Kingston Business School

Does size matter?

A comparative study of earnings management across small, medium, large private and publicly listed companies in the UK

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Abstract

The accounting regulation in the United Kingdom (UK) classifies firms into private (small, medium-sized, and large private firms) and publicly listed companies (PLCs). Evidence of earnings management in PLCs is plentiful, yet there is scant evidence in private firms. This thesis investigates the degree of earnings management for small, medium, and large private firms, compared to PLCs in the UK given the distinctive features of private firms and limited evidence about their earnings management practices. This thesis considers the implications of private firms' specific characteristics that may be associated with their earnings manipulation practices. Specifically, the effects of regulatory size, ownership structure (i.e., controlling interest and ownership dispersion), different accounting standards, capital structure (i.e., leverage levels) and the audit effect across differently sized private firms.

Data for this thesis have been collected using FAME database for the period 2005 to 2018. A combination of the frequency distribution of reported earnings, changes in earnings, and the discretionary accruals have been used in the data analysis to investigate differences across the different classes of firms.

The empirical evidence shows that private firms manipulate earnings to a greater extent than PLCs. The small private firms have the highest level of earnings management, followed by large and medium private firms. It has been revealed that subsidiaries of PLCs may have contributed to the lower level of earnings management amongst PLCs. Specifically, earnings manipulation within private subsidiaries of PLCs is greater than in stand-alone private firms. The influence of ownership concentration on earnings management level is supported by the findings. Private firms with more dispersed ownership exhibit less manipulation than private firms with concentrated ownership. The analysis based on private firms also suggests that the adoption of International Financial Reporting Standards (IFRS) allows greater discretion than Generally Accepted Accounting Practice in the UK (UK GAAP). The higher level of leverage clearly intensifies the opportunistic behaviour of private firms more profoundly than PLCs. The effectiveness of audits on constraining earnings management is reduced in small private firms compared to medium and large private firms.

The findings of this thesis contribute not only to the current discussion on earnings management in private firms versus PLCs but provide an important opportunity to advance the understanding of financial reporting practices in private firms across different sizes in the UK. This thesis contributes to earnings management research by demonstrating how various characteristics of private firms affect the level of earnings manipulation.

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Table of Contents

List of Tables

List of Figures

List of Abbreviations

Abbreviation	Meaning
AIM	Alternative Investment Market
APB	Audit Practices Board
CEO	Chief Executive Officer
DAC	Absolute Values of Discretionary Accruals Estimated with the Performance-adjusted Model
E	Scaled Earnings
EU	European Union
FAME	Bureau van Dijk's Fame Database
FRSs	Financial Reporting Standards
FRSSEs	Financial Reporting Standards for Smaller Entities
GAAP	Generally Accepted Accounting Practice
HMRC	Her Majesty's Revenue and Customs
IAS	International Accounting Standards
IFRS	International Financial Reporting Standards
IPO	Initial Public Offering
IQR	Interquartile Range of Variable
LEV_TYPE	Level of Leverage by the Type of the Firm
LSE	London Stock Exchange
MJ_DAC	Absolute Values of Discretionary Accruals Estimated with the Modified Jones Model
MNCs	Multinational Corporations
NAICS	North American Industry Classification System
NDΔE	Scaled Non-discretionary Earnings Change
NDE	Scaled Non- discretionary Earnings
OLS	Ordinary Least Square Regression
OWN	Ownership Dispersion
P(EARN)	Earnings Management Probability
PLCs	Publicly Listed Companies
PSM	Propensity Score Matching
R&D	Research and Development
RAM	Real Activities Manipulation
ROA	Return on Assets

S&P 500	Standard and Poor's 500 Index
SBA	Small Business Administration
SEC	Securities and Exchange Commission
SEOs	Secondary Seasoned Offerings
SEW	Socioemotional Wealth
SIZE	Regulatory Size
SMEs	Small and Medium-sized Businesses
SORPs	Statements of Recommended Practice
SOX	Sarbanes-Oxley Act
SSAPs	Statements of Standard Accounting Practice
STND	Reporting Accounting Standards
TYPE	Controlling Interest
UITFs	Urgent Issue Task Force Abstracts
UK	United Kingdom
UK GAAP	Generally Accepted Accounting Practice in the UK
UKLA	United Kingdom Listing Authority
US	United States
VAT	Value Added Tax
ΔE	Scaled Change in Earnings

Chapter One

Introduction

1.1. Background

The concept of a true and fair view is central to the entire discipline of accounting and financial reporting. Yet, in light of widely known financial reporting scandals such as Enron and WorldCom in the United States (hereafter, US), it is becoming extremely difficult to ignore the existence of opportunistic financial reporting misstatements. More importantly, the recent accounting scandals in the United Kingdom (hereafter, UK) such as: profit overstatements by Tesco; inventory overstatements by Ted Baker; misrepresented financial statements and forecasts by BHS Group Limited; extensive misstatements of Patisserie Valerie's accounts have heightened the need to address the question of whether size matters in the context of financial reporting quality in the UK. Furthermore, even though the quality of financial reporting is a major area of interest within the field of accounting, prior empirical research on earnings manipulation practices has been mostly restricted to publicly listed companies (hereafter, PLCs). Indeed, far too little attention has been paid to private firms, including small and medium-sized businesses (hereafter, SMEs) that generally play a vital role in the UK, the US and the European Union (hereafter, EU) economies in terms of employment, wealth, and the development of the countries (Van Tendeloo and Vanstraelen, 2008; Brav, 2009; Clatworthy and Peel, 2013; Hope, Thomas and Vyas, 2013; ICAEW, 2014; Vanstraelen and Schelleman, 2017; Denes, Duchin and Hackney, 2021).

In the UK, as in most EU countries, the private sector largely dominates with slightly over 98% of the business of the whole UK economy (BEIS, 2017), suggesting that private firms have a pivotal role in the UK economy. Besides that, private firms have fundamentally different settings than PLCs. For instance, private firms do not trade in a public market (i.e., its equity or debt is not traded publicly); hence, they do not have public accountability (IASPlus, 2017a). Accordingly, they are not public companies (Companies Act 2006). Subsequently, as Hope and Vyas (2017) point out, financial accounting information such as earnings may be more important for private firms than PLCs because they disclose less non-accounting information. In other words, they are not required to disclose as many narratives as PLCs.

The accounting regulation in the UK classifies private firms into small, medium-sized, and large private firms and PLCs for financial reporting purposes. More importantly, small

private firms are subject to reduced disclosure requirements and are not subject to mandatory audits (Companies Act 2006). Another interesting aspect of the financial reporting framework for private firms in the UK is the allowance to report in accordance with International Accounting Standards (hereafter, IAS), or firms may choose to comply with the Generally Accepted Accounting Practice (hereafter, UK GAAP) (Companies Act 2006). On the contrary, since 2005, all the listed companies must prepare consolidated financial statements in accordance with International Financial Reporting Standards (hereafter, IFRS) (IASPlus, 2017b). These settings may create different opportunities that could result in financial reporting practices that differ from those captured in PLCs.

Other significant institutional aspects that may lead to different financial reporting practices in private firms compared to PLCs are different ownership structures and agency relationships, source of financing, and variations in stakeholders' interests that may influence managers' financial reporting discretions differently. Consequently, managers of private firms may be exposed to different incentives to alter reported earnings.

The ownership structure of privately held firms is generally less dispersed than in PLCs (Goncharov and Zimmermann, 2006; Hope and Vyas, 2017). Moreover, information is communicated through private channels rather than publicly (Goncharov and Zimmermann, 2006). As mentioned previously, private firms are not traded publicly; hence, there is less scrutiny by investors, regulating authorities of stock exchanges (i.e., no additional filings required by securities regulators and stock exchange) and financial analysts (Van Tendeloo and Vanstraelen, 2008; Hope and Vyas, 2017). As a consequence, the capital market pressure is not of concern for managers in private firms. Thus, they do not have to meet or beat analysts forecast and to report earnings increase due to capital markets pressures. However, PLCs with a controlling interest in private firms may influence their financial reporting practices (Prencipe, 2012).

The concentrated ownership structure of private firms also suggests less agency conflict between owners and managers (Jensen and Meckling, 1976). Nevertheless, agency conflicts between owners, managers, banks and other stakeholders are associated with private firms (Van Tendeloo and Vanstraelen, 2008). Also, in contrast to PLCs that have access to capital markets, private firms depend mainly on bank financing (Brav, 2009; Hope and Vyas, 2017). The users of financial statements of private firms have fairly diverse needs than the ones of PLCs (Vanstraelen and Schelleman, 2017); thus, stakeholders other than equity investors, such as private investors, banks, employees, tax authorities, suppliers and short-term creditors together with the aforementioned agency conflicts (Bowen, DuCharme and Shores, 1995; Van Tendeloo and Vanstraelen, 2008; Vanstraelen and Schelleman, 2017) may drive private firms' managers to manipulate earnings in a different manner from PLCs. Additionally, private firms may become public through an initial public offering

(hereafter, IPO) that could drive managers to smooth reported earnings (Graham, Harvey and Rajgopal, 2005).

To sum up, the fundamental regulatory and institutional dissimilarities between private firms and PLCs can clearly influence their financial reporting practices differently. Therefore, findings from research into PLCs may not be generalisable to private firms due to specific regulatory and institutional settings of private firms. Moreover, due to different financial reporting requirements, the regulatory settings in the UK provide an exciting opportunity to compare earnings management practices in small, medium, and large private firms and PLCs.

1.2. Motivation

One of the key regulatory requirements for financial reporting in the UK is that financial statements must provide a true and fair view of financial position and financial performance (Companies Act 2006). To provide assurance whether financial reports give a true and fair view, an audit of financial statements is required for all firms that do not qualify for the audit exemption (Companies Act 2006). Importantly, even though there is a statutory requirement for a true and fair financial reporting, research on earnings management highlights that managers may deliberately distort reported financial information. In particular, the research demonstrates that "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" (Healy and Wahlen, 1999, p. 368). Clearly, this problem is of economic importance to stakeholders who may rely on unreliable information for decision making. Moreover, this raises broader issues of reliability of the reported financial information as well. In other words, earnings management may undermine the central concept of financial reporting. Therefore, understanding the issues concerning earnings managements is a continuing concern for policymakers and society.

As was pointed out previously, another principal feature of the UK financial reporting setting is that private firms are subject to more flexible financial reporting requirements than PLCs. The UK is particularly interesting because disclosure and audit requirements vary depending on the regulatory classification of the firms. These important regulatory characteristics may clearly create different opportunities resulting in earnings management levels that differ from those captured in PLCs. As a consequence, the quality and the integrity of financial reporting in the UK may be impaired. To examine this issue, the UK offers an ideal opportunity due to the availability of accounting data for a large sample of private firms and PLCs. Furthermore, an existing public policy debate about further relaxation of financial reporting requirements for SMEs increases a concern that regulation

(i.e., deregulation) of private firms may be associated with different financial reporting practices. It is also important to highlight that policy makers raised the question "as to whether size is the most appropriate criterion for discriminating among different types of firms in setting financial reporting requirements" (ICAEW, 2015, p. 8). Surprisingly, despite the call from policymakers and the economic importance of private firms, most research focuses on PLCs. In other words, there remains a paucity of evidence on the effects of distinctive features of private firms and the degree of earnings management across small, medium and large private firms, compared to the PLCs in the UK.

More importantly, even though some research has been carried out on the differences in the financial reporting quality between private firms and PLCs, the evidence is somewhat inconclusive. For instance, the US-based studies suggest that private firms have a higher quality of reported earnings than PLCs (e.g., Beatty, Ke and Petroni, 2002; Givoly, Hayn and Katz, 2010), whereas Hope, Thomas and Vyas' (2013) findings suggest the opposite. Regarding the UK studies, they indicate that private firms have a lower quality of earnings (e.g., Ball and Shivakumar, 2005; Liu and Skerratt, 2018). However, very little is currently known about the effect of regulatory size-based disclosure requirements on the quality of reported earnings. It is also important to highlight that, to the best of my knowledge, none of the research in the UK has investigated whether regulatory size affects accruals manipulation practices differently than in PLCs.

This thesis also provides an important opportunity to advance the understanding of the effects of other private firms' distinctive features on the degree of earnings. For instance, the evidence from the literature demonstrates that parent companies use their subsidiaries for manipulating earnings (Shuto, 2009; Prencipe, 2012; Bonacchi, Cipollini and Zarowin, 2018; Beuselinck *et al.,* 2019). This evidence clearly indicates a need to understand whether controlling interests may result in a different level of earnings management within private firms. As far as my knowledge is concerned, no studies examine the pervasiveness of earnings management in private subsidiaries of PLCs compared to private firms. Another distinct characteristic of private firms is more concentrated ownership than the ownership of PLCs. More importantly, there is more variation in the number of shareholders within private firms (BIS, 2011), resulting in different agency costs. While Clatworthy and Peel (2013) indicate that ownership concentration is associated with accounting errors, no previous study has investigated the effect of different levels of ownership dispersion on discretionary accruals levels in private firms.

Returning to the accounting regulation in the UK, it is clear that private firms have less restricted financial reporting regulation in relation to the application of accounting standards. Whilst some research has been carried out on the degree of earnings management in private firms across national standards and IFRS (Cameran, Campa and Pettinicchio, 2014; Liu and Skerratt, 2018), the evidence is inconclusive. Also, no studies have been found that

compared differences in accruals manipulations between UK GAAP and IFRS in private firms.

Financing is another intrinsically interesting aspect of private firms. As mentioned above, the capital structure of private firms is fundamentally different compared to that of PLCs. Therefore, their opportunistic behaviour may be influenced by different financial structure as the key driver of financial reporting practices (Hope and Vyas, 2017). Despite that, much of the research up to now has focused only on the implications of financing on earnings management in only one organisational type (i.e., in private firms or PLCs). A search of the literature has not revealed previous studies comparing the effect of leverage across private firms and PLCs.

Regarding the audit in the UK, small private firms are generally exempt from the mandatory audit (Companies Act 2006). The evidence also suggests that they undertake audits opportunistically (Collis, 2008; Dedman, Kausar and Lennox, 2014). Moreover, the effect of audit on the quality of reported earnings varies amongst different sizes of UK's private firms (Liu and Skerratt, 2018). Surprisingly, the effect of audit on discretionary accruals levels across private firms of different sizes has not been closely examined to the best of my knowledge.

To sum up, whilst some research has been carried out on earnings management practices in private firms, there is clearly a lack of research on the specific private firms' features and their effect on the prevalence of earnings management.

1.3. Research objectives

As discussed above, private firms have clearly an important role in the UK's economy. Yet, there is very limited evidence about their earnings management practice. This thesis aims to investigate the degree of earnings management levels across small, medium, and large private firms and PLCs in the UK. The influence of a variety of private firms' specific factors that may be associated with their financial reporting practices is examined to determine how they affect earnings manipulation levels. Specifically, the effects of regulatory size, different structure of ownership (i.e., controlling interest and ownership dispersion), different accounting standards, different capital structure (i.e., different levels of leverage) and the effect of audit across differently sized private firms are investigated in this thesis. To determine whether and how these specific characteristics of private firms influence their earnings management levels, the following research objectives are specified:

I. Investigate the differences in earnings management behaviour between small, medium and large private firms and PLCs.

II. Determine if subsidiaries of PLCs manage earnings to a greater extent than other private firms.

III. Determine if private firms with more dispersed ownership have lower levels of earnings management than private firms with less dispersed ownership.

IV. Investigate earnings management levels between private firms that prepare financial statements under the UK GAAP and private firms that report under IFRS.

V. Determine whether the effect of leverage on earnings manipulation varies in private firms relative to PLCs.

VI. Investigate earnings management levels between audited accounts of small, medium and large private firms.

1.4. Methodology and data

This thesis uses financial data from the Bureau van Dijk's Fame database (hereafter, FAME) to analyse differences in earnings management levels between small, medium and large private firms and PLCs in the UK. The main analysis is based on 184,120 firm-year observations over the period 2006 to 2018. The combination of univariate and multivariate approaches in the data analysis is used. The first methodology used is based on Burgstahler and Dichev (1997) and Gore, Pope and Singh (2007), where frequency distributions of earnings and non-discretionary earnings around common benchmarks are compared. Furthermore, to gain a better understating of the differences between the analysed firms, discretionary accruals and a panel data analysis are used. Specifically, a between-within regression model is used. Then to examine the sensitivity of the main findings, a propensity-score matching analysis (hereafter, PSM) is used. Finally, two additional tests for the robustness of the findings are performed. An ordinary least square regression (hereafter, OLS) analysis is estimated first, followed by between-within regression model analysis with an alternative measure of discretionary accruals.

1.5. Main empirical findings

This thesis aims to contribute to earnings management research by investigating how different factors may influence earnings manipulations of annual reported earnings in small, medium and large private firms and PLCs in the UK.

The evidence demonstrates that both private firms and PLCs manipulate earnings around earnings benchmarks. Further analysis reveals that private firms manipulate earnings to a greater extent than PLCs. More importantly, the evidence suggests that different accounting requirements may influence the levels of discretionary accruals in small, medium and large private firms and PLCs. A subsequent analysis of private firms

revealed that private subsidiaries of PLCs manage their earnings to a greater extent than stand-alone private firms. The results also imply that private firms with a greater ownership dispersion are less likely to manipulate earnings relative to private firms with less dispersed ownership. Furthermore, analysis has revealed that different accounting standards may influence the degree of earnings management in private firms. In particular, the results suggest that private firms reporting under IFRS exhibit higher levels of earnings management than the ones following UK GAAP.

The findings also demonstrate that higher leverage may influence earnings manipulations in private firms more profoundly relative to PLCs. Interestingly, the results also suggest that the audit effectiveness may be associated with the regulatory size of the firm. It has been found that the effectiveness of audit may be reduced amongst small private firms. In other words, the results illustrate higher levels of earnings management in small private firms with audited accounts than in unaudited ones.

1.6. Contributions

This thesis provides a comprehensive analysis of various characteristics of private firms that may affect the levels of earnings management. The findings of this thesis make several contributions to the current literature. First, the results add to existing knowledge of earnings management by providing evidence of earnings management within private firms that have a pivotal role in the UK economy. Second, to the best of my knowledge, this is the first study to compare the accruals manipulation across regulatory sizes of firms. Third, prior to this study, no study explicitly examined whether earnings management varies amongst private subsidiaries of PLCs and stand-alone private firms. Fourth, this thesis also expands our understanding of how the different levels of ownership dispersion are associated with earnings manipulations within private firms. Fifth, this study provides a new understanding of the accruals manipulations across private firms that adopt different accounting standards (i.e., IFRS or UK GAAP). Sixth, a major contribution of this study is the findings that shed new light on leverage influence on earnings management in private firms compared to PLCs. Seventh, to the best of my knowledge, this is the first study that provides evidence on the audit's sphere of influence on discretionary accruals across small, medium and large private firms.

Overall, by providing evidence of earnings management in private firms, the findings of this thesis not only make an important contribution to the earnings management literature. But they also add to public policy debates about the requirements for financial reporting within small, medium and large private firms. Also, the analysis of accruals manipulations in private firms has significant implications for understanding how earnings management practices differ amongst small, medium, large private firms and PLCs. Moreover, the findings of this thesis raise awareness of earnings management and the awareness of

potential sources of inconsistency in the quality of reported earnings. To this end, insights gained from this thesis may be of assistance to stakeholders while making decisions.

Findings from this study are important for regulators, investors and other users of financial information. Stakeholders may consider more scrutiny of financial reports by small firms, rather than providing exemptions from reporting.

1.7. Structural summary of the thesis

The remaining part of the thesis is structured as follows.

Chapter 2 outlines the regulatory and institutional settings of private firms and PLCs in the UK. The chapter begins with a discussion of legal forms of private businesses in the UK. Then, it provides definitions of small, medium and large private firms and PLCs, followed by the discussion of the regulatory settings (i.e., accounting framework and different taxes). The peculiar institutional settings of private firms such as ownership structure, source of financing, stakeholders' interests, compensation payments and IPOs are outlined last.

Chapter 3 defines earnings management and sets out the theoretical background of the thesis. It discusses agency theory, stakeholder theory, prospect theory and transaction cost theory and provides theoretical predictions about the earnings management in private firms and PLCs.

Chapter 4 discusses the empirical evidence from the literature and develops six hypotheses. This chapter highlights the potential motivations behind earnings management across private firms and PLCs. The chapter begins with a discussion about the implications of different ownership structures on earnings manipulations. Specifically, financial reporting regulatory differences between small, medium, and large private firms and PLCs are discussed first. Implications of different controlling interests and different levels of ownership dispersion within the private firms are reviewed next. This is followed by the implications of variations in applicable accounting standards, different financing structure and the implications of audit on the levels of earnings management.

Chapter 5 begins by laying out the data collection and sample selection procedures and outlines the research methodology. The adopted distributional approach is outlined first. Then, the discussion of accruals-based studies and the adopted discretionary accruals estimation models are provided. The discussion of panel data research designs and selection criteria for between-within panel data regression are outlined next, followed by the model specification. The PSM procedure is described next, followed by subsequent robustness tests.

Chapter 6 provides descriptive statistics and the results of univariate analyses for all six testable hypotheses across six sections. Each section consists of four subsections. In particular, the first subsections provide and interpret descriptive statistics and Pearson correlation coefficients. The following subsections demonstrate the results of performed univariate analysis. Specifically, they present frequency distributions of earnings and non-discretionary earnings, followed by frequency distributions of scaled change in earnings and non-discretionary change in earnings. The results of the performed tests for the statistical significance of discontinuity are also presented and interpreted for each testable hypothesis.

Chapter 7 presents and discusses the key findings of the thesis, focusing on the six testable hypotheses. The results of the preliminary testing are illustrated first in each section. Then the main findings from the between-within panel data regression model and further robustness tests are demonstrated and discussed for all six hypotheses in separate sections. Earnings management between small, medium, and large private firms and PLCs is examined first. Then the prevalence of earnings management in private subsidiaries of PLCs with stand-alone private firms is compared, followed by the analysis of earnings management levels across private firms with more dispersed ownership and less dispersed ownership. The degree of earnings management levels for private firms across UK GAAP and IFRS is assessed next, followed by the analysis of leverage effect on earnings manipulations across private firms and PLCs. The last test examines earnings management between audited accounts of small, medium and large private firms.

Chapter 8 concludes this thesis by providing a concise summary of this thesis and its findings. The first section provides a summary of the literature. Then the research objectives are provided. The summary of the main findings and research contribution are discussed next, followed by research implications. The final section lays out the limitations of this thesis and provides suggestions for future research.

Chapter Two

Regulatory and Institutional Settings of Private Firms and PLCs in the UK

2.1. Objectives

The primary objective of this chapter is to undertake a review of the regulatory accounting framework and institutional settings for private firms and PLCs in the UK. The chapter aims to understand the private firms' distinctive settings that may be an explanation for their peculiar earnings management practices. The chapter begins with the description of legal forms of private businesses in the UK, followed by the statutory definition of private firms, SMEs, large private firms and PLCs in the UK. Another significant aspect of the extensive regulatory accounting framework is demonstrated next. Finally, the specific institutional setting of private firms is outlined.

2.2. Introduction

As it was pointed out in the introduction chapter of this thesis, the fundamental difference of regulatory and institutional settings between private firms and PLCs in the UK may influence earnings management practices.

Regarding the regulatory setting of private firms, it is important to note that the UK's accounting regulatory framework applies similar or the same accounting standards to private firms and PLCs. Despite that, some peculiarities still exist with respect to financial reporting and audit requirements; hence, these are discussed below. Moreover, since firms are subject to various taxes that may affect their performance, taxes and their effects are also explained.

The main institutional differences between private firms and PLCs are in their ownership structure and sources of financing. Therefore, the ownership structure is discussed first, followed by the discussion of debt financing and its implications. Then, important external stakeholders and the types of compensation are discussed next. Finally, the IPO procedure and its characteristics are described.

2.3. Legal forms of private businesses in the UK

Private firms may adopt various legal forms as opposed to PLCs. They are generally grouped into two main categories that are further divided into separate categories. The two main categories include unincorporated and incorporated private business forms (BIS, 2011).

The unincorporated forms are further classified into sole traders, unincorporated associations, partnerships, limited partnerships and trusts (BIS, 2011). A key characteristic of all unincorporated business is that they do not have separate legal personality from their owners (BIS, 2011). In other words, the owners are fully and personally liable. In terms of taxes, all the unincorporated businesses except trusts who do not distribute profits pay income tax rather than corporate tax (BIS, 2011).

In contrast to unincorporated forms, incorporated businesses are entities with separate legal personality (BIS, 2011). These entities are further classified to limited companies, limited liability partnerships, community interest companies, charitable incorporated organisations, industrial and provident societies (i.e., co-operative societies and community benefit societies) and financial mutuals (i.e., a building society, credit union and a friendly society) (BIS, 2011). Moreover, the limited companies are further divided into

companies limited by guarantee[1] and companies limited by shares which are further divided into private limited and PLCs (BIS, 2011). Regarding the distribution of profits, most of these entities, except limited companies, reinvest their profits back into the organisations (BIS, 2011). In addition, with respect to financial reporting, firms with limited liability are required to disclose more information than firms with unlimited liability, such as sole proprietors (ICAEW, 2015). For these reasons, this thesis focuses only on limited liability companies, referred to as private firms. In particular, these firms are generally owned by members and have greater accountability and transparency than unincorporated business (BIS, 2011). Moreover, all limited liability companies in the UK are incorporated by the Companies House and their financial statements must comply with the requirements of the Companies Act 2006 (BIS, 2011) that is discussed below.

2.4. Small, medium-sized and large private firms and PLCs

In the case of private firms, the Companies Act 2006 defines them unambiguously as non-public firms. According to Section 755 of the Companies Act 2006, these firms cannot offer to the public any securities; thus, they cannot be quoted. Despite that, there are multiple definitions of what SMEs are, and most of them are based on the same metrics, such as the number of employees, total net assets or annual turnover. In the UK, Her Majesty's Revenue and Customs (hereafter, HMRC) define an SME as a business not exceeding 500 employees with either an annual turnover under €100 million or a balance sheet not exceeding €86 million for the purpose of Research and Development Tax Relief (GOV.UK, 2016). On the other hand, the Companies Act 2006 for accounting purposes defines SMEs as a business not exceeding 250 employees (for small firms not exceeding 50 employees), and which have an annual balance sheet total not exceeding £18 million (for small firms £5.1 million), and/or an annual turnover not exceeding £36 million (for small firms £10.2 million). Subsequently, large private firms are all the ones that are not defined as SMEs. Furthermore, according to the European Commission (2017), SMEs are defined as enterprises that are not exceeding 250 employees and which have an annual balance sheet total not exceeding €43 million and/or an annual turnover not exceeding €50 million. In the case of the US, to determine if businesses qualify for various government programs (i.e., contracting opportunities or loan programmes), the Small Business Administration sets industry size standards (SBA, 2019). More specifically, they provide various thresholds for each industry classified by North American Industry Classification System (hereafter, NAICS) codes. Thresholds[2]are generally based on average annual revenue or the number of employees, and they vary across NAICS industries (SBA, 2019).

[1] According to Section 5 of the Companies Act 2006 companies with share capital cannot be limited by guarantee. Firms whose members pay guarantee for the case of liquidation do not have share capital. Also, in contrast to shareholders who usually have one vote per share, if not agreed differently, in firms limited by guarantee, one member generally have only one vote (BIS, 2011).
[2] For additional details on thresholds, see SBAa (2019).

In summary, while a variety of definitions of the term SMEs have been suggested, it is evident that none of the above definitions can be generalised. Additionally, according to IFRS, in contrast to PLCs (i.e., companies who trade in a public market), SME entities are the ones that have no public accountability (i.e., its equity or debt are not traded publicly) (IASPlus, 2017a). Therefore, by taking together IASPlus (2017a) and the Companies Act 2006 definitions, for the purpose of this thesis, SMEs are defined as private firms (not listed) who meet required size thresholds under the Companies Act 2006.

Regarding public companies, the Act defines them as companies limited by shares or limited by guarantee whose certificate of incorporation states that it is a public company.[3] It is clear that this definition is ambiguously worded because these companies may be both listed and unlisted companies. For this reason, quoted and unquoted companies are defined in Section 385 of the Companies Act 2006. Quoted companies are the ones whose equity share capital is listed on the stock exchange. Therefore, for the purpose of this thesis, quoted companies are referred to as publicly listed companies or PLCs.

2.5. Regulatory setting of private firms in the UK

To further understand private firms' settings, this section points out the regulatory settings of private firms in the UK. As previously discussed, the legal form of private firms is one aspect that illustrates that private firms are rather different from PLCs. Another aspect that should be considered is the extensive regulatory accounting framework for private firms and PLCs.

2.5.1. Generally Accepted Accounting Practice in the UK (UK GAAP)

In the UK, the accounting framework is generally known as the UK GAAP. Furthermore, in recent years, a new UK GAAP has been developed. Consistent with this, the old UK GAAP was effective for periods before 1 of January 2015 when the new UK GAAP became applicable. Both UK GAAPs are briefly outlined below.

The old UK GAAP incorporated mandatory sources such as the Companies Act 2006, Financial Reporting Standards (hereafter, FRSs), Financial Reporting Standards for Smaller Entities (hereafter, FRSSEs) for the firms that qualified as small entities, and advisory sources such as Statements of Recommended Practice (hereafter, SORPs) as a guide for the application of accounting standards within specific industries or sectors and Urgent Issue Task Force Abstracts (hereafter, UITFs) that put an interpretation on accounting issues related to the application of FRSs and Statements of Standard Accounting Practice (hereafter, SSAPs) (IASPlus, 2017b; ICAEW, 2018a).

[3] Section 4 of the Companies Act 2006

A newer version of the UK GAAP reduced FRSs, respectively. According to IASPlus (2017b) and ICAEW (2018a), the previous 30 FRSs are initially replaced with 5 FRSs (FRS 100, 101, 102, 103[4] and 104). It is also important to highlight that up to 1 of January 2016, small firms could still adopt FRSSEs when they were replaced with FRS105 for micro-entities. With the implementation of the new UK GAAP, all previous FRSs, SSAPs, UITFs are withdrawn.

In terms of PLCs, in addition to the aforementioned sources of accounting requirements, they are required to follow Listing Rules of the London Stock Exchange (hereafter, LSE) and the Alternative Investment Market (hereafter, AIM) rules (IASPlus, 2017b). Furthermore, since 2005 all the listed companies in the EU securities market are required to prepare consolidated financial statements in accordance with IFRS (IASPlus, 2017b). Consistent with this, PLCs without subsidiaries may report under the UK GAAP and the Listing Rules (IASPlus, 2017b, IASPlus, 2017c). Moreover, groups and all the other firms, including PLCs that are required to use IFRS for the consolidated financial statements, may choose to use IFRS or UK GAAP for their individual financial statements according to the Companies Act 2006 (IASPlus, 2017b; IASPlus, 2017c). In other words, they can adopt one standard for their individual accounts and another for consolidated financial statements.

Having briefly discussed the accounting regulatory framework, the following section outlines the major disparities between private firms and PLCs. These differences relate mainly to the requirements of the Companies Act 2006 for reporting and audit purposes. Additionally, taxes and their implications are considered in section 2.5.1.3.

2.5.1.1. Companies Act 2006

The Companies Act 2006 is the paramount source of companies' law in the UK. As previously mentioned, the Act clearly recognises private firms as non-public, whereas public companies are limited by shares or by guarantee and having a share capital.[5] According to the Act, incorporated companies must include in their name the following: private limited companies are obliged to incorporate only 'limited' or 'ltd', while public companies are required to incorporate 'public limited company' or PLC.[6] Another fundamental difference between public and private firms is that the Act prohibits the public offering of any of the firms' securities in the case of private firms.[7] Following this, it is clear that PLCs can raise capital by issuing shares to the public, whereas this is not an option for private firms.

[4] Applicable for entities with insurance contracts (IASPlus, 2017b).
[5] Section 4 of the Companies Act 2006
[6] Section 58 & Section 59 of the Companies Act 2006
[7] Section 755 of the Companies Act 2006

As it was pointed out previously, for the purpose of the filing of accounts and reports with the register, the Act qualifies companies as small, medium-sized, unquoted and quoted companies.[8] In addition, it is worth mentioning that thresholds change over time; hence, the old and new size-based thresholds for the classification of firms are included in Appendix I.[9] Despite this classification, it is important to note that small companies that were a public company or a member of an ineligible group[10] (i.e., a group is ineligible if any of its members is a traded company) at any time within the financial year to which the accounts relate are excluded from the small companies' regime. Additionally, Section 384a has been implemented in the Companies Act 2006 recently for the micro-companies.

Part 15 of the Companies Act 2006 (Sections 380 to 474) points out the statutory requirements related to accounts and reports. Specifically, Section 380 of the Companies Act 2006 clearly draw a fundamental distinction between firms qualified as small and others that are not subject to a small companies' regime and between quoted and unquoted companies. This is important to consider because different provisions are applying to these subjects. For instance, small companies' individual accounts must comprise a balance sheet on the last day of the financial year; however, they have the discretion to choose to deliver a profit and loss account and directors' report.[11] Regarding companies that are qualified as medium-sized, they must deliver to the register annual accounts, the strategic report and the director's report.[12] In the same vein, unquoted companies must deliver to the register annual accounts, the strategic report, the directors' report and a separate corporate governance statement.[13] In addition, it is worth mentioning that until recently, medium-sized companies could deliver abbreviated accounts (i.e., without profit and loss account); however, unless they were exempt from the audit, they had to deliver an auditor's report on these abbreviated accounts.[14] The requirements for the audit are discussed in more detail in the section below. Regarding quoted companies, the Companies Act 2006 requires submission of annual accounts, directors remuneration report and directors report. More importantly, all of the PLCs' accounts have to be audited.[15]

With respect to group accounts, unless the firm is not exempt[16] from the preparation of group accounts, the Act requires a consolidated balance sheet, a consolidated profit and loss account and notes to accounts.[17] In Appendix II, all the requirements for preparing, filing, and distributing financial reports under the Companies Act 2006 are demonstrated.

[8] Section 441 of the Companies Act 2006
[9] New thresholds are generally effective from 1 January 2016, 6 April 2008 & 30 January 2004.
[10] Section 384 of the Companies Act 2006
[11] Section 444 of the Companies Act 2006
[12] Section 445 of the Companies Act 2006
[13] Section 446 of the Companies Act 2006
[14] Section 445 of the Companies Act 2006; Statutory Instruments No. 980, 2015
[15] Section 447 of the Companies Act 2006
[16] Section 399 of the Companies Act 2006
[17] Section 404 of the Companies Act 2006

Another point to consider is that the Act permits small, medium-sized and large firms to report individual accounts in accordance with IAS.[18] With respect to groups, unless they are required to prepare annual accounts in accordance with IAS (i.e., consolidated accounts), the same applies to the group accounts.[19] In other words, the financial statements of the groups may be prepared in accordance with IAS or the Act. Nevertheless, if there are relevant changes of circumstance, the Act place restrictions on switching between IAS and the Act's regimes due to the consistency of financial reporting.[20] Besides this, the Act requires that financial statements give a true and fair view of financial position and performance.[21]

Overall, the reporting requirements for PLCs and private firms, except for small and micro firms, are the same.

2.5.1.2. Audit requirements

Having discussed the Companies Act 2006's financial reporting requirements, this section addresses its audit requirements. In the EU, most of the private firms, except for the smallest ones, are subject to mandatory audits (Vanstraelen and Schelleman, 2017). With respect to audit requirements in the UK, part 16 of the Companies Act 2006 sets out the requirements for the audit. The Act requires that the auditors' opinion clearly states whether financial reports give a true and fair view of financial performance and financial position.[22] Furthermore, the Companies Act 2006 has adopted size-based exemptions for audits. More precisely, it requires audited annual reports for all firms unless they qualify as small, subsidiary or dormant firms[23] (i.e., firms without significant accounting transaction (GOV.UKe, no date)). Nevertheless, according to the Act, a small company is not exempted from an audit if it was at any time within a financial year a public company[24], part of a group that is not classified as a small group, or a part of an ineligible group.[25] Therefore, it is clear that in some cases, the small companies' regime does not apply to small companies qualified by size; hence, they become subject to a mandatory audit. It is also worth mentioning that until recently, requirements were different. The size thresholds for statutory audit exemptions were increased from the 1 of January 2016 (ICAEW, 2018b). Also, medium-sized companies could opt-out from audit according to the older legislation.[26]

[18] Section 395 of the Companies Act 2006
[19] Section 403 of the Companies Act 2006
[20] Section 395 & Section 403 of the Companies Act 2006
[21] Section 393 of the Companies Act 2006
[22] Section 495 of the Companies Act 2006
[23] Section 475 of the Companies Act 2006
[24] Section 478 of the Companies Act 2006
[25] Section 479 of the Companies Act 2006
[26] Section 445 of the Companies Act 2006; Statutory Instruments No. 980, 2015

2.5.1.3. Imposed taxes and their implications in the UK

In the case of taxes, both PLCs and private firms are generally subject to various taxes. More importantly, the literature suggests that private firms may minimise taxes more extensively due to less concern about earnings being less informative (Ball and Shivakumar, 2005; Coppens and Peek, 2005; Burgstahler, Hail and Leuz, 2006; Goncharov and Zimmermann, 2006; Sánchez-Ballesta and Yagüe, 2021). With respect to the UK's taxes, corporation tax, value added tax (hereafter, VAT) and income tax are the three main taxes that may influence private firms' financial reporting choices.

