity based compensation plans (Bergstresser & Philippon, 2006). Managers engage however in earnings management practices, as to maximize the value of their equity based compensation, which most often consists of stock option plans. Baker et al. (2003) argue that stock option plans for executives incentivise managers to adopt income decreasing accruals prior to the option award dates. The relation becomes even stronger when managers are able to publicly announce earnings prior to the option award date. As accruals reverse in future periods, it is most likely that these stock options will be more valuable in the future, and therefore increase management compensation. In addition, it is found that in firms where managements' compensation is more tied to stock market performance, higher levels of earnings management are detected (Bergstresser & Philippon, 2006; Cornett et al., 2008).

The debt covenant hypothesis predicts that managers are inclined to shift earnings from future periods to current periods to avoid violating debt covenants. Increasing income in the current period will lower the probability of default. Violation of covenants will most likely limit the managers' discretion in managing the firm; therefore managers may adopt policies to raise current periods' earnings. Sweeny (1994) was one of the first researchers investigating earnings management surrounding debt covenant violations. The results show that managers of firms that are close to violating accounting restrictions in debt covenants are more likely to make income-increasing

accounting changes when compared to a control group. In addition, Kim et al. (2011) find that managers use real earnings management activities to avoid violation of debt covenants.

The political cost hypothesis predicts that managers are more likely to choose accounting procedures that postpone current earnings to future periods when the firm is faced with high political costs. Firms which exhibit high profitability might attract attention, which could translate in new laws, higher taxes or regulatory interventions. Former is confirmed by Key (1997) who finds that firms in the cable TV business have higher income decreasing accruals in periods under congressional scrutiny. Han and Wang (1998) investigate how oil companies cope with increasing earnings during the oil crisis of 1990. They find that oil companies adopt income decreasing accruals to lower their quarterly earnings.

Concluding on public firms, there are many incentives to manage earnings. Capital market motivations may be the predominant force that incentivises managers to engage in earnings management. This however differs from privately held firms, as capital market forces are largely absent for the latter. However, other incentives may play a dominant role for privately held firms engaging in earnings management, which is discussed in the next paragraph.

2.3.2 Incentives for privately held firms

Privately held firms have different firm characteristics and serve different stakeholders compared to public firms, they have therefore other incentives to manage earnings when compared to public firms. Shareholders of public firms rely predominantly on publicly available information when valuating and monitoring firms, they therefore demand high quality financial statements. When financial statements are of low quality, investors might be unwilling to provide capital to firms. Therefore, firms are incentivised to provide high quality financial statements. In privately held firms however, communication mostly occurs through private channels. Financial statement quality (e.g. earnings quality) is therefore of less importance when compared to public firms. As a result, earnings of privately held firms are therefore less informative and of lower quality when compared to public firms (Burgstahler, 2006).

For privately held firms, tax determination (as opposed to valuation and assessing management stewardship for publicly held firms) is one of the main objectives of the financial statements (Ball & Shivakumar, 2005). As a result, earnings may be managed, to minimize taxable income. According to Coppens and Peek (2005), there are two important factors that determine how tax incentives influence the financial statements. First, when financial statements are used for contracting and communication purposes, a negative relation is found with tax management, as the contracting and communication function of the financial statements have opposing reporting incentives compared to the tax function. This is therefore one of the main distinctions between public and privately held firms, where the former use financial statements more dominantly for contracting

and communication purposes. Second, in countries where there is strong alignment between rules for taxation and accounting, tax incentives have a greater influence on the financial statements. Therefore, financial statements may not necessarily reflect economic performance, but are prepared with regard to minimizing taxable income.

As privately held firms do not rely on equity financing by public equity markets, capital market forces may largely be absent in incentivising managers to engage in earnings management. Privately held firms do however (inter alia) rely on debt financing by issuing bonds or attracting loan capital from banks. It is therefore expected that privately held firms have similar incentives as public firms when engaging in earnings management practices with regard to debt covenants. Subsequently, Coppens & Peek (2005) argue that privately held firms may face less agency problems, because shares of these firms are often in hands of management themselves. Further, management performance is assessed more subjectively by direct monitoring activities, instead of relying on the communication function of financial statements (Cavalluzzo & Sankaraguruswamy, 2000; Ke, Petroni, & Safieddine, 1999). Agency problems are however not fully absent, as current shareholders might sell their claim on the firm in the future, which creates agency problems between the current shareholders, and future shareholders. Therefore, earnings management may be less driven by agency related problems in privately held firms.

Another key distinction between public and privately held firms is that shares of the latter are not freely transferable between investors. Therefore, equity based compensation is mostly absent in privately held firms. However, compensation contracts based on budgets or net income targets can be present. But overall, as performance is more assessed subjectively, managers of privately held firms may be less inclined to manage earnings for bonus purposes, when compared to public firms.

Public firms are also considerably larger in size compared to privately held firms. The latter are therefore less visible to policymakers and general public, and may therefore not be incentivised to manage earnings with regard to political costs.

In sum, as privately held firms mainly use financial statements to determine taxable income, and less for compensation and communication, earnings management for taxation purposes may be the predominant incentive for managers of privately held firms.

2.4 Constraints on earnings management and hypothesis development

As both types of firms have incentives to manage earnings, the question arises which constraining factors limit managers to engage in earnings management. Based on a cost-benefit approach as proposed by Zang (2012), I argue that public firms are more likely to substitute real for accrual-based earnings management. Certain firm characteristics and institutional factors put constraints on accrual-based earnings management, which makes (the in principle more expensive) real earnings management more favourable to apply for public firms. For privately held firms however, I argue that real earnings management is too expensive to apply, which makes managers therefore prefer accrual-based methods. Therefore, it is expected that privately held firms are less likely to substitute real for accrual-based earnings management when compared to public firms.

Zang (2012) argues that firms trade-off both forms of earnings management with regard to their relative costliness. Thus, firms engage more in one method when it is considered to be relatively cheaper than the other. Zang (2012) finds evidence that public firms engage in less real earnings management when firms do not have a market leader status. Real earnings management is considered to be more costly for firms that do not enjoy market leader status, and these firms would therefore not want to deviate from optimal business practices. Public firms are often larger than privately held firms, and are more often found to be in a market leader position; therefore real earnings management may be preferred over accrual-based earnings management for publicly held firms.

Public and privately held firms do not share the same accounting standards. Where the latter mostly adopt local standards (that is, local GAAP), are public firms in the European Union obliged to adopt IFRS. Barth et al. (2008) investigate accounting quality under IFRS versus local GAAP and find that firms who adopt IFRS are exhibiting higher accounting quality. Accrual-based earnings management may therefore be more costly to apply for public firms when compared to privately held firms; as the former are obliged to apply accounting standards that leave little room for discretion. Extending accounting standards, accrual-based earnings management is relatively easy to detect for auditors. Francis and Wang (2008) find that Big four auditors constrain accrual-based earnings management, and therefore enhance earnings quality. Privately held firms are more often clients of non-big four auditors which may fail to detect accrual-based earnings management. Therefore, accrual-based earnings management may be more costly to apply for public firms compared to privately held firms. In addition, Langli and Svanström (2013) even find that big four auditors are less incentivized to provide high quality audits to smaller clients because they have lower publicity and face less litigation risk. Therefore accrual-based earnings management may be more persistent in privately held firms.

In privately held firms, there is more managerial ownership relative to the number of outstanding shares than in public firms (Fama & Jensen, 1983; Beatty and Harris, 1999). It is therefore unlikely that managers want to engage in real earnings management practices, as these have the

potential to destroy long-term firm value. In line with the former, as public firms have more dispersed ownership structures, it is relatively easy for managers to defend their choice of real earnings management practices in front of a large body of individual shareholders, as it is hard to distinguish from normal business operations. For privately held firms however, having more concentrated ownership, managers may not want to engage in real earnings management as the risk of detection is much higher compared to publicly held firms. Concentrated ownership involves more communication through private channels, and direct supervision, therefore managers are more likely to be disciplined by the shareholders when applying real earnings management practices, compared to publicly held firms. This makes accrual-based earnings management more favourable to apply for privately held firms than real earnings management, as the relative costs are higher for the latter.

As mentioned before, tax incentives are one of the main drivers for earnings management among privately held firms. Where managers can choose between two earnings management practices, it is expected that accrual-based earnings management is preferred over real earnings management. As accruals have no direct cash flow effect, and only temporarily increase or decrease earnings, they can be utilized to minimize taxable income without negative long-term effects. It is expected that shareholders don't consider accrual-based earnings management an issue (when applied for taxation purposes), as accruals reverse in future periods, and cash flows (and underlying power to generate earnings) are not affected.

The analysis of incentives and constraining factors leads to the following hypothesis:

H1: Ceteris paribus, public firms are more likely to substitute real earnings management for accrual-based earnings management than privately held firms.

2.4.1 Investor protection

Not only certain firm characteristics and/or differences influence managers to choose between earnings management methods. Also institutional characteristics shape the environment that constrains or facilitates managers to apply one of the two forms of earnings management. If investors are not adequately protected against appropriation by managers or controlling shareholders, public *and* privately held firms are expected to prefer the less costly accrual-based earnings management over real earnings management; that is, no substitution can be observed. I argue that through constraints on accrual-based earnings management substitution occurs, but this effect is likely to be moderated by the degree of investor protection. Therefore, hypothesis one is only expected to hold under strong(er) forms of investor protection. Francis and Wang (2008) and Hung (2000) support this argument, as they find that earnings have higher value relevance and earnings quality is higher in countries with strong investor protection; which indicates lower levels of accrual-based earnings management in countries with strong investor protection.

According to Leuz et al. (2003) "*Insiders, such as controlling owners or managers, can use their control over the firm to benefit themselves at the expense of other stakeholders" (p.2).* Managers may want to hide these privately acquired control benefits as to prevent outside intervention. They may do so by engaging in earnings management. Therefore, investor protection is needed to limit managers' actions. Leuz et al. classify countries in three clusters, and observe a decrease in (predominantly) accrual-based earnings management in the cluster with the strongest investor protection (measured by high dispersed ownership, large stock markets, strong investor rights and legal enforcement). These measures largely overlap with the more simplified distinction between code and common law countries, where investors are considered to be better protected in the latter. Cohen et al. (2008) study earnings management changes concerning the introduction of the Sarbanes-Oxley Act, which can be seen as a very strong form of investor protection. They find that accrual-based earnings management increases in the period leading to the passage of the Sarbanes-Oxley Act, and diminishes afterwards. However, they observe an increase in real earnings management after the passage. This strengthens the notion that managers trade-off the two forms of earnings management, as accrual-based earnings management was severely constrained after the passage of the Sarbanes-Oxley Act.

It is expected that the degree of investor protection in a country moderates the substitution relationship between accrual-based earnings management and real earnings management. Constraints on accrual-based earnings management will drive managers to apply real earnings management; but only under strong investor protection (which can be seen as a constraint on accrual-based earnings management) When investor protection is less strong, it is expected that there is no substituting relationship, because managers will prefer the less-costly accrual-based earnings management method over real earnings management. All mentioned authors in this paragraph however restrict their analysis **to *public firms only***, it is therefore unclear *if* and how substitution occurs for privately held firms, and

if investor protection plays a role in determining earnings management behaviour of the latter. Based on the argumentation in former chapters, I argue that under weak investor protection, no substitution can be observed for public *and* privately held firms; as both firms will prefer the less costly accrual-based earnings management. Under strong investor protection, it is expected that substitution is observable for publicly held firms, but it is unclear to what *extent* investor protection affects a possible substitution relationship for privately held firms. Therefore, for public firms, substitution is expected, and for privately held firms substitution may be observed. In between is moderate investor protection, where for both types of firms a possible substitution may be observed. Figure two summarizes the expected substitution effect for public and privately held firms, and how these relations are affected by the degree of investor protection

Degree of investor protection	Expectations on public firms	Expectations on privately held firms
Weak	No substitution	No substitution
Moderate	Possible substitution	Possible substitution
Strong	Substitution	Possible substitution

Figure two: hypotheses development

The following hypotheses are added to test the expected relations: (for brevity, only the expected relations for privately held firms have been hypothesized).

H2: Under weak investor protection, there is no substitution between real and accrual-based earnings management for privately held firms.

H2a: Under moderate investor protection, there may be substitution between real and accrual-based earnings management for privately held firms.

H2b: Under strong investor protection, there may be substitution between real and accrual-based earnings management for privately held firms.

3 Research method

3.1 Data

In order to test the hypotheses, data is collected from the Amadeus database, which is provided by Bureau van Dijk. The Amadeus database is the largest database that has information about public *and* privately held firms in Europe. Amadeus has up to ten years of data availability for 43 European countries. The choice for the Amadeus database is in line with previous studies (Burgstahler, 2006; Coppens & Peek, 2005) that also focus on earnings management in privately held companies. For this study, the most recent year with the highest amount of data availability is investigated, in this case 2014. The following countries are included in the sample: Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and the United Kingdom. These countries have the required data availability, and are included in three clusters that are used to proxy for the degree of investor protection (Leuz et al., 2003). Privately held firms that go public in 2014 are excluded from the sample, as they may bias the results (Burgstahler et al., 2006). The sample consists of large and very large firms that adhere to the following criteria: (as adopted by Coppens & Peek, 2005) total assets above 10 million, and sales above 20 million (Euro's). Following prior research, financial institutions (SIC codes between 6000 and 6799) and public administration institutions (SIC codes above 9000) are excluded from the sample. Former because they are heavily regulated industries, that may distort the results. Only consolidated financial statement data is used because consolidated financial statements are considered to be more informative than unconsolidated financial statements (Burgstahler et al., 2006; Coppens & Peek, 2005). Only firms that are active (not in bankruptcy filings or similar conditions) are used in the sample, to control for possible biases arising out of abnormal business practices. Firms that are listed on any stock exchange are defined as publicly held firms, whereas firms that are not listed on any stock exchange are defined as privately held firms.