Corporation tax is regulated by the Corporation Tax Act 2010. According to the Act, both PLCs' and private firms' earnings are subject to it. The corporation tax rate[27] is generally set by Parliament for the financial year[28] suggesting that it may vary from year to year. Evidently, payments for the corporation tax result in cash outflow unless tax relief is available for trade losses against total profits.[29]

Another tax that is in common to both types of businesses is VAT. VAT is regulated by the Value Added Tax Act 1994. Generally, firms with a taxable turnover[30] above the threshold[31] in 12 months are required to register with HMRC for the purposes of the VAT (GOV.UKb, no date). There are numerous benefits of registering for VAT. However, some drawbacks may prevail over the benefits. These downsides may particularly influence small businesses that are below the VAT threshold. To illustrate, VAT is charged on any non-exempt supply of services and goods.[32] Therefore, it is clear that most of the customers have to pay higher prices. Moreover, registered businesses must keep VAT records, a VAT account, and they also must file VAT returns (GOV.UKb, no date). This clearly requires more time and paperwork. Also, in the case that a registered company charge more VAT than it pays, the difference must be paid to HMRC (GOV.UKc, no date). Consequently, businesses may incur higher costs that reduce their cash flow.

Turning now to income tax, as its name suggests, this tax is levied on personal income rather than on firms' profits. Since unincorporated businesses are not separate legal personalities; accordingly, sole traders' profits, for example, are subject to income tax (BIS, 2011). Therefore, this may be of particular interest for studies of unincorporated businesses rather than incorporated ones. Regarding limited liability companies, they withhold income tax from salary payments (GOV.UKd, no date). Moreover, shareholders for dividend payments over £5,000 are also subject to income tax (GOV.UKd, no date). Therefore, it may be argued that shareholders of private firms may have incentives to engage in earnings

[27] The current corporate tax rate is set up at 19% (GOV.UKa, no date).
[28] Section 3 of the Corporation Tax Act 2010
[29] Section 37 of the Corporation Tax Act 2010
[30] The total value of everything company sells that is not exempt from VAT (GOV.UKb, no date).
[31] Current threshold £85,000 (GOV.UKb, no date).
[32] Section 4 and Section 5 of the Value Added Tax Act 1994

manipulation in order to receive "tax-free[33]" income. Importantly, Karjalainen *et al.*, (2020) found that dividend tax rules influence earnings management behaviour within small and medium private firms in Finland. Despite that, it is important to indicate that in the case of dividend payments, they must usually be paid to all shareholders proportionally to their share of the ownership (GOV.UKd, no date). In addition, the evidence from the literature showed that tightly controlled firms pay dividends to a smaller extent (Faccio, Lang and Young, 2001). Clearly, this suggests that decision may be influenced by the business's ownership structure that is discuses in the section below.

This section has reviewed the three key taxes that may affect financial reporting choices. Considering the literature and the effects of taxes, it can be argued that the avoidance of taxes may incentivise managers in private firms more than the ones in PLCs.

2.6. Institutional settings of private firms

Building on the idea that the regulatory setting of private firms is somewhat different, this section illustrates notable differences in institutional settings of private firms and PLCs. The differences primarily occur in the structure of ownership, including corporate governance, management system and culture, types of financing, the implications of external stakeholders, compensation (i.e., dividend policy) and private firms' specific event such as IPOs. These distinctive characteristics that may influence financial reporting choices (i.e., earnings management) are discussed in the sections below.

2.6.1. The structure of ownership

The literature suggests that ownership structure and legal form are amongst the factors that influence private firms' financial behaviour. This is important to note because the ownership structure of private firms differs fundamentally from the PLCs (Brav, 2009). Consequently, it may be assumed that earnings management practices are likely to vary from private firms to PLCs. Furthermore, even though the ownership of a company may be separated from management in both forms of the businesses, private limited companies are generally more heterogeneous with respect to a number of shareholders (BIS, 2011). In other words, there is considerable variation in ownership structure among private firms. To be more precise, they vary from firms with a single stakeholder (i.e., owner-manager) to larger firms with more stakeholders (BIS, 2011). Compared to the requirement of at least two directors in PLCs, private firms must have at least one (BIS, 2011). Moreover, in contrast to PLCs, private firms' governance mechanisms are usually less formal and managerial ownership is greater (Hope and Vyas, 2017).

[33] As already noted, companies' profits are subject to corporation tax; thus, "tax-free".

2.6.1.1. Separation of ownership and management

In terms of the ownership concentration, private firms generally tend to be more concentrated than in PLCs (Goncharov and Zimmermann, 2006; ICAEW, 2015; Hope and Vyas, 2017). This is exemplified in work undertaken by Collis and Jarvis (2002). In their survey, 82% of the surveyed small UK firms predominantly consist of one to four shareholders. Despite that, some very large private firms may have dispersed ownership. Also, in the cases of family businesses, the ownership concentration may become less concentrated over time (ICAEW, 2015). Moreover, due to an increase in crowdfunding and employee share schemes, firm' ownership may also become more dispersed in private firms (ICAEW, 2015).

In terms of the financial reporting and management decisions among private firms, they are more likely to vary depending on heterogeneity in terms of separation of management and ownership (Van Tendeloo and Vanstraelen, 2008). This point is illustrated by Clatworthy and Peel (2013). In particular, they confirmed that UK private firms' accounts are less likely to contain accounting errors with greater shareholder dispersion. Moreover, financial reporting practices in private firms that are subsidiaries of PLCs, for example, may be influenced by parent companies (Prencipe, 2012). On the contrary, the financial reporting practices of private firms run by owners or family businesses are likely to be influenced by the owners. For example, as noted by Paiva, Lourenço and Branco (2016), multiple positions of an individual in family firms (i.e., family member, manager and owner) may emphasise the importance of stakeholder's satisfaction in these firms. Besides that, Collis and Jarvis (2002) noted that the risk of information asymmetry (i.e., internal and external) is reduced in small firms. This may suggest that earnings management is less likely in these firms.

The diversity among private companies may also lead to different agency relationships that may incentivise managers to manipulate earnings differently. For instance, it may be assumed that companies with a single owner/manager will be incentivised more to minimise taxes, which will lead to downward earnings management practices rather than upward ones. Also, opposite to dispersed ownership, in the case of concentrated ownership, controlling shareholders generally have more control; hence, they may exercise it over the interests of minority shareholders (Demsetz, 1983; Salvato and Moores, 2010). In addition, the extraction of private benefits is particularly pronounced in family firms with concentrated ownership (Salvato and Moores, 2010). Moreover, as Cormier, Houle and Ledoux (2013) pointed out, they may engage in earnings manipulation. On the contrary, larger private firms with greater ownership dispersion are less likely to have this conflict of interest among shareholders (Demsetz, 1983). Nevertheless, it may be assumed that managers in this setting may exercise more power in their own interest.

2.6.1.2. Equity investors

Before proceeding to the discussion of debt financing and its implications, it is important to discuss the characteristics of equity investors in private firms compared to PLCs. The shareholders of both PLCs and private firms own one or more share and their liability is limited by the invested amount (BIS, 2011). Despite that, the distinguishing characteristic between the two is that PLCs' shares are generally bought and sold publicly, whereas shares in private firms are not (Companies Act 2006; ICAEW, 2015). Subsequently, the purpose of financial reporting may vary between these types of businesses. Also, the equity structure clearly influences the way how information is communicated. For instance, for the evaluation and monitoring of a company's performance, the owners of PLCs rely on the data that are publicly available, whereas in non-listed firms' information is generally communicated through private channels (Burgstahler, Hail and Leuz, 2006; Goncharov and Zimmermann, 2006; ICAEW, 2015). Therefore, it may be said that the financial statements of private firms are prepared mainly for external stakeholders, in contrast to PLCs that communicate information through published financial statements. This different purpose of financial reporting among business highlights the notion of different motivations for earnings manipulations. On the one hand, PLCs may be incentives significantly by the market, whereas private firms do not experience market pressure for the reported earnings. Subsequently, they might be influenced more by their external stakeholders rather than shareholders. In addition, the implications of private firms' external stakeholders are further discussed in section 2.6.3.

Another aspect that needs to be considered is the case of equity investors in family-owned firms. In the field of accounting research, numerous terms are used to describe family firms (Prencipe, Bar-Yosef and Dekker, 2014). In other words, empirical research has generally employed different thresholds of family equity ownership when defining family firms. According to Prencipe, Bar-Yosef and Dekker (2014), one of the most commonly used definition is based on the proportion of the family-owned equity. On the contrary, Salvato and Moores (2010) revealed that family firms are usually operationalised as a firm with concentrated ownership. With respect to the findings from the research on family-controlled firms, conflicting evidence is presented (Paiva, Lourenço and Branco, 2016). One strain of research suggested that family firms are less likely to manipulate earnings, whereas others demonstrated the evidence of greater earnings manipulations in family-owned businesses than non-family (Salvato and Moores, 2010; Prencipe, Bar-Yosef and Dekker, 2014; Paiva, Lourenço and Branco, 2016).

2.6.2. Debt financing and its implications

Another key characteristic of private firms as compared to PLCs is their financing. In contrast to PLCs, private firms clearly have more restricted financing, and they cannot offer

debentures or shares to the public (Brav, 2009). Subsequently, rather than depending on investors, private firms mainly depend on debt financing such as loans (Brav, 2009; Hope and Vyas, 2017). Based on the dataset of private and public companies in the UK, during the period 1989 to 1999, Ball and Shivakumar (2005) demonstrated that listed companies have higher long-term debt than private firms. Interestingly, despite that, private firms have higher total debt suggesting greater use of bank debt and trade debt. In a similar vein, Brav (2009) examined similar data set for a period 1993 to 2003. Consistent with Ball and Shivakumar's (2005) findings, he revealed that the leverage ratios of private firms are approximately 50% higher than of PLCs. More recent evidence from Collis (2008) demonstrates that in 2006 more than three quarters (83%) of surveyed SMEs were financed by debt financing. Similarly, the Organisation for Economic Co-operation and Development indicated that SMEs are commonly financed through bank debt (OECD, 2015). Collis (2008) also revealed that financing decisions vary by size. In particular, while medium-sized firms rely more on bank financing and/or asset-based financing (i.e., leasing), a third of small firms have used bank finance and/or directors' loans. Overall, these cases support the view that private firms are predominantly financed by debt.

With respect to the type of debt financing, Brav (2009) has also revealed that private firms in the UK have twice as much short-term debt than PLCs. Accordingly, it can be concluded that private firms in the UK rely more on short-term bank loans and suppliers. In addition, Li *et al.*, (2021) revealed that the debt structure (i.e., the concentration of debt) is associated with the quality of accounting information. More specifically, they found that the lower concentration of debt structure is associated with a higher quality of accounting information. Furthermore, the empirical evidence suggests that businesses with at least one subsidiary have higher leverage than those with no subsidiaries (Dedman, Kausar and Lennox, 2014). With respect to smaller and highly leveraged PLCs, Doukakis (2014) finds a prevalence of earnings management (i.e., real activities manipulation (hereafter, RAM)). In terms of the UK, Clatworthy and Peel's (2013) findings demonstrated that more leveraged small private firms in the UK are more likely to disclose accounting errors. Moreover, as Hope and Vyas (2017) highlight, financial reporting practices within private firms are primarily driven by their financial structure. Subsequently, it may be expected that higher leverage in private firms may lead managers to engage in earnings management to a greater extent than in PLCs.

In the case of bank debt, ahead of any credit approval, banks generally base their lending decision mainly on accounting information (i.e., financial statements, bank statements and tax returns), the length of their relationship with borrowers and credit scores provided by credit agencies (Cassar, Ittner and Cavalluzzo, 2015). As noted by Brav (2009), financing costs are generally higher for private firms than PLCs. Therefore, to ensure a lower cost of financing in the preliminary stage for the loan, private firms may also be

incentivised to manipulate earnings. This can be supported by Mafrolla and D'Amico's (2017) study that demonstrated an association between higher loan costs and earnings manipulation. Additionally, Li and Richie (2016) findings provided evidence that PLCs with less volatile earnings obtained a lower cost of debt.

After the credit approval, banks continuously monitor the firms with higher leverage in an effort to reduce the high risk of default (Ang, Cole and Lin, 2000). Therefore, for the purpose of the continuous financial assessment, banks may request lender's financial statements (OECD, 2015). They usually require the "maintenance" of certain financial ratios based on accounting information in order to comply with debt covenants (Hope, Thomas and Vyas, 2017; Hope and Vyas, 2017). As a result, this may significantly influence private firms' managers to manipulate the accounting ratios which are included in the debt covenants. In summary, in comparison to PLCs, private firms' financial reporting choices may be impacted by debt financing more profoundly.

2.6.3. External stakeholders

As pointed out previously, external stakeholders are primary users of published financial statements. Therefore, it may be argued that the perception of different stakeholders is a deciding factor for financial reporting choices (i.e., accounting and audit policies). Bowen, DuCharme and Shores (1995) have indicated that earnings changes influence the value of stakeholders' implicit claims, whereas earnings levels are more related to the explicit claims' value (i.e., equity and debt). Accordingly, these stakeholders may also incentivise owners or managers to manipulate reported earnings.

To further understand the specific environment of private firms, these different users of financial reports of private firms are further discussed. In contrast to PLCs, there is a close relationship between stakeholders and a private firm; thus, information can be communicated directly (Dedman, Kausar and Lennox, 2014). The needs of different stakeholders (i.e., banks, suppliers, competitors, tax authorities) vary accordingly (Dedman, Kausar and Lennox, 2014). From the aforementioned, it is evident that the financing of private firms depends mainly on debt holders; therefore, it may be argued that they are the most important stakeholder for these firms.

With respect to the UK, the primary users of private SMEs' published financial statements are outlined in the case of Collis's (2008) findings. More specifically, 62% of SME directors identified credit rating agencies, 46% mentioned banks and other lenders, while 64% indicated suppliers and other trade creditors. These findings clearly support the notion that banks are important stakeholders that play a crucial role in the financing of private firms.

In addition, the literature also recognises the importance of businesses' reputation for the negotiation of the terms of trade (Bowen, DuCharme and Shores, 1995). For instance, suppliers generally grant credit to firms for delivered goods (Hope and Vyas, 2017); hence, those credit terms in general clearly affect the financial performance of firms and vice versa. For this reason, customers and suppliers are of particular interest to private firms. As indicated previously, the importance of firms' suppliers has been exemplified in a study by Collis (2008).

Turning now to competitors as one of the users of published financial statements, despite the fact that they do not provide direct financing as previously mentioned stakeholders, the literature suggests that they may also affect financial reporting decisions (Hope and Vyas, 2017). Questioning the importance of competitors, 57% of respondents in Collis' (2008) survey believed that competitors were using the published accounts. It is important to note that these financial disclosures may be useful in the evaluation of the firms' performance (Bernard, Burgstahler and Kaya, 2018). Therefore, it is clear that competitors could use information about the company's financial performance, liquidity and working capital. In particular, as Bernard, Burgstahler and Kaya (2018) suggested, they may exploit information about sales trends, operating profits, gross profits, margin levels, and most importantly, information about liquidity constraints to "prey on weaker rivals" Bernard, Burgstahler and Kaya (2018, p.99) and to provide lower prices than financially constrained rivals. They may also use disclosed information to benchmark themselves with rivals (Bernard, Burgstahler and Kaya, 2018). Therefore, it may be argued that all of the above may incentivise private firms to engage in earnings manipulations in order to deceive competitors.

Other potentially important stakeholders are tax authorities. As Ball and Shivakumar (2005) pointed out, financial choices in private firms may also be influenced by taxation. Surprisingly, in Collis' (2008) survey, tax authorities have not been mentioned as a potential stakeholder. This may be explained by the fact that the UK is a tax-non-alignment country. In other words, annual financial statements are not used for tax purposes (GOV.UKd, no date).

2.6.4. Compensation

Compensation in private firms may vary among owners and managers. As Cole and Mehran (2016) concluded, the executive payment is usually associated with the structure of the ownership. In terms of private firms, the ownership section of this thesis has demonstrated that private firms in the UK typically have more concentrated ownership than PLCs. For this reason, the compensation of the Chief Executive Officer (hereafter, CEO) in private firms is set up mainly by themselves rather than by an independent board as in PLCs (Gilles, 1999; Cole and Mehran, 2016).

Regarding the type of payment, there are generally three main ways of compensation payments related to private firms. The first type of owners' payment is through dividends. As already discussed, the main drawback of this type of payment is that it constitutes a mandatory pay-out to all stakeholders. Also, since profits are subject to corporation tax in the case of payments over £5,000, there would be double taxation (i.e., corporation tax and income tax). On the contrary, in the case of only one owner/manager, this may be "tax-free" income. Another type of payment is through salary that is subject to income tax. Moreover, salaries are considered as a cost for the company leading to higher leverage and decreased earnings. Clearly, both types of payments affect cashflows in a different way; thus, other factors such as leverage are considered when deciding about owners' compensation. In addition, a recent study by Cole and Mehran (2016) affirmed that owner-managers in small private firms in the US are influenced by firms' leverage when deciding between dividend payments and their salary. Moreover, since small firms in their study have been defined as firms with less than 500 employees, it can be argued that this finding may be relevant to all private firms. Third, in the case of more dispersed ownership, owner-manager with less than 100% of the ownership may be incentives to consume certain perks that decrease the firm's value (Ang, Cole and Lin, 2000). In other words, personal benefits may be more influential than firms' interests.

With respect to the compensation of employed managers, in contrast to PLCs, their compensation is mainly cash-based (i.e., salary and annual bonuses) rather than share-based (Gilles, 1999). In terms of the SMEs in the UK, Watson (1994) findings suggested that profitability and the growth of the company may impact managers' salaries. He also confirmed that almost 62% of the sampled UK's managers in SMEs had received a part of remuneration as a share in the profit or bonuses related to profit. Moving on now to consider IPO that is only relevant for private firms.

2.6.5. Initial public offerings

One way of raising equity financing for the further development of private firms is to join a public market. An IPO is a specific event for private firms that extends their shareholder base to public investors; hence, while raising equity capital and increasing firm's liquidity, the private firm ceases to be private (Ibbotson, Sindelar and Ritter, 1988; Ritter and Welch, 2002; Woolland and Seal, 2010). The process of an IPO is generally divided into two phases: pre-IPO preparation, including the IPO process, and post-IPO (Woolland and Seal, 2010). During the first phase, when a firm is still private, the firm must prepare for the IPO. In the second phase (i.e., post-IPO), the company has to follow the rules for listed companies.

In terms of the UK, private firms can join two different public markets. In particular, they can list their shares on less regulated AIM market (i.e., market for smaller firms) or the

main market (i.e., LSE). Firms listing on the AIM market are required to abide by AIM rules (IASPlus, 2017b), whereas IPO firms on the main market are required to follow Listing Rules by the United Kingdom Listing Authority (hereafter, UKLA) before they can list on the market (Woolland and Seal, 2010). The listing requirements include financial information requirements, amongst others. More specifically, firms are required to have unqualified[34] audited financial statements that cover at least a three year period. In addition, firms usually provide a long-form report that is prepared by an auditor. This report includes information about organisational structure, management and personnel, taxation information, financial performance and accounting policies information, and information about the information system.

Despite enhanced and intense scrutiny by regulators, underwriters, auditors, analysts, investors, and the public during the listing period, one strain of literature suggests that firms may behave opportunistically around IPO events. Consistent with this, Ritter and Welch (2002) suggested that the decision to go public may be a response to an opportunity such as investors' overoptimism or other favourable market conditions. In terms of the opportunistic financial reporting, it has been suggested that IPO firms in the UK misrepresent earnings around IPO events (Alhadab, Clacher and Keasey, 2016). More importantly, Alhadab, Clacher and Keasey's (2016) findings implied that the regulatory environment of public markets is associated with different levels of earnings manipulation among IPO firms. In particular, they found that IPO firms on the less-regulated market (i.e., AIM) manipulate earnings to a greater extent compared to IPO firms on the main market (i.e., LSE).

On the other hand, in spite of these recent findings about opportunistic behaviour around IPOs, Ball and Shivakumar (2008) suggested that IPO firms in the UK do not inflate earnings. In other words, their findings suggest that enhanced regulatory demand increases the quality of financial reporting. However, as noted by Ritter and Welch (2002) the opportunistic behaviour is not unexpected, and long-term underperformance by IPO firms might be partially associated to it. Having discussed IPOs, the following section concludes this chapter.

[34] Meaning that financial statements are prepared in accordance with accounting standards and are free of material misstatements.

2.7. Conclusion

The regulatory and institutional settings discussion outlines distinctive characteristics of private firms that may influence their financial reporting choices uniquely compared to PLCs. At first glance, it is clear that private firms are more heterogeneous with respect to legal forms. Despite that, accounting regulation similarly treats private firms and PLCs. Nonetheless, certain exceptions apply only to small and micro business. The most obvious dissimilarities from the regulatory framework are in annual financial reporting and audit requirements. Accordingly, given that an audit is voluntary for some private firms, the quality of their financial reports may differ from audited and unaudited accounts. For this reason, potential variations in earnings management practices amongst private firms, as well as in between private firms and PLCs may occur. In terms of taxes, it is clear that private managers in private firms generally have greater autonomy. In other words, they have more discretion over their financial reporting choices and compensation choices (i.e., salaries and dividends). More importantly, distinctive features of private firms such as ownership structure, internal communication of information, the nature of the relationship between owners, managers, banks and other external stakeholders and capital structure clearly demonstrate the uniqueness of their settings. This distinctiveness may lead to some different practices of earnings management. Furthermore, a unique special event such as IPO clearly influences the financial reporting of private firms. Therefore, some variation in earnings management practices may also occur pre-IPO and post-IPO.

Following the discussion about the unique regulatory and institutional setting of private firms, the next chapter provides the theoretical background of earnings management studies.

Chapter Three

Earnings Management Definitions and Theoretical Background

3.1. Objectives

The primary objective of this chapter is to define earnings management and to discuss the underlying theoretical framework of this thesis. First, since the definition of earnings management varies among researchers, earnings management is defined first. Then, the principal underlying theories that underpin empirical research are discussed next. The agency theory is discussed firstly, followed by stakeholder theory, prospect theory and transaction cost theory. Finally, the conclusion of the chapter provides the outline for theoretical predictions for earnings management practices in private firms and PLCs.

3.2. Introduction

A large and growing body of literature has investigated earnings management practices. In terms of the definitions of earnings management, there is no consensus within the literature. In this sense, numerous definitions are used to define earnings management. For instance, one perspective suggests that earnings management positively affects the quality of reported earnings (i.e., enhances the quality of reported earnings). On the contrary, another perspective (i.e., opportunistic view) demonstrates that earnings management rather distorts the quality of reported earnings. Despite conflicting perspectives, both agree that earnings manipulations are conscious actions motivated by different incentives. These motivations for earnings manipulations are heterogeneous and they are recognised in the literature. In other words, different objectives are pursued by managers or firms. Besides that, earnings are generally managed either downwards or upwards.

Further, based on the literature, there are various theories that support the opportunistic behaviour of managers to manipulate earnings. Most researchers investigating earnings management view the firm as a nexus of contracts. Subsequently, previous research has established that individual (i.e., managers) behaviour is influenced by the contract's nature (Alchian and Demsetz, 1972; Jensen and Meckling, 1976; Hill and Jones, 1992). Building from this fundamental concept, agency and stakeholder-agency theory evolved. Nevertheless, despite common underlying assumptions, these theories do not reach a consensus about earnings management levels among firms.

Another point to consider is the theories that support the idea that managers are motivated to manage earnings around earnings thresholds such as zero earnings and zero changes in earnings. As noted by Burgstahler and Dichev (1997), the prospect and transaction cost theories provide a useful account of how earnings benchmarks may affect earnings management levels. To be more precise, they explain why managers may be incentivised to manipulate reported earnings to beat certain earnings thresholds (i.e., to avoid losses or earnings declines).

In summary, this chapter discusses the concept of earnings management followed by the underlying theoretical framework of this thesis. The agency theory is discussed first, followed by the stakeholder theory. Then, the prospect and transaction cost theories are considered. Finally, the evaluation and predictions of the discussed theories are provided.

3.3. Definition of earnings management

In the field of earnings management, various definitions are found. Some of the definitions refer to how earnings are managed and situations in which earnings are managed, while others include incentives for earnings manipulations. Therefore, in order to define earnings management for the purposes of this thesis, various definitions are discussed below.

Schipper (1989) defines earnings management as “disclosure management”. More specifically, she defines it as “a purposeful intervention in the external financial reporting process, with the intent of obtaining some private gains” (Schipper, 1989, p.92). Furthermore, she further extends this definition to “real” earnings management that is carried out by financial decisions or investment timing in order to alter reported earnings. More recent studies defined real activities-based manipulations as management actions that deviate from normal business operations (i.e., the change of the timing or structuring of actual transactions) with the purpose of meeting certain earnings benchmarks (Ewert and Wagenhofer, 2005; Roychowdhury, 2006).

In a similar vein, under the most cited 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” (Healy and Wahlen, 1999, p. 368). For example, earnings may be managed to reduce the volatility of reported earnings to obtain a lower cost of financing (e.g., Li and Richie, 2016), to avoid political scrutiny (e.g., Watts and Zimmerman, 1990), to avoid taxes (e.g., Coppens and Peek, 2005), or to mitigate potential regulation (e.g., Bernard, Burgstahler and Kaya, 2018). Additionally, Fields, Lys and Vincent (2001) affirmed that managers choose accounting treatments to maximise their bonuses.

Another line of thought on earnings management demonstrates that “abusive “earnings management” involves the use of various forms of gimmickry to distort a company’s true financial performance in order to achieve the desired result” (Securities and Exchange Commission, 1999, p.84). Clearly, this definition suggests that misrepresentation of the firms’ earnings is considered financial reporting misconduct (i.e., fraud). Consistent with this view, the Audit Practices Board (hereafter, APB) (2001, p.4) affirmed that “aggressive earnings management results in stakeholders, and the capital markets generally, being misled to some extent about an entity’s performance and profitability”. They also noted that at the extreme, earnings management might become a criminal offence.

Collectively, the above definitions suggest that earnings management is an opportunistic choice that may be exercised through RAM or accruals manipulations. In

terms of RAM, Beneish (2001) pointed out that it is difficult to distinguish between profitable opportunity and earnings manipulations. To be more precise, he argued that it is unreasonable to consider a deviation from rational investment behaviour as manipulation of earnings.

In contrast to the definitions above, another stream of research on earnings management suggests that earnings management is not opportunistically motivated. To be more precise, it has been shown that managers use their discretion according to applied accounting standards as a signalling choice (i.e., to convey private information on future earnings); hence, increasing informativeness and the quality of reported earnings (Sankar and Subramanyam, 2001).

To sum up, the definition of earnings management varies in the literature and there is terminological confusion. On the one hand, earnings management is seen as opportunistic (i.e., distorts reported earning), whereas others suggest that it is used as a signalling effect (i.e., enhances the quality of reported earnings). Although differences of opinion clearly exist, there appears to be agreement that earnings management is used to refer to conscious manipulations of reported earnings within accounting. Nevertheless, earnings manipulation is used for different purposes (i.e., to convey private information on future earnings, to mislead stakeholders, to influence contractual outcomes or to maximise their bonuses) (Schipper, 1989; Healy and Wahlen, 1999; Sankar and Subramanyam, 2001; Fields, Lys and Vincent, 2001). While a variety of definitions of the term earnings management have been suggested, this thesis adopts an opportunistic view on earnings management (i.e., to mislead stakeholders and to influence contractual outcomes). Moreover, based on Beneish's (2001) argument about difficulties to distinguish between profitable opportunity and earnings manipulations, this thesis is concentrated on accruals manipulations solely. Having defined what is meant by earnings management, the following sections discuss the underlying theoretical framework of earnings management.

3.4. Theories that underpin earnings management research

The literature on earnings management has highlighted a number of theories that propose various explanations behind earnings management. Traditionally, most research investigating earnings management view firms as a nexus of contractual relationships. A fundamental implication of this is that the nature of the agency relationship (i.e., conflicting interest) between individuals is often proposed as one of the explanations for managerial opportunism. Therefore, much of the literature on earnings management focuses on agency and stakeholder theory. By contrast, another line of research suggests earnings thresholds as an alternative incentive for managing earnings. In other words, they propose prospect and transaction cost theory as the underlying motives for reaching earnings benchmarks. To this end, to establish the theoretical framework of this thesis, both aspects are

considered in an attempt to explain why earnings management levels may vary amongst different types of firms.

3.4.1. Agency theory

Agency theory is the dominant theoretical framework in earnings management research. As its name suggests, the principal focus of agency theory is on the agency relationship between the managers (i.e., agents) and shareholders (i.e., principals). This relationship is defined by Jensen and Meckling (1976) as a contract under which the principal(s) employs the agent(s) to perform certain tasks on their behalf; hence, decision making responsibility is delegated to the agent(s). According to this definition, the firm is considered as a nexus of contracts; hence, individual(s) (i.e., manager(s)) behaviour may be influenced by the nature of the contract (Alchian and Demsetz, 1972; Jensen and Meckling, 1976).

Fundamentally, this definition implies a separation of management and ownership in firms. Therefore, unless the owner and manager are the same people, the ownership and the management of daily operations within a firm are usually separated. As a result of this separation, stakeholders generally have less control than managers over a firm's resources (Demsetz, 1983). In other words, managers have more control to establish strategic goals of the firm to accomplish particular objectives. Subsequently, if the interests of owners and managers are not aligned, an agency problem may arise. For instance, managers may be more interested to maximise their own utility, whereas shareholders or owners of the firms are rather interested in profit maximisation (Alchian, 1965; Jensen and Meckling, 1976; Demsetz, 1983). Therefore, the choice of accounting procedures may be motivated by compensation plans, political costs and regulations, taxes, and administrative costs (Watts and Zimmerman, 1978; Watts and Zimmerman, 1990) rather than shareholders' profit maximisation. Additionally, despite the risk aversion of individuals, a sense of perspective about risk may differ substantially between managers and shareholders (Eisenhardt, 1989; Shankman, 1999).

Another agency problem that arises is the monitoring of management. In terms of the ownership structure of traditional firms, as mentioned in the previous chapter, the ownership structure varies among different types of firms. In particular, private firms tend to have less dispersed ownership than PLCs (Goncharov and Zimmermann, 2006; ICAEW, 2015; Hope and Vyas, 2017), whereas ownership in PLCs is generally diluted among different shareholders; hence, monitoring of managers is more difficult and costlier (Jensen and Meckling, 1976; Eisenhardt, 1989). Additionally, as previously discussed, the shareholders of PLCs obtain financial information from published financial reports. On the other hand, managers have insider information leading to a greater information asymmetry; thus, generating higher agency costs.

Overall, due to the organisational structure and the nature of the agent-principal relationship (i.e., a different interest of the managers and shareholders, and the agency costs) (Alchian, 1965; Jensen and Meckling, 1976; Demsetz, 1983; Zingales, 2000) managers may behave opportunistically to maximise their own interests. Consistent with this view, it may be expected that private firms will exhibit lower levels of earnings management than PLCs since they have less separation between managers and their owners.

3.4.2. Stakeholder-agency theory

Similar to agency theory, the central principle underlying the stakeholder-agency theory is that the firm is considered a nexus of contracts (Hill and Jones, 1992). Despite that, unlike agency theory, stakeholder-agency theory expands the agency responsibility of managers to all major stakeholders of the firm (Hill and Jones, 1992). In other words, the theory considers both explicit and implicit contractual relationships between stakeholder such as managers, shareholders, employees, suppliers, customers, creditors, the local community, and the general public (Hill and Jones, 1992; Donaldson and Preston, 1995; Smith, 2003).

Building upon the broader perspective of agency-relationship, the key issue that has to be considered is the control and communication of information. Similar to agency theory, stakeholders' dispersion increases the management control leading to a greater information asymmetry between management and the firm's stakeholders; thus, increasing monitoring problem as well as stakeholders' utility loss[35] (Hill and Jones, 1992). Nevertheless, increased scrutiny of large shareholders may reduce monitoring problems (Harrison, Freeman and Sá de Abreu, 2015). Besides that, not only do regulators set up reporting requirements to reduce the inherent conflict between managers and stakeholders, but intense pressure by the group(s) of stakeholders may also increase regulatory disclosure requirements (Hill and Jones, 1992).

Another significant aspect of this theory is that stakeholders are clearly a heterogeneous group. Subsequently, they may have conflicting demands because of their different interests (Hill and Jones, 1992). Also, as discussed in the previous chapter, the different perception of stakeholders may be deciding factor for accounting and audit policies. Furthermore, as noted by Harrison, Freeman and Sá de Abreu (2015), the difficulties in a relationship with one group of stakeholders inevitably influence other stakeholders. In this sense, the opportunistic behaviour of managers may deteriorate relationship with stakeholders; hence, it may negatively affect the reputation of the firm. To this end, managers may be directly affected as well.

[35] Utility loss refers to the loss that stakeholders incur because managers act in self-interest rather than in stakeholders' best interest (Hill and Jones, 1992).

To sum up, it has been demonstrated that the broader perspective of the agency relationship may influence managerial opportunism rather differently. Therefore, as noted by Hill and Jones (1992), predictions may not be consistent with agency theory. As indicated previously, private firms do not trade on capital markets; hence, there is less demand for high-quality financial information by their stakeholders. Subsequently, private firms may exhibit higher levels of earning management than PLCs since managers of private firms are less concerned with earnings being less informative (Burgstahler, Hail and Leuz, 2006). Further, as mentioned earlier, greater managerial ownership and considerable reliance on debt financing may also create greater incentives for earnings management in private firms.

3.4.3. Prospect theory

Prospect theory offers a behavioural model that offers an explanation for the perception of losses and gains. In particular, the theory suggests that investors' investment decisions do not depend on the final degree of wealth but rather on the expectations of gains and losses relative to a particular reference point (Kahneman and Tversky, 1979). One of the fundamental phenomena of prospect theory is loss aversion (Kahneman and Tversky, 1979). In other words, a sense of loss is generally perceived more profoundly than a sense of the gains of the same values. The individuals' perception of risk is different from those of the losses. In this sense, individuals are willing to accept the risk in the case of losses, whereas in the case of gains, they are more likely to be risk-averse (Kahneman and Tversky, 1979).

Returning briefly to the agency and stakeholder-agency theories, it is clear that the opportunistic behaviour of managers may be driven by both managers' and stakeholders' loss and risk aversion. Despite these different motivations, it may be argued that in either case, managers are incentivised to engage in earnings management. Moreover, as demonstrated by Burgstahler and Dichev (1997), prospect theory implies that managers are motivated to engage in earnings manipulations to meet or beat certain earnings thresholds (i.e., to avoid losses or earnings declines).

Clearly, the managers' sense of perspective, as well as that of the stakeholders, may drive earnings management around earnings benchmarks. For example, if a firm reports losses or negative changes in earnings, stakeholders, lenders, suppliers, employees, and customers will perceive this as a negative sign. If this is the case, lenders and suppliers may tighten financial terms. This may affect future earnings that may lead to further shareholders' losses. As a result, the value of the firm decreases, and managers are less likely to maximise their utility. Therefore, the prospect theory predicts that PLCs may be motivated more than private firms to manipulate earnings to avoid losses and negative changes in earnings. This is due to the fact that investors positively perceive shifts from losses to gains rather than as a negative sign. Consequently, it may be expected that

managers of PLCs are highly motivated to report positive earnings due to the importance of investors' financing.

3.4.4. Transaction cost theory

Another alternative theory that explains managerial opportunism for reporting positive earnings is transaction cost theory. The concepts of transaction and cost are clearly a central concern of this theory; hence, it has been assumed that the main focus of the firm is a transaction cost reduction (Coase, 1937; Williamson, 1985). Subsequently, it may be said that managers' decisions are based on those costs. Besides that, transaction cost theory also maintains behavioural assumptions such as bounded rationality (i.e., limited decision-making capacity) and opportunism of the individual, as well as risk neutrality (Williamson, 1985). Accordingly, as Williamson (1979) outlined, transaction costs theory consolidates economics and the organisational theory while closely coinciding with a contracting notion of the firm.

In terms of earnings management around earnings benchmarks, Burgstahler and Dichev (1997) proposed that reported earnings may play a prominent role in the transaction terms between a firm and its stakeholders. In particular, they base this proposition on two underlying assumptions. More specifically, they assumed that higher earnings generally result in more favourable transaction terms for the firm. The second assumption underpins the belief that some stakeholders utilise a simple thresholds heuristics technique to establish transactions terms due to the high information processing costs. Therefore, stakeholders tend to focus on thresholds around certain thresholds, such as zero earnings levels and zero change in earnings.

In summary, it has been shown that the lowering of transaction costs may incentivise managers to engage in earnings management. Based on the principle that transaction terms between firms' stakeholders and the firm are generally affected by profit information (Burgstahler and Dichev, 1997), it may be expected that both private firms and PLCs may be motivated to report higher earnings that lead to better transaction costs. In other words, they will be incentivised to avoid reporting losses or decreases in earnings.

3.5. Conclusion

This chapter outlines the adopted theoretical framework that explains why earnings management levels may be different between private firms and PLCs. In the context of a definition of earnings management, two opposing perspectives are discussed first, and the opportunistic perspective is adopted.