The number of observations for the full sample are displayed in table one. Public and private firms of thirteen[1] countries are included. The sample consists of 11.595 observations of privately held firms, and 1.434 observations of publicly held firms, with a total of 13.029 observations[2]. The vast majority of observations are from the United Kingdom, Italy and Spain, as these have the highest data availability on privately held firms.

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[1] In the original sample, Austria and Hungary were included, but because many industry groupings had too few observations as a result of missing data, these countries were excluded. Subsequently, Poland is excluded because of missing institutional data.
[2] For each firm in the sample, two firm-year observations exist; for 2013 and 2014. Accounting data from 2013 is required to obtain the change in various variables, but is not used in further analysis. Therefore, all further tables only display firm-year observations (or accounting data) pertaining to the year 2014. Including firm-observations from 2013 would overestimate the observations in the descriptive statistics, but the final regressions would be unaffected.

Table two shows the number of industry-observations per country. Industries that lack sufficient observations (<10 industry observations, see paragraph 3.2.3) are excluded when estimating abnormal accruals or cash flow from operations. As a result, for most countries, industry one and two had to be excluded from the analysis.[3] In contrast, industry 11, 3 and 10 have the most observations of the entire sample, 3.670, 2.181 and 1.425 respectively.

Table three displays the reporting basis for each country (IFRS or local GAAP) and several institutional characteristics. What stands out is that firms in Denmark, Finland, the Netherlands, and Sweden only prepared their financial statements according to local GAAP. In contrast, Portugal and Spain prepared their financial statements only according to the IFRS guidelines. Most firms apply the local GAAP, as the majority of the sample consists of privately held firms. Institutional characteristics for each country are the degree of investor protection (Leuz et al., 2003) and book-tax alignment (Burgstahler et al., 2006).

Table 1 Listing status

Country	Publicly quoted		Total
	No	Yes	
BELGIUM	375	4	379
DENMARK	371	35	406
FINLAND	495	62	557
FRANCE	771	216	987
GERMANY	954	184	1.138
GREECE	128	94	222
IRELAND	206	16	222
ITALY	1.922	124	2.046
NETHERLANDS	360	16	376
PORTUGAL	101	2	103
SPAIN	1.227	77	1.304
SWEDEN	754	72	826
UNITED KINGDOM	3.931	532	4.463
Total	**11.595**	**1.434**	**13.029**

The table presents the listing status for each firm sorted by country. Hungary and Austria have no listed firms that adhere to the selection criteria as defined in paragraph 3.1, as a result they are excluded from further analysis. Poland is excluded because of missing institutional data (see also table three).

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[3] The exclusion of certain industries causes the number of observations in the final regression to be lower than the number of observations in the descriptive statistics; this is intentional and not an error.

Table 2 firm-years sorted by industry

Country	1	2	3	4	5	6	7	8	9	10	11	12	Total
BELGIUM	1	0	41	13	14	24	14	19	10	46	188	9	379
DENMARK	5	2	62	29	29	23	39	37	21	53	90	16	406
FINLAND	4	1	116	38	36	45	52	36	53	36	120	20	557
FRANCE	4	4	154	31	93	61	51	41	37	163	281	67	987
GERMANY	3	8	184	61	40	46	133	47	107	85	387	37	1.138
GREECE	9	3	36	33	32	18	6	10	11	21	26	17	222
IRELAND	3	2	32	10	6	11	12	12	7	25	86	16	222
ITALY	11	13	380	177	143	162	310	144	101	231	315	59	2.046
NETHERLANDS	6	2	95	14	30	23	10	21	13	78	63	21	376
PORTUGAL	0	0	23	6	8	13	0	14	3	16	17	3	103
SPAIN	16	1	156	80	95	122	48	62	54	150	459	61	1.304
SWEDEN	6	2	142	28	18	62	37	59	62	63	306	41	826
UNITED KINGDOM	43	51	760	218	205	449	193	259	146	458	1.332	349	4.463
Total	111	89	2.181	738	749	1.059	905	761	625	1.425	3.670	716	13.029

The table displays the number of firm-years for each of the twelve industry groupings. Austria and Hungary have too few industry-observations to reliably estimate abnormal accruals and cash flow from operations; as a result they are excluded from further analysis. Poland is excluded because of missing institutional variables, see also table three.

Table 3 institutional characteristics

Country	Accounting practice		Book-tax alignment	Investor protection
	IFRS	**Local GAAP**		
BELGIUM	4	375	1	Moderate
DENMARK	0	406	0	Moderate
FINLAND	0	557	1	Moderate
FRANCE	229	758	0	Moderate
GERMANY	261	877	1	Moderate
GREECE	161	61	1	Weak
IRELAND	43	179	0	Moderate
ITALY	337	1.709	1	Weak
NETHERLANDS	0	376	0	Moderate
PORTUGAL	103	0	1	Weak
SPAIN	1.304	0	1	Weak
SWEDEN	0	826	1	Moderate
UNITED KINGDOM	873	3.590	0	Strong
Total	**3.315**	**9.714**		

The table presents the applied accounting practice for all thirteen countries in the sample, either IFRS or Local GAAP.
Book-tax alignment is an indicator variable, where a value of one represents high alignment between rules for accounting and
taxation, and zero otherwise (Burgstahler et al., 2006). Investor protection is a variable that can take on three values
(weak, moderate and strong), where these values are a combination of several (country) characteristics that define the level
of investor protection (Leuz et al., 2003).

3.2 Measurement of variables

3.2.1 Dependent variable

The dependent variable in the econometric model is real earnings management, as the objective of this study is to examine which other (independent) variables have an effect on real earnings management. To proxy for real earnings management, I follow Cohen et al., (2008), Cohen and Zarowin (2010) and Roychowdhury (2006) who identify the following three methods to manage earnings:

- Sales manipulation by offering price discounts or more lenient credit terms;
- Reduction of discretionary expenses by lowering R&D, SG&A and advertising expenditures;
- Overproduction, aimed at reducing costs of goods sold by spreading fixed costs over a larger amount of products.

By offering price discounts and more lenient credit terms to customers, sales in the current period will increase, which will lead to an increase in earnings (in the current period), but not to an increase in cash flows. By reducing discretionary expenditures, current period earnings and cash flows are increased, but most probably at the expense of earnings in future periods. Overproduction of inventory lowers the cost per product as fixed costs get spread out over more products when compared to normal production levels. As a result, costs of goods sold is reduced which boosts current period earnings. However, overproduction lowers cash flow from operations, as raw materials have to be purchased.

In this study, only abnormal patterns in cash flows can be observed, as a result of limited data availability for privately held firms regarding discretionary expenditures and costs of goods sold. As observed by Zang (2012), the net effect on cash flow from operations could be ambiguous, when firms combine the three real earnings management methods simultaneously. E.g. reducing discretionary expenditures increases cash flow from operations, where overproduction reduces cash flow from operations. Thirdly, price discounts will lower the cash flow from operations in relation to sales. However, due to limited data availability for privately held firms, abnormal cash flows from operations is the most reliable proxy for real earnings management. To estimate abnormal cash flow from operations, the model of Roychowdhury (2006) is adopted, that pictures cash flow from operations as a function of sales and change in sales, scaled by lagged assets. The model is displayed below:

$$\frac{CFO_{it}}{A_{it-1}} = \alpha_0 + \beta_1 \left(\frac{1}{A_{it-1}}\right) + \beta_2 \left(\frac{REV_{it}}{A_{it-1}}\right) + \beta_3 \left(\frac{\Delta REV_{it}}{A_{it-1}}\right) + \varepsilon \quad (1)$$

Where:

CFO_{it}	= Cash flow from operations for industry i year t
A_{it-1}	= Total assets for industry i in year $t-1$
REV_{it}	= Revenues for industry i year t
ΔREV_{it}	= Revenues for industry i year t minus revenues in year $t-1$.

CFO_{it} is measured by subtracting total accruals from earnings before extraordinary items, as adopted by Ball and Shivakumar (2005). Total accruals are derived from equation (2) at the firm level. Where Amadeus provides earnings before extraordinary items, this metric preferred, otherwise net income is used (under the assumption that there are no extraordinary items included in earnings). Equation (1) is estimated separately for every industry-year. By estimating equation (1) for each industry-year, there can be controlled for industry-wide changes to economic conditions that could affect the residuals (Cohen & Zarowin, 2010). The cross-sectional regression is estimated for each industry grouping with at least ten observations. Twelve different industries are defined, following Campbell' (1993) industry classification based on two digit SIC codes; which is also adopted by Burgstahler (2006). Paragraph 3.2.3 (control variables) describes how firms were classified into each of the twelve industry groupings.

The residual(s) from equation (1) capture the abnormal cash flow from operations, which is used as a proxy for real earnings management. Subsequently, the residuals are multiplied by -1, so that positive values correspond with income increasing real earnings management. To control for outliers, all accounting variables that are used to compute real earnings management are winsorized at the 1% and 99% percentiles to prevent results to be driven by extreme outliers (Braam et al., 2015).

3.2.2 Independent variables

The first independent variable is accrual-based earnings management. To proxy for accrual-based earnings management, Dechow, Sloan & Sweeney (1995) discuss several models that capture the discretionary component of total accruals. Discretionary accruals involve significant management judgment, which can therefore be manipulated by management to manage earnings. Dechow, Sloan & Sweeney (1995) find that the Jones model can effectively capture discretionary accruals compared to other models (Industry model, Healy model, DeAngelo model). The Jones model assumes that revenues are nondiscretionary, which is acknowledged as a limitation by the author (Jones, 1991). However, this model is used in various contemporary research when determining accrual-based earnings management (Cohen & Zarowin, 2010; Cohen et al., 2008). Therefore, in line with previous authors, the Jones model is used to estimate the discretionary component of total accruals. Before calculating the discretionary part of accruals, total accruals have to be determined at the firm-level.

Following Bergstresser & Philippon (2006); Dechow, Sloan & Sweeney (1995); Healy (1985); and Jones (1991) total accruals are estimated as follows:

$$TA_{it} = (\Delta CA_{it} - \Delta CL_{it} - \Delta Cash_{it} + \Delta STD_{it} - DEPR_{it}) \quad (2)$$

Where:

TA_{it}	= Total accruals for firm i in year t.
ΔCA_{it}	= Current assets for firm i in year t minus current assets in year t -1.
ΔCL_{it}	= Current liabilities for firm i in year t minus current liabilities in year t -1.
$\Delta Cash_{it}$	= Cash and equivalent for firm i in year t minus cash and equivalent for in year t-1.
ΔSTD_{it}	= Short term debt included in current liabilities for firm i in year t minus short term debt in year t-1.
$DEPR_{it}$	= Depreciation expense for firm i in year t.

The total accruals (scaled by total assets) are subsequently used to estimate the discretionary accruals for each industry-year with the Jones Model (see equation 3). Total accruals are scaled by total assets to control for firm size, and to reduce heteroskedasticity in the residuals (Kothari et al., 2005). Consistent with estimating real earnings management, the cross-sectional regression is estimated for each industry grouping with at least ten observations (see paragraph 3.2.3)

$$\frac{TA_{it}}{A_{it-1}} = \alpha_0 + \beta_1\left(\frac{1}{A_{it-1}}\right) + \beta_2\left(\frac{\Delta REV_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \varepsilon \quad (3)$$

Where:

TA_{it}	= Total accruals for industry i in year t, scaled by total assets
A_{it-1}	= Total assets for industry i year t-1
ΔREV_{it}	= Revenues for industry i year t minus revenues in year t-1
PPE_{it}	= Total tangible fixed assets for industry i in year t.

The residuals from the equation (3) are considered the discretionary part of total accruals. Consistent with previous research (Cohen et al., 2008) the absolute value of discretionary accruals is used to proxy for accrual-based earnings management. As no direction of earnings management is predicted under both hypotheses, only the magnitude of discretionary accruals allows for assessment of accrual-based earnings management. Subsequently, it also captures accrual reversals from previous years that arise out of earnings management (Braam et al., 2015). Consistent with the estimation of

real earnings management, all accounting variables used in computing accruals are winsorized at the 1% and 99% level.

The second independent variable is a dummy variable that takes on the value of one if a firm is listed on any stock exchange (indicating public firms), and a value of zero if a firm is not listed on any stock exchange (indicating privately held firms). By inclusion of dummy variables, differences between public and privately held firms can be displayed.