To further understand the motivations for managing earnings, four explanatory theories for opportunistic tendencies are discussed. The theoretical discussion suggests that both private and PLCs may manipulate reported earnings. Nonetheless, certain theoretical divergence evidently exists. While agency theory tends to be more concerned with the conflicting interests of managers and stakeholders, stakeholder theory extends the relationship of managers to all firms' stakeholders. Also, on the contrary to agency and stakeholder theory, the prospect theory predominantly concentrates on investors perception rather than the agency relationship, whereas transaction cost theory emphasises transactions. Furthermore, in terms of the risk, agency, stakeholder and prospect theory assume that individuals are not comfortable taking a risk; hence, individuals are considered to be risk-averse. Additionally, prospect theory also suggests that individuals are loss averse; hence, they perceive losses negatively and are more likely to accept risk to avoid losses. By contrast, transaction cost theory assumes risk neutrality and focuses on the transaction costs rather than on the individuals. To this end, it is clear from the outlined differences between theories that earnings management levels could vary amongst different types of firms. However, in terms of theoretical predictions, there is no theoretical consensus as to which type of firm could exhibit higher levels of managed earnings. For instance, owing to the greater separation between owners and management as well as considerable reliance on capital markets (i.e., investors) for financing, agency and prospect theories predict that earnings management levels could be higher in PLCs compared to private firms. On the other hand, stakeholder theory predicts that lack of scrutiny can result in higher levels of earnings management in private firms. Also, contrary to all earlier predictions, transaction cost theory suggests that both types of firm could be motivated to report higher earnings to reduce transaction costs; thus, similar levels of earnings management may be expected. In addition, both prospect and transaction cost theories provide a useful account of the importance of earnings benchmarks.

Chapter Four

Literature Review of Empirical Evidence of Earnings Management and Hypotheses Development

4.1. Objectives

The main objective of this chapter is to provide a thorough discussion of the earnings management literature and to develop testable hypotheses in the context of privately and PLCs. The evidence of earnings management and potential incentives for earnings manipulations across PLCs and private firms are discussed first. Specifically, the implications of the ownership structure and applied accounting standards are discussed first, followed by financing and audit implications on the quality of reported earnings. Additionally, as mentioned in the second chapter of the thesis, audit requirements vary amongst private firms; hence, the implications of audits on financial reporting in private firms, the choice for voluntary audit and size-based manipulations to avoid audit are discussed as well. The testable hypotheses are developed at the end of every relevant section.

4.2. Introduction

The literature suggests that earnings management practices differ amongst PLCs and private firms. It is clear from the literature that the divergence in ownership structure incentivises managers to engage in manipulations rather differently. For instance, relative to private firms, PLCs trade on capital markets; thus, capital market pressure influence managers decisions to manipulate earnings. Another important aspect is that many PLCs have subsidiaries. Subsequently, the evidence demonstrates that earnings are managed through subsidiaries. On the contrary to PLCs, private firms generally have more concentrated ownership that is associated with higher earnings management. Also, they are generally smaller than PLCs and can apply different accounting standards. In other words, they can choose whether to report under UK GAAP or IFRS, while PLCs have to prepare consolidated financial statements under IFRS. Regarding the effect of applied accounting standards on the quality of reported earnings, the existing literature provides conflicting evidence (Capkun, Collins and Jeanjean, 2016; De George, Li and Shivakumar, 2016).

Furthermore, the existing body of research on earnings management suggests that financing also plays a significant role in earnings management studies. As previously mentioned, PLCs can raise financing from capital markets, while the major source of external financing for private firms are banks (Brav, 2009; Hope and Vyas, 2017). The evidence suggests that managers are inclined to manipulate earnings before and after loan agreements. Subsequently, debt financing may be a determining factor in different earning management practices amongst PLCs and private firms.

The final but not less important principal factor that differentiates PLCs and private firms is an audit. For instance, in the UK, PLCs are subject to mandatory audit, whereas small, subsidiaries or dormant companies are not. The evidence presented shows that audit generally enhances the reliability of reported earnings and mitigates agency costs, while the avoidance of mandatory audit could deteriorate the quality of reported earnings. The literature also suggests that levels of earnings management and attitudes towards voluntary audit vary by size of the firm.

In order to identify whether there are any differences in earnings management practices amongst small, medium-sized, large private firms and PLCs in the pages that follow, all of the fundamental differences and the empirical evidence of earnings management and various implications of private firms' characteristics versus PLCs on earnings management practices are discussed in separate sections.

4.3. The implications of ownership structure on earnings management practices

As previously discussed in the second chapter of this thesis, private firms' ownership structure in many aspects differs from the PLCs (Brav, 2009). Moreover, much of the research up to now has been primarily concentrated either at listing status, the size of the firm or type of ownership (i.e., family firms, subsidiaries) and their earnings management practices. Despite attempts to compare earnings management practices between private firms and PLCs, to the best of my knowledge, none of the research in the UK has investigated whether the specifics of private firm's ownership and their size affect accruals manipulation practices differently than in PLCs.

4.3.1. Listed companies

With respect to listing status, there is a large number of published studies that examined earnings management practices in PLCs. The US evidence suggests that companies manipulate earnings through accruals (e.g., Healy, 1985; Jones, 1991, amongst others). Consistent with US studies, Peasnell, Pope and Young (2000) examined whether the UK's quoted companies employ accounting manipulations in pre-(i.e., 1990 to 1992) and post-(i.e., 1994 to 1995) Cadbury periods to meet earnings benchmarks. To determine the effects of the Cadbury Report, they analysed the sample of 1,260 firm-year observations throughout four years period. Specifically, they divided the sample of firm-year observations into four years as follows: for 1990 N = 301, for 1991 N = 329, for 1994 N = 346 and for 1995 N = 284. To estimate discretionary accruals, they employed the cross-sectional Modified Jones model, and they found evidence of earnings manipulations to avoid earnings losses and earnings declines.

A more recent study by Gore, Pope and Singh (2007) investigated a sample of all UK quoted non-financial companies during the period 1989 to 1998. They examined the distribution of earnings around earnings benchmarks and the effect of the discretionary accruals on earnings distributions to meet earnings benchmarks. Specifically, they found that the discontinuities within the distribution of earnings relative to earnings targets (i.e., zero earnings, changes in earnings and analyst forecast) are caused by discretionary accruals.

Before proceeding further, it is worth noting that the ownership structure in PLCs is fundamentally different from the one of private firms. As previously mentioned in the second chapter of this thesis, the key difference between PLCs and private firms relates to equity investors. More precisely, in contrast to private firms that cannot trade shares (i.e., equity) publicly, PLCs trade on capital markets. Consequently, capital markets (i.e., secondary seasoned offerings (hereafter, SEOs) and analysts' forecasts) are of great concern to PLCs; thus, they may incentivise managers to manipulate reported earnings.

Regarding SEOs events, the literature demonstrates the existence of a relationship between earnings manipulations and SEOs. Cohen and Zarowin (2010) investigated earnings manipulation activities around SEOs. They analysed 1,511 completed US offers over the sample period of 1987 to 2006. The results demonstrated income increasing accruals manipulations in the year of the SEO. Additionally, it has been confirmed that managers use RAM as well. In addition, in line with Zang (2012), the findings also suggested the possibility of a trade-off between RAM and discretionary accruals manipulations. It has also been found that profitability (i.e., return on assets) decline more profoundly after the share issue (i.e., post-SEO period) in companies with more extreme RAM rather than the ones with extreme discretionary accruals. In this sense, it may be said that RAM is costlier than accruals manipulations. Despite that, managers overstate earnings by both methods of manipulations in order to enhance share sales. In a similar vein, Shivakumar (2000) confirmed that PLCs inflate reported earnings before SEO and experience a decline in earnings in the post-SEO period. Nevertheless, it has been suggested that manipulations are the result of rational response to market expectations.

Turning now to analyst forecast as an incentive, the literature indicates an association between earnings management and analysts' forecasts. For instance, Degeorge, Patel and Zeckhauser (1999) examined a sample of US PLCs during the period of 1974 to 1996. More specifically, they focused on earnings per share distributions. They confirmed earnings manipulations to meet or beat analysts' forecasts amongst others (i.e., positive earnings and changes in earnings). Similar to the above studies on SEOs, their results suggested that companies who meet earnings thresholds experience weaker future performance than companies that do not meet targets.

Similarly, Burgstahler and Eames (2006) confirmed Degeorge, Patel and Zeckhauser's (1999) findings. They analysed a sample of US PLCs (i.e., 25,951 firm-year observation) during the period 1986 to 2000. The findings confirmed earnings manipulations around zero and small positive earnings surprises. In other words, they found that analysts' forecasts clearly motivate managers to engage in earnings manipulations to avoid reporting lower earnings (i.e., negative earnings surprises) than predicted ones.

In summary, evidence suggests that PLCs manipulate earnings to beat certain earnings thresholds. The evidence related to studies concentrated only on private firms is discussed in the section below, followed by comparative studies in section 4.3.3.

4.3.2. Private firms

Coppens and Peek (2005) examined the distributions of earnings level and the distributions of changes in earnings in private firms across eight EU countries (i.e., Belgium, France, Denmark, Germany, Spain, Netherlands, Italy and the UK) for the period from 1993

to 1999. In order to determine whether the capital market affects earnings management decisions, they compared earnings levels and earnings changes distributions of private firms with PLCs. Their findings revealed that in countries where tax regulation does not influence financial reporting (i.e., Denmark, Netherlands, Spain, and the UK), private firms manage earnings to avoid losses. Nevertheless, it was not confirmed that they manipulate earnings to avoid decreases in reported earnings. Moreover, for the countries where tax regulation influence financial reporting (i.e., Belgium, France, Germany and Italy), results are mixed. For instance, it has not been confirmed that private firms from Germany and France manipulate earnings to avoid losses, whereas Italian and Belgium private firms exhibited statistically significant loss avoidance. Interestingly, it has been suggested that Italian and Belgium private firms smooth their earnings due to taxes. Additionally, Graham, Harvey and Rajgopal (2005) revealed in their survey that private firms are concerned with the stability of earnings that may explain why they smooth earnings (i.e., avoidance of volatile earnings). Furthermore, it is also important to note that in these countries, financial statements are prepared for tax assessment purposes; hence, managers are more motivated to decrease taxable reported earnings. With respect to the distributional approach's criticisms, in their study, they have employed different scaling confirming similar results.

Consistent with Coppens and Peek's (2005) findings, Poli's (2013) distributional results suggest that Italian small private firms (i.e., less than 50 employees with annual turnover or annual balance sheet total less than 10 million €) manipulate earnings around zero earnings benchmark (i.e., they avoid losses and minimise reported earnings). With respect to earnings decreases, it has been confirmed that they are less relevant. Interestingly, it has been demonstrated that firms smooth their earnings. In other words, they avoid reporting substantial changes in earnings in relation to the previous years' earnings. Therefore, the results are in line with Coppens and Peek (2005).

In a similar vein, Sánchez-Ballesta and Yagüe's (2021) analysed Spanish SMEs (i.e., firms that do not exceed 250 employees and which have an annual balance sheet total not exceeding €43 million and/or an annual turnover not exceeding €50 million) for the period from 2006 to 2014. Their analysis results agree with those of Coppens and Peek (2005) and Poli (2013). In other words, the analysis confirmed that SMEs manipulate earnings to avoid losses as well as to sustain stable earnings (i.e., below or above last year). In particular, the findings suggest that SMEs use both methods of earnings management (i.e., discretionary accruals and RAM) to beat zero earnings and to smooth earnings. Further analysis also implied that in the absence of incentives to manipulate earnings upwards (i.e., to increase earnings to reach the earnings targets) SMEs might manipulate earnings downward to minimise tax payments.

In terms of the private firms in the UK, O'Callaghan, Ashton and Hodgkinson (2018) investigated 1,223 large firms. The results of the multivariate cross-sectional regression analysis implied that private firms manage earnings opportunistically. Interestingly, it has been suggested that motivations for earnings manipulations differ across different levels of managerial ownership. However, the main weakness of this study is that sample comprised of only one year of the data from the annual reports (i.e., ownership and financial data).

Collectively, the evidence presented in this section indicates that private firms opportunistically manage earnings. The section that follows discusses comparative studies of earnings management in private firms versus PLCs.

4.3.3. Comparative studies of private firms and PLCs

Another stream of research compared earnings quality across private firms and PLCs. The US-based studies investigated: a) US publicly and privately held banks (Beatty, Ke and Petroni, 2002); b) compared PLCs and private firms with privately held debts in the US (Givoly, Hayn and Katz, 2010) and c) compared the quality of earnings across US private and PLCs (Hope, Thomas and Vyas, 2013). Burgstahler, Hail and Leuz (2006) compared private firms and PLCs across 13 EU countries, whereas in terms of the UK, only two studies (i.e., Ball and Shivakumar, 2005 and Liu and Skerratt, 2018) concentrated on comparative analysis of private firms and PLCs.

More specifically, the study by Beatty, Ke and Petroni (2002) compared earnings management practices in the US publicly and privately held banks. Specifically, they analysed earnings changes distribution and discretionary accounting choices (i.e., loan loss provisions and realized security gains and losses). Moreover, they examined strings of consecutive earnings increases across both types of banks. The sample comprised of 707 publicly and 1,160 privately held banks during the period 1988 to 1998. The findings suggested that publicly held banks have smoother reported earnings than privately held banks. In other words, they found that publicly held banks, compared to privately held banks, have a greater propensity for using discretion in financial reporting in order to avoid reporting small earnings declines. Also, they confirmed that publicly held banks have greater sequences of earnings increases. In this sense, the evidence suggests that publicly held banks use accruals for the manipulation of earnings to a greater extent than privately held banks. Nevertheless, these findings are relevant to the banking sector; hence, they may not be generalizable to firms in the non-financial sector.

Another US-based study by Givoly, Hayn and Katz (2010) compared PLCs and private firms with publicly traded debt in the US. With respect to financial reporting regulation under the Securities and Exchange Commission (hereafter, SEC), both types of firms are considered public (Givoly, Hayn and Katz, 2010). Therefore, it is clear that one of the main

differences between these two types of firms is related to capital market incentives that are not of concern in private firms. The analysis is performed for a 26-year period (i.e., 1978 to 2003). In line with Beatty, Ke and Petroni's (2002) findings, the results of the analysis revealed that PLCs undertake more opportunistic manipulation than private firms. To be more precise, 28.4% of PLCs compared to private firms (25.3%) shifted losses into profits. In terms of earnings declines, approximately 10% more PLCs (i.e., 46.1% of the cases) than private firms (i.e., 36.1% of the cases) used accruals to shift earnings declines into increases. Considering accounting conservatism, it has been demonstrated that despite higher conservatism in PLCs, managers report more opportunistically. Subsequently, it has been concluded that earnings management is more prevalent in PLCs. Nevertheless, it may be argued that these findings may be driven by the sample of private firms. In particular, the median value of $337 million of total asset and the median value of $405 million of total sales suggest that the analysed private firms were large.

Not all findings, however, indicate that PLCs manipulate earnings rather excessively compared to private firms. For instance, in terms of non-financial industry, a recent study by Hope, Thomas and Vyas (2013) investigated the financial reporting quality of US private firms and PLCs from 2002 to 2009. In contrast to Givoly, Hayn and Katz's (2010) study, the small and medium-sized private firms are more represented in their sample (i.e., median total assets is $4.1 million). They demonstrated that PLCs, on average, have a higher quality of accruals. Four accrual quality measures (i.e., discretionary total accruals, discretionary working capital accruals, discretionary revenues and the ratio of the magnitude of accruals to cash flow) suggest that private firms have a lower quality of accruals than PLCs. Nevertheless, they revealed that the superior quality attributed to PLCs' financial reporting gradually or entirely cease in the subsample tests.[36] Moreover, findings affirmed that size is positively correlated with the quality of accruals measure.

Burgstahler, Hail and Leuz (2006) investigated private firms and PLCs across 13 EU countries (i.e., Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, Portugal, Spain, Sweden and the UK) in the period 1997 to 2003. The results indicated that EU private firms manipulate earnings more than PLCs. Despite that, it is important to note that the results are for aggregate samples based on a maximum of 269 industry-level observations across 13 EU countries. Hence, as suggested by Liu and Skerratt's (2018) results may be driven by countries' differences rather than the characteristics of companies. Besides that, the total assets median (i.e., 15.77 million EUR) is much greater compared to Hope, Thomas and Vyas's (2013) study, however still much lower than that in Givoly, Hayn and Katz's (2010).

[36] They compared accrual quality for firms that (1) just beat an earnings benchmark by reporting a small profit or a small increase in earnings, (2) obtain external financing in the subsequent year, (3) do not employ a Big 4 auditor, or (4) have no analyst following.

With respect to the UK, a seminal study by Ball and Shivakumar (2005) compared the quality of financial reporting in private firms in contrast to PLCs. They examined and compared samples of 141,649 firm-year observations for private and 6,208 firm-year observations for PLCs for the period 1989 to 1999. Additionally, the sample consisted of 54,778 private firms and 1,475 PLCs. It is important to note that the sample included only the firms that are required to have audited financial reports. Therefore, small firms are excluded from the sample. Consistent with Beatty, Ke and Petroni (2002), their findings revealed that private firms exhibit considerably greater volatility of earnings. They also found that privately held firms, compared to PLCs, recognise losses in a less timely manner. Therefore, they concluded that private firms in the UK have lower earnings quality than PLCs. These findings are consistent with the signalling hypothesis which suggests that smoother earnings are more informative (i.e., of higher quality) rather than being an indication of managerial opportunism. On the contrary, Givoly, Hayn and Katz's (2010) findings implied that even though PLCs report more conservatively (i.e., loss recognition tests), the quality of their reported earnings is generally lower compared to private firms. In other words, consistent with Beatty, Ke and Petroni's (2002) findings, they revealed that PLCs manipulate earnings to a greater extent than private firms. Furthermore, Burgstahler, Hail and Leuz (2006) replicated Ball and Shivakumar's (2005) analysis for the UK amongst other observed countries (i.e., 13 EU sample countries), and interestingly, they have not found confirmatory evidence for the UK. Furthermore, before moving further, it is important to note that earnings smoothing may be driven by managers' opportunism (i.e., to reach or beat earnings targets) rather than for the enhancement of the quality of reported earnings (i.e., for the communication of private information) (Dechow, Ge and Schrand, 2010; Ewert and Wagenhofer, 2011). Therefore, earnings smoothness as an indicator for greater earnings quality (i.e., an absence of earnings management) can be challenged because an accounting choice can distort the quality of earnings (i.e., decision usefulness) rather than increase it (Dechow, Ge and Schrand, 2010).

A more recent study by Liu and Skerratt (2018) used earnings smoothness as an indicator for lower quality of reported earnings. They compared earnings quality across listed, large private, medium-sized, small and micro firms in the UK. Their sample included 514,224 firm-year observations for the period 2006 to 2013. To be more precise, they examined 6,318 listed, 13,067 large, 20,630 medium-sized, 256,562 small and 217,647 micro firm-year observations. They defined different sizes based on the regulation applicable for the financial year beginning on or after 6 of April 2008 (see Appendix I). Their results suggest that among all the observed firms, PLCs generally have the greatest quality of reported earnings. On the other hand, large and medium-sized private firms exhibit the lowest quality of earnings. In other words, their smoothing is approximately six times larger than in PLCs and four times larger than in small and micro firms.

It is worth noting that all of the discussed studies excluded subsidiaries from their analysis despite the fact that they are relevant to group financial reporting. Therefore, section 4.3.4 discusses the empirical evidence on earnings management at parent listed companies and subsidiary-level.

4.3.3.1. The hypothesis to be tested

From the aforementioned discussion, evidence suggests that both private and PLCs manipulate reported earnings. Studies concentrated on only one type of firm clearly demonstrate the evidence that underpins opportunistic behaviour among firms. Nevertheless, the literature offers conflicting evidence on the differences in earnings management practices among private firms and PLCs. For instance, Beatty, Ke and Petroni (2002), Givoly, Hayn and Katz (2010) show that the discretionary accruals of PLCs in the US are of the lower quality, whereas Ball and Shivakumar (2005) and Liu and Skerratt (2018) concluded that PLCs in the UK have a greater quality of reported earnings. Furthermore, Hope, Thomas and Vyas' (2013) findings demonstrate that the size of the firms is correlated with the earnings management practices (i.e., quality of accruals). Despite that, most of the aforementioned studies have not considered earnings management practices in relation to the regulatory size of the firm. To the best of my knowledge, the study by Liu and Skerratt (2018) is the only UK study that investigates earnings quality across UK firms in relation to their size. Their findings suggest that the quality of earnings is the lowest among large and medium-sized private firms compared to others.

Based on the above discussion, there is still uncertainty as to whether size influence earnings management practices across firms; thus, the first hypothesis is developed:

H1: Earnings management behaviour does not differ between small, medium, and large private firms and PLCs.

4.3.4. Parent listed companies and subsidiaries

To provide additional insight into earnings management practices, one stream of studies investigated earnings management practices within parent companies and their subsidiaries. As discussed in the second chapter of the thesis, subsidiaries' financial reporting practices may be influenced by parent companies. In addition, subsidiaries prepare their financial reports as per group guidelines that affect their reporting (Prencipe, 2012). Clearly, these may induce earnings management practices on the subsidiary level; thus, studies that considered earnings management practices within parent companies and their subsidiaries are discussed below.

Shuto (2009) investigated earnings management within listed parent companies in Japan. In particular, the study concentrated on individual earnings compared to consolidated ones. The sample consisted of 20,823 firm-year observations for the period 1980 to 2006. Furthermore, during this period, the new legislation for financial reporting was introduced in 2000 (i.e., consolidated financial statements became mandatory for submission). Therefore, the analysis is conducted on the pre- and post-new legislation period. For the period 1980 to 1999, it has been found that earnings management to beat earnings thresholds (i.e., loss avoidance and changes in earnings) in the individual accounts of parent companies is more pronounced than in consolidated financial statements. Nevertheless, after the introduction of new legislation in 2000 (i.e., consolidated financial statements became mandatory for submission), it was found that earnings management is less pervasive in parent companies, whereas consolidated earnings exhibited an increase compared to the preceding period.

Prencipe (2012) compared earnings management practices in domestic and multinational parent-PLCs. The analysis is conducted on the sample of all US PLCs for the period from 1994 to 2009. In particular, 60,474 firm-year observations (i.e., 20,429 multinationals and 40,045 domestic firms) are examined. Furthermore, since this period included implementation of the Sarbanes-Oxley Act (hereafter, SOX) requirements, the study investigated pre- and post-SOX periods. For that purpose, the sample is divided into two periods. Each period undertakes an examination of seven years pre- and seven years post-SOX periods. The results implied that US domestic firms engage in accruals manipulations more than multinational corporations (hereafter, MNCs). Surprisingly, it has been demonstrated that domicile corporations compared to MNCs exhibit more income increasing accruals manipulations, whereas income-decreasing manipulations differences between the two groups are not statistically significant. In terms of the SOX implementation, the study provided evidence consistent with Cohen, Dey and Lys (2008). In other words, it reduced accrual manipulation in both domicile and MNCs. Additionally, the author pointed out that future research should examine subsidiaries to understand whether parent companies manipulate through subsidiary-level reporting.

To provide a more complete study of the earnings management practices within groups, Beuselinck *et al.* (2019) examined earnings management within MNCs. In particular, they focused on the influence of MNCs over the earnings management behaviour in subsidiaries. They conducted analysis across 89 countries over the period 2002 to 2010. The sample consisted of 84,115 MNCs-parent-subsidiary-year observations. More precisely, it included 2,156 unique MNC-parents and 15,020 unique subsidiaries. The results affirmed that subsidiaries undertake earnings management practices in order to meet parent's reporting objectives. Specifically, in the cases of income-increasing incentives (i.e., beating zero earnings benchmarks and reporting small gains) of parent-

MNCs, earnings manipulations are more pronounced at the subsidiary level. In other words, to avoid reporting consolidated losses, parent companies influence reporting of their subsidiaries. The findings also suggest that parent-MNCs from countries with strong institutional settings (i.e., US and UK) manipulate their consolidated earnings through their subsidiaries from countries with weaker institutional settings.

Another study by Bonacchi, Cipollini and Zarowin (2018) investigated earnings management practices in Italian subsidiaries of domestic listed parent firms. In particular, they focused on the directly controlled subsidiaries (with > 50% of the voting equity) of listed parent companies that meet or beat earnings benchmarks (i.e., zero earnings, last year earnings and analyst forecast). The analysis was performed for the period 2003 to 2014 on the sample of 1,688 parent PLCs firm-years and 3,196 subsidiary firm-years for the zero earnings and last year earnings' benchmarks. For the beating or meeting analyst forecast analysis, the sample was reduced to1,039 parent firm-years and 2,392 subsidiary firm-years due to data availability. The distributional test revealed the following: 165 suspect parents PLCs for the zero-earnings benchmark leading to 288 subsidiaries; 295 suspect parents PLCs for the meeting or beating last year's earnings leading to 621 subsidiaries; and 142 parents PLCs for analyst forecast benchmark leading to 296 subsidiaries. The results suggested that private subsidiaries undertake earnings management practices when their parent PLC reports small earnings or when they are beating analyst forecast by €0.03 per share or less. In terms of last year's earnings, findings revealed that they are not a motive for earnings manipulations.

4.3.4.1. The hypothesis to be tested

As discussed above, subsidiaries of the PLCs may be influenced by their parent companies. However, most of the research that compared private and PLCs excluded subsidiaries from their sample. The evidence discussed above clearly demonstrate that PLCs use their subsidiaries to meet their objective; hence it can be assumed that subsidiaries' discretionary accruals are different compared to stand-alone private firms. In other words, it can be expected that the prevalence of earnings management in subsidiaries is greater than in stand-alone firms. Subsequently, the aim of this study is to test the following hypothesis:

H2: Private firms that are subsidiaries of PLCs manage earnings to a greater extent than other private firms.

4.3.5. Dispersion of ownership

As discussed in the second chapter of this thesis, the ownership structure influences how information is communicated between firms and stakeholders. It has been also demonstrated that private firms generally have less dispersed ownership than PLCs.

Subsequently, in contrast to PLCs, private firms' shareholders generally communicate through private channels (Burgstahler, Hail and Leuz, 2006; Goncharov and Zimmermann, 2006; ICAEW, 2015). Nevertheless, some private firms may have more dispersed ownership than others. It is also important to mention that the concertation of ownership is one of the key determinants for financial policies (e.g., Brav, 2009) and clearly influence the demand for audit (e.g., Dedman, Kausar and Lennox, 2014). Hence, it may be argued that a higher concentration of ownership may affect the quality of earnings differently than more dispersed ownership.

Furthermore, in previous studies on the quality of reported earnings, it has been found that ownership concertation is related to earnings management (e.g., Leuz, Nanda and Wysocki, 2003), earnings informativeness (e.g., Fan and Wong, 2002; Burgstahler, Hail and Leuz, 2006) and accounting errors (e.g., Clatworthy and Peel, 2013).

Regarding the level of earnings management, Leuz, Nanda and Wysocki (2003) examined the sample of PLCs across 31 countries during the period 1990 to 1999. Their country-level tests suggested that the ownership concentration is not the primary determinant for earnings management across countries. Nevertheless, a cross-sectional analysis suggested that concentrated ownership may be positively related to earnings manipulations within a country.

To determine the effects of ownership concentration on earnings informativeness, Fan and Wong (2002) investigated a sample of 977 PLCs in seven East Asian economies. In addition, as noted by the authors, the East Asian economies have highly concentrated ownership of PLCs compared to the US. They focused on ultimate ownership (i.e., the highest percentage of direct holdings by the single largest shareholder, but not less than 20% of voting rights). Their results demonstrated that the high concentration of ownership has a negative effect on the informativeness of earnings. In other words, concentrated ownership is associated with the low quality of reported earnings (i.e., earnings informativeness). These results are similar to those reported by Burgstahler, Hail and Leuz (2006) in a cross-EU study that confirmed a negative and significant relation between high ownership concentration and earnings informativeness.

In terms of the UK, Clatworthy and Peel's (2013) study concentrated on the individual small private firms. In their analysis of 1,067,577 firms (i.e., April 2010 FAME disclosures), they included the ownership dispersion variable as a control variable. Specifically, they measured ownership dispersion as the total number of shareholders. The mean of 2.227 suggests that most of the analysed firms consisted of approximately two shareholders (i.e., concentrated ownership). The findings indicated that the accounts of the firms with less dispersed ownership (i.e., small firms) are more likely to contain accounting error. In their

sensitivity tests, they used an alternative measure of ownership dispersion. In particular, they used the ratio of shareholders to board size, and the findings remained consistent.

4.3.5.1. The hypothesis to be tested

As indicated above, the literature identifies that a higher concentration of ownership leads to lower quality of reported earnings. Furthermore, as previously mentioned in the second chapter, private firms generally have more concentrated ownership than PLCs. More importantly, the number of shareholders among private firms is heterogeneous. Consequently, the level of earnings management among private firms may vary due to different ownership concentration. Similar to Clatworthy and Peel (2013), it is expected that private firms with lower ownership concentration report earnings of higher quality (i.e., less earnings management) to satisfy increased demand for a higher quality of reported earnings. Thus, in order to test for the relationship between ownership concentration and the level of earnings management, the additional hypothesis is developed:

H3: Earnings management in private firms with more dispersed ownership is lower than in private firms with less dispersed ownership.

The following section discusses family firms studies. Nevertheless, it is worth noting that the influence of family ownership is outside the scope of this thesis.

4.3.6. Family firms studies

Another line of research on earnings management focused on family firms and companies. As noted in the second chapter, the definitions of the family firm vary in the literature, and there is terminological confusion. Consequently, as noted by Prencipe, Bar-Yosef and Dekker (2014) the findings of various studies may not be comparable. In terms of the scope of the studies on family firms, they concentrated mainly on family firms only or on the comparison between family firms and non-family firms. Also, it is important to highlight that some studies investigated listed companies whereas other private firms. For instance, the US-based study by Wang (2006) compared the quality of reported earnings between family and non-family listed companies. Another Italian based study by Prencipe, Markarian and Pozza (2008) also concentrated on listed family and non-family companies. However, in contrast to Wang (2006), they focused on the motivation for earnings manipulation rather than the quality of earnings. In terms of private family firms Stockmans, Lybaert and Voordeckers (2010) compared the associations of upward earnings manipulations with the generational stage, the CEO position and the management team characteristics.

In terms of PLCs, Wang (2006) investigated listed family companies from the Standard and Poor's 500 index (hereafter, S&P 500) on 31 December 1994 or on 31

December 2002. Specifically, he examined 3,456 firm-year observations for the quality of accruals, 3,483 firm-year observations for the analysis of earning informativeness and 3,552 firm-year observations for the persistence of transitory losses. Additionally, family companies are defined as companies with substantial equity ownership held by a family. The sample mainly consisted of the family companies that hold less than 58%. Specifically, there were only three companies with family ownership greater than 58%. Interestingly, the result of descriptive statistics for all three samples revealed that family companies are younger with fewer institutional owners, lower leverage, and are less likely to report losses and negative earnings changes than non-family companies. Overall, the results demonstrated that family-owned companies compared to non-family companies report a higher quality of earnings. Specifically, family companies report a lower level of discretionary accruals, their earnings are more informative, and their transitory losses are less persistent, suggesting that their reporting is more conservative than in non-family companies. Interestingly, it has been found that the association between family companies and the quality of reported earnings may not be linear. In other words, in cases when family ownership exceeds levels above 58% to 67%, non-family companies exhibit a higher quality of reported earnings. One of the limitations of this study is that it employed non-parametric tests and the results are applicable to the US-listed family-owned companies only.

Another study by Prencipe, Markarian and Pozza (2008) investigated motivations for earnings management in listed family companies compared to listed non-family companies. They focused on specific accruals rather than aggregated accruals, as in the study above. More precisely, during the observed period, Italian accounting regulation permitted certain flexibilities[37] in the accounting treatment for the research and development (hereafter, R&D) costs; thus, they examined R&D cost capitalization in particular. The sample comprised of all listed non-financial family companies on the Milan Stock Exchange that performed and disclosed R&D activities from 2001 to 2003. In addition, family companies are defined as companies with one or more families with a sufficient share of equity (i.e., more than 50%) for making strategic decisions. The final sample composed of 129 firm-year observations over the examined period. Additionally, it considered 44 different companies from which 23 are family and 21 non-family companies. The results revealed that earnings management incentives differ between family and non-family companies. Family companies compared to non-family companies show a weaker relationship of R&D cots capitalisation with income smoothing and a stronger relationship with leverage. In other words, the result suggests that short-term fluctuations in profitability do not motivate family companies, whereas the violation of debt covenant represents a strong motivation for earnings manipulations. Interestingly, the result also revealed that non-family companies are not motivated to manipulate earnings due to debt covenants.

[37] R&D costs could be accounted either as an asset on the balance sheet or as an expense on the income statements (Prencipe, Markarian and Pozza, 2008).

Unlike the studies above that concentrated on listed companies, Stockmans, Lybaert and Voordeckers (2010) examined socioemotional wealth (hereafter, SEW) as an incentive for earning manipulation in Flemish private family firms. They investigated how upward earnings manipulation due to the protection of SEW differ between the generational stage (i.e., first-generation, second-generation and third and later generation firms), the CEO position (i.e., founder CEO, descendant CEO and external CEO) and the management team characteristics (i.e., external manager(s) and non-external manager(s)). The data included two types of data. The survey data were collected in 2001, and the financial data are collected for 2000. The final sample consists of 132 family SMEs that engaged in upward earnings manipulations. Family firms are defined based on the CEOs' perception that a firm is a family firm and based on a sufficient family's share of equity (i.e., more than 50%) amongst other criteria. The findings suggest that first-generation and founder-led family firms are more likely to engage in earnings manipulation when performance is poor. In other words, they found that family firms led by second, third and later generation exhibit less earnings manipulation due to negative economic performance. Surprisingly, the difference in upward earnings manipulation between founder-led family firms and one with an external CEO is not statistically significant. Also, there was no difference in positive discretionary accruals between family firms with and without external managers. Some limitations of the study are worth mentioning. First, the sample is relatively small; thus, inferences may not be reliable. Then, the mean of the total assets of the examined firms suggests that small firms may be excluded from the sample. Besides that, other descriptive statistics for the size is not provided. Moreover, the sample included firms that are perceived as family firms by surveyed CEO, and as the authors noted, the study lacks information on ownership dispersion.

To sum up, according to Wang (2006), family-owned listed companies in the US have a lower level of discretionary accruals, less leverage, and they are less likely to report losses and negative earnings changes. Prencipe, Markarian and Pozza (2008) revealed that Italian family listed companies are not motivated with short-term motivations such as income smoothing. However, the motivation to use R&D cost capitalisation is stronger with higher leverage. Finally, Stockmans, Lybaert and Voordeckers's (2010) findings suggested that earnings management practices differ between founder-led and first-generation private family firms and others. They concluded that founder-led firms are more likely to manage earnings during times of bad performance compared to descendant-led family firms.

4.4. The implication of accounting standards

As explained in the second chapter, it is clear that the Companies Act 2006 differentiate between firms qualified as firms that are subject to small companies' regime and others, as well as quoted and unquoted companies. It is also important to highlight that the Companies Act 2006 permits flexibility for private (i.e., unquoted) firms to choose

between reporting under UK GAAP (i.e., Companies Act 2006) or IFRS. On the contrary, since 2005, all the PLCs in the EU securities market are required to prepare consolidated financial statements in accordance with IFRS (IASPlus, 2017b). Subsequently, it may be assumed that this variation in reporting standards may lead to a different quality of reported earnings amongst private firms.

In terms of the literature, studies provided valuable information on the impact of IFRS adoption on the quality of reported earnings. In particular, to determine whether IAS[38]/IFRS enhances the quality of reported earnings in comparison to national standards, most studies compared the earnings quality of PLCs (i.e., Van Tendeloo and Vanstraelen, 2005; Barth, Landsman and Lang, 2008; Jeanjean and Stolowy, 2008 and Capkun, Collins and Jeanjean, 2016). With respect to private firms, to the best of my knowledge, only a few studies have investigated the difference in the quality of reported earnings under the IFRS and national standards in private firms (i.e., Cameran, Campa and Pettinicchio, 2014 and Liu and Skerratt, 2018).

4.4.1. The implication of accounting standards in PLCs

A study by Barth, Landsman and Lang (2008) analysed whether there is an association between IFRS predecessor (i.e., IAS) and higher quality of accounting compared to non-US national standards in PLCs. In addition, the measure of earnings quality is based on the magnitude of earnings management (i.e., earnings smoothing and the frequency of positive earnings), timely loss recognition and value relevance metrics. The analysed sample consisted of 327 voluntarily adopters from 21 countries over the period 1994 to 2003. More importantly, the sample is unbalanced and most of the sampled companies are from Switzerland, China and Germany, whereas there are only four companies from the UK.[39] It is also important to highlight that the observed UK PLCs have been incorporated in Bermuda rather than the UK. The descriptive statistics revealed that companies that report under IAS have significantly less incidence of small positive earnings suggesting that IAS companies are less likely to manipulate earnings to reach earnings positive thresholds. Furthermore, the results of the cross-sectional regression analysis revealed different findings for pre- and post-adoption IAS periods. On the one hand, no significant difference in accounting quality has been found between IAS and non-IAS companies in the pre-adoption period, except for the timely loss recognition. The results also suggest that IAS companies in the pre-adoption period recognised losses in a timelier manner than non-IAS companies. On the contrary, in the post-adoption period, the differences became significant, suggesting that IAS has a positive impact on accounting quality. Specifically, IAS is associated with less earnings management, greater value

[38] International Accounting Standards (IAS) are issued before April 2001, and they are the predecessor of IFRS that are issued after April 2001 (IASPlus, 2021).
[39] Offshore companies in the UK could adopt IAS/IFRS earlier than the rest of the UK firms (Barth, Landsman and Lang, 2008).

relevance, and more timely loss recognition in comparison to national standards. Therefore, it may be said that IAS limit managers' discretion; thus, it decreases earnings manipulations. Nonetheless, as the authors noted, these results may not rule out entirely the influence of other factors such as companies' incentives and the economic environment. Moreover, another question that needs to be asked is whether the changes in the quality of accounting are also driven by the unbalanced sample and country differences rather than the application of IAS.