The third independent variable is the interaction term between publicly held firms and accrual-based earnings management. The relationship between real and accrual-based earnings management may differ for public and privately held firms, therefore an interaction term allows displaying differences in the relation depending on the values of public and private (1) and (0). The interaction term therefore allows testing of the first hypothesis. The absolute centred value for discretionary accruals is multiplied by the dummy variable that pertains to public (1) or privately (0) held firms (see paragraph 3.3 econometric model). Centring discretionary accruals is in line with previous research and can be interpreted as the average effect of accrual-based earnings management (Braam et al., 2015).

3.2.3 Control variables

Following prior literature it is important to include several control variables that may have an effect on the dependent variable. The size of a company may affect earnings management choices, therefore the natural logarithm of total assets (at the firm level) is included to control for the size of a company (Zang, 2012). Following the debt-equity hypothesis, leverage is included as second control variable, as highly leveraged companies may want to manage earnings to avoid (debt) covenant violations (DeFond and Jimbalvo, 1994). Leverage is computed as the ratio of total liabilities (short-term + long-term) divided by total assets (at the firm level). The third control variable is the industry classification, which is already included in the models that estimate abnormal cash flows from operations and abnormal accruals. Twelve industry groupings are identified, based on their two digit SIC-code, see table four below (Campbell, 1993).

Table 4 Industry classification

Industry (nr)	Industry classification (by 2 digit SIC-code)
1	Agricultural industry (SIC 2, 7-9)
2	Oil and gas industry (SIC 13, 29)
3	Consumer durables industry (SIC 25, 30, 36-37, 39, 50, 55, 57)
4	Basic industry (SIC 10, 12, 14, 24, 26, 28, 33)
5	Food/tobacco industry (SIC 1, 20, 21, 54)
6	Construction industry (SIC 15-17, 32, 52)
7	Capital goods industry (SIC 34-35, 38)
8	Transportation industry (SIC 40-42, 44, 45, 47)
9	Utilities industry (SIC 46, 48, 49)
10	Textiles/trade industry (SIC 22-23, 31, 51, 53, 56, 59)
11	Services industry (SIC 43, 72-73, 75-76, 80-84, 86-88, 89)
12	Leisure industry (SIC 27, 58, 70, 78-79)

The industry grouping above is slightly different from Campbell (1993), who didn't include an industry grouping pertaining to agricultural products. Furthermore, Campbell (1993) excluded many SIC codes that are commonly classified as being part of the services industry; these SIC codes are included in the industry grouping above. It is important to note that there are other industry classifications available, e.g. Fama & French (1997), who distinguish 48 different industries. In contrast, Braam et al. (2015) use a more simplified industry grouping of 6 industries (with the inclusion of financial institutions SIC 60-67).

The fourth control variable is degree of investor protection. This variable is not directly included in the econometric model (see next paragraph) but the model is estimated for each cluster separately. To proxy for investor protection, the country classification from Leuz et al. (2003) is adopted, who identify three clusters of ascending degree of investor protection. The country distribution among the three clusters is displayed in table five.

Table 5 clusters of investor protection

Cluster one	Cluster two	Cluster three
United Kingdom	Germany	Greece
	Belgium	Portugal
	Netherlands	Italy
	Denmark	Spain
	France	
	Finland	
	Sweden	
	Ireland	

The table above displays three clusters, which are used to proxy for the degree of investor protection. Cluster one includes countries which have the strongest degree of investor protection (strong), cluster two includes countries with a moderate degree of investor protection (moderate), and cluster three includes countries with the lowest degree of investor protection (weak) Leuz et al. (2003).

3.3 Econometric model

To test the hypothesis, the dependent and independent variables are incorporated in the following econometric model: (4):

$$REMinvert = \beta 0 + \beta 1 DA[ABS] + \beta 2 LISTED + \beta 3 SIZE + \beta 4 LEVERAGE`$$
$$\beta 5 DA\_C[ABS] * LISTED + e \quad (4)$$

Where *REMinvert* are the residuals from equation (1) multiplied by -1, to allow positive residuals to correspond with income increasing real earnings management (Zang, 2012). *DA[ABS]* is the absolute value of the residuals, computed with the Jones model (see equation 3). The coefficient β_1, is expected to be negative, which would represent substitution of real for accrual-based earnings management for privately held firms. β_1 may however differ for different levels of investor protection, as no substitution is predicted under weak investor protection. *LISTED* is a dummy variable that takes on the value of one if a company is listed on a stock exchange (public firms), and zero otherwise (indicating privately held firms). No expectation is defined for β_2, as this coefficient captures the difference between public and privately held firms, when all other variables are zero (no hypothesized relationship). *SIZE* is included as a control variable which represents the natural log of total assets, which controls for size differences that could have an effect on real earnings management. Following the debt-equity hypothesis, a positive β_4 is expected for the control variable *LEVERAGE*, as highly leveraged firms may want to manage earnings to avoid (debt) covenant violations (DeFond & Jimbalvo, 1994). *DA_C[ABS] * LISTED* is the main independent variable of interest; it captures the interaction term between public firms and accrual-based earnings management. It is expected that the interaction term has a negative β_5 to confirm increased substitution between real and accrual-based earnings management for publicly held firms (compared to privately held firms). Equation 4 is estimated for the full sample, and for each cluster separately. By estimating the regression for each cluster separately, there is no need to control for investor protection in the econometric model itself, and it allows for convenient comparison of coefficients (see results in table eight).

4 Results

4.1 Descriptive statistics

Panel A of table six displays accounting figures that are used to estimate total accruals and cash flow from operations. For each country that did not report accounting figures in Euro's, the mean exchange rate from the year 2014 is taken to convert all figures to Euro's.[4] The mean of total assets is (approximately) 332 million, with a high standard deviation of 1.055 billion. This is due to the high variability in firm sizes among privately held firms, but consistent with prior research (Ball & Shivakumar, 2005). The mean for operational cash flow is 39 million, also with a high standard deviation of 367 million. A positive mean value for operational cash flows implies that total accruals are more often negative than positive, as the mean of net income is positive. Net income – total accruals = CFO, implying that total accruals have to be negative, regarding positive means for net income and CFO. For various variables a large standard deviation is observable, which is again associated with the large variability in firm sizes, but consistent with prior research on privately held firms (Coppens & Peek, 2005).

Panel B of table six displays the metrics used for calculating accrual-based earnings management. Total accruals are negative, as was expected seeing the positive cash flow from operations. The value for discretionary accruals has a mean of 0.000, and a standard deviation of 0.125. A mean close to zero is expected, as one of the requirements for OLS to be unbiased, is that the residuals have a mean value of zero. In the econometric model however, the absolute value of discretionary accruals is used; it has a mean of 0.073 and a standard deviation of 0.102. These values are very similar to those found by Cohen et al. (2008) who did research on public firms in the United States.

Panel C of table six displays the metrics used when calculating real earnings management. The residuals from the abnormal cash flow model are multiplied by -1, so that positive residuals imply more real earnings management through price discounts or more lenient credit terms (represented by *REM[invert])*. The values are again very similar to prior research (Cohen et al., 2008).

Pearson correlations between all variables (excluding the interaction term) are displayed in table seven. Consistent with prior research (Cohen et al., 2008; Cohen & Zarowin, 2010; Zang, 2012), the correlations between real and accrual-based earnings management are negative and significant, which indicates substitution between the two methods. Leverage shows positive correlations for real and accrual-based earnings management, indicating that leveraged firms use both real and accrual-based earnings management to (possibly) avoid debt covenant violations. Also, a positive correlation can be observed between size and listed, which infers that larger companies are more often listed on a stock exchange, which is of course very logical.

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[4] The following countries were converted from their original currency to Euro's: Denmark, Sweden and the United Kingdom (See table six panel A)

Table 6 descriptive statistics for all firms

Variables	Mean	Standard deviation	Lower Quartile	Median	Upper Quartile
Panel A					
Total assets	332.175.345	1.054.907.685	28.716.704	61.227.542	165.486.498
Tangible fixed assets	99.084.162	368.601.991	3.399.799	11.859.000	42.816.580
Current assets	141.562.482	418.274.059	15.813.102	32.444.418	82.064.122
Current assets (debtors)	42.907.101	121.573.646	4.639.147	10.632.000	27.364.819
Cash & Cash equivalent	27.842.156	90.594.434	1.417.627	4.462.288	14.155.128
Current liabilities	105.674.828	323.924.779	10.617.507	22.147.000	59.928.945
Current liabilities (loans)	19.712.655	59.527.753	195.937	3.053.442	12.458.006
Non-current liabilities	102.766.316	390.585.091	1.782.573	8.222.658	35.203.431
Turnover	315.257.454	955.761.832	39.014.484	72.414.000	177.349.271
Depreciation	13.602.591	46.518.576	762.883	2.148.321	6.575.252
Net income	10.168.665	46.158.440	170.523	1.521.460	5.282.274
Net income before ex. Items	9.934.627	67.159.561	184.057	1.550.231	5.289.327
Cash flow from operations	39.011.564	366.765.500	608.307	3.429.909	11.432.354

Table six reports descriptive statistics for all sample firms in 2014 (in EUR; no scaling of thousands or millions has been applied).For countries that reported in foreign currencies, the mean exchange rate from 2014 is used to convert accounting figures to Euro's. Net income before extraordinary items is computed as net income – extraordinary items (not displayed in table). Cash flow from operations is calculated by the balance sheet approach, by subtracting total accruals from net income before extraordinary items (Burgstahler et al., 2006).See panel B for value of total accruals.

Table 6 (continued)

Variables	Mean	Standard deviation	Lower Quartile	Median	Upper Quartile
Panel B					
Measures of accrual-based earnings management					
TOACC	-29.076.937	347.847.900	-7.244.000	-1.803.607	365.183
TOACC/A_{t-1}	-0,037	0,135	-0,082	-0,036	0,009
A_{t-1}	323.800.216	1.040.277.464	27.263.980	58.925.352	158.996.976
1/A_{t-1}	0,000	0,000	0,000	0,000	0,000
ΔREV/A_{t-1}	0,080	0,703	-0,027	0,037	0,152
ΔREV-ΔREC/A_{t-1}	0,068	0,691	-0,029	0,032	0,137
PPE/A_{t-1}	0,282	0,267	0,082	0,224	0,408
DA	0,000	0,125	-0,044	0,004	0,046
DA[ABS]	0,073	0,102	0,021	0,045	0,089
Panel C					
Measures of real earnings management					
CFO/A_{t-1}	0,079	0,161	0,016	0,068	0,129
REV/A_{t-1}	1,642	1,268	0,837	1,342	2,093
ΔREV/A_{t-1}	0,080	0,703	-0,027	0,037	0,152
REM[invert]	0,000	0,153	-0,052	0,006	0,060

TOACC is the total accrual value, computed using equation (1). TOACC/A_{t-1} is the value for total accruals scaled by lagged assets. A_{t-1} is the value for lagged assets (assets of 2013). ΔREV/A_{t-1} is the change in revenues scaled by lagged total assets (Jones model). ΔREV-ΔREC/A_{t-1} is the change in revenues minus the change in receivables, scaled by lagged total assets (second component of the modified Jones model). PPE/A_{t-1} is the property plant and equipment (tangible fixed assets) scaled by lagged total assets. DA are the residuals from the Jones model, where DA[ABS] is the absolute value of the residuals from the Jones model. CFO/ A_{t-1} is the cash flow from operations scaled by lagged total assets. REM[invert] are the inverted residuals from the model that estimated abnormal cash flows.

Table 7 Correlations

	1	2	3	4	5
1. REM[invert]	1.00				
2. DA[ABS]	-0.0525***	1.00			
3. LISTED	-0.0291***	0.0160*	1.00		
4. SIZE	-0.0284***	-0.0233***	0.3179***	1.00	
5. LEVERAGE	0.0558***	0.1226***	-0.0378***	0.0108	1.00

This table shows the correlations between all variables that are used in the econometric model (with the exception of the interaction term). * indicates significance at the 10% level, *** indicate significance at a level of 1%

4.2 Main results

Table eight displays the results from the following regression analysis:

$$REMinvert = \beta0 + \beta1 DA[ABS] + \beta2 LISTED + \beta3 SIZE + \beta4 LEVERAGE`$$
$$\beta5 DA\_C[ABS] * LISTED + e \quad (4)$$

The first column displays the results for the full sample. The first coefficient *DA[ABS]* displays the effect of accrual-based earnings management on real earnings management for privately held firms (that is, the effect when all other coefficients are zero, indicating privately held firms). A significantly negative coefficient (-0.04) can be observed, indicating that privately held firms substitute real for accrual-based earnings management. The coefficient for *LISTED* displays the effect of public firms on real earnings management. As the coefficient is not significant, no conclusions can be drawn regarding the difference between public and privately held firms on the appliance of real earnings management. *SIZE* is also not significant, but *LEVERAGE* is, indicating that (private) leveraged companies are more likely to apply real earnings management (when all other variables equal zero). This is consistent with the debt- equity hypothesis, mentioned by DeFond and Jimbalvo (1994).

The most interesting is however the interaction term *DA_C[ABS]*LISTED*, which captures earnings management substitution that is unique to publicly held firms. A significantly negative coefficient can be observed, indicating that there is an interaction between accrual-based earnings management and public firms, which has a negative effect on real earnings management. This can be inferred as that public firms use real and accrual-based earnings management as substitutes, which has been confirmed by various other researchers (Cohen et al., 2008; Braam et al., 2015). When combined with β_1, the first hypothesis can be confirmed, because public firms are more likely to substitute real for accrual-based earnings management as β_1 shows a small substitution relationship for privately held firms.