In contrast to Barth, Landsman and Lang's (2008) findings, no evidence of lower earnings management among German IFRS voluntarily adopters are detected in Van Tendeloo and Vanstraelen's (2005) study. Interestingly, their findings suggested an increase in earnings smoothing among PLCs that adopted IFRS voluntarily (i.e., 636 firm-observations) over the 1999 to 2001 period. Also, PLCs that report under German GAAP exhibited less discretionary accruals than PLCs reporting under IFRS. Overall, the results have not confirmed that companies that report under IFRS are associated with a higher quality of earnings (i.e., lower earnings management) than companies reporting under national standards.

While Barth, Landsman and Lang (2008) and Van Tendeloo and Vanstraelen (2005) focus on voluntary adopters, Jeanjean and Stolowy (2008) are more concerned with the effect of IFRS on earnings management among PLC mandatory adopters. Specifically, they examined 422 firms (i.e., 1,933 firm-year observations) from Australia, 321 (i.e., 1,316 firm-year observations) from France and 403 (i.e., 1,802 firm-year observations) from the UK during the period 2002 to 2006. Furthermore, in order to compare pre- and post-IFRS periods, they compared pre- and post-IFRS earnings distributions for each country. Additionally, they focused on earnings management around zero earnings threshold (i.e., avoidance of losses). The distribution of earnings revealed discontinuities around zero earnings in both pre- and post-IFRS periods for all of the observed countries. Moreover, the examination of odds ratios revealed an increase in earnings manipulations rather than a decrease as expected. Despite that, the odds ratios for Australia and the UK are insignificant, whereas it was significant for France. Based on these findings, they concluded that earnings management has increased only in France with the adoption of IFRS, suggesting that IFRS may not be sufficient to enhance the quality of reported earnings.

Following conflicting evidence, a comprehensive cross-country study by Capkun, Collins and Jeanjean (2016) investigated the effect of IFRS adoption on the quality of reported earnings (i.e., smoothness of reported earnings) amongst PLCs that adopted IFRS. In particular, they analysed and compared the cross-country sample of 3,853 firms from 29 countries over the period 1994 to 2009. Furthermore, they partition the sample since previous studies covered mainly periods before 2005. More specifically, they considered the sample of early adopters that consisted of 508 firms (i.e., 3,359 firm-year

observations), the sample of late adopters consisting of 930 firms (i.e., 5,786 firm-year observations) and the sample of mandatory adopters comprising of 2,415 firms (i.e., 11,133 firm-year observations). Interestingly, their results confirmed Barth, Landsman and Lang's (2008) findings. More precisely, during the period of the "old" version of IAS/IFRS, early adopters have a higher quality of reported earnings relative to companies reporting under national standards. Surprisingly, after 2005, early adopters exhibited greater earnings management relative to the pre-2005 period. The findings have also demonstrated that the others (i.e., late adopters and mandatory adopters) experienced the same increase in earnings smoothing after 2005. The authors explained this phenomenon suggesting that 2005 IAS/IFRS changes enhanced flexibility; thus, increases managers discretion. Interestingly, the analysis of the standards changes from local GAAP to IFRS revealed greater earnings smoothing among low absence countries (i.e., such as the UK[40]) compared to high absence countries for both late and mandatory adopters. However, the results for the difference in large negative and small positive reported earnings are not consistent.

4.4.2. The implication of accounting standards in private firms

In the case of the private firms, Cameran, Campa and Pettinicchio (2014) investigated the effect of IFRS adoption on the reported earnings of Italian private firms. The sample included voluntary adopters of IFRS with available data throughout the observed period and a matched sample of firms reporting under the local Generally Accepted Accounting Practice (hereafter, GAAP) covering the period 2005 to 2008. Additionally, sampled firms have been matched by firm size, leverage, profitability and the industry at the firm's adoption year of IFRS, resulting in 270 pairs of IFRS and non-IFRS adopters (i.e., 948 firm-year observations). They measured the quality of reported earnings (i.e., the level of discretionary accruals and timely loss recognition). The results suggested that the IFRS adopters have higher levels of discretionary accruals and less timely recognised losses than non-adopters. The earnings smoothness robustness test confirmed that IFRS adopters smooth earnings to a greater extent than non-adopters.

Regarding the UK, Liu and Skerratt (2018) compared the earnings management levels (i.e., earnings smoothness) between PLCs, large, medium-sized, small and micro private firms reporting under the IFRS and UK GAAP as well as the impact of switching standards to the quality of reported earnings. They examined and compared the samples of businesses reporting under IFRS (i.e., 6,830 firm-year observations) and UK GAAP (i.e., 505,650 firm-year observations) during the period 2006 to 2013. To be more precise, the IFRS sample consisted of 5,466 PLCs, 651 large, 182 medium-sized, and 531 small firm-year observations. The UK GAAP sample included 12,074 large, 20,318 medium-sized, 255,611 small and 217,647 micro private firms-year observations. In addition, they defined

[40] Absence score measures the alignment of specific rules regarding certain accounting issues (i.e., rules on recognition, measurement, and disclosure) between national standards and IAS Ding *et al.* (2007).

the size of the firms as per the regulation applicable for the financial year beginning on or after 6 of April 2008 (see Appendix I). The findings for both groups (i.e., IFRS and UK GAAP) suggested that the earnings quality does not depend on adopted standards. In particular, both samples have similar smoothing values across all of the types of businesses despite the adopted standards. Nevertheless, large and medium-sized firms have the lowest quality of earnings (i.e., highest smoothing values) amongst all the observed firms regardless of the adopted standards. Findings also suggest that large and medium-sized firms exhibited a slightly higher quality of earnings under the IFRS. Therefore, it may be argued that UK GAAP allows more discretion than IFRS. The authors noted that this finding is in line with opportunistic behaviour amongst large and medium-sized firms (i.e., UK GAAP allows more discretion than IFRS). With respect to the changing standards, it seems that only large private firms that switched to IFRS reduced their smoothing slightly. In other words, all the other private firms exhibited more smoothing in the year of switch compared to the ones that used only one standard no matter the direction of the change (i.e., IFRS to UK GAAP or UK GAAP to IFRS).

4.4.2.1. The hypothesis to be tested

As noted by Capkun, Collins and Jeanjean (2016) and De George, Li and Shivakumar (2016) studies on the effect of applied accounting standards on the quality of reported earnings provide conflicting evidence relating to IFRS implementation and its effect on the earnings quality. This notion is clearly illustrated in the discussion above. Specifically, Barth, Landsman and Lang's (2008) findings suggested that early[41] PLC IAS adopters exhibited more variable earnings; thus, higher quality of reported earnings. On the contrary, Van Tendeloo and Vanstraelen's (2005) study have not found that voluntarily adoption of IFRS is associated with less earnings manipulations within German PLCs. In a similar vein, Jeanjean and Stolowy (2008) have found that the pervasiveness of earnings manipulation has not decreased with IFRS adoption amongst mandatory PLC adopters. In other words, companies manipulate earnings to avoid losses in the pre- and post-IFRS period to a similar extent. The most recent study by Capkun, Collins and Jeanjean (2016) revealed that despite the period of the adoption of IFRS, all of the observed PLCs exhibited the same increase in earnings management after 2005, suggesting that IFRS allows greater managerial discretion.

Regarding the private firm studies, the evidence is inconsistent as well. Cameran, Campa and Pettinicchio (2014) showed that Italian private firms that adopted IFRS exhibited a higher level of discretionary accruals, less timely loss recognition and greater smoothing than non-adopters. On the contrary, Liu and Skerratt (2018) suggested that private firms' earnings quality measured by smoothing values does not depend on the adopted standards

[41] Before 2005.

(i.e., IFRS and UK GAAP) in the UK. However, the findings revealed that large and medium-sized private firms exhibited the lowest quality of earnings (i.e., greatest smoothing) under the UK GAAP. Following this, the authors implied that the difference in earnings quality is due to different financial standards adopted. In other words, they suggested that under the UK GAAP, managers can exercise more discretion than under IFRS.

To mitigate problems of different accounting standards (i.e., UK GAAP and IFRS) under which financial reports are prepared and to determine whether managers use a different level of discretion, the following hypothesis is developed:

H4: Earnings management differs between private firms that prepare financial statements under the UK GAAP and private firms that report under IFRS.

The following section discusses the implications of debt financing on earnings management practices in private firms as to whether they are more profound than in PLCs.

4.5. The implications of financing on earnings management practices

As explained in the second chapter of this thesis, it is clear that the financing of private firms varies widely in comparison to PLCs. The literature provides a useful account of how financing structure differs between private firms and PLCs. Most importantly, private firms in general clearly rely more on debt financing than PLCs (Brav, 2009; Hope and Vyas, 2017). Thus, for communication with important stakeholders such as banks and trade creditors (Collis, 2008) earnings may be of crucial importance for the private firms. Therefore, corporate lending agreements, in other words, accounting-based contracts between lenders and borrowers (Mafrolla and D'Amico, 2017) may influence the opportunistic behaviour of private firms' managers to employ earnings manipulation practices more profoundly than the managers of PLCs. Moreover, as previously demonstrated, there are incentives to manipulate earnings ahead of, as well as after the credit approval. The evidence of earnings management regarding the level of leverage, lowering borrowing cost and debt covenants is further discussed below, and the relevant hypothesis is developed.

4.5.1. The effect of leverage on earnings management

Doukakis (2014) examined a sample of PLCs in the 22 EU countries that mandatorily adopted IFRS in 2005 during the period 2000 to 2010. The sample consisted of 2,021 firms representing 13,295 firm-year observations. He concluded that less profitable, highly leveraged and smaller PLCs manipulate earnings to a greater extent. This conclusion is supported by Dichev and Skinner's (2002) and Iatridis and Kadorinis' (2009) studies that are further discussed in the sections below. Despite that, it is important to note that this result may be driven by country differences rather than firms' characteristics.

Another study by Clatworthy and Peel's (2013) revealed similar results for the UK's small private firms. The results of the univariate analysis demonstrated that larger, younger, more leveraged firms with lower profitability are more likely to disclose accounting errors. Consistent with this result multivariate analysis of cross-sectional models confirmed that firms with higher leverage are significantly more likely to experience accounting errors. The sample included only individual UK private firms using one year of data for each firm (i.e., April 2010 FAME disclosures). The final sample comprised of 1,067,577 observations. One of the limitations of this study is that it included only one year of data of small UK private firms.

4.5.2. Borrowing costs and debt covenants

In terms of borrowing costs, Li and Richie (2016) examined the effect of income smoothing on the cost of public debt. They compared the cost of debt for higher smoothing firms and lower smoothing firms. To measure income smoothing, they examined PLCs in the US (i.e., 60,448 firm-year observations) during the period 1988 to 2007. Furthermore, for the estimation of the cost of debt, they analysed the sample of 796 US trading PLCs and 2,097 bond issues over the period 2002 to 2007. The results imply that firms with smoother earnings exhibit a lower cost of debt. In particular, they show that income smoothing, as the signalling effect is stronger in smaller and less profitable firms, firms with more volatile reported earnings, and firms with lower credit ratings. Moreover, the authors suggested that the signalling effect of income smoothing level is not significant for the large firms, whereas it is significant for middle-sized and small firms. Nevertheless, it is important to note that it is not clear how the size was determined from the study. Furthermore, since the study is based on the public debt market, the authors suggested that the signalling effect for the private debt market may be lower.

Another study by Mafrolla and D'Amico (2017) focused on the cost of private debt. They analysed ex-post and ex-ante earnings manipulations in small and medium-sized private firms to acquire better borrowing capacity. Additionally, the panel sample consists of 465 firms (i.e., 5,115 unbalanced firm-year observations) during the period 2002 to 2012. They established that private small and medium-sized in debt dependant countries (i.e., Italy, Portugal and Spain) report managed earnings in order to improve their borrowing capacities and to signal better quality of earnings. Also, the association between higher loan costs and earnings manipulation has been demonstrated, however, with low statistical power.

With respect to debt violation, many studies investigated the ex-post manipulation of earnings that is reflected in the works of DeFond and Jiambalvo (1994), Sweeney (1994), Dichev and Skinner (2002), Iatridis and Kadorinis (2009), Rodríguez-Pérez and van Hemmen (2010), amongst others. For instance, Dichev and Skinner (2002) analysed a

sample of US PLCs and their private lending agreements between January 1989 and December 1999. They concentrated on the current ratio and net worth covenants as the ratios with the least ambiguous definition. The current ratio sample consisted of 1,001 firms (i.e., 1,313 loans; 13,052 loan/quarter observations), whereas, the net worth sample comprised of 236 firms (i.e., 288 loans; 2,339 loan/quarter observations). The descriptive statistics suggested that most loans in the sample are short or medium-term loans (i.e., median less than three years). The results revealed that private lending agreements have somewhat tight debt covenants. Also, consistent with the covenant violation hypothesis, they confirmed that firms tend to avoid covenant violation. This behaviour is particularly noticeable ahead of the initial violation of the debt covenant. Moreover, the findings suggest that non-violating firms are less leveraged and more profitable in relation to firms that violate debt covenants. In other words, more leveraged and less profitable firms are more likely to violate debt covenants.

Regarding the UK, Iatridis and Kadorinis (2009) investigated the effect of covenant violations amongst other incentives (i.e., voluntary accounting disclosures, management compensation, needs for equity and debt capital and analyst forecast) and their relationship with earnings management practices within PLCs. The study concentrated on the period January to December 2007. The sample comprised of 239 PLCs listed on the LSE. The authors assumed that firms with interest cover ratio lower than 1 are close to debt covenant violation. Subsequently, a lower ratio indicated that firm encountered difficulties to pay current interests, suggesting that they are more likely to manipulate earnings. The results implied that firms close to covenant violation experience higher small profits and lower large losses, and they also exhibited a less volatile change in net profit relative to the firms far from debt covenants. Additionally, it has been suggested that firms close to debt covenant violation tend to engage in accrual-based manipulation. Overall, consistent with Dichev and Skinner's (2002) findings, the results imply that firms with low profitability and high leverage are inclined to manage earnings to avoid debt covenant violation.

4.5.2.1. The hypothesis to be tested

As indicated above, debt financing is a major source of external financing for private firms (Brav, 2009; Hope and Vyas, 2017). PLCs, on the contrary, can offer debentures and shares to the public (Brav, 2009). This distinguishing characteristic of private firms implies that banks are one of the key users of private firms' financial reports. Despite this difference, empirical evidence discussed above suggests that both types of firms engage in earnings manipulations to improve financing terms. More precisely, findings suggest that less profitable and more leveraged firms are inclined to manage earnings. Also, it has been demonstrated that firms manage earnings before and after loan agreements. However, none of the reviewed studies have considered if financing in private firms affects the opportunistic behaviour of managers differently than in PLCs.

In terms of the UK, the literature demonstrated that UK SMEs largely rely on debt financing (Collis, 2008; OECD, 2015) and their financing decisions differ by the size of the firm (Collis, 2008). Accordingly, as debt financing (i.e., bank and trade credit) is the major source of financing in UK private firms, it may be expected that they are rather more inclined than PLCs to manage earnings. Moreover, the pervasiveness of earnings manipulation may also vary due to different financing decisions and financial structure as the key driver of financial reporting practices (Hope and Vyas, 2017).

Furthermore, based on the financing structure of private firms and the incentives discussed above (i.e., lowering borrowing cost and avoidance of breaching debt covenants), this thesis hypothesises that the effect of leverage on the earnings management practices in private firms will differ from that of PLCs, given their reliance on bank debt. Hence, the fifth hypothesis is as follows:

H5: The effect of leverage on earnings manipulation varies across private firms relative to PLCs.

4.6. The implications of audit on earnings quality

As previously noted, provided that they are not classified as small, subsidiary or dormant companies, all firms in the UK are subject to a mandatory audit. Nevertheless, as noted by Esplin, Jamal and Sunder (2018) the purpose of audit in private firms is somewhat different than in PLCs. Specifically, in private firms' auditors act as accounting experts and service providers, whereas auditors in PLCs ensure the reliability of financial statements for the stakeholders; thus, another point to consider is the effect of audit in the context of private firms. Regarding the effect of the audit, the literature suggests that audit mitigates agency costs and increases economic benefits for private firms. Other studies focus on an association between the audit and the quality of the published financial reports. More specifically, some studies suggest that audit enhances the quality of accounting information for various stakeholders (i.e., banks and trade creditors, amongst others). On the other hand, it has been suggested that audit may also reduce the quality of reported earnings. Additionally, in terms of the incentives for the audit in private firms, there is generally a greater heterogeneity in drivers for audit demand (Vanstraelen and Schelleman, 2017). To further understand the role of audit and its effects on financial reporting quality, empirical evidence on decisions to undertake audits and its effect on private firms' financial reporting are discussed below. For completeness, section 4.6.3 additionally discusses the literature on audit quality (i.e., Big 4 vs non-Big 4 audits) on earnings management. Also, it is worth noting that the influence of the type of auditor is outside the scope of this thesis.

4.6.1. Effect on agency costs

Up to now, several studies have revealed that audits reduce agency conflicts between owners, managers and banks (Van Tendeloo and Vanstraelen, 2008). In terms of reduction of agency costs between owners and managers, it can be argued that audits may be particularly important for the owners of small private firms who are generally not capable of fully understanding accounting operations or financial results (Ang, Cole and Lin, 2000). In particular, it may help them in the evaluation of managerial performance (Van Tendeloo and Vanstraelen, 2008). Accordingly, Dedman, Kausar and Lennox (2014) showed that independent private firms are keen to audit their financial reports voluntarily when greater agency cost is involved.[42] Despite that, according to ICAEW (2014), attitudes towards audits are somewhat different. Telephone interviews were conducted with 500 randomly sampled small and medium-sized UK firms during May and June 2014. The findings revealed that the stance on audit adoption varies by the size of the firms. More specifically, smaller firms (i.e., sole traders and micro firms) seem to believe that audits are not economically beneficial for their business. Interestingly, this study revealed a strong correlation between attitudes toward growth with opinions about the audit. In other words, it has been suggested that the importance of the financial audit arises as firms grow/or tend to grow. Furthermore, Dedman, Kausar and Lennox (2014) suggested that firms with dispersed ownership[43] are more likely to be audited. Similarly, Minnis (2011) implied that a firm's size might significantly influence the decision to opt-in for audit.

4.6.2. Effect on quality of financial reports

Another positive aspect of audits in private firms is that they have a positive impact on the quality of financial reporting of private firms (Vanstraelen and Schelleman, 2017). Similar to PLCs, audits improve the credibility of private firms' financial reports (Vanstraelen and Schelleman, 2017). For instance, Clatworthy and Peel (2013) investigated the association between voluntary audits and accounting errors in published financial statements of 1,067,577 UK small private firms. The descriptive statistics revealed that a substantial majority of small firms (i.e., 96.7%) file unaudited financial reports. The study concluded that audited accounts of private UK firms are half as likely to contain accounting errors as their counterparts filing unaudited accounts. Implications of the results are limited only to small independent firms (i.e., not subsidiaries) that audited their accounts voluntarily. Nevertheless, this evidence highlights the fact that audits may improve the reliability of accounting information to a certain extent.

[42] They also found that riskier companies, companies who arrange auditors for non-audit services and ones in the mandatory audit regime are more likely to audit their financial statements.
[43] Measured as the number of stakeholders.

Another line of study on the benefits of audit demonstrates that audited accounts are of considerable importance to creditors (i.e., banks, suppliers) and other potential stakeholders of the firms (Clatworthy and Peel, 2013; Dedman, Kausar and Lennox, 2014). In terms of the SMEs in the UK, Collis (2008) conducted a postal-questionnaire survey to 9,458 non-publicly accountable private limited firms in the UK and Northern Ireland that filed their 2006 accounts by the end of August 2007. Size selection criteria were based on criteria for medium-sized firms (i.e., up to 250 employees and balance sheet total not exceeding £12.9 million). Her findings revealed that the majority of SMEs' directors in the UK identified that published accounts are valuable for effective credit risk assessment. This is not surprising since SMEs are mainly financed through bank debt (OECD, 2015). Interestingly, Collis (2008) also found that 32% of SMEs' directors voluntarily audit firms' accounts due to potential benefits for the firm.

Dedman, Kausar and Lennox (2014) concluded that firms decide to go for an audit if it is in their interest. They analysed voluntary audit decisions within independent private firms in the UK that were subject to mandatory audits in 2003. The analysis was performed on the sample of 6,274 UK small firms for three years post-exemption period (2004 to 2006). The focus of the analysis was on the firms that did not grow beyond the exemption threshold. Interestingly, the results revealed that over time there is an increasing trend of opting out from the audit. In particular, 71% of firms retained audits in 2004; in 2005, this number dropped to 60%, whereas in 2006, only 52% of firms retained audit. This negative trend continued for the years 2006 to 2013 in the UK (Liu and Skerratt, 2018). Interestingly, Dedman, Kausar and Lennox (2014) have also found that less profitable firms are more inclined to retain audits. The findings also showed that audited firms are leveraged to a greater extent than unaudited firms. Therefore, it may be argued that one of the underlying reasons for voluntary audits may be the higher credibility of financial reports that may lower the cost of borrowing.

This view is supported by Minnis (2011) who affirmed that private firms in the US with audited accounts obtained a significantly lower interest rate on debt. The sample included 25,784 firm-year observations (i.e., 12,616 unique firms) during the period 2001 to 2007. Only 23% of firms had audited financial reports. Not surprisingly, findings confirmed that an audit enhances the predictive ability of accruals for future cashflows. In other words, audited firms exhibited a higher quality of reported earnings. In this sense, it has been found that debt providers clearly consider audited financial reports more credible and useful than unaudited ones.

In addition to the evidence which presents the view that audit enhances the quality of reported earnings, an alternative perspective illustrates that the level of earnings management may vary amongst audited private firms of different sizes. The view that the effect of audit may be different between different sizes of private firms is exemplified in work

undertaken by Liu and Skerratt (2018) on the sample of small and micro private firms in the UK over the period 2006 to 2013. The sample for audited (unaudited) small firms included 75,976 (180,586) firm-year observations and for audited (unaudited) micro-firms 72,111 (145,536) firm-year observations. Their findings suggest that across small private firms in the UK, the quality of earnings (i.e., earnings smoothness) is the same among audited and unaudited accounts prior to the recession period. However, after the recession period (2011 to 2013), the quality of earnings in audited firms slightly deteriorate. Similar findings have been revealed for the micro firms for the period before 2011. However, for the period after the financial crisis (2011 to 2013), results indicated that the audited accounts of micro-firms might have exhibited a higher quality of earnings than unaudited ones. The authors suggested that this phenomenon may be due to increased demand for bank financing. This view is supported by Niskanen, Karjalainen and Niskanen's (2011) findings that demonstrated increased demand for higher audit quality as financial leverage increases in smaller private firms in Finland. Another possible explanation may be the fact that they adopted a voluntary audit.

In a similar vein, Paiva and Dias (2019) identified that the audit in private firms is not necessarily associated with the higher quality of earnings (i.e., lower discretionary accruals). They analysed the sample of Portuguese and Irish private firms during the period 2008 to 2016. In addition, the focus of this study was on the countries that successfully complied with the economic adjustment programmes. In particular, the examined sample consisted of 8,118 Portuguese and 612 Irish firm-year observations. Interestingly, the findings from this study suggest that audited large private firms exhibited higher levels of earnings management than unaudited ones. In the case of the small private firms' sample, the results indicated the opposite. In other words, it seems that the audit in small private firms may lead to lower levels of earnings management. However, one of the limitations of these findings is that analysis included only a few years after the adjustment programme. Also, the regulatory size-based thresholds are neglected. Instead, the mean value of the natural logarithm of total assets is used for the classification of large and small private firms. Despite that, the evidence implies that private firms of different sizes may exhibit different earnings manipulation levels.

Furthermore, as previously discussed in chapter two, the Companies Act 2006 adopt size-based exemptions for mandatory audits (i.e., based on the value of annual sales, total assets and the number of employees).[44] For this reason, to minimise proprietary costs of disclosure (i.e., to avoid income statement disclosure and mandatory audits), private firms may manage their size downward by manipulating total assets, the number of employees, and most importantly, they can manage income statement items such as sales or costs leading to under-reported earnings.

[44] Nevertheless, subsidiaries and small private firms are not required to audit their accounts.

Bernard, Burgstahler and Kaya (2018) analysed data from 12 EU countries (i.e., Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden and the UK) over the period 2003 to 2011. In particular, they focused on unconsolidated statements of stand-alone limited liability private firms. The cross-sectional frequency distributions of total assets, sales and the number of employees for the full sample period revealed that size management varies by country and threshold variable. For instance, for Spain, the evidence suggests that firms manipulate all three variables, whereas, for Germany, only the number of employees and assets are managed. In the case of the UK, the distribution revealed size management around assets thresholds only. An additional test related to different applicable size thresholds (i.e., different periods; 2004 and 2009) demonstrated that UK private firms manipulate size only below the applicable size thresholds. In other words, the evidence suggests that UK private firms manipulate size threshold variables only before changes in regulatory thresholds for audit exemptions.

In contrast to Bernard, Burgstahler and Kaya (2018), Kausar, Shroff and White (2016) found evidence that UK private firms manipulate downwards both sales and total assets to stay below the audit exemption threshold. One explanation for the different findings regarding the sales threshold may be due to differences in the examined sample. For example, while Bernard, Burgstahler and Kaya (2018) excluded firms in financial industries, public administration and insurance from their analysis, Kausar, Shroff and White (2016) have not. Also, it is not clear from the study if they considered only unconsolidated statements as Bernard, Burgstahler and Kaya (2018). The findings in relation to the post-2004 regulatory change are in line with findings in Bernard, Burgstahler and Kaya (2018). More precisely, the discontinuities in the frequency distribution around the pre-2004 period ceased to exist when the threshold for the audit was relaxed in 2004 (i.e., increased). The sample covered the periods 2001 to 2006; hence, only the 2004 regulatory change was considered.

4.6.2.1. <u>The hypothesis to be tested</u>

The evidence presented above has shown that audits mitigate agency costs and improve the credibility of reported earnings. However, the evidence also suggests that attitudes toward audits vary by size of the firms. More precisely, bigger firms, firms that tend to grow and firms that raise financing (i.e., more leveraged and less profitable firms) are more likely to have voluntary audits of their financial disclosures. Furthermore, firms with more dispersed ownership are also more likely to have an audit. More importantly, the evidence also suggests that even though audit improves the quality of financial statement, the levels of earnings management may vary according to the size of the firm. In summary, it has been shown that firms that derive potentially greater benefits are more prone to audit their accounts. To this end, it may be argued that there is greater heterogeneity in the quality of financial reports across private firms than PLCs in the UK. Therefore, this thesis considers

that the effect of audit may vary between private firms of different sizes; hence, the following hypothesis is tested:

H6: Earnings management differs between audited accounts of small, medium and large private firms.

The final section discusses the relationship between audit quality and earnings management. However, it is worth noting that the influence of the type of auditor on earnings management is outside the scope of this thesis.

4.6.3. The implications of audit quality on earnings management

The principal purpose of an audit is to ensure that the financial statements are prepared in accordance with the applicable accounting standards and to enhance the degree of confidence of financial statement users (ISA 200). In this sense, it may be argued that the quality of reported earnings does not vary amongst audited firms. However, on the contrary, DeAngelo (1981) argued that audit quality; thus, the quality of reported earnings depends on the size of the audit firm. The literature also suggests that the quality of reported earnings may vary between Big 4[45] and non-Big 4 audits.

Several lines of evidence suggest that Big 4, as high-quality auditors, constrain earnings management to a greater extent than non-Big 4. For instance, Becker *et al.* (1998) examined the relationship between discretionary accruals (i.e., earnings management) and audit quality among PLCs during the period 1989 to 1992. The results suggested that companies employing large auditors (Big 6 at the time) have significantly smaller mean and median absolute values of discretionary accruals and lower discretionary accruals as a percentage of total assets than non-Big 6 auditors. Despite that, it is important to note that the sample period is old and short. Selection bias is another potential concern because analysis included only companies that have not switched the type of auditor during the examined period. Besides that, the study does not take into account issues related to having an unbalanced sample (i.e., 10,397 Big 6 and 2,179 non-Big 6 firm-year observations).

Another study by Francis, Maydew and Sparks (1999) concentrated on NASDAQ companies. The analysis covered a more extended sample period than Becker *et al*.'s (1998) study. Specifically, the analysis covers the periods 1975 to 1994. As in Becker *et al.'s* (1998) study, this study does not address issues adequately with using an unbalanced sample (i.e., 78% of the observations appointed Big 6 auditors). Moreover, while most earnings management studies exclude financial institutions due to their industry-specific accruals and different regulations, they were not excluded from the analysis. In line with Becker *et al.*'s (1998) findings, Francis, Maydew and Sparks (1999) indicated that relative

[45] Before certain mergers, the Big 4 in the past consisted of the Big 5, the Big 6 and the Big 8 audit firms.

to firms that non-Big 6 auditors audit, most NASDAQ firms that appoint Big 6 auditors report higher levels of total accruals and lower levels of discretionary accruals. In an additional test, they investigated whether audit quality varies between auditors. Due to the availability of the data, the sample period is reduced to the years 1988 to 1994 for this test. The sample is divided into three levels of auditors (i.e., international Big 6, second-tier national auditors and third-tier local and regional auditors). The findings imply that the quality of audit decreases from Big 6 to second-tier and third-tier auditors. In other words, it has been found that Big 6 auditors provide the highest audit quality (i.e., the lowest discretionary accruals), followed by the second-tier audits. Furthermore, the second-tier auditors have higher audit quality than the third-tier auditors.

On the contrary to the above studies, Boone, Khurana and Raman (2010) revealed that the quality of audited reported earnings among PLCs does not depend on employed auditors. More specifically, the evidence of a matched-paired sample demonstrated that the quality of earnings (i.e., discretionary accruals level) is similar between Big 4 and second-tier auditors. The reason behind different result may be due to the recent sample period that covers 2003 to 2006. In this sense, as demonstrated by Prencipe (2012) and Cohen, Dey and Lys (2008), it can be argued that the implementation of the SOX in 2002 reduced accrual manipulation and led to different findings. Furthermore, similar to the analysis in Becker *et al.* (1998), only a three year period is considered. Another explanation for the different findings may be the inclusion of the companies that switched auditors, the balanced sample and exclusion of financial institutions and utility companies.

Another recent study by Francis and Wang (2008) examined whether the quality of reported earnings is not only affected by the type of auditor but by the investor protection environment as well. The study considered audited financial statements from 42 countries over the period 1994 to 2004. Moreover, three separate tests have been conducted in the analysis of the earnings quality. More precisely, the study examined the signed discretionary accruals, loss avoidance and earnings conservatism (i.e., timely loss recognition). Interestingly, the findings revealed that the countries with higher investor protection and with Big 4 audits exhibited the earnings of the highest quality (i.e., less income increasing discretionary accruals, less loss avoidance and more timely loss recognition). On the contrary, the quality of reported earnings seemed to be the same amongst firms audited by non-Big 4 firms across countries with diverse levels of investor protection. Therefore, it has been concluded that the difference in the quality of reported earnings between earnings audited by Big 4 and non-Big 4 auditors increases with greater investors protection. In other words, in the countries with weak investor protection, there is no difference between firms audited by Big 4 and non-Big 4 auditors, whereas this difference becomes more profound in the countries with greater investor protection.

In a similar vein, Van Tendeloo and Vanstraelen (2008) implied that the environment (i.e., country's characteristics) influence the audit quality of Big 4. It is important to note that in contrast to previously discussed studies, they examined private firms rather than PLCs. They investigated a cross-country EU sample from 1998 to 2002. They used an aggregated measure of earnings management proxies (i.e., the magnitude of total accruals, avoidance of small losses, earnings smoothness and the correlation of accounting accruals and operating cash flows). The descriptive statistics revealed that, on average, private firms employ non-Big 4 auditors more often than Big 4. Additionally, it has been revealed that larger EU private firms and those with a lower growth rate generally appoint Big 4 auditors. The results demonstrated that Big 4 auditors constrain earnings management more compared to non-Big 4 only in countries where tax reporting is aligned with financial reporting. Interestingly, it has been suggested that in countries such as the UK and the Netherlands (i.e., low tax alignment countries), appointing a Big 4 auditor is associated with greater flexibility (i.e., more earnings management).

Overall, the principal purpose of an audit is to ensure the quality of reported earnings. In this sense, it would be expected that all the levels of auditors reduce the level of flexibility (i.e., lower discretionary accruals). Despite that, the literature demonstrates conflicting results on audit quality between Big 4 and non-Big 4 audits. Becker *et al.* (1998) suggested that earnings audited by Big 6 auditors exhibit a smaller value of discretionary accruals compared to those audited by non-Big 6 auditors. Francis, Maydew and Sparks (1999) confirmed Becker *et al.*'s (1998) finding, and they concluded that Big 6 auditors constrain earnings management (i.e., lower levels of discretionary accruals amongst Big 6 compared to non-Big 6) to a greater extent than non-Big 6 audits. They also revealed that earnings quality diminishes with smaller audit firms. Put differently, the Big 6 provides the highest quality, followed by second-tier firms that provide higher quality than third-tier firms. On the contrary, Boone, Khurana and Raman (2010) have not confirmed these results. Specifically, their study has not revealed dissimilarities in the quality of discretionary accruals between Big 4 and second-tier audited earnings. For private EU firms, Van Tendeloo and Vanstraelen (2008) found that the quality of Big 4 audits depends on the tax regulation of the country. In particular, they showed that Big 4 auditors constrain earnings management to a greater extent only in high tax alignment countries. Finally, in a cross-country study, Francis and Wang (2008) demonstrated that the quality of Big 4 audits is affected by the country's investor protection level.

4.7. Conclusion

This chapter has reviewed the earnings management literature in light of the fundamental characteristics of private firms and PLCs that may influence managers behaviour in choosing financial reporting practices (i.e., opportunistic earnings management) distinctively. As indicated in previous chapters, private firms and PLCs have

different regulatory requirements for financial reporting purposes. In particular, they have specific disclosure and audit requirements. They also have distinct ownership and capital structures and different agency relationships that may influence earnings management practices. To address these distinctive features, relevant literature is reviewed, and testable hypotheses have been developed.

In terms of the earning management practices among private firms and PLCs, the literature offers conflicting evidence. More importantly, little is know about the effect of size-based regulatory disclosure requirements on earnings manipulation levels. Therefore, the first hypothesis proposes that earnings management behaviour does not differ between small, medium, and large private firms and PLCs. Regarding ownership structure, the literature suggests that parent PLCs use their subsidiaries to manage earnings; thus, the second hypothesis predicts that private firms that are subsidiaries of PLCs manage earnings to a greater extent than other private firms. Furthermore, the discussed empirical studies suggest that firms with more concentrated ownership are more likely to manipulate earnings. Therefore, the third hypothesis predicts that earnings management in private firms with more dispersed ownership is lower than in private firms with less dispersed ownership.

Returning to the financial reporting regulation and the effect of applied accounting standards, the studies provide inconsistent findings of the direction of the effect of the adopted standards on the earnings manipulations. Consequently, the fourth hypothesis predicts that earnings management differs between private firms that prepare financial statements under the UK GAAP and private firms that report under IFRS. The discussed studies also suggest that financing may drive earnings management; thus, to address the differences in financing between private firms and PLCs fifth hypothesis predicts that the effect of leverage on earnings manipulation varies across private firms relative to PLCs. Finally, the discussed studies on the association between audit and earnings management illustrate that attitudes towards audit may vary between different sizes of private firms. Some studies also suggest that earnings management may vary between audited firms of different sizes; hence, the sixth hypothesis predicts that earnings management differs between audited accounts of small, medium and large private firms.

Following the literature review and the development of testable hypotheses, the chapter that follows considers the data and research methodology to test developed hypotheses.

Chapter Five

Data and Research Methodology

5.1. Objectives

The main objective of this chapter is to describe the research strategy and methods used in this study in order to examine the difference in the prevalence of earnings management between small, medium, and large private firms compared to PLCs in the UK. The data collection and sample selection procedures are described first. The quantitative methods and proxies to capture earnings management are discussed next. In particular, there are three main streams of research used to identify earnings manipulation: the distributional approach studies, accrual-based studies, and RAM-based studies.[46] Additionally, it is important to note that RAM is out of the scope of this study. Finally, the conclusion of the chapter outlines the adopted empirical models.

[46] Some studies employed a survey research design (see Nelson, Elliott and Tarpley, 2002; 2003; Graham, Harvey and Rajgopal, 2005); however, this stream of research is out of the scope of this study.

5.2. Introduction

There is a growing body of literature on earnings management. So far, the extensive evidence of earnings management has been demonstrated; however, most of the studies have mainly focused on PLCs. In more recent years, attention has focused on private firms (e.g., Ball and Shivakumar, 2005; Coppens and Peek, 2005; Burgstahler, Hail and Leuz, 2006; Givoly, Hayn and Katz, 2010; Hope, Thomas and Vyas, 2013; Liu and Skerratt, 2018). The empirical evidence discussed in the previous chapter suggests that private firms manipulate earnings; however, to the best of my knowledge, only one recent study by Liu and Skerratt (2018) has recognised fundamental differences between the size of the private firms in the UK. Therefore, this thesis investigates whether the level of earnings management varies between small, medium, and large private firms, compared to PLCs in the UK. The detailed research hypotheses are defined in the previous chapter of this thesis.

The research design is based on a quantitative methodology. The collection of secondary data is discussed first, followed by the outlined sample selection procedures. The distributional method procedure and proxies to detect earnings management are discussed next. To gain a better understanding of differences in the level of earnings management between private firms and PLCs, this thesis considers the multivariate panel data regression model. The detailed discussion of the models precedes the discussion of the appropriate panel data regression model. Finally, the model specification and PSM sampling procedures are discussed, followed by additional robustness tests. The conclusion of the chapter outlines the adopted empirical models.