The second hypothesis is concerned with possible changes in substitution for privately held firms under different regimes of investor protection. To observe this effect, the regression is run for the United Kingdom and cluster two and three separately; the results are displayed in column two three and four. Column two of table eight represents the United Kingdom, which has the strongest form of investor protection. Under strong investor protection, substitution was expected for publicly held firms. This expectation can be confirmed with the significantly negative interaction term. The effect is even greater in magnitude than for the full sample, indicating that stronger investor protection leads to more substitution among publicly held firms. For privately held firms however, a possible substitution between real and accrual-based earnings management was predicted. However, no effect can be observed, regarding the insignificant β_1. Thus, under strong investor protection, privately held firms do not seem to treat real and accrual-based earnings management as substitutes.

Cluster two (column three) represents countries which qualify as having moderate investor protection. In line with the full sample and the United Kingdom, substitution can be observed for publicly held firms. The coefficient is however less in magnitude than for the United Kingdom, but still significant; which indicates a substitution effect for publicly held firms. Privately held firms show signs of substitution, regarding the significant β_1. For cluster two (having moderate investor protection), privately held firms are more likely to substitute real for accrual-based earnings management. What is however different is the coefficient for leverage, it shows that leverage has no effect on real earnings management under moderate investor protection.

Cluster three (column four) displays countries having the weakest investor protection. Under weak investor protection, there was no substitution expected for publicly held firms. This can be confirmed regarding the significantly positive interaction term, indicating that publicly held firms do not substitute the two earnings management methods, but apply them simultaneously. What stands out is that substitution can be observed between real and accrual-based earnings management for privately held firms, regarding the significantly negative coefficient of *DA[ABS]*. This is the opposite of what was expected, as under weak investor protection no substitution was predicted for privately held firms. What can be confirmed is that real and accrual-based earnings management are applied simultaneously by public firms.

In sum, regarding substitution between real and accrual-based earnings management, investor protection seems to be the determining factor for *publicly held* firms. This can be observed by the significantly negative interaction term, which ascends in magnitude when investor protection decreases. For the cluster representing weak investor protection, no substitution can be observed for publicly held firms, as they apply both earnings management methods simultaneously. Former results are consistent with previous research on (forms of) investor protection and substitution between the two earnings management methods (Cohen et al., 2008).

For *privately* held firms however, table eight shows mixed results, as three out of four coefficients infer substitution between real and accrual-based earnings management, and one does not (the coefficient for the United Kingdom). A possible explanation for these mixed results could be that investor protection does not have the same effect on privately held firms than it has on public firms. If investor protection would have similar effects on privately held firms, at least the coefficient of *DA[ABS]* for the United Kingdom (having the strongest investor protection), would be negative (as it is the case for the interaction term).

Since the results for cluster three are most contrasting with the expectations in paragraph 2.4.1., additional analysis is performed on the four countries that comprise cluster three.

4.2.1 Additional analysis

To investigate the results that pertain to cluster three, the following four countries are selected for individual analysis: Greece, Italy, Portugal and Spain. Table nine displays the coefficients at the country level. The substitution between real and accrual-based earnings management for privately held firms for cluster three, is mainly caused by the significant negative coefficients (of *DA[ABS]*) of Greece, Italy and Spain. The results show that privately held firms in these countries use both earnings management methods as substitutes. The main driver for the significantly positive interaction term for the full cluster is Italy, which shows that publicly held firms apply both real and accrual-based earnings management, instead of using them as substitutes. All other interaction terms show inconsistent results with the full cluster. The results are consistent with the presumed effect of investor protection that weaker investor protection would *not* lead to substitution between real and accrual-based earnings management for publicly held firms. However, the substitution for privately held firms was not predicted under weak investor protection, and the results are therefore inconsistent with the second hypothesis.

4.2.2 Robustness

To test the robustness of the results, all estimates have been recalculated with not twelve, but five different industries. Braam et al., (2015) adopt these classifications in their analysis of earnings management and politically connected firms. Narrowing down to five industries allows for any errors estimating the industry-specific residuals (for real and accrual-based earnings management) to come forward. The following five industry groupings have been defined: (based on two digit sic codes) SIC 10-17 mining and construction; SIC 20-39 manufacturing; SIC 40-49 transportation and utilities; SIC 50-59 Trade; SIC 70-89 services (financial institutions with SIC codes between 60-67 have been excluded, consistent with the main sample). When running all regressions again for these five industry classifications, the main results do *not* change. Therefore, the results are robust with respect to different industry classifications (see table ten, appendix A).

Table 8 Results

$$REMinvert = \beta0 + \beta1DA[ABS] + \beta2LISTED + \beta3SIZE + \beta4LEVERAGE`$$
$$\beta5DA\_C[ABS] * LISTED + e \quad (4)$$

Variables	Full sample	United Kingdom	Cluster2	Cluster3
DA[ABS]	-0.040	0.005	-0.069	-0.227
	(2.68)***	(0.21)	(2.69)***	(8.33)***
LISTED	-0.008	-0.005	-0.003	-0.006
	(1.86)	(0.52)	(0.50)	(0.69)
SIZE	-0.002	-0.003	-0.002	-0.002
	(1.87)	(1.26)	(1.69)	(0.90)
LEVERAGE	0.015	0.088	0.000	0.079
	(6.73)***	(11.58)***	(0.09)	(10.19)***
DA_C[ABS]*LISTED	-0.325	-0.866	-0.153	0.321
	(9.98)***	(13.61)***	(3.30)***	(5.50)***
CONSTANT	0.028	-0.011	0.050	-0.008
	(1.54)	(0.29)	(1.89)	(0.26)
R^2	0.02	0.07	0.01	0.04
# of obs.	12.915	4.463	4.816	3.636
F-statistic	0.0000	0.0000	0.0000	0.0000

This table shows the results from regression equation (4) with real earnings management as the dependent variable. Coefficients are displayed at the cluster level for each independent variable. Between brackets is the t-value. * indicates a p-value below 0.1 and *** indicates a p-value below 0.01.

Table 9 Additional analysis

$$REMinvert = \beta0 + \beta1DA[ABS] + \beta2LISTED + \beta3SIZE + \beta4LEVERAGE`$$
$$\beta5DA\_C[ABS] * LISTED + e \quad (4)$$

Variables	Greece	Italy	Portugal	Spain
DA[ABS]	-0.376	-0.305	-0.237	-0.271
	(2.26)**	(8.34)***	(1.38)	(6.11)***
LISTED	0.008	0.003	0.710	-0.010
	(0.73)	(0.24)	(1.57)	(0.62)
SIZE	-0.001	-0.002	-0.014	-0.000
	(0.24)	(0.67)	(0.80)	(0.13)
LEVERAGE	0.069	0.072	0.295	0.009
	(4.31)***	(5.53)***	(7.57)***	(0.73)
DA_C[ABS]*LISTED	0.139	0.652	17.011	-0.005
	(0.60)	(9.00)***	(1.30)	(0.05)
CONSTANT	-0.016	-0.001	0.065	0.019
	(0.22)	(0.03)	(0.20)	(0.39)
R^2	0.12	0.06	0.57	0.04
# of obs.	204	2.046	83	1.303
F-statistic	0.0000	0.0000	0.0000	0.0000

This table shows the results from regression equation (4) with real earnings management as the dependent variable. Coefficients are displayed at the country level for each independent variable. Between brackets is the t-value. * indicates a p-value below 0.1, ** indicates a p-value below 0.05 and *** indicates a p-value below 0.01.

5 Conclusion and discussion

5.1 Conclusion

In this study I examine the application of earnings management practices for public and privately held firms. Previous studies have found that accrual-based earnings management is applied less when there are certain constraints, e.g. new legislation and strong investor protection (Cohen et al., 2008; Leuz et al., 2003). Where previous studies have mainly focused on publicly held firms; this study focuses on public *and* privately held firms.

The first hypothesis is concerned with the substitution effect between real and accrual-based earnings management. Based on various incentives and constraints it was expected that privately held firms were less likely to substitute real earnings management for accrual-based earnings management when compared to publicly held firms. Based on the results of the full sample, the hypothesis can be confirmed. The results show convincingly that public firms substitute real and accrual-based earnings management, where privately held firms only do substitute marginally. Therefore, public firms are more likely to substitute real for accrual-based earnings management than privately held firms.

The second hypothesis is concerned with differences in (a possible) substitution effect for privately held firms under different forms (regimes) of investor protection. For publicly held firms, various other researchers have confirmed that stronger investor protection lead to substitution between real and accrual-based earnings management (Cohen et al., 2008; Zang, 2012). The results show that (in line with previous research) substitution occurs for public firms, where the substitution effect diminishes when investor protection is less strong. Regarding privately held firms however, it was unclear if and how investor protection would moderate a possible substitution relationship between real and accrual-based earnings management. Based on the difference that investor protection makes for public firms, it was hypothesized that under weak investor protection no substitution could be observed, and under moderate and strong investor protection that there might be substitution for privately held firms. The results fail to confirm the second hypothesis, as there is no substitution observed under strong investor protection for privately held firms. Subsequently, under weak investor protection, substitution could be observed for privately held firms, but these results were however contrary to the expectations of the second hypothesis.

The research question stated to what extent privately held firms were less likely to substitute real for accrual-based earnings management when compared to public firms. In general, the results for the full sample of thirteen countries can provide an answer to the research question. When referring to what extent privately held firms are less likely to substitute the two earnings management methods, it is to the extent of generalization; when all countries are combined, a significant effect can be observed. The results from the full sample are however largely based on the results from the third cluster, which were opposed to the expectations.

In sum, the results show that investor protection might not have the same effect on privately held firms as it has on publicly held firms, because there might be other factors that determine earnings management behaviour for privately held firms. This could be a possible explanation for the observed substitution relationship for privately held firms in the third cluster, where this was not expected.

5.2 Discussion

Because the results partially differ from the expectations in chapter two, there might be some challenges for future researchers to investigate this subject further. The results show clearly that privately held firms do not substitute real for accrual-based in the same way as public firms do. This could be because investor protection has a different effect on privately held firms than on publicly held firms. Differences in investor protection do not seem to explain the differences between the clusters, as the cluster which has the weakest investor protection shows results that are opposing the expectations.

A possible explanation would be that incentives to engage in either of the two earnings management methods are more shaping earnings management behaviour for privately held firms than constraints do (e.g. investor protection).

As with all research, this study has its limitations. Because of limited data availability, only one proxy for real earnings management could be defined, which has been criticized for being possibly ambiguous (Zang, 2012). Future studies where researchers have access to more complete financial statement data (predominantly applying to privately held firms), could include other measures that capture real earnings management (e.g. overproduction and cutting discretionary expenses). Further, this study is also limited to capture one year of data (2014) where (some) other researchers use panel data sets over multiple years (Braam et al., 2015; Cohen et al., 2008). Future research could examine larger panels of data that pertain to privately held firms. Finally, as there are no perfect measures that capture real or accrual-based earnings management, an entirely different research method could be considered. Earnings management could be investigated in line with Graham et al. (2005); who inquire CFO's, which could lead to new insights on what drives privately held firms to either apply real or accrual-based earnings management.

Concluding, this study is the first in examining a possible substitution effect between real and accrual-based earnings management for privately held firms. It may therefore be a first step in examining the appliance of real and accrual-based earnings management among privately held firms. The conclusions and implications can be fruitful for other researchers who wish to study substitution of earnings management methods under the influence of investor protection.

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Table 10 Results sensitivity analysis

$$REMinvert = \beta0 + \beta1 DA[ABS] + \beta2 LISTED + \beta3 SIZE + \beta4 LEVERAGE`$$
$$\beta5 DA\_C[ABS] * LISTED + e \quad (4)$$

Variables	Full sample	United Kingdom	Cluster2	Cluster3
DA[ABS]	-0.049	-0.016	-0.078	-0.213
	(3.33)***	(0.65)	(3.05)***	(7.82)***
LISTED	-0.010	-0.013	-0.002	-0.002
	(2.13)**	(1.43)	(0.31)	(0.21)
SIZE	-0.002	-0.003	-0.002	-0.002
	(2.15)**	(1.28)	(1.66)	(1.40)
LEVERAGE	0.016	0.089	0.001	0.085
	(7.02)***	(11.56)***	(0.32)	(10.80)***
DA_C[ABS]*LISTED	-0.340	-0.870	-0.154	0.328
	(10.60)***	(14.31)***	(3.31)***	(5.62)***
CONSTANT	0.034	-0.007	0.051	0.004
	(1.85)	(0.20)	(1.86)	(0.11)
R^2	0.02	0.08	0.01	0.04
# of obs.	12,869	4,401	4,849	3,619
F-statistic	0.0000	0.0000	0.0000	0.0000

This table shows the results from regression equation (4) with real earnings management as the dependent variable. Industry groupings have been narrowed down from twelve to just five. Coefficients are displayed at the cluster level for each independent variable. Between brackets is the t-value. * indicates a p-value below 0.1, ** indicates a p-value below 0.05 and *** indicates a p-value below 0.01.