5.3. Data collection

For the purpose of this study, available financial data for both private firms and PLCs is collected from the FAME database. As pointed out by Porter (2016), Bureau van Dijk is a global expert in providing information on private firms. A major advantage of FAME is that it comprises data for both private firms and PLCs. Moreover, FAME is particularly focused on companies in the UK and Ireland, and it provides data for more than 11 million firms (Porter, 2016; Fame, 2019). The use of FAME is a well-established approach for data collection in research on private firms in the UK (e.g., Collis and Jarvis, 2002; Ball and Shivakumar, 2005; Liu and Skerratt, 2018). Despite the advantages, it is important to mention that Bureau van Dijk creates and maintains information on firms from various sources (Porter, 2016). For instance, annual accounts are created from records filed at the Companies House (Ball and Shivakumar, 2005). As a result, this may be a potential source for data entry errors. Furthermore, even though FAME incorporates 20 years of data per company (Fame, 2019), it is important to mention that some data are static and do not change over time (i.e., legal form/listing status, number of shareholders). Consequently, if a firm changes listing status (i.e., from private to public and vice versa) over the sample

period, certain firm-year observations could be misclassified as such. To be more precise, all the past year information is classified as the last available classification.

5.4. Sample selection

The initial sample comprises of all private firms and PLCs that are domiciled in the UK over the period 2006 to 2018.[47] To be included in the sample, the industry sector and at least two continuous years of total assets, reported earnings, and the number of employees is required for the purpose of size classification. Furthermore, consistent with previous research (i.e., Ball and Shivakumar, 2005; Van Tendeloo and Vanstraelen, 2008; Hope, Thomas and Vyas, 2013), this study excludes all financial institutions (i.e., banks, insurance companies and public administrative institutions) as well as dormant firms due to their different accounting practices. Next, to control for potential data errors, missing values and zero values were eliminated for all the required accounting variables for the calculation of earnings management proxies. In addition, firms with a negative value of revenue, fixed total assets, long-term liabilities, and book value of equity[48] were also excluded. Furthermore, firms with qualified accounts were also excluded due to different reporting incentives (Liu and Skerratt, 2018). To ensure a reliable panel structure of the sample, all the firms without at least three consecutive years of accounts are eliminated from the sample. Consistent with Hope, Thomas and Vyas (2013), firms with a discontinuity in accounting reports of more than one year are also excluded from the sample. Finally, accounting variables are truncated at 0.5% at each extreme to account for potential data entry errors. Appendix III provides definitions of all variables. Table 5.1 below summarizes the sample selection procedures.

[47] For lagged variables calculations, 2005 data have been collected.
[48] As suggested by Hope, Thomas and Vyas (2013) firms with a negative book value of equity are more likely to be in financial distress; thus, their reporting incentives and financial measure are likely to differ significantly compared to the rest of the firms.

Table 5.1: Sample selection

Panel A: All Firms	***Number of private firms***	***Number of PLCs***
All active/inactive firms domiciled in the UK	10,729,907	1,625
Samples after excluding:		
Financial services & public administration	10,465,459	1,076
Firms without a value of total assets	4,720,489	1,031
Firms without a value of profit	342,344	877
Firms without a number of employees	105,028	877
Dormant firms	104,965	877
Firms with 0 values, missing data, or negative values	45,253	689
Firms with qualified accounts	45,142	688
Firms without 3 years of accounts	32,521	567
Final sample excluding firms with gaps of more than 1 year	28,708	497
Final sample firm-year observations used for *DAC* estimation	182,152	3,818
Number of firm-years with size variable	**180,302**	**3,818**

Panel B: Breakdown of private firms' sample across size categories (N = 180,302)	
Small firm-years	36,426
Medium-sized firm-years	69,495
Large firm-years	74,381

Panel C: Breakdown of private firm's sample across type categories (N = 73,477)	
Stand-alone private firm-years	35,919
Subsidiaries of PLCs firm-years	37,558

Notes: The number of all the other private firm-years in the sample is 106,825; thus, it adds up in total to 180,302 private firm-years.

Panel D: Breakdown of private firms' sample across ownership dispersion (N = 171,488)	
Firm-years with concentrated ownership	131,540
Firm-years with dispersed ownership	39,948

Notes: The number of firms-years with a missing value for No of shareholders is 8,814.

Panel E: Breakdown of private firms' sample across accounting standards (N = 145,925)	
Firms-years that followed UK GAAP	139,834
Firms-years that followed IFRS	6,091

Notes: The number of firms-years with a missing value for standards is 34,377

Panel F: Breakdown of the sample across leverage (N = 184,120)		
Low leveraged firms-years	89,629	2,431
Highly leveraged firm-years	90,673	1,387

Panel G: Breakdown of private firm's sample across audit (N = 180,302)	
Small audited firm-years	34,213
Small unaudited firm-years	2,213
Medium audited firm-years	69,169
Medium unaudited firm-years	326
Large audited firm-years	74,033
Large unaudited firm-years	348

The final sample consists of 184,120 firm-year observations from private firms (180,302) and PLCs (3,818) over the period 2006 to 2018. To investigate differences in the level of earnings management between small, medium, and large private firms compared to PLCs, the sample has been dichotomised into different subsets for each testable hypothesis, as shown in the table above. Further details for subsample classification are discussed next.

In the case of the breakdown of private firms' sample in Panel B above, it is important to highlight that the Companies Act 2006 classifies firms based on the different threshold such as turnover, assets, and the number of employees. More specifically, a firm must meet at least two out of three criteria to be classified as a small or a medium firm. Consequently, for the purposes of financial reporting and this thesis, large private firms are all the ones that do not satisfy two out of three criteria. Importantly, these thresholds for private firms change over time and they are included in Appendix I. To account for these changes, three different thresholds[49] were considered when classifying private firms by size.

The firms in Panel C are defined as stand-alone private firms and subsidiaries of PLCs. Stand-alone private firms are categorised as all the private firms that are independent and do not have an ultimate owner. Particularly, firms with shareholders with less than 50.1% of the ownership are considered as stand-alone private firms. On the contrary, subsidiaries of PLCs are defined as private firms whose ultimate owners are PLCs, meaning they have 50.1% or more of the ownership share.

Regarding Panel D, only private firms with the available number of shareholders are included. Similar to Clatworthy and Peel (2013) and Dedman, Kausar and Lennox (2014), the total number of shareholders is used to measure ownership dispersion. Then, the sample is divided into two groups based on the median value (i.e., 2) of the number of shareholders. More specifically, firms with concentrated ownership are all the firms that have two or fewer shareholders, whereas firms with more than two shareholders are classified as private firms with dispersed ownership.

The subsample in Panel F is divided into four groups based on the level of leverage and the type of firm (i.e., private firms or PLCs). Similar to Safieddine and Titman (1999) and Giroud and Mueller (2015), the median value of leverage ratio (i.e., 1.5) is used to determine leverage level across private firms and PLCs. Specifically, firms with leverage values of 1.5 or less are categorised as low leveraged firms, whereas firms with values above 1.5 are classified as highly leveraged.

Overall, this section has presented the sample selection procedures. The following section discusses the research methodology.

[49] New thresholds are generally effective from 1 January 2016, 6 April 2008 & 30 January 2004.

5.5. Research methodology

Different authors have measured earnings management in a variety of ways. However, most of the research has only focused on one method for capturing earnings management. There are three main streams of research used to identify earnings manipulation: the distributional approach studies, accrual-based studies, and real activities-based studies. Importantly, both accrual and real activities studies have adopted a regression-based research design. Moreover, regarding the accrual-based models, it is important to note that only balance sheet-based models are considered. The reason for this is that private firms report abbreviated financial statements; hence, cash flow statements might be unavailable.

5.5.1. Distributional approach

To determine whether managers manipulate earnings around certain earnings benchmarks (i.e., zero earnings, previous year's earnings), Burgstahler and Dichev (1997) developed the distributional approach that is widely used for the investigation of earnings manipulation (i.e., Degeorge, Patel and Zeckhauser, 1999; Beatty, Ke and Petroni, 2002; Coppens and Peek, 2005; Burgstahler and Eames, 2006; Gore, Pope and Singh, 2007; Jacob and Jorgensen, 2007; Donelson, Mcinnis and Mergenthaler, 2013; Burgstahler and Chuk, 2015). Specifically, they tested if earnings around earnings benchmarks are distributed smoothly or if they are discontinuous. In other words, if earnings are managed, this would be reflected in the frequency distribution as unusually low frequencies of small losses and unusually high frequencies of small profits.

One advantage of the frequency distribution methodology is that it is simple to deliver (i.e., univariate analysis) and easy to understand. Therefore, in order to gain a preliminary insight into the level of earnings management practices of sampled firms, this thesis uses a frequency distribution of earnings and changes in earnings first for all the testable hypotheses. In addition, the literature shows that analyst forecast is another important threshold to meet or beat (i.e., Degeorge, Patel and Zeckhauser, 1999; Gore, Pope and Singh, 2007; Bonacchi, Cipollini and Zarowin, 2018); however, given no analyst following for private firms this threshold is not relevant for the purpose of this thesis.

Traditionally, due to the heterogeneity of sampled firms, earnings are usually scaled by the market value of common equity (e.g., Burgstahler and Dichev, 1997; Burgstahler and Eames, 2006; Donelson, Mcinnis and Mergenthaler, 2013), the book value of common equity (e.g., Burgstahler and Dichev, 1997), sales (e.g.,Burgstahler and Dichev, 1997) or by opening or lagged total assets (e.g., Gore, Pope and Singh, 2007; Donelson, Mcinnis and Mergenthaler, 2013).

Despite the widespread use of the scaled variables, Dechow, Richardson and Tuna (2003) argued that scaling and sample selection bias influence the distribution of earnings. Similarly, Durtschi and Easton (2005; 2009) have challenged the distributional approach on the grounds that the scaling factors, sample selection bias, averaging and accounting methods might influence results. Subsequently, it has been suggested that irregularities in the earnings distribution are not evidence of earnings manipulation. Nonetheless, many authors have affirmed that the results are similar despite different denominators (i.e., Burgstahler and Dichev, 1997; Beatty, Ke and Petroni, 2002; Coppens and Peek, 2005; Gore, Pope and Singh, 2007; Jacob and Jorgensen, 2007; Donelson, Mcinnis and Mergenthaler, 2013; Burgstahler and Chuk, 2015).

Following studies that adopted a distributional approach, this thesis uses scaled variables to address potential heterogeneity issues that result from the sampled firms of different sizes. Similar to Gore, Pope and Singh (2007), lagged total assets was chosen as the scaling factor since private firms do not trade on capital markets. More specifically, for the purpose of this thesis, earnings in year *t* (E_t) are scaled by lagged total assets. Change in earnings between year *t* and the previous year *t-1* (ΔE_t) is scaled by lagged total assets.

Having defined scaling of the variables, another important factor to consider is the choice of bin widths. Different studies use different approaches when deciding the size of bin widths. For instance, for the histogram of earnings level, Jacob and Jorgensen (2007) used a value of 0.5% of the market value of the equity and 0.25% of the market value of the equity for the histogram of earnings changes. On the other hand, Degeorge, Patel and Zeckhauser (1999) used bin widths that depend on the variability of data and the number of observations. They noted that this approach provides precise density estimates and ensures visibility of the underlying patterns of data. Therefore, due to the variability of the sample sizes, the bin widths for the histograms are estimated by following Degeorge, Patel and Zeckhauser (1999). More precisely, a bin width is estimated as $2(\text{IQR})n^{-1/3}$, where IQR is the interquartile range of variable, and *n* is the sample size.

Further, to test the statistical significance of the hypotheses, a similar method to Burgstahler and Dichev (1997) and Gore, Pope and Singh (2007) is used. More specifically, under the null hypothesis of no deviations in a frequency distribution of reported earnings and earnings changes, the distribution is relatively smooth.[50] To test whether the distributions are smooth, standardised differences in the intervals around zero earnings are used. In addition, the standardised difference is the difference between the actual number of observations and the expected number of observations within the small-loss or small-profit intervals, divided by the standard deviation of the difference. It is assumed that the expected number of observations in an interval is equal to the mean of two adjacent

[50] The standardised differences will be approximately normally distributed with a mean 0 and standard deviation 1.

intervals. Because of this, it is clear that this method is concentrated on the data in the two bins around zero; thus, if the sample size is small, test statistics may have low statistical power (Byzalov and Basu, 2019). Subsequently, due to unequal sample sizes of different types of firms, it is essential to rule out the possibility of the low statistical power of the standardised difference test. To increase the validity of the distributional test's findings, Byzalov and Basu's (2019) new distribution discontinuity test without any explanatory variable has been used additionally.

In contrast to the standardised difference, Byzalov and Basu's (2019) test avoids the problem of low statistical power due to its ability to use narrower bins. More specifically, the model merges data from small-loss and small-profit intervals into one discontinuity estimate; thus, it improves the statistical power of the test. In other words, the small-loss or small-profit intervals are considered equally[51] as a single bin (Byzalov and Basu, 2019) for estimation purposes. The test uses two OLS steps. First, to estimate the smooth pre-managed earnings distribution, the data for all bins outside discontinuity (i.e., small-loss and small-profit) intervals are interpolated into discontinuity intervals on the assumption that the distribution of pre-managed earnings is smooth. Then, similar to the standardised differences, the earnings management probability *P(EARN)* is estimated. Specifically, *P(EARN)* is estimated as the difference between the actual distribution of earnings and the predicted pre-managed earnings distribution within the small-loss or small-profit interval.

The Stata estimation command is publicly available; however, it is important to mention that certain estimation settings are discretionary. For instance, the model specification (e.g., Model I or Model II), the size of the meet-or-just-beat intervals around the zero earnings, the estimation intervals, the polynomial order for the interpolation, and the bin widths have to be specified by the researcher. Regarding the model specification for *P(EARN)*, the authors consider two specifications. Model I assume that *P(EARN)* does not vary with the size of the loss (i.e., flat increments), whereas Model II assumes that *P(EARN)* decreases with the larger size of the loss (i.e., triangular increments). In terms of the validation of the standardised difference test, Model I was chosen because its specification is motivated by the standardised difference test. In other words, Model I assume that an upward(downward) shift in the earnings distribution is equal for all small profits(losses).

Furthermore, to validate discontinuities near zero earnings benchmarks (i.e., the statistical significance test results), the same attributes as in the standardised difference test have been adopted. In particular, the sizes of earnings management intervals (i.e., intervals around zero earnings) are based on the same bin widths for the histograms (i.e., IQR bins). Nonetheless, to increase the statistical power of the test, these bin widths are further divided into 0.001 bins. Following Byzalov and Basu (2019), the estimation interval

[51] The earnings distribution is shifted upward (downward) equally for all small profits(losses) (Byzalov and Basu, 2019).

around zero earnings benchmarks is restricted to ±0.04 for each sample. Also, for the probability density function, the third-order polynomial (P = 3) is used.

Before moving forward, it is important to mention that the distributional approach studies do not reveal how managers manipulate earnings (McNichols, 2000). In particular, this research design makes no attempt to assess the extent of earnings management through discretionary accruals. In addition, discretionary accruals are incorporated within the reported earnings; thus, they may cause discontinuities in earnings distribution (Jones, 1991; Gore, Pope and Singh, 2007). Therefore, in order to assess if discretionary accruals are causing discontinuities in earnings distributions, similar to Gore, Pope and Singh (2007), this thesis examines the histograms of scaled non-discretionary earnings (NDE_t) and the scaled non-discretionary earnings change ($ND\Delta E_t$). To put it differently, it is expected that the distributions of NDE_t and $ND\Delta E_t$ are not discontinuous around zero earnings targets; thus, discontinuity is reduced, and frequency distributions are relatively smooth. To determine the non-discretionary levels of earnings and non-discretionary levels of change in earnings (i.e., earnings and change in earnings before discretionary accruals), discretionary accruals are estimated first (see section 5.5.2.3 for the estimation details). Then, to measure NDE_t and $ND\Delta E_t$, discretionary accruals have been deducted from the earnings. In addition, to validate that the NDE_t and $ND\Delta E_t$ distributions are smooth, standardised differences in the intervals around zero earnings and new distribution discontinuity tests are used. The following section discusses the accrual-based studies and the adopted model for the discretionary accruals estimations.

5.5.2. Accruals-based studies

Prior research indicates that the accruals-based methods are the most well-known methods for assessing earnings management in the literature. These methods are particularly useful in studying earnings management practices because the accounting standards allow managers to exercise certain discretion in accounting choices and estimates; this discretion is measured in discretionary accruals. For instance, these policies are related to inventory valuation (e.g., First-In, First-Out), asset revaluation, revenue recognition and depreciation (e.g., assets can be expensed as 10 % or 20 % of the value of the assets over the period of 5 or 10 years). This choice clearly influences reported earnings. Consequently, managers could use accrual manipulation by deliberately altering the figures to reach certain earnings targets (i.e., loss avoidance or sustaining previous years' earnings).

There are two main types of methods used to identify discretionary accruals. One stream of research is focused on specific accruals such as R&D cost capitalization (i.e., Prencipe, Markarian and Pozza, 2008), the provision for bad debts (i.e., McNichols and Wilson, 1988), amongst the others. Nonetheless, as noted by McNichols (2000), there are

certain drawbacks associated with the use of a specific accrual approach. Specifically, this approach is costly because it requires more data and institutional knowledge. Also, the number of firms with specific accruals manipulation could be small. More importantly, in order to identify the extent of earnings manipulation, this approach would require a model for each potentially manipulated specific accrual. For these reasons, it has been decided that the aggregate accruals model is more appropriate for the purpose of this thesis and this is discussed next.

5.5.2.1. The aggregate accruals model

The use of aggregate accruals is one of the more practical ways compared to a specific accrual model to capture earnings manipulation. Also, it is the most widely used approach in earnings management literature. This method is based on the fundamental principle that accruals are part of earnings; thus, they may be used for the manipulation of earnings (Jones, 1991). More precisely, discretionary accruals are a portion of total accruals and they are considered to be the manipulated portion of accounts receivables, inventory, accounts payable, accrued expenses (i.e., other working capital), and depreciation (Ibrahim, 2009).

To determine the discretionary part of total accruals, this method applies regression-based models for the estimation of normal accruals (i.e., not managed or expected) and discretionary accruals (i.e., abnormal or unexpected) (McNichols, 2000; Beneish, 2001). In this context, the calculation of total accruals is required first, followed by the estimation of the discretionary part of accruals. Therefore, the following subsections explain the method further.

5.5.2.2. The measure of total accruals

Generally, there are two methods used to determine total accruals. Some studies use cash flow statements, whereas most of the studies use balance sheet information. Moreover, as previously mentioned, this study considers only a balance sheet-based model because private firms generally report abbreviated financial statements; hence, it is highly likely that cash flow statements might be unavailable.

As noted by Jones (1991) total accruals are a change in revenue and property plant and equipment. Consistent with Healy (1985), Jones (1991) and Dechow, Sloan and Sweeney (1995), total accruals are defined as:

Equation 1: Total accruals

$$\mathrm{TA}_{it} = (\Delta\mathrm{CA}_{it} - \Delta\mathrm{CL}_{it} - \Delta\mathrm{CASH}_{it} + \mathrm{STD}_{it} - \mathrm{DEP}_{it})/(\mathrm{A}_{it\text{-}1}) \quad (1)$$

Where

TA_{it}: total accruals for firm *i* in year *t*;

ΔCA_{it}: change in current assets for firm *i* from year *t-1* to year *t*;

ΔCL_{it}: change in current liabilities for firm *i* from year *t-1* to year *t*;

$\Delta CASH_{it}$: change in cash and cash equivalents for firm *i* from year *t-1* to year *t*;

STD_{it}: change in debt included in current liabilities for firm *i* from year *t-1* to year *t*;

DEP_{it}: depreciation and amortization expense for firm *i* in year *t*;

A_{it-1}: total assets for firm *i* in year *t-1*.

5.5.2.3. Discretionary accruals estimation

The early studies with discussions and analyses of accruals-based earnings management emerged in 1985 with Healy, followed by DeAngelo (1986). One major drawback of their research designs is the assumption that at the time of the analysed event, all the accruals changes are discretionary. Another problem with this approach is that it fails to consider changes in unmanaged earnings (i.e., non-discretionary). In other words, it has been assumed that non-discretionary accruals are constant over time. In order to improve the potential weaknesses of these models, Jones (1991) proposed a regression-based model that indicates that change in revenues and the level of gross, property, plant and equipment determines the level of non-discretionary accruals. A major problem with the Jones model (1991) is that it fails to consider the potential manipulation of revenues into account; thus, non-discretionary accruals are inflated. Specifically, while revenue accruals do not comprise a discretionary component, it is assumed that change in working capital is driven by a change in revenue; hence, the model includes measurement errors and the model's power to detect earnings management is reduced.

Building on the Jones model (1991), Dechow, Sloan and Sweeney (1995) modified her research design (i.e., modified Jones model). They adjusted the Jones model by capturing manipulation through the credit sale in manipulation years. To clarify, in order to capture manipulation through non-cash revenue in the period of earnings manipulation, they adjusted the change in revenues for the change in receivables in the event period. One limitation of this model is that it does not consider the possibility that some part of a change in revenue may be non-discretionary. In other words, it assumes that all changes in the level of credit sales in the event period are the result of earnings manipulations. Also, it has been demonstrated that in cases when a company experienced extreme growth during the test period, in relation to the estimation period, an estimate of discretionary accrual will be inflated (Kothari, Leone and Wasley, 2005).

All the above research designs employed time-series data that require longer periods of data for each company. For instance, Jones (1991) excluded from the sample companies

that have less than fourteen years of time-series observations. This requirement evidently enhances the internal validity of the findings; however, it leads to a smaller sample. Survival bias and decreased sample lead to greater homogeneity of the sample. In other words, it is likely that the observed companies are mature; hence, the external validity or generalisability of the findings is reduced.

To avoid the issue of low external validity and generalisability, Kothari, Leone and Wasley (2005) adopted a cross-sectional design that ensured that firms with brief history are not excluded, which leads to a larger sample that increases external validity. Nevertheless, it is important to note that these studies suffer from lower internal validity on account of the generalisability of the findings. Also, to eliminate changes from performance, this balance sheet accrual-based model estimates cross-sectionally the Jones and Modified Jones models and introduce return on assets (*ROA* in either year *t* or *t-1*) as a regressor; hence, the performance matched model. They also matched firm-year observations with another firm in the same industry with the closest levels of *ROA*. Kothari, Leone and Wasley (2005) revealed that performance matching based on ROA_{t-1} performs worse than on ROA_t.

The use of the Kothari, Leone and Wasley's (2005) performance-adjusted model is one of the most common models in accounting research to capture managers' discretion. Subsequently, their model is adopted for the estimation of discretionary accruals in this thesis by including lagged *ROA* as an additional regressor. The following model is estimated for each industry-year,[52] with at least ten observations:[53]

Equation 2: Performance-adjusted model

$$\mathrm{TA}_{it}=\propto_0+\propto_1(1/\mathrm{A}_{it-1})+\propto_2(\Delta\mathrm{REV}_{it}-\Delta\mathrm{REC}_{it})+\propto_3\mathrm{PPE}_{it}+\propto_4\mathrm{ROA}_{it}+\varepsilon_{it} \quad (2)$$

Where

TA_{it}: total accruals for firm *i* in year *t*, measured as the change in non-cash current assets minus current liabilities plus a change in short-term debt, excluding depreciation, scaled by lagged total assets;

A_{it-1}: total assets for firm *i* in year *t-1*;

$\Delta\mathrm{REV}_{it}$: revenues for firm *i* in year *t* less revenues in year *t-1* scaled by lagged total assets;

$\Delta\mathrm{REC}_{it}$: accounts receivables for firm *i* in year *t* less accounts receivables in year *t-1* scaled by lagged total assets;

PPE_{it}: gross property, plant, and equipment for firm *i* in year *t* scaled by lagged total assets;

ROA_{it}: return on assets[54] for firm *i* in year *t* scaled by lagged total assets;

ε_{it}: error term (i.e., residual).

[52] Industry classification is based on Van Tendeloo and Vanstraelen (2008).
[53] Minimum of ten observation has been chosen based on the prior research (i.e., Kothari, Leone and Wasley, 2005).
[54] *ROA* is measured as net income divided by total assets.

The residuals from the above industry-specific regression model are used to proxy for discretionary accruals. In addition, these discretionary accruals are deducted from the earnings to measure NDE_t and $ND\Delta E_t$ in the previous histogram-based approach. Furthermore, the focus of the thesis is on the magnitude of accruals; thus, similar to Hope, Thomas and Vyas (2013), the absolute values of discretionary accruals (*DAC*) are used to proxy for discretionary accruals. In particular, the higher *DAC* values of firm *i* in year *t* estimated using performance-adjusted model/methodology represents a higher level of earnings manipulation.

Further, to increase the robustness of the findings, Dechow, Sloan and Sweeney's (1995) modified Jones model is used as an alternative specification for the estimation of discretionary accruals. The following model is estimated for each industry-year[55] combination, with at least ten observations:[56]

Equation 3: Modified Jones model

$$\mathrm{TA}_{it}=\propto_0+\propto_1(1/\mathrm{A}_{it\text{-}1})+\propto_2(\Delta\mathrm{REV}_{it}\text{-}\Delta\mathrm{REC}_{it})+\propto_3\mathrm{PPE}_{it}+\varepsilon_{it} \quad (3)$$

Where

TA_{it}: total accruals for firm *i* in year *t*, measured as the change in non-cash current assets minus current liabilities plus a change in short-term debt, excluding depreciation, scaled by lagged total assets;

$\mathrm{A}_{it\text{-}1}$: total assets for firm *i* in year *t-1*;

$\Delta\mathrm{REV}_{it}$: revenues for firm *i* in year *t* less revenues in year *t-1* scaled by lagged total assets;

$\Delta\mathrm{REC}_{it}$: accounts receivables for firm *i* in year *t* less accounts receivables in year *t-1* scaled by lagged total assets;

PPE_{it}: gross property, plant, and equipment for firm *i* in year *t* scaled by lagged total assets;

ε_{it}: error term (i.e., residual).

Similar to the main estimation of discretionary accruals, the absolute values of residuals are used to proxy for discretionary accruals (*MJ_DAC)*. In particular, the higher *MJ_DAC* values of firm *i* in year *t* estimated using modified Jones model/methodology represents a higher level of earnings manipulation.

Having discussed the model for the estimation of discretionary accruals, the next section of this thesis addresses panel data research designs.

[55] Industry classification is based on Van Tendeloo and Vanstraelen (2008).
[56] Minimum of ten observation has been chosen based on the prior research (i.e., Kothari, Leone and Wasley, 2005).

5.5.3. Panel data research designs

To gain a better understanding of earnings management, many recent accounting studies have focused on panel data models (Amir *et al.*, 2015). The term panel data refers to the combination of the same cross-sectional units over different time periods (Baltagi, 2005). In other words, it pools cross-sectional and time-series observations. A major advantage of this approach over the cross-sectional and time-series approaches is that it controls for a time-invariant individual unobserved heterogeneity; thus, it reduces omitted variable bias (Baltagi, 2005). Also, unlike the pooled cross-sections or time-series data, panel data are more informative, have less collinearity among the variables, and provide more variability; hence, their parameter estimates are more reliable (Baltagi, 2005). In other words, by holding individual characteristics constant, only the panel data can identify and measure within and between variations (i.e., effects) (Baltagi, 2005). Statistical models used for panel data are either fixed-effects models, random-effects models, or hybrid models. These models are discussed next.

5.5.3.1. Fixed-effects model vs random-effects model

The vast majority of empirical accounting studies have utilised the fixed-effects model. One reason behind this choice is that the fixed-effects model assumes that the unobserved effects of the firm and time-specific effects are correlated with the main control variables in the model (Amir *et al.*, 2015). In other words, it assumes that a firm's unique characteristics and time could impact or bias the outcome variable. Therefore, any differences between firms and time periods are controlled for by the model. Accordingly, the fixed-effects model is restricted to the variation within each firm (i.e., within-effects variations) and controls for all the unobserved stable variables while completely disregards between variations (Allison, 2005; Kohler and Kreuter, 2012; Bell and Jones, 2014). The greatest strength of this approach is that the 'causal effects' inferences may be drawn since the estimated coefficients cannot be biased due to firms' heterogeneity (i.e., omitted stable characteristics) (Kohler and Kreuter, 2012; Bell and Jones, 2014). However, it is also important to highlight widespread econometric misunderstandings in accounting research that have tended to omit firm fixed effects. In particular, they generally control for time fixed effects and industry fixed effects rather than individual ones (i.e., firm). To this end, models are often incorrectly specified, thereby providing biased coefficient estimates and standard error terms that often lead to incorrect inferences (Amir *et al.*, 2015).

Furthermore, regardless of the discussed advantages of the fixed-effects model and its widespread popularity, it is important to mention that it completely disregards variations between effects or a general effect (Allison, 2005; Bell and Jones, 2014). Consequently, the inferences are limited to the examined sample only (Baltagi, 2005); thus, results cannot be generalised. Another drawback is its incapability to estimate the coefficients for stable or

time-invariant variables (Allison, 2005; Kohler and Kreuter, 2012). For instance, in the case of this thesis, the fixed-effects model would control for all the unmeasured stable characteristics; thus, it would be impossible to estimate coefficients for the size or type of firm variable. In other words, because size[57] is constant, it does not change within the firm, the size would be collinear with a firm variable.

In contrast to the fixed-effects model, the random-effects model assumes random and independent variations across individuals (i.e., firms) and it does not control for omitted stable characteristics of the individuals (Allison, 2005). In other words, unobserved independent variables are not correlated with the residuals (Amir *et al.*, 2015; Bell and Jones, 2014). For this reason, this model could be used for the estimation of time-invariant variable effects (Allison, 2005), such as the type or the firm's size. Another advantage of the random-effects model is that it considers both within and between variations; thus, it has higher degrees of freedom than the fixed-effects model (Allison, 2005). Also, a major advantage of the random-effects model over the fixed-effects model is that findings are generalisable because the individual effects are characterised as random from a population (Baltagi, 2005; Bell and Jones, 2014). For this reason, inferences are not restricted to the analysed sample only.

Despite the advantages, there are certain problems with the use of the random-effects model. First, the random-effects model is not used widely in accounting studies (Amir *et al.*, 2015). Clearly, the underlying reason for that is the exogeneity assumption. In other words, the random-effects model assumes that the residuals are independent of explanatory variables (Bell and Jones, 2014). In the case of the accounting studies, this would mean that the individual-specific effects such as unobserved firm and time effects are random and uncorrelated with the explanatory variables. Subsequently, it is highly likely that the between-effects would be biased by omitted variables that are correlated with explanatory variables (Allison, 2005).

By taking everything into consideration, it is clear that discussed methods may not be appropriate for the purpose of this thesis. More specifically, by disregarding the between-effects, the fixed-effects model provides an unbiased estimate because it controls for all omitted variables. On the other hand, only the random-effects model allows the inclusion of time-invariant variables. Nevertheless, the random-effects model imposes an exogeneity assumption; thus, it may provide biased estimates. Subsequently, the section that follows moves on to consider the hybrid model known as the between-within method.

[57] Although little variations within-firms may exist.

5.5.3.2. Hybrid model or between-within model

As indicated previously, none of the discussed models seems to be suitable for the objectives of the test. On the one hand, the fixed-effects model controls for the differences within individuals and provides unbiased estimates. Nevertheless, with respect to this thesis, it does not allow the inclusion of time-invariant or static variables that are of the main interest of this thesis (i.e., size, type of the firm, or the ownership dispersion variables). In other words, it is not possible to investigate the relationship between size and earnings management. On the other hand, the random-effects model allows the inclusion of these variables. However, it may provide biased estimates due to omitted variables. Subsequently, a hybrid, or as recently defined, the between-within model (Allison, 2005; Allison, 2014), is considered next.

As the name suggests, the between-within method, or hybrid method, is a random-effects model with embedded fixed-effects estimators within the model (Allison, 2014). In other words, this method benefits from the combination of both between and within effects. Subsequently, this approach derives substantial benefits from both fixed-effects and random-effects models (Allison, 2014). The major benefit of this approach is that it uses a random-effects model configuration; hence, it avoids the problems related to the fixed-effects model. In particular, it allows the inclusion of time-invariant variables or higher-level variables (Allison, 2005; Bell and Jones, 2014) which are the main interest of this thesis. Another important advantage of this method is that it provides unbiased within-effects estimates of the coefficient that are identical or very similar to the estimates of fixed-effects models (Allison, 2005; Schunck, 2013; Allison, 2014; Bell and Jones, 2014). Nonetheless, similar to the estimates of random-effects models, it is important to note that time-invariant (i.e., higher-level) effects may still be biased due to omitted variables (Bell and Jones, 2014).

In summary, it has been shown that the between-within method is seeming to be more superior over the others for the purpose of this thesis. Whereas the fixed-effects method tends to be more accepted in the accounting literature, the between-within method clearly avoids certain problems associated with the fixed-effects model. Most importantly, this method offers an effective way to measure the effects of time-invariant variables which are of central interest to this thesis. Additionally, it also provides the same estimates of the coefficients as the fixed-effects model. Therefore, to capture the effect of the size and other time-time invariant variables on the earnings management phenomenon, this method is adopted. The model is specified in the following section.

5.5.4. Model specification

The between-within panel data regression model has been adopted to test all the testable hypotheses throughout this thesis. As previously mentioned, this model embeds fixed-effects estimates within the random-effects model (Allison, 2014). In the context of this thesis, this model estimates both the between-firm[58] effect and the part of the within-firm effect while providing estimates for the time-invariant variables of the interest. Following Allison (2005), Schunck (2013), Bell and Jones (2014), and Bell, Fairbrother and Jones (2019), the general equation for the adopted model is as follows:

Equation 4: Between-within panel data model

$$\gamma_{it} = \beta_0 + \sum_{j=1}^{J} \beta_{Wj}(X_{ijt} - \bar{X}_{\iota}) + \sum_{j=1}^{J} \beta_{Bj}\bar{X}_{\iota} + \sum_{j=1}^{J} \beta_{Zi} + \upsilon_i + \varepsilon_{it} \qquad (4)$$

Where

γ_{it}: the outcome variable for firm *i* in year *t*;

β_0: intercept;

β_W: within-firm regression coefficient;

β_B: between-firm regression coefficient;

β_Z: time-invariant[59] regression coefficient;

X_{ijt}: independent variable *j* for firm *i* in year *t*;

$\bar{X}_i$: mean of independent variable *j* for firm *i* (i.e., cluster-specific mean[60]);

$(X_{ijt} - \bar{X}_j)$: cluster component (i.e., deviation scores[61] known as group mean centring of the independent variable);

υ_i: the error term of time-invariant variable and the random intercept (i.e., the model's (homogenous) random effects for firm *i*);

ε_{it}: the error term of time-variant variables (i.e., homoscedastic residuals).

With respect to the β_W coefficients in Equation 4, it is important to mention that these estimates represent firm fixed-effects estimates. On the other hand, in Equation 4 β_B coefficients represent firm random-effects estimates. In addition, the model could be run without the cluster-specific means ($\bar{X}_i$), nonetheless, the inclusion of this variable ensures that the effects of time-invariant variables (β_{Zi}) are more reliable (Allison, 2005). In particular, the estimates of the time-invariant variables are corrected for random effect cluster differences (Schunck, 2013).

[58] However, the between-firm coefficients are generally not informative because they are confounded with the unobservable variables' effects; thus, they are not presented in the results for simplicity (Allison, 2005).
[59] Varies only between firms.
[60] Following Schunck (2013), the cluster-specific means are computed with the center command within Stata (Jann, 2007).
[61] Following Schunck (2013), the deviation scores are computed with the center command within Stata (Jann, 2007).

In addition, as indicated previously, the *DAC* variable is used to proxy for the level of earnings manipulation. Therefore, to test for the differences in earnings management levels, an outcome variable for all the testable hypotheses is *DAC* in the main between-within panel data analyses. Furthermore, to determine how specific factors of private firms influence the levels of earnings management, specific time-invariant variables are included in the between-within panel data regression model of each testable hypothesis. In particular, to estimate the effect of regulatory size, the *SIZE* variable is included in the regression model for H1. The *TYPE* variable is included in the regression model for H2 to capture the effect of controlling interest. In the test for the H3 *OWN* variable is included to estimate the effect of ownership dispersion. To estimate the effect of different standards in the H4 *STND* variable is included. The *LEV_TYPE* variable estimates the effect of leverage in H5. Finally, the *SIZE* and *AUDIT* variables are included in the regression model for H6 to capture the effect of audit on earnings management levels across differently sized private firms (see Appendix III for the additional details of the variables and the relevant section in chapter seven for the full model specification for each hypothesis).

Having defined the adopted between-within panel data regression model, the following section discusses preliminary testing to ensure the suitability of the model.

5.5.4.1. Preliminary testing

To ensure that the adopted between-within panel data regression model is suitable for the data the preliminary testing is performed. First, to determine if the random-effects model is suitable, the Breusch-Pagan Lagrange multiplier test is performed. Under the null hypothesis, there are zero variances across entities (Breusch and Pagan, 1980). In other words, if significant differences across firms are confirmed, the null hypothesis of homoscedasticity is not rejected, and the random-effects model is appropriate.

Two subsequent Wald tests are performed to determine whether time and industry effects are required in the model. The null hypothesis of the Wald test is that the variables of interest (i.e., *Year*, *Industry*) are jointly equal to zero. To put it differently, if the null hypothesis is not rejected, the test suggests significant differences across time and industries; thus, the result suggests that they should be included in the model. Having discussed how preliminary testing of the model is performed, the following section provides control variables.

5.5.4.2. Control variables

This thesis examines the earnings management practices of the small, medium, large private firms and PLCs in the UK. The primary inclusion criterion for the control variables is the association of measures with the accruals quality of the firms based on the prior accounting research. There are different groups of factors affecting the accruals quality;

therefore, based on previous studies (i.e., Ball and Shivakumar, 2005; Burgstahler, Hail and Leuz, 2006; Minnis, 2011; Hope, Thomas and Vyas, 2013; Liu and Skerratt, 2018) control variables are included in all the regressions analyses, and they are discussed below.

First, as discussed in the second and fourth chapter of this thesis, different types of financing may affect the level of accruals. Therefore, it is important to control for financing and liquidity risks. To control for the financial leverage of the firms, the debt ratio, measured as end-of-year total liabilities divided by the end-of-year book value of equity (*Lev*), is included first. The quick ratio (QR) measured as end-of-year current assets divided by end-of-year current liabilities is included in regressions to control for short-term liquidity.

After controlling for liquidity and financing risk, it is important to consider growth performance as the potential source that may affect the quality of accruals between private and PLCs differently. To account for the growth of the firm, two variables are included in the model. The growth in revenue (*Growth_REV*) measured as the percentage change in sales in the current year *t* from year *t-1*, and the growth in assets (*Growth_A*) measured as the percentage change in total assets in the current year *t* from year *t-1*.

As already mentioned in the second chapter of this thesis, another fundamental difference between private firms and PLCs is firm size. To control for the differences in size,[62] the natural logarithm of total assets (*Log_*A) is commonly used; hence, it is included in regressions.

With respect to performance and profitability, the cumulative percentage of sample years that the firm reported a loss (*Loss)* and the return on assets (*ROA*) measured as end-of-year net income divided by lagged total assets are included. Finally, *Industry*[63] and *Year* have been included in all the models as well.

5.5.5. Propensity score matching (PSM)

As indicated previously, the estimates of time-invariant variables may still be potentially biased due to omitted variables. To assess the robustness of the main findings, PSM samples of observations are analysed next. PSM is a method of sampling that reduces the dissimilarities of covariates (i.e., matching characteristics) between groups; hence, it adjusts for confounding variables (Rosenbaum and Rubin, 1983; Shipman, Swanquist and Whited, 2017). Nonetheless, PSM produces smaller samples that reduce the generalisability of findings (Shipman, Swanquist and Whited, 2017); hence, it is used only to examine the sensitivity of the main findings.

[62] *Log_A* is the proxy for size in multivariate analysis; however, it is not the main measure of small, medium and large private firms.
[63] *Industry* classification is based on Van Tendeloo and Vanstraelen (2008).

The first step in the PSM process is to assign observations in treatment and control groups. Then, the prediction model is defined. As suggested by Shipman, Swanquist and Whited (2017), unless stated differently, the samples of treatment and control groups are then matched on the same variables included in the main model using the estimated likelihood of receiving treatment. To ensure closeness of firm characteristics in the matched sample, following prior literature (i.e., Leung and Veenman, 2018) a caliper[64] distance of 0.01 is used. The closeness of the match decreases covariates difference and potentially reduces bias in the treatment effect (DeFond, Erkens and Zhang, 2017). Additionally, to ensure that the results are not driven by the imposed caliper restriction, results are also examined with a narrower caliper of 0.00005 (e.g., Hope, Thomas and Vyas, 2013). Further, following previous studies (Shipman, Swanquist and Whited, 2017; Leung and Veenman, 2018) propensity scores of treatment and control groups are matched as one-to-one without replacement[65] with the closest propensity score.[66]

The final step of PSM is the assessment of the quality of the matched sample. First, the average propensity scores between the treatment and control group are compared. Then, to test for a covariate balance, the initial logit regression is re-run with the matched sample to ensure statistical insignificance of difference in the PSM sample. The detailed process for the matching is outlined for each hypothesis in chapter seven of the thesis. Moreover, the assessment of the quality of the matched sample is presented in the relevant appendices.

5.5.6. Additional robustness tests

To further examine the robustness of the main findings, two additional tests are performed, and the results are presented in the relevant appendices. First, the OLS model is fit in a similar way to the main models for all the testable hypotheses. In particular, models are estimated with *DAC* variable as dependant variable including control variables that are not transformed, and the general equation for the adopted model is as follows:

Equation 5: OLS model

$$\gamma_i = \alpha_0 + \alpha_p \sum X_{ijt} + \varepsilon_i \quad (5)$$

Where

γ_{it}: the outcome variable for firm *i* in year *t*;

α_0: intercept;

α_p: regression coefficient for firm;

[64] A caliper distance is the maximum allowable difference between propensity scores for the matching purpose (Shipman, Swanquist and Whited, 2017; DeFond, Erkens and Zhang, 2017).
[65] Each control variable is matched only once.
[66] A propensity score is aggregated measure of all variables; hence, it reduces the differences in covariates.

X_{ijt}: independent variable *j* for firm *i* in year *t*;

ε_i: error term (i.e., residual).

Furthermore, similar to the main analysis, additional sensitivity analysis is performed with a between-within panel data regression model. More specifically, models are estimated for all the testable hypotheses with an alternative measure of discretionary accruals (i.e., *MJ_DAC*) as a dependent variable (see Equation 3 in section 5.5.2.3 for the estimation).

5.6. Conclusion

The focus of this thesis is on the comparison of the magnitude of earnings management between small, medium, large private firms and PLCs. This chapter provided an outline of the main components of the research strategy. The annual accounts of UK private and PLCs have been collected using the FAME database over the period 2006 to 2018. To estimate the prevalence of earnings management, the univariate cross-sectional design is adopted first for all the testable hypotheses. More specifically, the distribution of reported earnings in relation to basic benchmarks such as the earnings level benchmark (i.e., loss avoidance) or earnings change benchmark (i.e., sustaining the previous year's earnings) are examined first. Further, to establish if discretionary accruals affect distributions of interest, non-discretionary level of earning and non-discretionary change in earnings are examined as well. To increase the validity of the findings, another angle to research design is considered. Therefore, multivariate analysis that concentrates on differences in accounting choices (or accrual-based manipulations) is considered next. To gain a better understanding of the differences between firms of interest (i.e., to test all the testable hypotheses), a panel data design is used next. It has been concluded that the multivariate between-within regression is most appropriate for the purposes of hypotheses testing. Put it differently, the hybrid model approach was adopted to assess earnings management practices of the small, medium, large private firms and PLCs. Using the absolute value of discretionary accruals, multivariate regression is estimated, and the robustness of the findings is tested on PSM samples. Moreover, two additional tests are performed for the robustness of the findings. More specifically, the OLS models and the between-within regression models with an alternative measure of discretionary accruals are estimated.

Chapter Six

Descriptive and Univariate Analysis

6.1. Objectives

The primary objective of this chapter is to provide and interpret descriptive statistic and to discuss the results of univariate analyses across all the testable hypotheses. Each section presents analysis with respect to one hypothesis. Subsequently, there are six sections that examine descriptive statistics and correlations first, followed by the univariate analyses of frequency distributions and discontinuity tests results.

6.2. Introduction

As outlined previously, this thesis assesses the earnings management levels between private firms and PLCs (H1). To address the first hypothesis, the next section of this chapter examines summary statistics and correlation coefficients of the small, medium, and large private firms and PLCs in the UK. Furthermore, to determine if there is a difference in earnings management levels between different sizes of private firms compared to PLCs, frequency distributions of scaled earnings and non-discretionary earnings, followed by frequency distributions of changes in earnings and non-discretionary changes in earnings are provided and discussed.

The second set of analyses in section 6.4 explores the levels of earnings management across stand-alone private firms and private subsidiaries of PLCs (H2). Specifically, to obtain preliminary information on the characteristics of these firms, summary statistics and correlation coefficients are discussed first, followed by the univariate analysis. To examine whether there are differences in earnings management levels, frequency distributions of scaled earnings and non-discretionary earnings are examined first, followed by frequency distributions of changes in earnings and non-discretionary changes.

To investigate the implication of ownership concentration on earnings management levels across private firms (H3), section 6.5 provides summary statistics for the sample of private firms across ownership dispersion. The correlation table is analysed next, followed by the frequency distributions. To gain insight into the levels of earnings management between private firms of different level of ownership concentration, frequency distributions of scaled earnings and non-discretionary earnings, and frequency distributions of changes in earnings and non-discretionary changes are compared.

To address H4 of this thesis, section 6.6 provides and discusses descriptive statistics, correlation table and univariate analysis for the sample of private firms that prepare financial statements across different accounting standards (i.e., UK GAAP and IFRS). In particular, to detect if there are different earnings management practices, scaled earnings and non-discretionary earnings frequency distributions are discussed first. The frequency distributions of changes in earnings and non-discretionary changes are analysed next.

Section 6.7 focuses on the implications of leverage on earnings management levels in private firms and PLCs (H5). Therefore, to explore how leverage affects levels of earnings management across private firms compared to PLCs, summary statistics and correlation coefficients are discussed first. Then, to gain further information, frequency distributions of scaled earnings, non-discretionary earnings, changes in earnings and non-discretionary changes in earnings are examined next.

The final set of the analysis in this chapter focuses on the sample of private firms across audit (H6). Specifically, the descriptive statistics and correlations for the sample of all the private firms divided into audited and unaudited firms are analysed first. Then, to understand how earnings management levels may vary between audited private firms, frequency distributions are examined. In particular, the frequency distribution of scaled earnings and non-discretionary earnings, followed by the frequency distribution of changes in earnings and non-discretionary changes in earnings.

6.3. Earnings management across small, medium, and large private firms and PLCs

6.3.1. Descriptive statistics and correlations

This section shows descriptive statistics for the small, medium, and large private firms and PLCs samples between 2006 and 2018. Table 6.1 below provides the summary statistics for the main variables used in the main analysis for the sample of private firms (N = 180,302) and PLCs (N = 3,818).

With respect to earnings levels, it is apparent from this table that the standard deviation of E_t for all the sampled firms is lower than the standard deviation of NDE_t. Regarding the change in earnings, similar results are revealed. In particular, the standard deviation for ΔE_t for all the sampled firms is lower than the standard deviation of $ND\Delta E_t$. To this end, the results indicate that both earnings and change in earnings are less scattered compared to non-discretionary earnings and non-discretionary earnings change.

The comparison of the mean and median for *DAC* values indicates that private firms have higher *DAC* compared with PLCs, suggesting that on average private firms may manipulate earnings to a greater extent than PLCs. More specifically, it can be seen that small private firms have the highest mean and median values of *DAC* (0.121 and 0.083, respectively) compared with the rest of the sampled firms. This finding is consistent with that of Hope, Thomas and Vyas (2013) who demonstrated that private firms have lower accrual quality (i.e., higher levels of discretionary accruals) than PLCs.

Table 6.1: Descriptive statistics for the small, medium, large private and PLCs sample

	N	Mean	Std. Dev.	25%	50%	75%	Min	Max
Small private firms								
E_t	36,426	0.086	0.116	0.017	0.063	0.135	-0.322	0.668
NDE_t	36,426	0.086	0.198	-0.021	0.071	0.186	-0.963	1.131
ΔE_t	36,426	0.007	0.099	-0.034	0.003	0.043	-0.418	0.531
$ND\Delta E_t$	36,426	0.007	0.193	-0.088	0.007	0.108	-1.093	1.019
DAC	36,426	0.121	0.121	0.037	0.083	0.164	0.000	0.854
Lev	36,426	2.837	5.069	0.605	1.305	2.913	0.061	76.545
QR	36,426	2.176	1.826	1.184	1.605	2.451	0.083	17.027
Growth_REV	36,426	0.062	0.277	-0.073	0.035	0.156	-0.808	2.608
Growth_A	36,426	0.073	0.243	-0.061	0.047	0.178	-0.627	1.877
Log_A	36,426	8.251	0.949	7.669	8.327	8.866	4.970	14.141
Loss	36,426	0.144	0.253	0.000	0.000	0.222	0.000	0.144
ROA	36,426	0.086	0.116	0.017	0.063	0.135	-0.322	0.668
Medium private firms								
E_t	69,495	0.075	0.099	0.019	0.057	0.115	-0.320	0.667
NDE_t	69,495	0.078	0.155	-0.004	0.068	0.155	-0.842	1.159
ΔE_t	69,495	0.008	0.080	-0.025	0.004	0.037	-0.417	0.531
$ND\Delta E_t$	69,495	0.011	0.151	-0.061	0.012	0.086	-1.132	0.911
DAC	69,495	0.093	0.096	0.028	0.063	0.123	0.000	0.857
Lev	69,495	2.589	4.008	0.715	1.410	2.805	0.094	63.903
QR	69,495	1.805	1.218	1.104	1.453	2.098	0.142	10.801
Growth_REV	69,495	0.076	0.204	-0.029	0.054	0.152	-0.519	1.646
Growth_A	69,495	0.085	0.195	-0.025	0.058	0.167	-0.495	1.392
Log_A	69,495	9.125	0.640	8.701	9.066	9.477	6.267	13.784
Loss	69,495	0.130	0.240	0.000	0.000	0.182	0.000	1.000
ROA	69,495	0.075	0.099	0.019	0.057	0.115	-0.320	0.667
Large private firms								
E_t	74,381	0.064	0.089	0.016	0.049	0.098	-0.323	0.664
NDE_t	74,381	0.060	0.156	-0.016	0.052	0.135	-0.938	1.084
ΔE_t	74,381	0.006	0.072	-0.019	0.004	0.030	-0.414	0.530
$ND\Delta E_t$	74,381	0.003	0.154	-0.067	0.004	0.077	-1.082	0.960
DAC	74,381	0.096	0.104	0.028	0.063	0.126	0.000	0.931
Lev	74,381	3.299	5.347	0.843	1.711	3.587	0.077	90.223
QR	74,381	1.695	1.255	1.047	1.348	1.933	0.095	12.205
Growth_REV	74,381	0.088	0.228	-0.022	0.057	0.156	-0.556	2.281
Growth_A	74,381	0.090	0.208	-0.021	0.059	0.169	-0.516	1.916
Log_A	74,381	10.606	1.331	9.744	10.387	11.296	6.896	18.031
Loss	74,381	0.139	0.246	0.000	0.000	0.200	0.000	1.000
ROA	74,381	0.064	0.089	0.016	0.049	0.098	-0.323	0.664
PLCs								
E_t	3,818	0.046	0.096	0.013	0.049	0.093	-0.321	0.585
NDE_t	3,818	0.066	0.117	0.013	0.068	0.123	-0.674	0.838
ΔE_t	3,818	0.010	0.083	-0.018	0.008	0.035	-0.417	0.531
$ND\Delta E_t$	3,818	0.030	0.115	-0.022	0.027	0.077	-0.837	0.841
DAC	3,818	0.058	0.063	0.019	0.039	0.073	0.000	0.631
Lev	3,818	1.675	1.807	0.702	1.140	2.017	0.096	25.043
QR	3,818	1.606	1.122	0.982	1.347	1.864	0.200	12.306
Growth_REV	3,818	0.121	0.306	-0.011	0.071	0.187	-0.710	4.112
Growth_A	3,818	0.110	0.257	-0.019	0.056	0.169	-0.471	2.228
Log_A	3,818	12.485	2.400	10.686	12.258	14.188	6.203	19.621
Loss	3,818	0.193	0.294	0.000	0.000	0.286	0.000	1.000
ROA	3,818	0.046	0.096	0.013	0.049	0.093	-0.321	0.585

Notes: E_t is the scaled earnings, measured as end-of-year net income divided by lagged total assets; NDE_t is the scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*; ΔE_t is the scaled change in earnings, measured as end-of-year net income less net income in year *t-1* divided by lagged total assets; $ND\Delta E_t$ is the scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t,* estimated with the performance-adjusted model in year *t*; *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.

Similar to Hope, Thomas and Vyas (2013), in order to gain insight into differences in the strength of association between DAC and other variables across different sizes of firms, Table 6.2 below provides the Pearson correlation coefficients of the small, medium, and large private firms and PLCs, separately.

Table 6.2: Pearson correlations for the small, medium, large private and PLCs sample

Panel A: Pearson correlations for small private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.053*	1.000						
(3) QR	-0.014*	-0.259*	1.000					
(4) Growth_REV	0.090*	0.045*	-0.090*	1.000				
(5) Growth_A	0.195*	0.049*	-0.052*	0.365*	1.000			
(6) Log_A	-0.062*	-0.003	0.064*	0.007	0.082*	1.000		
(7) Loss	-0.007	0.163*	-0.072*	-0.054*	-0.122*	-0.022*	1.000	
(8) ROA	0.139*	-0.192*	0.106*	0.222*	0.345*	-0.110*	-0.436*	1.000

Panel B: Pearson correlations for medium private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.065*	1.000						
(3) QR	0.007	-0.293*	1.000					
(4) Growth_REV	0.081*	0.049*	-0.076*	1.000				
(5) Growth_A	0.210*	0.037*	-0.033*	0.400*	1.000			
(6) Log_A	-0.021*	-0.066*	0.140*	-0.006	0.075*	1.000		
(7) Loss	0.001	0.181*	-0.117*	-0.064*	-0.143*	0.034*	1.000	
(8) ROA	0.127*	-0.204*	0.197*	0.225*	0.361*	-0.052*	-0.435*	1.000

Panel C: Pearson correlations for large private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.076*	1.000						
(3) QR	0.015*	-0.229*	1.000					
(4) Growth_REV	0.107*	0.058*	-0.071*	1.000				
(5) Growth_A	0.237*	0.067*	-0.037*	0.376*	1.000			
(6) Log_A	-0.001	0.017*	0.047*	0.003	0.037*	1.000		
(7) Loss	-0.016*	0.161*	-0.104*	-0.042*	-0.118*	0.037*	1.000	
(8) ROA	0.130*	-0.199*	0.175*	0.175*	0.302*	-0.040*	-0.431*	1.000

Panel D: Pearson correlations for PLCs

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.076*	1.000						
(3) QR	0.093*	-0.250*	1.000					
(4) Growth_REV	0.110*	-0.042*	0.013	1.000				
(5) Growth_A	0.257*	-0.052*	0.078*	0.403*	1.000			
(6) Log_A	-0.191*	0.189*	-0.114*	-0.116*	-0.077*	1.000		
(7) Loss	0.139*	0.024	0.082*	0.044*	-0.088*	-0.308*	1.000	
(8) ROA	-0.039*	-0.108*	0.005	0.089*	0.254*	0.155*	-0.615*	1.000

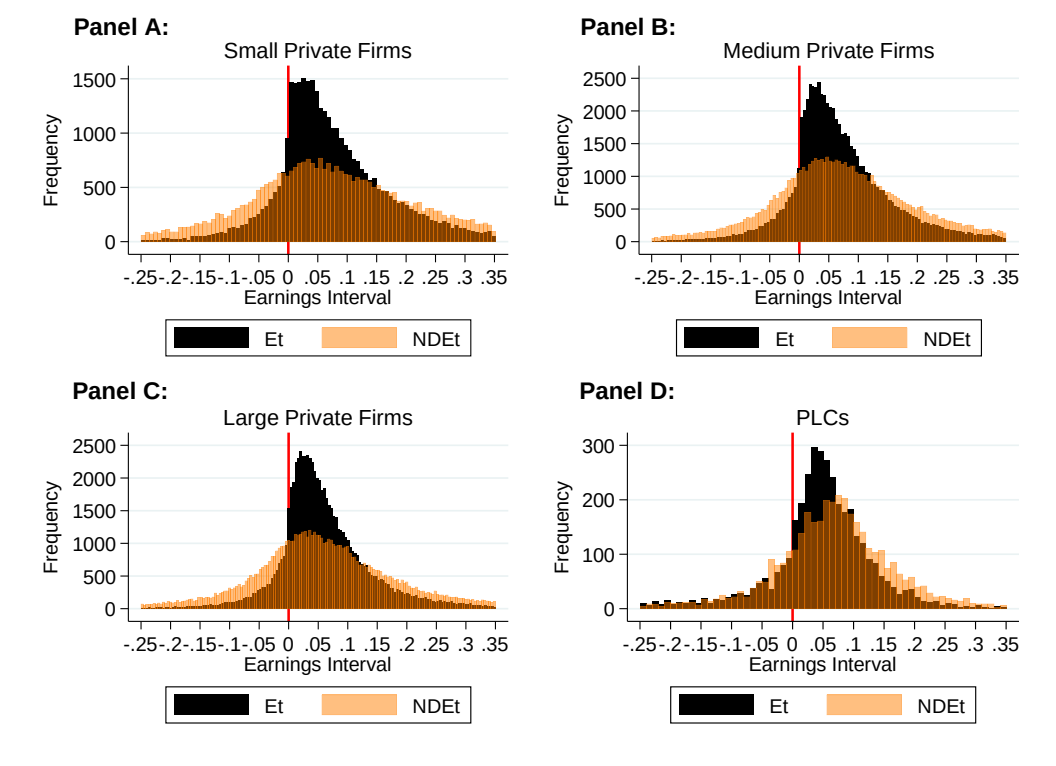
Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.
* Indicates significance at the 5 percent level.

As expected, there is a significant and positive correlation between *Lev* and *DAC* in all the panels, suggesting that more leveraged firms are more likely to manipulate reported earnings. The correlations for *QR*, are mixed suggesting that liquidity risk may drive earnings management differently between the different sizes of firms. More specifically, in Panel C and Panel D, *QR* is positively correlated with *DAC* suggesting that large private firms (0.015, significant at p = 0.05) and PLCs (0.093, significant at p = 0.05) are more concerned about the short-term liquidity. Also, similar to other studies, *Log_A* is generally negatively correlated with *DAC*, implying that the bigger the firm is, the less likely it is to manage earnings. Regarding the growth, it is apparent that both *Growth_REV* and *Growth_A* are significantly and positively related to the level of earnings management. Interestingly, it seems that *Loss* in private firms does not drive earnings management, whereas, in Panel D, there is a significant positive correlation of *Loss* with *DAC* for the sample of PLCs (0.139, significant at p = 0.05). On the contrary, correlations between *ROA* and *DAC* reveal that *ROA* may drive earnings management in private firms, whereas in Panel D, it is negatively correlated with *DAC* (-0.039, significant at p = 0.05) for the sample of PLCs. The following sections compare cross-sectional distributions of earnings variables and present a test for the statistical significance of the hypothesis that the frequency distribution is smooth.

6.3.2. The distribution of scaled earnings

To gain a preliminary insight into levels of the earnings management between small, medium, and large private firms and PLCs (H1), the distributions of annual net earnings and non-discretionary earnings scaled by lagged total assets are presented first. Figure 6.1 below shows the results of univariate analysis of H1 by comparing the distributions of earnings and non-discretionary earnings for the period 2006 to 2018.

Figure 6.1: The frequency distribution of scaled annual earnings compared to annual non-discretionary scaled earnings across small, medium, and large private firms and PLCs for the period 2006 to 2018 (E_t vs NDE_t)



Notes: The distribution of annual net income divided by lagged total assets and the distribution of annual non-discretionary earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: small private firms (0.007), medium private firms (0.005), large private firms (0.004) and PLCs (0.010). The location of zero on the horizontal axis is marked by the line. The first interval to the right of zero contains all observations in the interval [0, 0.007) for the small private firms, [0, 0.005) for the medium private firms, [0, 0.004) for the large private firms and [0, 0.010) for the PLCs. The vertical axis labelled frequency represents the number of observations in each scaled earnings and non-discretionary scaled earnings interval.

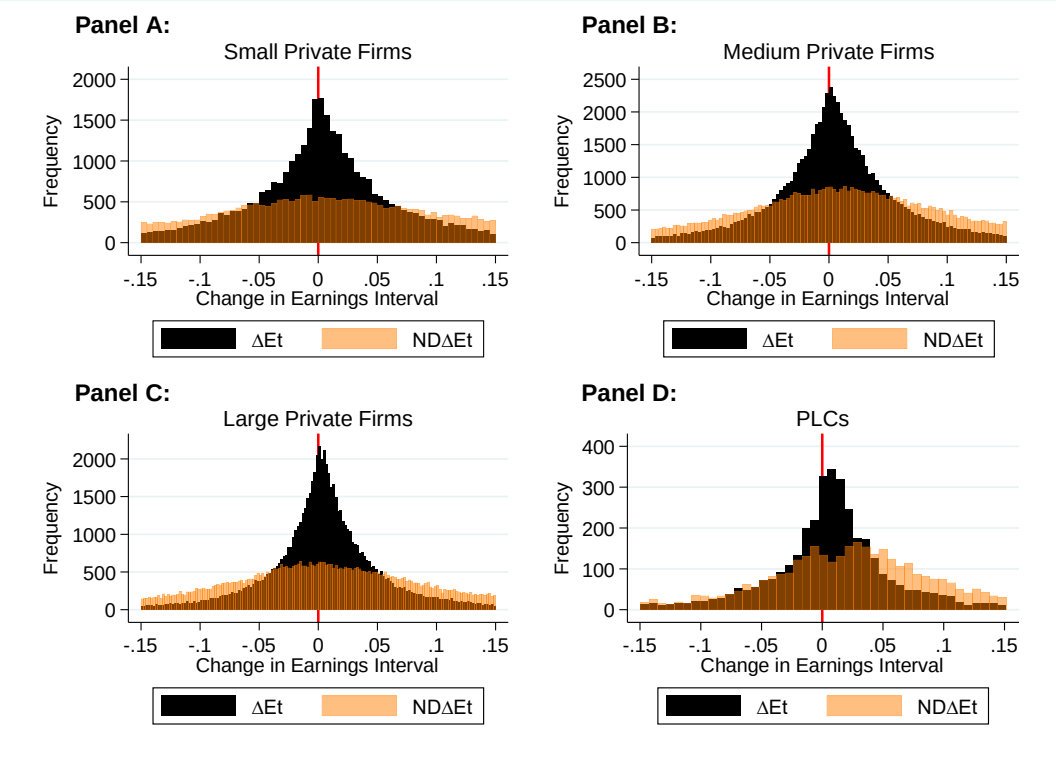
As explained in the previous chapter, if there is earnings management, it is expected that the frequency distribution is discontinuous around zero earnings. Also, if discretionary accruals are excluded from the earnings discontinuities around zero earnings, it is expected that discontinuities will be minimised, resulting in a relatively smooth frequency distribution. Panel A of Figure 6.1 reveals that the frequency distribution of earnings of small private firms exhibits the most distinct discontinuity at zero levels compared to others suggesting that they may manipulate reported earnings to avoid losses the most. What also stands out in Figure 6.1 above is that there is a clear difference between the reported earnings and non-discretionary earnings levels. As expected, Panel A demonstrates that discontinuity around zero earnings benchmark is minimised after removal of discretionary accruals. Subsequently, the frequency distribution of non-discretionary earnings is relatively smoother than the frequency distribution of reported earnings. The most interesting aspect of histograms reported in Figure 6.1 is that these differences seem to be more pronounced in Panel A, Panel B and Panel C (i.e., private firms) than Panel D (i.e., PLCs). Therefore,

they are suggesting that private firms may manipulate earnings through accruals manipulations to avoid losses more than PLCs.

6.3.3. The distribution of scaled change in earnings

To assess the earnings management between small, medium, and large private firms and PLCs (H1) further, this section focuses on earnings management to avoid earnings declines. Figure 6.2 below presents the comparison of the frequency distributions of change in earnings and non-discretionary change in earnings for the period 2006 to 2018.

Figure 6.2: The frequency distribution of scaled changes in earnings compared to non-discretionary changes in scaled earnings across small, medium, and large private firms and PLCs for the period 2006 to 2018 (ΔE_t vs $ND\Delta E_t$)



Notes: The distributions of changes in annual net income divided by lagged total assets and the distributions of non-discretionary changes in earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the change in earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: small private firms (0.005), medium private firms (0.003), large private firms (0.002) and PLCs (0.007). The location of zero on the horizontal axis is marked by the line. The first interval to the right of zero contains all observations in the interval [0, 0.005) for the small private firms, [0, 0.003) for the medium private firms, [0, 0.002) for the large private firms and [0, 0.007) for the PLCs. The vertical axis labelled frequency represents the number of observations in each scaled earnings change and non-discretionary scaled earnings change interval.

As discussed above, if there is earnings management, there would be unusually low frequencies of earnings changes and unusually high frequencies of change in earnings. Further, similar to the previous test, it is expected that the exclusion of discretionary accruals results in a smoother frequency distribution. Regarding the earnings management to avoid declines in earnings, Panel D (i.e., PLCs) illustrates that PLCs have the highest frequencies

of positive earnings changes compared to other panels (i.e., private firms). Panel D also reveals that the frequency of earnings changes below zero seems to be lower compared to the frequency of positive earnings. These results imply that PLCs may be more inclined to manipulate reported earnings to avoid earnings declines than private firms (i.e., Panel A, Panel B and Panel C). Furthermore, as can be seen from the histograms in Figure 6.2 above, non-discretionary change in earnings is spread more widely than changes in earnings. The difference between changes in earnings and non-discretionary change in earnings suggests that firms may use their discretion to increase the frequency of small positive change in earnings. A comparison of panels in Figure 6.2 reveals that the removal of discretionary accruals reduces the frequencies of small positive changes in earnings. Interestingly, when Panel D (i.e., PLCs) is compared with other panels (i.e., private firms) of Figure 6.2, it seems that PLCs use their discretion more profoundly to reduce the frequency of largely positive changes in earnings than private firms (i.e., Panel A, Panel B and Panel C).

6.3.4. Statistical significance of discontinuities

As indicated previously, the analysed frequency distributions suggest that both private firms across different sizes and PLCs manipulate their earnings to meet or beat certain earnings thresholds (i.e., loss avoidance and avoidance of earnings decreases). Despite that, it is important to validate if observed discontinuities within frequency distributions are statistically significant and whether the removal of discretionary accruals results in smoother distributions. To test the statistical significance of the deviations in the frequency distributions above, the null hypothesis of smooth distribution (i.e., no earnings management) for the bins immediately adjacent to zero is tested below. The focus on the intervals immediately adjacent to zero is based on the fact that earnings management to meet or beat zero earnings threshold results in a discontinuity at zero; thus, if there is earnings management, those two intervals will be affected simultaneously and vice versa (Burgstahler and Dichev, 1997). The results of Burgstahler and Dichev's (1997) standardised difference test and Byzalov and Basu's (2019) new distribution discontinuity test relating to the reported frequency distributions in Figure 6.1 and Figure 6.2 are presented in Table 6.3 below.

Table 6.3: Distributions of near-zero earnings and non-discretionary earnings relative to targets across small, medium, and large private firms and PLCs for the period 2006 to 2018

	N	Std. Diff. i < 0	p-value	Std. Diff. i > 0	p-value	t-value
Panel A: Earnings level						
Small private firms	36,426	-7.96***	0.000	8.66***	0.000	9.63***
Medium private firms	69,495	-9.95***	0.000	9.91***	0.000	12.88***
Large private firms	74,381	-5.87***	0.000	6.04***	0.000	8.54***
PLCs	3,818	-2.50**	0.012	1.58	0.113	1.99**
Panel B: Non-discretionary earnings level						
Small private firms	36,426	-0.25	0.805	-0.13	0.897	0.12
Medium private firms	69,495	0.77	0.442	-0.36	0.717	-0.21
Large private firms	74,381	1.54	0.123	-1.85*	0.064	-2.38**
PLCs	3,818	0.71	0.479	-0.80	0.424	-1.04
Panel C: Earnings changes level						
Small private firms	36,426	0.49	0.628	5.17***	0.000	2.87***
Medium private firms	69,495	-1.26	0.209	4.49***	0.000	3.62***
Large private firms	74,381	0.30	0.765	3.35***	0.001	2.37**
PLCs	3,818	-1.23	0.220	3.53***	0.000	2.92***
Panel D: Non-discretionary earnings changes level						
Small private firms	36,426	-2.20**	0.028	0.96	0.337	1.53
Medium private firms	69,495	0.24	0.809	0.73	0.466	0.10
Large private firms	74,381	-0.15	0.881	0.63	0.530	0.95
PLCs	3,818	0.64	0.520	0.18	0.857	-0.88

Notes:

a) N is the total number of observations in the sample; i is the interval; Std. Diff. is the standardised difference statistics; all p-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

b) The table shows the Burgstahler and Dichev (1997) standardised difference statistic used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. This test statistics is measured as the difference between the actual and expected number of observations in an interval of interest, divided by the standard deviation of the difference. The expected number of observations in an interval of interest is assumed to be the average of the immediately adjacent intervals. The test statistics for an interval of interest *i* is shown below:

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

Where

n_i: is the number of observations in an interval i

N: is the total number of observations in the sample

p_i: is the probability that an observation will fall into the interval i

c) t-value shows the Byzalov and Basu (2019) distribution discontinuity test used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. All t-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Data from Table 6.3 above generally confirm the effect of discretionary accruals on the discontinuities in the distributions of earnings and changes in earnings. In particular, Panel A shows that the private firms' difference between the actual number of earnings observations and the expected number of observations within the small loss (small profit)

interval is significantly less (more) than expected at the 1% level. Specifically, the standardised difference of E_t for the small loss (small profit) intervals are as follows: for small private firms, it is -7.96 (8.66), for medium private firms is -9.95 (9.91) and for large private firms is -5.87 (6.04). On the contrary, in the case of PLCs, it seems that only the small loss interval contains fewer observations than expected at the 5% level, suggesting that PLCs may tend to shift their earnings toward more positive earnings rather than zero earnings. Nevertheless, Byzalov and Basu's (2019) test t-value of 1.99, p = <0.01 for PLCs, suggest that insignificant result of standardised difference test for PLCs may be driven by the small sample. As expected, the comparison of Panel A and Panel B indicates that the removal of discretionary accruals reduces the standardised differences around zero earnings. For example, the standardised difference of E_t in the loss (profit) interval of small private firms is -7.96 (8.66) is reduced to -0.25 (-0.13) after the removal of discretionary accruals. Similar results are obtained for the medium and large private firms and PLCs.

Regarding ΔE_t, Panel C shows that standardised differences for the intervals to the right of zero are significantly higher at the 1% level than the expected number of observations for all the sampled firms. On the contrary, the intervals to the left of zero are mainly insignificantly different from expected. The comparison of Panel C and Panel D confirms that the removal of discretionary accruals reduces the number of observations in the interval to the right of zero. In particular, the standardised differences of ΔE_t have reduced as follows: for small private firms from 5.17 to 0.96, for medium private firms from 4.49 to 0.73, large private firms from 3.35 to 0.63 and PLCs from 3.53 to 0.18. The results of Byzalov and Basu's (2019) test have validated standardised difference test; thus, it is clear that the removal of discretionary accruals results in smoother distributions of changes in earnings.

Overall, the results suggest that both private firms and PLCs use discretion to reach certain earnings targets. Since these results do not control for any differences in the characteristics of the small, medium, large private and PLCs, the results of multivariate panel data regressions are analysed in the following chapter.

6.4. Earnings management across stand-alone private firms and private subsidiaries of PLCs

6.4.1. Descriptive statistics and correlations

In this section, descriptive statistics for the sample of stand-alone private firms and the private subsidiaries of PLCs between the year 2006 and 2018 is presented. Table 6.4 shows summary statistics for the main variables used in the main analysis for the sample of stand-alone private firms (N = 35,919) and private subsidiaries of PLCs (N = 37,558).

Table 6.4: Descriptive statistics for the stand-alone private firms and the private subsidiaries of PLCs sample

	N	Mean	Std. Dev.	25%	50%	75%	Min	Max
Stand-alone private								
E_t	35,919	0.059	0.087	0.013	0.045	0.093	-0.323	0.668
NDE_t	35,919	0.064	0.145	-0.012	0.052	0.132	-0.808	0.999
ΔE_t	35,919	0.005	0.075	-0.022	0.003	0.030	-0.418	0.530
$ND\Delta E_t$	35,919	0.009	0.143	-0.057	0.007	0.076	-0.972	0.969
DAC	35,919	0.085	0.092	0.025	0.057	0.110	0.000	0.811
Lev	35,919	3.031	4.953	0.770	1.557	3.220	0.061	81.883
QR	35,919	1.684	1.299	1.033	1.335	1.896	0.086	17.027
Growth_REV	35,919	0.074	0.223	-0.033	0.051	0.151	-0.790	2.507
Growth_A	35,919	0.074	0.194	-0.028	0.048	0.150	-0.627	1.881
Log_A	35,919	9.290	1.195	8.610	9.153	9.859	4.990	17.518
Loss	35,919	0.143	0.259	0.000	0.000	0.200	0.000	1.000
ROA	35,919	0.059	0.087	0.013	0.045	0.093	-0.323	0.668
Private subsidiaries of PLCs								
E_t	37,558	0.086	0.113	0.021	0.066	0.134	-0.323	0.667
NDE_t	37,558	0.081	0.188	-0.015	0.071	0.176	-0.963	1.159
ΔE_t	37,558	0.086	0.113	0.021	0.066	0.134	-0.323	0.667
$ND\Delta E_t$	37,558	0.081	0.188	-0.015	0.071	0.176	-0.963	1.159
DAC	37,558	0.117	0.119	0.034	0.079	0.158	0.000	0.880
Lev	37,558	2.819	4.697	0.635	1.369	3.001	0.061	88.586
QR	37,558	2.063	1.603	1.156	1.562	2.379	0.083	17.027
Growth_REV	37,558	0.078	0.247	-0.044	0.049	0.159	-0.808	2.608
Growth_A	37,558	0.091	0.235	-0.037	0.062	0.188	-0.621	1.915
Log_A	37,558	10.191	1.705	8.975	10.008	11.241	5.489	17.793
Loss	37,558	0.147	0.250	0.000	0.000	0.200	0.000	1.000
ROA	37,558	0.086	0.113	0.021	0.066	0.134	-0.323	0.667

Notes: E_t is the scaled earnings, measured as end-of-year net income divided by lagged total assets; NDE_t is the scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*; ΔE_t is the scaled change in earnings, measured as end-of-year net income less net income in year *t-1* divided by lagged total assets; $ND\Delta E_t$ is the scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t,* estimated with the performance-adjusted model in year *t*; *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.

Regarding earnings levels, the standard deviation of NDE_t is higher for all the sampled firms than the standard deviation of E_t. Similar results are revealed for the change in earnings. Specifically, all the sampled firms have a higher standard deviation for $ND\Delta E_t$ than the standard deviation of ΔE_t. Therefore, it is clear that both non-discretionary earnings and non-discretionary earnings change are more scattered than earnings and change in earnings.

With respect to the mean and median values for *DAC*, it seems that, on average, subsidiaries manipulate earnings to a greater extent than stand-alone private firms. In other words, it is evident that the stand-alone private firms have lower mean and median values of *DAC* (0.085 and 0.057, respectively) compared to the subsidiaries of PLCs (0.117 and 0.079, respectively).

To gain more insight into differences across stand-alone private firms and private subsidiaries of PLCs, the Pearson correlation coefficients of private firms are analysed next.

Table 6.5: Pearson correlations for the stand-alone private and the private subsidiaries of PLCs sample

Panel A: Pearson correlations for stand-alone private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.081*	1.000						
(3) QR	0.023*	-0.244*	1.000					
(4) Growth_REV	0.087*	0.056*	-0.070*	1.000				
(5) Growth_A	0.190*	0.044*	-0.029*	0.394*	1.000			
(6) Log_A	-0.114*	-0.006	-0.011*	0.068*	0.076*	1.000		
(7) Loss	0.011*	0.157*	-0.100*	-0.077*	-0.159*	0.000	1.000	
(8) ROA	0.128*	-0.180*	0.168*	0.205*	0.354*	-0.128*	-0.458*	1.000

Panel B: Pearson correlations for private subsidiaries of PLCs

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.053*	1.000						
(3) QR	-0.005	-0.276*	1.000					
(4) Growth_REV	0.102*	0.048*	-0.089*	1.000				
(5) Growth_A	0.210*	0.061*	-0.050*	0.362*	1.000			
(6) Log_A	-0.083*	0.095*	-0.116*	-0.001	0.031*	1.000		
(7) Loss	-0.022*	0.161*	-0.102*	-0.040*	-0.110*	0.029*	1.000	
(8) ROA	0.127*	-0.216*	0.149*	0.191*	0.308*	-0.157*	-0.449*	1.000

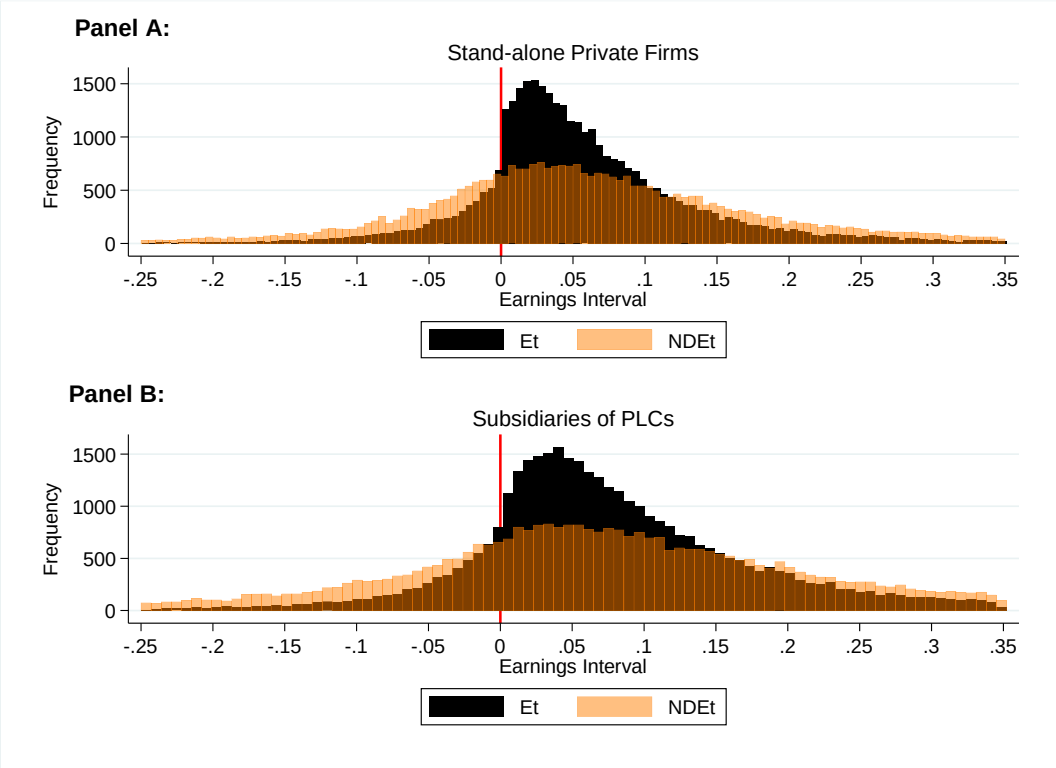
Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.
* Indicates significance at the 5 percent level

In the case of the Pearson correlations for the sample of stand-alone private firms and private subsidiaries of PLCs in Panel A and Panel B of Table 6.5, it is evident that there is a significant and positive correlation between *Lev* and *DAC*. Therefore, more leveraged firms are more likely to have higher discretionary accruals. The correlations for *QR* are rather different in the sample of stand-alone private firms (0.023, significant at the p = 0.05) compared to subsidiaries of PLCs (-0.005, not significant at p = 0.05). Not surprisingly, it seems that liquidity risk is of more importance to the stand-alone private firms than to the subsidiaries of PLCs. Further, in line with other studies, *DAC* is negatively correlated with *Log_At* for all the sampled firms; thus, the bigger the firm is, the less likely it is to manage earnings. The correlations for both *Growth_REV* and *Growth_A* suggest that growth in all the analysed firms is likely to drive earnings management levels. The correlations for *Loss* are somewhat surprising. Specifically, there is a significant and positive correlation of *Loss* with *DAC* in Panel A, whereas negative and significant in Panel B. More precisely, the correlation of *Loss* and *DAC* in Panel A for the sample of stand-alone private firms is 0.011, whereas, for the sample of the subsidiaries in Panel B, this correlation is -0.022. The correlations for *ROA* are significant and positive for both types of the sampled private firms. A comparison of the cross-sectional distributions of earnings variables and a test statistic that the frequency distribution is smooth is presented in the following sections.

6.4.2. The distribution of scaled earnings

In order to address whether levels of earnings management vary between stand-alone private firms and private subsidiaries of PLCs (H2), the distributions of earnings and non-discretionary earnings for the period 2006 to 2018 are presented in Figure 6.3 below.

Figure 6.3: The frequency distribution of scaled annual earnings compared to annual non-discretionary scaled earnings across stand-alone private firms and private subsidiaries of PLCs for the period 2006 to 2018 (E_t vs NDE_t)



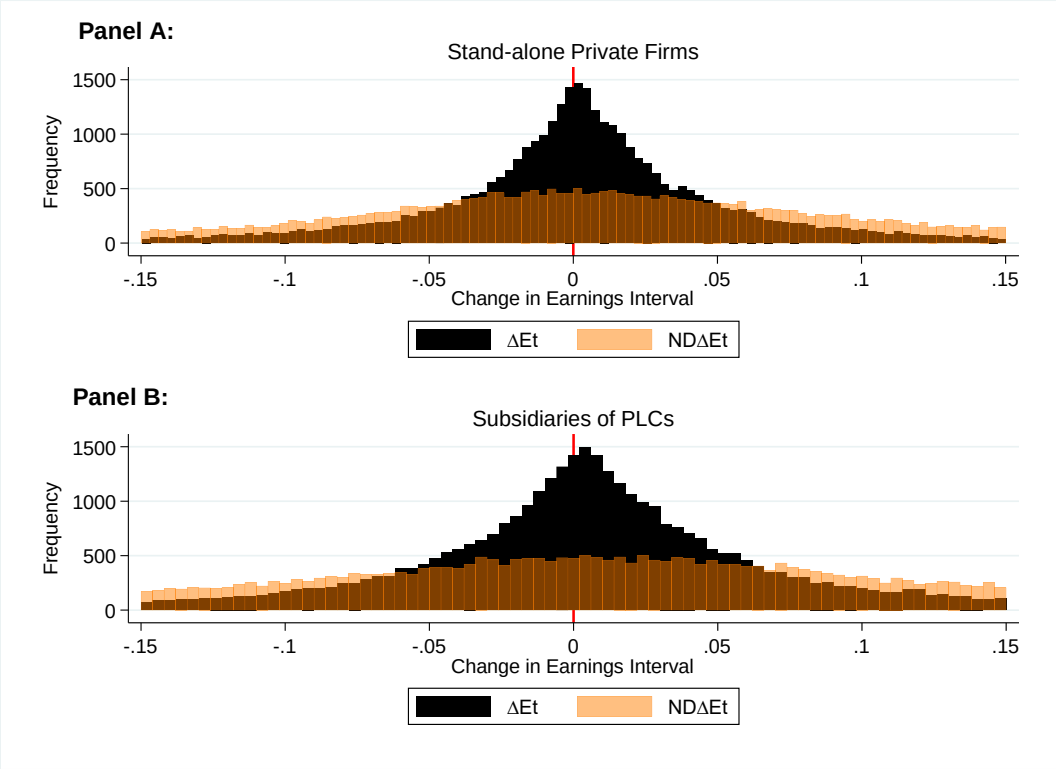
Notes: The distribution of annual net income divided by lagged total assets and the distribution of annual non-discretionary earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: the stand-alone private firms (0.005) and the subsidiaries of PLCs (0.007). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.005) for the stand-alone private firms and [0, 0.007) for the subsidiaries of PLCs. The vertical axis labelled frequency represents the number of observations in each scaled earnings and non-discretionary scaled earnings interval.

As was pointed out in the previous chapter, discontinuities around zero earnings will occur if there is earnings management to avoid losses. Furthermore, after discretionary accruals removal, it is expected that the observed discontinuities in the first distribution will be minimised. The histograms in Figure 6.3 above clearly reveal differences between reported earnings and non-discretionary earnings levels amongst stand-alone private firms in Panel A and private subsidiaries of PLCs in Panel B. What is interesting about these histograms is that the frequency distribution of stand-alone private firms in Panel A shows more distinct discontinuity around zero level earnings, suggesting that they may manipulate earnings to avoid losses more profoundly than subsidiaries of PLCs.

6.4.3. The distribution of scaled change in earnings

In terms of the further analysis of earnings management levels between stand-alone private firms and private subsidiaries of PLCs (H2), this section provides and discusses the frequency distributions of change in earnings and non-discretionary change in earnings or the period 2006 to 2018 in Figure 6.4.

Figure 6.4: The frequency distribution of scaled changes in earnings compared to non-discretionary changes in scaled earnings across stand-alone private firms and private subsidiaries of PLCs for the period 2006 to 2018 (ΔE_t vs $ND\Delta E_t$)



Notes: The distributions of changes in annual net income divided by lagged total assets and the distributions of non-discretionary changes in earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the change in earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: the stand-alone private firms (0.003) and the subsidiaries of PLCs (0.004). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.003) for the stand-alone private firms and [0, 0.004) for the subsidiaries of PLCs. The vertical axis labelled frequency represents the number of observations in each scaled earnings change and non-discretionary scaled earnings change interval.

In a similar vein to the previous tests, it is expected that frequencies of small negative changes in earnings are unusually low, while frequencies of small positive earnings change unusually high if there is earnings management to avoid declines in earnings. Furthermore, it is expected that the frequency distribution of non-discretionary changes is smoother compared to the distributions of changes in earnings. From the histograms in Figure 6.4 above, it is clear that the non-discretionary change in earnings is spread more widely than changes in earnings. In other words, it seems that both stand-alone private firms (i.e., Panel A) and subsidiaries of PLCs (i.e., Panel B) may use discretionary accruals to increase the frequency of small positive change in earnings. Interestingly, it seems that private

subsidiaries of PLCs in Panel B exhibit a higher frequency of more positive changes in earnings compared to stand-alone private firms in Panel A.

6.4.4. Statistical significance of discontinuities

As was mentioned in the methodology chapter, in order to validate findings of frequency distributions and to assess if discretionary accruals are causing discontinuities in the distributions, the null hypothesis of no deviations (i.e., no earnings management) in frequencies distributions are tested next. The focus of the statistical significance tests of discontinuities is on the intervals immediately left from zero and right from zero earnings. Specifically, to test the null hypothesis of smooth distributions, this section shows the results of Burgstahler and Dichev's (1997) standardised difference test and Byzalov and Basu's (2019) new distribution discontinuity test. In particular, the statistical significance results for the previously analysed frequency distributions in Figure 6.3 and Figure 6.4. are presented in Table 6.6 below.

Table 6.6: Distributions of near-zero earnings and non-discretionary earnings relative to earnings benchmarks across stand-alone private firms and private subsidiaries of PLCs for the period 2006 to 2018

	N	Std. Diff. i < 0	p-value	Std. Diff. i > 0	p-value	t-value
Panel A: Earnings level						
Stand-alone private	35,919	-8.03***	0.000	7.42***	0.000	10.00***
Private subsidiaries of PLCs	37,558	-5.36***	0.000	3.22***	0.001	5.56***
Panel B: Non-discretionary earnings level						
Stand-alone private	35,919	1.38	0.166	-1.96*	0.051	-1.30
Private subsidiaries of PLCs	37,558	-0.61	0.544	0.17	0.864	0.56
Panel C: Earnings changes level						
Stand-alone private	35,919	0.51	0.610	2.01**	0.045	1.60
Private subsidiaries of PLCs	37,558	-1.42	0.155	1.83*	0.068	2.71***
Panel D: Non-discretionary earnings changes level						
Stand-alone private	35,919	-1.28	0.199	2.35**	0.019	1.87*
Private subsidiaries of PLCs	37,558	-0.34	0.735	0.88	0.378	1.00

Notes:

a) N is the total number of observations in the sample; i is the interval; Std. Diff. is the standardised difference statistics; all p-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

b) The table shows the Burgstahler and Dichev (1997) standardised difference statistic used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. This test statistics is measured as the difference between the actual and expected number of observations in an interval of interest, divided by the standard deviation of the difference. The expected number of observations in an interval of interest is assumed to be the average of the immediately adjacent intervals. The test statistics for an interval of interest *i* is shown below:

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

Where

n_i: is the number of observations in an interval i

N: is the total number of observations in the sample

p_i: is the probability that an observation will fall into the interval i

c) t-value shows the Byzalov and Basu (2019) distribution discontinuity test used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. All t-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

From the data in Table 6.6 above, it can be seen that discretionary accruals affect the discontinuities in the distributions of earnings and change in earnings to a certain extent. Specifically, Panel A demonstrates that the difference between the actual number of earnings observations and the expected number of observations within the small loss (small profit) interval is significantly less (more) than expected at the 1% level for both types of private firms. In particular, the standardised difference of E_t for the small loss (small profit) intervals for the stand-alone private firms is -8.03(7.42), and for the subsidiaries of PLCs is -5.36 (3.22). As expected, Panel B shows that the removal of discretionary accruals reduces

standardised differences around zero earnings. Specifically, for the stand-alone private firms standardised difference of *NDEt* is 1.38 (-1.96), and for the subsidiaries of PLCs is -0.61 (0.17). Additionally, Byzalov and Basu's (2019) test confirmed that the frequency distributions of non-discretionary earnings are relatively smooth.

Regarding ΔE_t, Panel C indicate that intervals to the right from zero are significantly higher than the expected number of observations. In particular, standardised differences of ΔE_t, for stand-alone private firms are significantly higher at the 5% level and for private subsidiaries of PLCs at the 10% level, respectively. Additionally, the intervals to the left of zero are insignificantly different from expected for both types of private firms. Surprisingly, Panel D provides conflicting findings with respect to the removal of discretionary accruals. To be more exact, Panel C and Panel D comparison provide confirming results that private subsidiaries of PLCs may use discretionary accruals to reach a small positive change in earnings. More specifically, the standardised difference is reduced from -1.42(1.83) for ΔE_t to -0.34(0.88) for $ND\Delta E_t$ in the sample of private subsidiaries of PLCs. Nonetheless, in the sample of stand-alone private firms, the results of both the standardised difference test and Byzalov and Basu's (2019) test suggest that they may possibly use another type of earnings management (i.e., RAM) rather than discretionary accruals to increase their reported earnings.

To sum up, the results suggest that both stand-alone private and private subsidiaries of PLCs manage earnings to reach certain earnings targets. Nevertheless, in the case of stand-alone private firms, it has not been confirmed that they use their discretion to reach analysed earnings targets. The presented findings in this section do not control for any differences in the characteristics of stand-alone private and private subsidiaries; therefore, the multivariate panel data regressions results are discussed in the next chapter.

6.5. Earnings management across ownership dispersion in private firms

6.5.1. Descriptive statistics and correlations

This section provides descriptive statistics for the sample of private firms with concentrated ownership and private firms with dispersed ownership over the period 2006 and 2018. Table 6.7 shows the summary statistics for the main variables used in the main analysis for the sample of private firms with concentrated ownership (N = 131,540) and private firms with dispersed ownership (N = 39,948).

Table 6.7: Descriptive statistics for the private firms with concentrated ownership and private firms with dispersed ownership sample

	N	Mean	Std. Dev.	25%	50%	75%	Min	Max
Private firms with concentrated ownership								
E_t	131,540	0.077	0.102	0.019	0.058	0.117	-0.323	0.668
NDE_t	131,540	0.075	0.172	-0.013	0.065	0.160	-0.963	1.159
ΔE_t	131,540	0.008	0.083	-0.025	0.004	0.037	-0.417	0.531
$ND\Delta E_t$	131,540	0.006	0.168	-0.073	0.007	0.089	-1.132	1.019
DAC	131,540	0.105	0.109	0.031	0.070	0.139	0.000	0.931
Lev	131,540	2.928	4.823	0.730	1.501	3.143	0.061	90.223
QR	131,540	1.881	1.417	1.113	1.466	2.157	0.083	17.027
Growth_REV	131,540	0.079	0.232	-0.034	0.052	0.156	-0.808	2.608
Growth_A	131,540	0.087	0.216	-0.030	0.060	0.176	-0.626	1.916
Log_A	131,540	9.605	1.424	8.702	9.393	10.331	4.970	18.031
Loss	131,540	0.134	0.241	0.000	0.000	0.200	0.000	1.000
ROA	131,540	0.077	0.102	0.019	0.058	0.117	-0.323	0.668
Private firms with dispersed ownership								
E_t	39,948	0.064	0.086	0.017	0.048	0.095	-0.323	0.666
NDE_t	39,948	0.069	0.140	-0.005	0.056	0.133	-0.777	1.108
ΔE_t	39,948	0.007	0.071	-0.019	0.004	0.030	-0.418	0.530
$ND\Delta E_t$	39,948	0.012	0.134	-0.051	0.008	0.075	-0.966	0.843
DAC	39,948	0.080	0.086	0.024	0.053	0.104	0.000	0.810
Lev	39,948	2.682	4.321	0.727	1.436	2.875	0.065	83.727
QR	39,948	1.703	1.254	1.047	1.362	1.938	0.090	16.373
Growth_REV	39,948	0.079	0.213	-0.023	0.055	0.150	-0.790	2.608
Growth_A	39,948	0.078	0.184	-0.021	0.052	0.149	-0.618	1.881
Log_A	39,948	9.516	1.293	8.732	9.301	10.094	5.371	17.793
Loss	39,948	0.127	0.236	0.000	0.000	0.167	0.000	1.000
ROA	39,948	0.064	0.086	0.017	0.048	0.095	-0.323	0.666

Notes: E_t is the scaled earnings, measured as end-of-year net income divided by lagged total assets; NDE_t is the scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*; ΔE_t is the scaled change in earnings, measured as end-of-year net income less net income in year *t-1* divided by lagged total assets; $ND\Delta E_t$ is the scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t,* estimated with the performance-adjusted model in year *t*; *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.

As can be seen from the table above, the standard deviations of NDE_t and $ND\Delta E_t$ are higher for all the sampled firms than the standard deviations of E_t and ΔE_t. These results suggest that both reported earnings and earnings changes are more scattered than non-discretionary earnings and non-discretionary earnings change.

The differences between the mean and median of *DAC* suggest that private firms with more concentrated ownership, on average, engage in earnings management more than private firms with more dispersed ownership. In particular, it is apparent from the table above that private firms with concentrated ownership have higher mean and median values of *DAC* (0.105 and 0.070, respectively) than private firms with dispersed ownership (0.080 and 0.053, respectively).

Furthermore, to gain more insight into differences across ownership levels in private firms, Table 6.8 below provides the Pearson correlation coefficients of private firms with concentrated ownership and private firms with dispersed ownership.

Table 6.8: Pearson correlations for the private firms with concentrated ownership and private firms with dispersed ownership sample

Panel A: Pearson correlations for private firms with concentrated ownership

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.061*	1.000						
(3) QR	0.008*	-0.257*	1.000					
(4) Growth_REV	0.090*	0.052*	-0.088*	1.000				
(5) Growth_A	0.216*	0.056*	-0.048*	0.379*	1.000			
(6) Log_A	-0.050*	0.047*	-0.040*	0.024*	0.056*	1.000		
(7) Loss	-0.008*	0.171*	-0.094*	-0.046*	-0.118*	0.024*	1.000	
(8) ROA	0.132*	-0.206*	0.164*	0.199*	0.322*	-0.100*	-0.425*	1.000

Panel B: Pearson correlations for private firms with dispersed ownership

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.096*	1.000						
(3) QR	0.006	-0.246*	1.000					
(4) Growth_REV	0.107*	0.072*	-0.063*	1.000				
(5) Growth_A	0.210*	0.062*	-0.033*	0.390*	1.000			
(6) Log_A	-0.064*	0.002	0.035*	0.033*	0.053*	1.000		
(7) Loss	-0.001	0.148*	-0.102*	-0.051*	-0.141*	0.024*	1.000	
(8) ROA	0.129*	-0.168*	0.164*	0.205*	0.356*	-0.114*	-0.420*	1.000

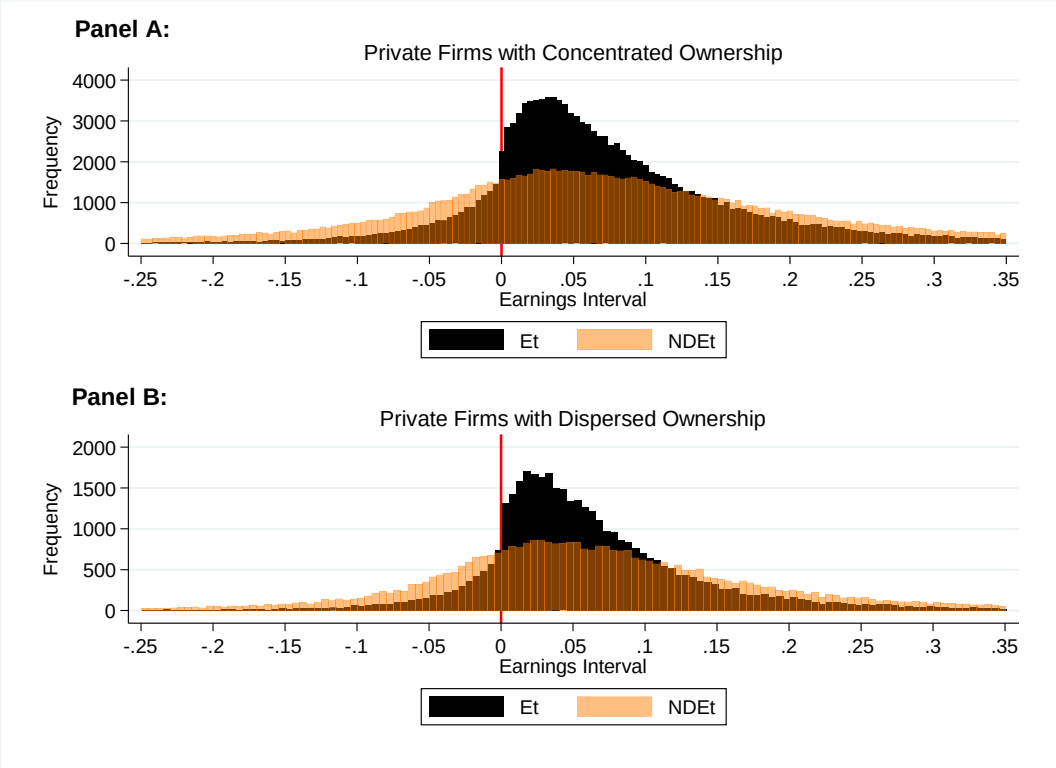
Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.
* Indicates significance at the 5 percent level.

Both Panel A and Panel B of Table 6.8 demonstrate significant and positive correlations between *Lev* and *DAC*. These correlation coefficients imply that firms with higher leverage levels are more likely to manage earnings. With respect to *QR*, the significance of coefficients is rather different between Panel A and Panel B. Specifically, the coefficient for private firms with concentrated ownership (0.008) is significant at the p = 0.05 level, whereas the correlation coefficient for the firms with more dispersed ownership (0.006) is not statistically significant. This implies that liquidity risk may drive earnings management behaviour to a greater extent in private firms with concentrated ownership than in private firms with dispersed ownership. Similar to other studies, correlations between *Log_A* and *DAC* are significant and negative in both panels, suggesting that bigger firms are less likely to manipulate earnings. Furthermore, the correlations for both *Growth_REV* and *Growth_A* are significantly and positively related to the levels of discretionary accruals in Panel A and Panel B. Interestingly, correlations for *Loss* with *DAC* are negative in both panels. Nevertheless, the coefficient for private firms with concentrated ownership (-0.008) is significant at the p = 0.05 level, whereas the correlation coefficient for the firms with more dispersed ownership (-0.001) is not statistically significant. In contrast, *ROA* is positively and significantly correlated with *DAC* in both panels. A comparison of the cross-sectional distributions of earnings variables and the statistical discontinuity test of smooth frequency distributions are presented and discussed in the sections that follow.

6.5.2. The distribution of scaled earnings

To determine whether earnings management levels vary within private firms between different levels of ownership dispersion (H3), the distributions of earnings and non-discretionary earnings for the period 2006 to 2018 are presented in Figure 6.5 below.

Figure 6.5: The frequency distribution of scaled annual earnings compared to annual non-discretionary scaled earnings across ownership dispersion in private firms for the period 2006 to 2018 (E_t vs NDE_t)



Notes: The distribution of annual net income divided by lagged total assets and the distribution of annual non-discretionary earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: private firms with concentrated ownership (0.004) and private firms with dispersed ownership (0.005). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.004) for the private firms with concentrated ownership and [0, 0.005) for the private firms with dispersed ownership. The vertical axis labelled frequency represents the number of observations in each scaled earnings and non-discretionary scaled earnings interval.

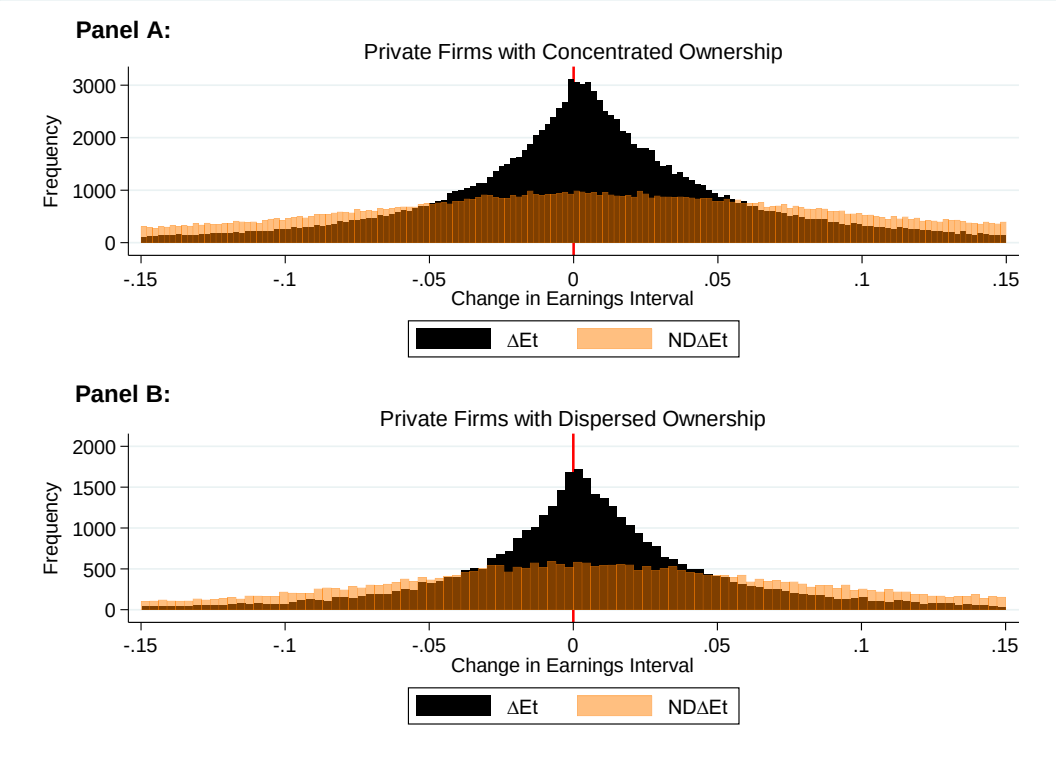
In terms of earnings management, it is expected that the frequency distribution of earnings exhibits a small number of small losses and a high frequency of small profits in the case of earning management. Additionally, there should be a smoother frequency distribution after the removal of discretionary accruals. The visual inspection of Panel A and Panel B of Figure 6.5 reveals that there is a kink in the distribution of reported earnings. Therefore, it may be said that despite the different concentration of ownership, private firms manipulate earnings to avoid losses. It is also evident that non-discretionary earnings are spread more widely compared to reported earnings. The results suggest that both private

firms with concentrated ownership in Panel A and private firms with dispersed ownership in Panel B are using discretionary accruals to avoid losses.

6.5.3. The distribution of scaled change in earnings

To further understand whether earnings management levels vary within private firms between different levels of ownership dispersion (H3), the distributions of changes in earnings and non-discretionary changes in earnings for the period 2006 to 2018 are shown below in Figure 6.6.

Figure 6.6: The frequency distribution of scaled changes in earnings compared to non-discretionary changes in scaled earnings across ownership dispersion in private firms for the period 2006 to 2018 (ΔE_t vs $ND\Delta E_t$)



Notes: The distributions of changes in annual net income divided by lagged total assets and the distributions of non-discretionary changes in earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the change in earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: private firms with concentrated ownership (0.002) and private firms with dispersed ownership (0.003). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.002) for the private firms with concentrated ownership and [0, 0.003) for the private firms with dispersed ownership. The vertical axis labelled frequency represents the number of observations in each scaled earnings change and non-discretionary scaled earnings change interval.

As previously described in the fifth chapter, the distributions of changes in earnings will be discontinuous around zero changes in earnings if there is earnings management. On the other hand, it is expected that distributions of non-discretionary changes in earnings are not discontinuous around zero changes in earnings. The comparison of Panel A and Panel B of Figure 6.6 does not reveal many differences in the frequency distributions of changes

in earnings between private firms with concentrated ownership and ones with dispersed ownership. Nonetheless, it seems that both distributions of changes in earnings have a slightly higher number of small positive changes in earnings than small negative changes in earnings. Regarding non-discretionary changes in earnings, both distributions of non-discretionary changes in earnings appear to be wider than changes in earnings. The results suggest that both private firms with concentrated ownership in Panel A and private firms with dispersed ownership in Panel B are using discretionary accruals to avoid reporting earnings declines.

6.5.4. Statistical significance of discontinuities

The visual inspection of histograms in the previous sections suggests that despite different levels of ownership concentration, private firms are using discretionary accruals to reach earnings targets. To validate those results, further test statistics for the null hypothesis of smooth distribution (i.e., no earnings management) was used to confirm if there are significantly fewer or significantly more observations than expected in the intervals immediately adjacent to zero had distributions been smooth. Therefore, this section provides the statistical significance test results of Burgstahler and Dichev's (1997) standardised difference test and Byzalov and Basu's (2019) new distribution discontinuity test in Figure 6.9 below for the previously analysed distributions in Figure 6.5 and Figure 6.6.

Table 6.9: Distributions of near-zero earnings and non-discretionary earnings relative to earnings benchmarks across ownership dispersion in private firms for the period 2006 to 2018

	N	Std. Diff. i < 0	p-value	Std. Diff. i > 0	p-value	t-value
Panel A: Earnings level						
Concentrated ownership	131,540	-8.16***	0.000	8.56***	0.000	12.29***
Dispersed ownership	39,948	-8.22***	0.000	7.52***	0.000	9.94***
Panel B: Non-discretionary earnings level						
Concentrated ownership	131,540	1.26	0.209	-0.95	0.344	-1.56
Dispersed ownership	39,948	0.59	0.554	-0.38	0.705	-0.12
Panel C: Earnings changes level						
Concentrated ownership	131,540	-0.79	0.430	4.43***	0.000	4.00***
Dispersed ownership	39,948	0.52	0.606	3.19***	0.001	1.80*
Panel D: Non-discretionary earnings changes level						
Concentrated ownership	131,540	-1.27	0.204	1.06	0.288	1.37
Dispersed ownership	39,948	-1.49	0.135	1.16	0.248	1.75*

Notes:

a) N is the total number of observations in the sample; i is the interval; Std. Diff. is the standardised difference statistics; all p-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

b) The table shows the Burgstahler and Dichev (1997) standardised difference statistic used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. This test statistics is measured as the difference between the actual and expected number of observations in an interval of interest, divided by the standard deviation of the difference. The expected number of observations in an interval of interest is assumed to be the average of the immediately adjacent intervals. The test statistics for an interval of interest *i* is shown below:

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

Where

n_i: is the number of observations in an interval i

N: is the total number of observations in the sample

p_i: is the probability that an observation will fall into the interval i

c) t-value shows the Byzalov and Basu (2019) distribution discontinuity test used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. All t-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

The comparison of Panel A and Panel B of the table above confirms that private firms use their discretion to manipulate earnings to avoid losses. Panel A shows that the standardised differences of E_t for the small loss (profit) interval are significantly less (more) than expected at the 1% level. On the contrary, Panel B demonstrates that these differences between the actual number of observations and the expected number of observations are reduced after the removal of discretionary accruals. In particular, in the case of private firms with concentrated ownership, the standardised difference in the loss (profit) interval for E_t is -8.16 (8.56). After the removal of discretionary accruals from the earnings standardised

difference is reduced to 1.26(-0.95) for NDE_t. Similarly, the standardised difference for E_t of -8.22 (7.52) for private firms with dispersed ownership is reduced to 0.59 (-0.38) for NDE_t. The same results are obtained with Byzalov and Basu's (2019) test; therefore, it may be said that despite different levels of ownership concentration, it seems that private firms manipulate earnings to avoid losses.

In relation to ΔE_t, Panel C reveals that standardised differences for the small loss intervals are insignificantly different from the expected, whereas ones for the small profit intervals are significantly higher at the 1% level in both types of private firms. Panel D reveals that these standardised differences in small loss (profit) interval are reduced to insignificant after the removal of discretionary accruals. Notably, private firms with concentrated ownership have a standardised difference of ΔE_t -0.79(4.43), while one for $ND\Delta E_t$ is -1.27(1.06). Similarly, for private firms with dispersed ownership standardised difference in Panel C is 0.52 (3.19), while in Panel D is reduced to -1.49(1.16). However, the t-test from Byzalov and Basu (2019) does not confirm findings for the private firms with dispersed ownership. In particular, the t-value of 1.75, p = <0.10 for $ND\Delta E_t$, suggest that even though discretionary accruals are removed, discontinuity in the intervals adjacent to zero is still significantly different than expected under smooth distribution. The use of RAM may be linked to these results. In other words, instead of using discretionary accruals to increase their reported earnings, private firms with dispersed ownership may use RAM.

The results in this section indicate that despite different dispersion of ownership (i.e., concentrated or dispersed ownership), private firms generally use discretionary accruals to manipulate earnings. However, with respect to changes in earnings, it has not been confirmed that private firms with dispersed ownership use discretionary accruals. Also, the findings of the univariate analysis in this section do not control for different characteristics of firms. The next chapter, therefore, moves to multivariate panel data regression analysis to determine whether there is a lower level of earnings management in private firms with more dispersed ownership compare to private firms with less dispersed ownership.

6.6. Earnings management across accounting standard in private firms

6.6.1. Descriptive statistics and correlations

In this section, descriptive statistics for the sample of private firms preparing financial statements under UK GAAP and IFRS for the period 2006 to 2018 is shown. The main variables used in the main analysis for the sample of private firms reporting under UK GAAP (N = 139,834) and the ones reporting under IFRS (N = 6,091) are presented in Table 6.10 below.

Table 6.10: Descriptive statistics for the private firms across accounting standards

	N	Mean	Std. Dev.	25%	50%	75%	Min	Max
UK GAAP								
E_t	139,834	0.074	0.099	0.019	0.056	0.113	-0.323	0.667
NDE_t	139,834	0.074	0.163	-0.010	0.063	0.153	-0.963	1.126
ΔE_t	139,834	0.008	0.080	-0.023	0.004	0.035	-0.418	0.531
$ND\Delta E_t$	139,834	0.007	0.159	-0.066	0.008	0.084	-1.093	0.969
DAC	139,834	0.098	0.103	0.029	0.065	0.129	0.000	0.931
Lev	139,834	2.803	4.606	0.713	1.448	2.994	0.061	89.458
QR	139,834	1.868	1.409	1.105	1.457	2.139	0.083	17.027
Growth_REV	139,834	0.077	0.224	-0.031	0.052	0.151	-0.807	2.608
Growth_A	139,834	0.084	0.204	-0.026	0.058	0.167	-0.627	1.916
Log_A	139,834	9.518	1.308	8.704	9.313	10.167	4.970	17.793
Loss	139,834	0.131	0.227	0.000	0.000	0.200	0.000	1.000
ROA	139,834	0.074	0.099	0.019	0.056	0.113	-0.323	0.667
IFRS								
E_t	6,091	0.064	0.109	0.011	0.049	0.107	-0.322	0.668
NDE_t	6,091	0.068	0.181	-0.022	0.055	0.154	-0.815	0.991
ΔE_t	6,091	0.005	0.086	-0.025	0.004	0.036	-0.408	0.529
$ND\Delta E_t$	6,091	0.009	0.175	-0.068	0.008	0.090	-0.917	0.878
DAC	6,091	0.107	0.117	0.030	0.067	0.139	0.000	0.850
Lev	6,091	3.249	5.346	0.722	1.584	3.512	0.061	75.383
QR	6,091	1.716	1.446	0.981	1.329	1.946	0.084	15.876
Growth_REV	6,091	0.085	0.269	-0.043	0.046	0.160	-0.808	2.239
Growth_A	6,091	0.090	0.236	-0.034	0.054	0.171	-0.625	1.887
Log_A	6,091	10.757	2.056	9.266	10.571	12.002	5.525	18.031
Loss	6,091	0.191	0.284	0.000	0.000	0.300	0.000	1.000
ROA	6,091	0.064	0.109	0.011	0.049	0.107	-0.322	0.668

Notes: E_t is the scaled earnings, measured as end-of-year net income divided by lagged total assets; NDE_t is the scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*; ΔE_t is the scaled change in earnings, measured as end-of-year net income less net income in year *t-1* divided by lagged total assets; $ND\Delta E_t$ is the scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t,* estimated with the performance-adjusted model in year *t*; *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.

It can be seen from the data in Table 6.10 above that reported earnings, as well as the change in earnings, are less scattered than non-discretionary earnings and non-discretionary change in earnings for all the sampled firms. In other words, the standard deviations for E_t and ΔE_t are lower compared to the standard deviations of NDE_t and $ND\Delta E_t$.

Concerning discretionary accruals, it can be seen that private firms reporting under IFRS have slightly higher mean and median values of *DAC* compared to private firms that report under UK GAAP. Therefore, it seems that, on average, they manipulate earnings to a greater extent than private firms reporting under UK GAAP. Specifically, private firms that prepare financial statements under UK GAAP have slightly lower mean and median values of *DAC* (0.098 and 0.065, respectively) compared to private firms preparing financial statements under IFRS (0.107 and 0.067).

Furthermore, to gain more insight into differences of the associations between *DAC* and other variables across private firms reporting under UK GAAP and private firms reporting under IFRS, the Pearson correlation coefficients are analysed next.

Table 6.11: Pearson correlations for the private firms across accounting standards

Panel A: Pearson correlations for private firms which followed UK GAAP

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.068*	1.000						
(3) QR	0.014*	-0.257*	1.000					
(4) Growth_REV	0.089*	0.051*	-0.081*	1.000				
(5) Growth_A	0.209*	0.052*	-0.042*	0.374*	1.000			
(6) Log_A	-0.048*	0.024*	-0.008*	0.029*	0.059*	1.000		
(7) Loss	-0.004	0.172*	-0.098*	-0.045*	-0.125*	0.009*	1.000	
(8) ROA	0.134*	-0.200*	0.168*	0.203*	0.333*	-0.090*	-0.413*	1.000

Panel B: Pearson correlations for private firms which followed IFRS

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.073*	1.000						
(3) QR	0.025	-0.234*	1.000					
(4) Growth_REV	0.077*	0.022	-0.055*	1.000				
(5) Growth_A	0.183*	0.052*	-0.025	0.379*	1.000			
(6) Log_A	-0.165*	0.097*	-0.159*	0.022	0.034*	1.000		
(7) Loss	-0.040*	0.149*	-0.128*	0.015	-0.094*	0.033*	1.000	
(8) ROA	0.124*	-0.200*	0.184*	0.120*	0.261*	-0.166*	-0.494*	1.000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.
* Indicates significance at the 5 percent level.

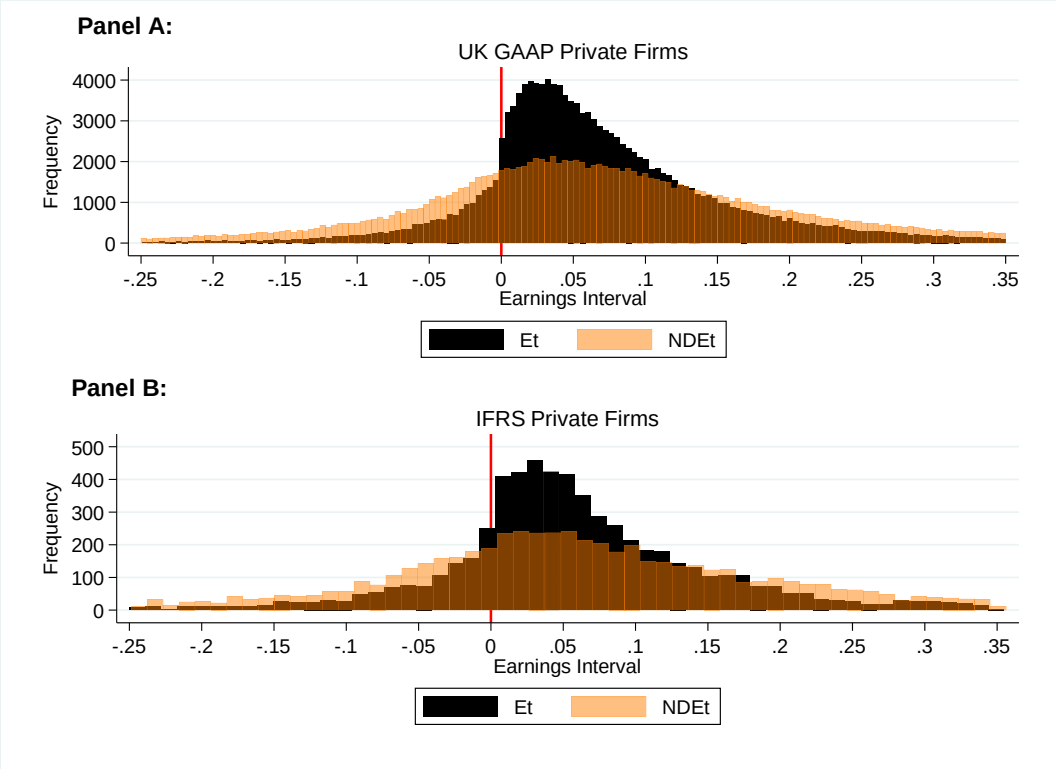
In terms of the Pearson correlations for the sample of private firms across accounting standards, both Panel A and Panel B of Table 6.11 reveal significant and positive correlations between *Lev* and *DAC*. Therefore, it seems that more leveraged private firms are more likely to have higher discretionary accruals despite reporting under different standards. *QR* is positively correlated with discretionary accruals, even though it is not statistically significant for the private firms reporting under IFRS (0.025). In line with other studies, the correlations coefficients for *Log_At* and *DAC* are negative and statistically significant in both panels; hence, there is a lower level of discretionary accruals in bigger firms. On the contrary, in both panels, *Growth_REV* and *Growth_A* are significantly and positively related to the earnings management levels, whereas correlations between *Loss* and *DAC* are negative. In particular, Panel A shows no statistically significant correlation at p = 0.05 level for private firms reporting under UK GAAP (-0.004), while there is a negative and significant correlation for private firms reporting under IFRS (-0.040). Finally, it seems that *ROA* is increasing the levels of discretionary accruals in both panels.

The cross-sectional distributions of earnings variables are compared and discussed in the following sections, followed by the statistical discontinuity test of smooth frequency distributions.

6.6.2. The distribution of scaled earnings

To gain insight into levels of earnings management amongst private firms that report under different accounting standards (H4), frequency distributions of earnings and non-discretionary earnings over the period 2006 to 2018 are presented in Figure 6.7 and discussed below.

Figure 6.7: The frequency distribution of scaled annual earnings compared to annual non-discretionary scaled earnings across accounting standards in private firms for the period 2006 to 2018 (E_t vs NDE_t)



Notes: The distribution of annual net income divided by lagged total assets and the distribution of annual non-discretionary earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: private firms that followed UK GAAP (0.004) and private firms that followed IFRS (0.011). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.004) for the UK GAAP private firms and [0, 0.011) for the IFRS private firms. The vertical axis labelled frequency represents the number of observations in each scaled earnings and non-discretionary scaled earnings interval.

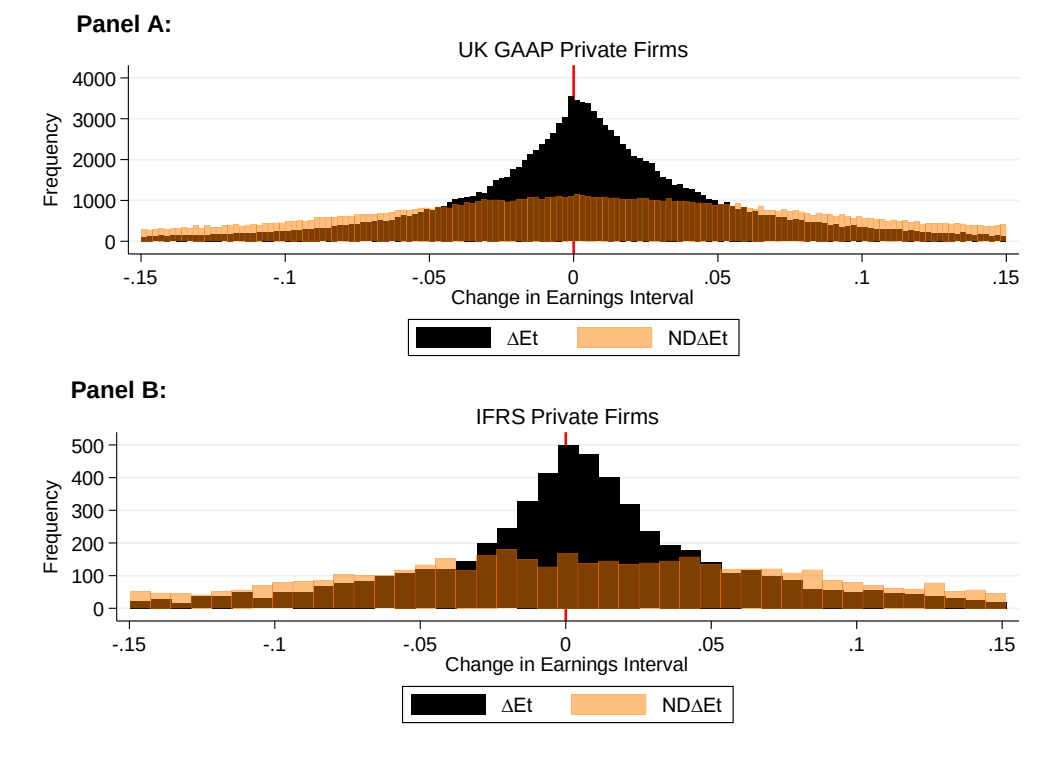
As discussed previously in the chapter above, frequency distributions of earnings will exhibit discontinuities around zero earnings benchmark if earnings are manipulated. Furthermore, if earnings are manipulated through discretionary accruals, their removal from reported earnings will result in a smoother frequency distribution. From the histograms in Figure 6.7, it can be seen that both Panel A and Panel B show a discontinuity around zero earnings. In other words, while there is a high frequency of small positive earnings, there is clearly a much lower frequency of small negative earnings in the frequency distributions. Therefore, it seems that earnings management levels to avoid losses in UK GAAP private firms (i.e., Panel A) is similar to that of IFRS private firms (i.e., Panel B). Regarding non-

discretionary earnings, it is apparent that frequency distributions are more symmetric compared to reported earnings; hence, it may be said that private firms reporting under UK GAAP (i.e., Panel A) are using discretionary accruals to avoid losses in the same way as the ones that report under IFRS (i.e., Panel B).

6.6.3. The distribution of scaled change in earnings

To further investigate earnings management levels in private firms across different accounting standards (H4), Figure 6.8 below presents the distributions of changes in earnings and non-discretionary changes in earnings for the period 2006 to 2018.

Figure 6.8: The frequency distribution of scaled changes in earnings compared to non-discretionary changes in scaled earnings across accounting standards in private firms for the period 2006 to 2018 (ΔE_t vs $ND\Delta E_t$)



Notes: The distributions of changes in annual net income divided by lagged total assets and the distributions of non-discretionary changes in earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the change in earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: private firms that followed UK GAAP (0.002) and private firms that followed IFRS (0.007). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.002) for the UK GAAP private firms and [0, 0.007) for the IFRS private firms. The vertical axis labelled frequency represents the number of observations in each scaled earnings change and non-discretionary scaled earnings change interval.

As discussed above in the fifth chapter, in the case of earnings management to avoid earnings declines, the distributions of changes in earnings will be discontinuous around zero changes in earnings. In addition, if earnings are managed through discretionary accruals, it is expected that the removal of discretionary accruals will result in smoother

distributions of non-discretionary changes in earnings. In terms of the distributions of changes in earnings, Panel A, same as Panel B of Figure 6.8, reveals that there is a slightly higher frequency of small positive changes in earnings than small negative changes in earnings. Also, it seems that there are not many differences in the frequency distributions of changes in earnings between private firms reporting under different accounting standards. The comparison of the frequency distributions of changes in earnings and non-discretionary changes in earnings reveals that despite different accounting standards, private firms (i.e., Panel A and Panel B) use their discretion to report positive changes in earnings.

6.6.4. Statistical significance of discontinuities

On the question of whether there is earnings management to reach certain thresholds (i.e., to avoid losses and earnings decreases), frequency distributions suggest that private firms use accruals manipulations despite reporting under different accounting standards. This section presents the results of the two statistical significance tests of discontinuities around zero earnings to confirm if the number of observations in the intervals directly next to zero is significantly different than what would be expected under the assumption of smooth distribution. Specifically, Table 6.12 shows the results for the standardised difference test of Burgstahler and Dichev (1997) and the new discontinuity test by Byzalov and Basu (2019) for the histograms in Figure 6.7 and Figure 6.8.

Table 6.12: Distributions of near-zero earnings and non-discretionary earnings relative to earnings benchmarks across accounting standards in private firms for the period 2006 to 2018

	N	Std. Diff. i < 0	p-value	Std. Diff. i > 0	p-value	t-value
Panel A: Earnings level						
UK GAAP	139,834	-10.32***	0.000	10.69***	0.000	14.69***
IFRS	6,091	-4.55***	0.000	4.22***	0.000	4.36***
Panel B: Non-discretionary earnings level						
UK GAAP	139,834	0.80	0.423	-1.34	0.180	-1.18
IFRS	6,091	0.06	0.952	0.00	1.000	-0.14
Panel C: Earnings changes level						
UK GAAP	139,834	-0.16	0.874	4.28***	0.000	3.49***
IFRS	6,091	0.83	0.405	2.49**	0.013	1.19
Panel D: Non-discretionary earnings changes level						
UK GAAP	139,834	-0.62	0.538	1.05	0.294	1.18
IFRS	6,091	-0.58	0.561	1.67*	0.094	1.74*

Notes:

a) N is the total number of observations in the sample; i is the interval; Std. Diff. is the standardised difference statistics; all p-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

b) The table shows the Burgstahler and Dichev (1997) standardised difference statistic used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. This test statistics is measured as the difference between the actual and expected number of observations in an interval of interest, divided by the standard deviation of the difference. The expected number of observations in an interval of interest is assumed to be the average of the immediately adjacent intervals. The test statistics for an interval of interest *i* is shown below:

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

Where

n_i: is the number of observations in an interval i

N: is the total number of observations in the sample

p_i: is the probability that an observation will fall into the interval i

c) t-value shows the Byzalov and Basu (2019) distribution discontinuity test used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. All t-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

As can be seen from the Panel A of Table 6.12, there are significantly less (more) observations than expected in the small loss (profit) intervals for all the sampled private firms. As expected, after the removal of discretionary accruals, the results in Panel B confirm that standardised differences of NDE_t are not significantly different from smooth distribution. More specifically, the standardised difference of E_t for private firms reporting under UK GAAP is reduced from -10.32 (10.69) in Panel A to 0.80 (-1.34) for NDE_t in Panel B. Similarly, in the case of private firms that report under IFRS, the standardised difference of E_t in Panel A is reduced from -4.55 (4.22) to 0.06 (0.00) for NDE_t in Panel B. Byzalov and

Basu's (2019) test confirmed that the removal of discretionary accruals from the earnings resulted in relatively smoother distribution. Therefore, it seems that although private firms prepare financial statements under different accounting standards, they manipulate earnings to avoid losses.

The comparison of Panel C and Panel D reveals that the significance of the standardised differences for ΔE_t in the small positive earnings interval is reduced from 4.28 to an insignificant level of 1.05 for $ND\Delta E_t$ in the sample of UK GAAP private firms. Further t-test from Byzalov and Basu's (2019) test confirms this finding. Nonetheless, in the case of IFRS private firms, the standardised differences for ΔE_t (2.49) and $ND\Delta E_t$ (1.67) are both significant. Besides that, t-value of 1.19, p = >0.10 for ΔE_t and t-value of 1.74, p = <0.10 for $ND\Delta E_t$ provide conflicting findings. This result is somewhat counterintuitive. In other words, for the sample of IFRS private firms, the result from Byzalov and Basu's (2019) test in Panel C do not confirm that IFRS private firms manipulate earnings to increase their reported earnings. Also, it has not been confirmed in Panel D that the removal of discretionary accruals decreases the frequency of small positive earnings.

Overall, the results suggest that private firms use discretionary accruals to avoid losses despite different financial reporting standards. Similarly, in the case of private firms reporting under UK GAAP, it has been suggested that they use their discretion to maintain positive earnings. However, contrary to expectations, it has not been confirmed that IFRS private firms use discretionary accruals to avoid negative changes in earnings. To compare the difference in the levels of earnings management between private firms reporting under UK GAAP and the ones reporting under IFRS, the next chapter provides and discusses the results of multivariate panel data regression analysis.

6.7. Earnings management across different levels of leverage in private firms and PLCs

6.7.1. Descriptive statistics and correlations

This section demonstrates descriptive statistics related to the sample of private firms and PLCs across different levels of leverage during the period 2006 to 2018. Table 6.13 shows the summary statistics for the main variables used in the main analysis for the sample of low leveraged private firms (N = 89,629), highly leveraged private firms (N = 90,673), low leveraged PLCs (N = 2,431) and highly leveraged PLCs (N = 1,387).

Table 6.13: Descriptive statistics for the private firms and PLCs sample across leverage

	N	Mean	Std. Dev.	25%	50%	75%	Min	Max
Low leveraged private firms								
E_t	89,629	0.094	0.107	0.029	0.072	0.138	-0.322	0.668
NDE_t	89,629	0.090	0.157	0.002	0.073	0.164	-0.963	1.131
ΔE_t	89,629	0.008	0.085	-0.025	0.005	0.038	-0.418	0.531
$ND\Delta E_t$	89,629	0.005	0.153	-0.067	0.004	0.078	-1.132	1.019
DAC	89,629	0.092	0.098	0.027	0.061	0.121	0.000	0.931
Lev	89,629	0.760	0.378	0.446	0.733	1.066	0.061	1.494
QR	89,629	2.444	1.640	1.540	1.998	2.830	0.084	17.027
Growth_REV	89,629	0.060	0.216	-0.041	0.042	0.134	-0.807	2.608
Growth_A	89,629	0.067	0.180	-0.027	0.051	0.147	-0.627	1.891
Log_A	89,629	9.516	1.343	8.691	9.338	10.194	4.970	17.793
Loss	89,629	0.107	0.214	0.000	0.000	0.143	0.000	1.000
ROA	89,629	0.094	0.107	0.029	0.072	0.138	-0.322	0.668
Highly leveraged private firms								
E_t	90,673	0.052	0.086	0.010	0.040	0.085	-0.323	0.667
NDE_t	90,673	0.055	0.172	-0.028	0.050	0.140	-0.938	1.159
ΔE_t	90,673	0.006	0.077	-0.022	0.004	0.033	-0.417	0.530
$ND\Delta E_t$	90,673	0.009	0.170	-0.069	0.012	0.094	-1.008	0.969
DAC	90,673	0.108	0.111	0.032	0.072	0.143	0.000	0.880
Lev	90,673	5.079	6.073	2.106	3.120	5.411	1.494	90.223
QR	90,673	1.233	0.666	0.977	1.164	1.383	0.083	17.027
Growth_REV	90,673	0.097	0.243	-0.026	0.063	0.176	-0.808	2.608
Growth_A	90,673	0.102	0.236	-0.032	0.065	0.197	-0.626	1.916
Log_A	90,673	9.603	1.439	8.688	9.359	10.300	4.990	18.031
Loss	90,673	0.166	0.269	0.000	0.000	0.250	0.000	1.000
ROA	90,673	0.052	0.086	0.010	0.040	0.085	-0.323	0.667
Low leveraged PLCs								
E_t	2,431	0.051	0.102	0.016	0.057	0.099	-0.321	0.585
NDE_t	2,431	0.069	0.123	0.015	0.071	0.129	-0.674	0.838
ΔE_t	2,431	0.010	0.085	-0.018	0.009	0.037	-0.406	0.531
$ND\Delta E_t$	2,431	0.029	0.117	-0.024	0.025	0.078	-0.837	0.841
DAC	2,431	0.056	0.063	0.018	0.037	0.072	0.000	0.631
Lev	2,431	0.816	0.350	0.532	0.812	1.095	0.096	1.494
QR	2,431	1.837	1.266	1.114	1.557	2.130	0.200	12.306
Growth_REV	2,431	0.130	0.318	-0.011	0.076	0.199	-0.700	3.936
Growth_A	2,431	0.113	0.263	-0.015	0.058	0.166	-0.471	2.228
Log_A	2,431	12.062	2.291	10.453	11.762	13.490	6.203	19.621
Loss	2,431	0.195	0.298	0.000	0.000	0.286	0.000	1.000
ROA	2,431	0.051	0.102	0.016	0.057	0.099	-0.321	0.585
Highly leveraged PLCs								
E_t	1,387	0.037	0.083	0.008	0.039	0.078	-0.301	0.502
NDE_t	1,387	0.061	0.105	0.009	0.063	0.114	-0.440	0.487
ΔE_t	1,387	0.009	0.078	-0.017	0.006	0.029	-0.417	0.489
$ND\Delta E_t$	1,387	0.032	0.110	-0.020	0.029	0.077	-0.664	0.641
DAC	1,387	0.060	0.062	0.020	0.042	0.077	0.000	0.525
Lev	1,387	3.180	2.283	1.889	2.434	3.595	1.495	25.043
QR	1,387	1.201	0.635	0.842	1.104	1.380	0.325	8.208
Growth_REV	1,387	0.105	0.282	-0.011	0.066	0.165	-0.710	4.112
Growth_A	1,387	0.105	0.244	-0.027	0.052	0.178	-0.435	1.964
Log_A	1,387	13.226	2.407	11.514	13.410	14.973	6.723	19.193
Loss	1,387	0.190	0.287	0.000	0.000	0.300	0.000	1.000
ROA	1,387	0.037	0.083	0.008	0.039	0.078	-0.301	0.502

Notes: E_t is the scaled earnings, measured as end-of-year net income divided by lagged total assets; NDE_t is the scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*; ΔE_t is the scaled change in earnings, measured as end-of-year net income less net income in year *t-1* divided by lagged total assets; $ND\Delta E_t$ is the scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t,* estimated with the performance-adjusted model in year *t*; *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.

In terms of earnings levels, the table above illustrates that all sampled firms have higher standard deviations of E_t than the standard deviations of NDE_t. Similar results are revealed for the change in earnings. Specifically, for all the sampled firms, the standard deviations of ΔE_t variables are lower than the standard deviation of $ND\Delta E_t$. These results show that both non-discretionary earnings and non-discretionary earnings change are more scattered compared to reported earnings and change in earnings.

As the table above shows, there is a clear difference in the mean and median values for *DAC* between the private firms and PLCs. Data from this table can be compared with the data in Table 6.1 which shows that private firms may manipulate earnings to a greater extent than PLCs. More specifically, it seems that highly leveraged private firms, on average, exhibit greater levels of earnings management than the rest of the sampled firms. In other words, highly leveraged private firms have the highest mean and median values of *DAC* (0.108 and 0.072, respectively) compared with the rest of the sampled firms.

Table 6.14 below provides the Pearson correlation coefficients of the private firms and PLCs across different level of leverage. Regarding the *Lev* and *DAC*, there is a positive and significant correlation between the two in all the panels except in Panel C. To put it differently, it seems that leverage in private firms drives earnings management to a greater extent than in PLCs. For example, as it can be seen in Panel A, low leveraged private firms have a 0.018 (significant at p = 0.05 level) coefficient between *Lev* and *DAC*, while Panel D shows that low leveraged PLCs (-0.035, not significant at p = 0.05) are not likely to manipulate earnings. The correlations for *QR* are positive in all panels. However, for highly leveraged PLCs (0.022) in Panel D, this correlation is not statistically significant. Not surprisingly, the coefficients of *Log_A* and *DAC* are negative and significant in all the panels of Table 6.14. Also, similar to previous correlation tables, there are significant and positive correlations for both *Growth_REV* and *Growth_A* with *DAC* in all the panels. What stands out in Panel A and Panel B are correlations for *Loss* with *DAC* that are negative and significant, suggesting that despite different leverage levels, *Loss* in private firms does not drive earnings manipulations. In contrast, in Panel C and Panel D, PLCs have a significant and positive correlation between *Loss* and *DAC*; thus, implying that *Loss* avoidance increases discretionary accruals in PLCs more than private firms. On the contrary, *ROA* is negatively correlated with *DAC* for PLCs (i.e., Panel C and Panel D), while it may drive earnings management in private firms (i.e., Panel A and Panel B).

The following sections provide the cross-sectional distributions of earnings variables across different levels of leverage in private firms and PLCs and present and discusses the statistical discontinuity test of smooth frequency distributions.

Table 6.14: Pearson correlations for the small, medium, large private and PLCs sample across leverage

Panel A: Pearson correlations for low leveraged private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.018*	1.000						
(3) QR	0.068*	-0.572*	1.000					
(4) Growth_REV	0.065*	0.079*	-0.078*	1.000				
(5) Growth_A	0.152*	0.059*	-0.014*	0.368*	1.000			
(6) Log_A	-0.075*	-0.000	-0.033*	0.033*	0.062*	1.000		
(7) Loss	-0.016*	0.032*	-0.060*	-0.049*	-0.152*	0.004	1.000	
(8) ROA	0.213*	-0.068*	0.095*	0.250*	0.447*	-0.094*	-0.384*	1.000

Panel B: Pearson correlations for highly leveraged private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.049*	1.000						
(3) QR	0.041*	-0.103*	1.000					
(4) Growth_REV	0.101*	0.022*	-0.019*	1.000				
(5) Growth_A	0.247*	0.022*	-0.002	0.384*	1.000			
(6) Log_A	-0.042*	0.029*	0.028*	0.022*	0.052*	1.000		
(7) Loss	-0.014*	0.160*	-0.048*	-0.072*	-0.131*	0.022*	1.000	
(8) ROA	0.098*	-0.184*	0.076*	0.200*	0.293*	-0.093*	-0.469*	1.000

Panel C: Pearson correlations for low leveraged PLCs

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	-0.035	1.000						
(3) QR	0.133*	-0.408*	1.000					
(4) Growth_REV	0.110*	-0.056*	0.011	1.000				
(5) Growth_A	0.294*	-0.008	0.100*	0.366*	1.000			
(6) Log_A	-0.171*	0.262*	-0.070*	-0.108*	-0.066*	1.000		
(7) Loss	0.153*	-0.206*	0.097*	0.107*	-0.038	-0.326*	1.000	
(8) ROA	-0.038	0.093*	-0.020	0.056*	0.211*	0.194*	-0.626*	1.000

Panel D: Pearson correlations for highly leveraged PLCs

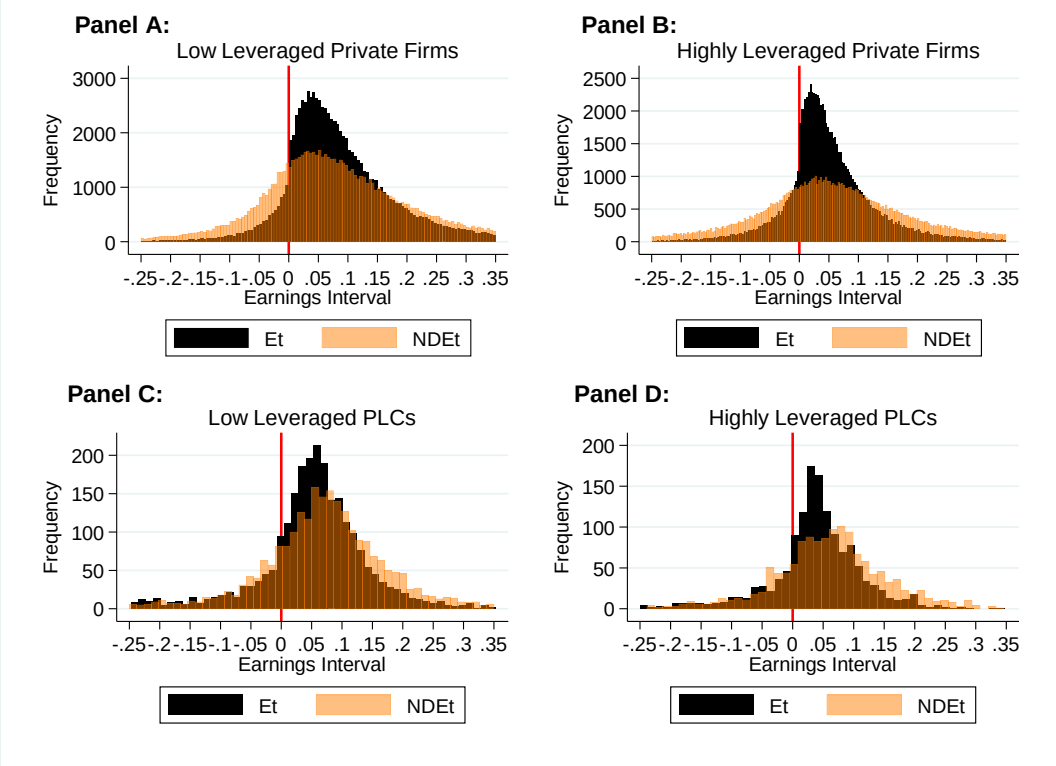
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.139*	1.000						
(3) QR	0.022	-0.084*	1.000					
(4) Growth_REV	0.113*	-0.026	-0.030	1.000				
(5) Growth_A	0.188*	-0.093*	-0.001	0.482*	1.000			
(6) Log_A	-0.259*	0.026	-0.013	-0.117*	-0.092*	1.000		
(7) Loss	0.114*	0.122*	0.044	-0.087*	-0.187*	-0.296*	1.000	
(8) ROA	-0.036	-0.190*	0.009	0.158*	0.352*	0.143*	-0.603*	1.000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.
* Indicates significance at the 5 percent level.

6.7.2. The distribution of scaled earnings

To assess earnings management levels across different levels of leverage in private firms and PLCs (H5), the distributions of annual net earnings and non-discretionary earnings are presented first. Figure 6.9 below provides a comparison of the distributions of earnings and non-discretionary earnings across different levels of leverage in private firms and PLCs for the period 2006 to 2018.

Figure 6.9: The frequency distribution of scaled annual earnings compared to annual non-discretionary scaled earnings across different levels of leverage in private firms and PLCs for the period 2006 to 2018 (E_t vs NDE_t)



Notes: The distribution of annual net income divided by lagged total assets and the distribution of annual non-discretionary earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: low leveraged private firms (0.005), highly leveraged private firms (0.003), low leveraged PLCs (0.012) and highly leveraged PLCs (0.013). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.005) for the low leveraged private firms, [0, 0.003) for the highly leveraged private firms, [0, 0.012) for the low leveraged PLCs and [0, 0.013) for the highly leveraged PLCs. The vertical axis labelled frequency represents the number of observations in each scaled earnings and non-discretionary scaled earnings interval.

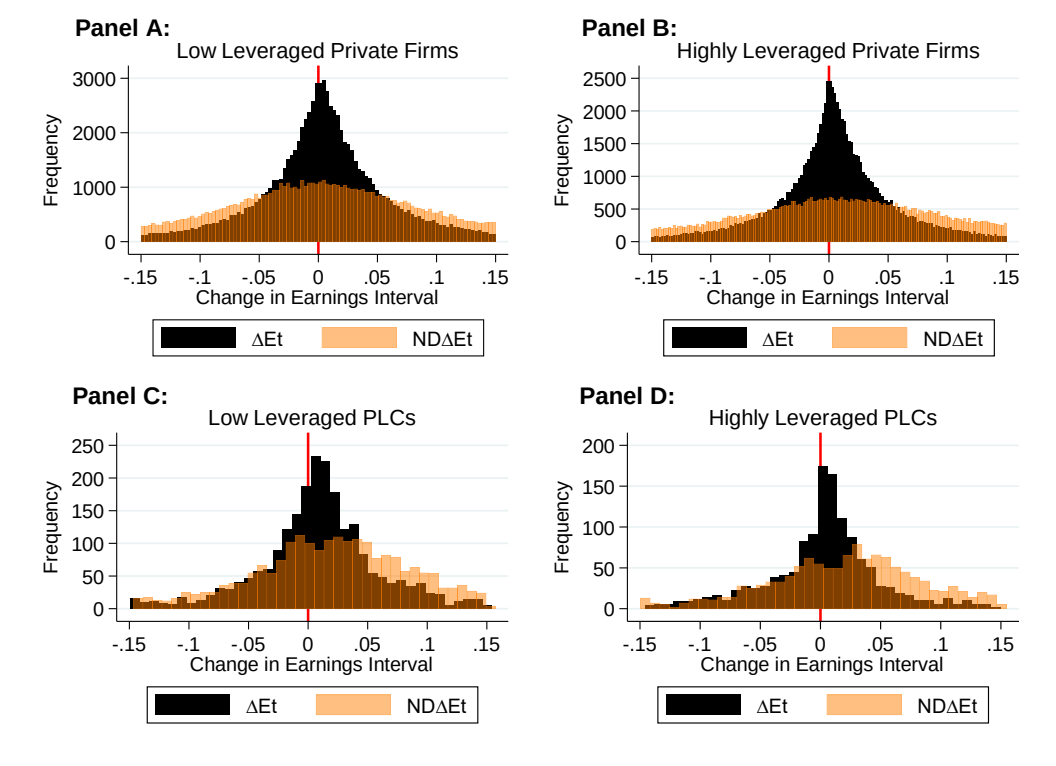
In the case of earnings management to avoid losses, it is expected that there is a kink in the earnings distribution in the case of earnings management to avoid losses. Furthermore, if there is earnings management and discretionary accruals are removed from the earnings, it is expected that a frequency distribution is relatively smoothened. In terms of the kink, it seems that private firms in Panel A and Panel B have the most pronounced kinks around zero earnings compared to others (i.e., PLCs). Therefore, it seems that despite different levels of leverage, private firms may manipulate reported earnings to avoid losses

to a similar extent. The differences between the reported earnings and non-discretionary earnings are clearly highlighted in Figure 6.9. As expected, discontinuities around zero earnings are minimised in all the panels of Figure 6.9 after the removal of discretionary accruals. Nevertheless, it seems that highly leveraged private firms in Panel B show the most pronounced difference between the two. To put it differently, Panel B reveals that highly leveraged private firms may manipulate earnings to avoid losses through accruals more than the rest of the firms. In particular, more than low leveraged private firms (i.e., Panel A) and PLCs (i.e., Panel C and Panel D).

6.7.3. The distribution of scaled change in earnings

To further assess earnings management levels across different levels of leverage in private firms and PLCs (H5), the distributions of change in earnings and non-discretionary change in earnings are discussed in this section. Figure 6.10 below provides the comparison of the frequency distributions of change in earnings and non-discretionary change in earnings across different levels of leverage in private firms and PLCs for the period 2006 to 2018.

Figure 6.10: The frequency distribution of scaled changes in earnings compared to non-discretionary changes in scaled earnings across different levels of leverage in private firms and PLCs for the period 2006 to 2018 (ΔE_t vs $ND\Delta E_t$)



Notes: The distributions of changes in annual net income divided by lagged total assets and the distributions of non-discretionary changes in earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the change in earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: low leveraged private firms (0.003), highly leveraged private firms (0.002), low leveraged PLCs (0.008) and highly leveraged PLCs (0.008). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.003) for the low leveraged private firms, [0, 0.002) for the highly leveraged private firms, [0, 0.008) for the low leveraged PLCs and [0, 0.008) for the highly leveraged PLCs. The vertical axis labelled frequency represents the number of observations in each scaled earnings change and non-discretionary scaled earnings change interval.

Similarly, to the previous section, in the case of earnings management to avoid earnings declines, the kink in the frequency distributions of changes in earnings is expected. Also, as discussed in chapter five, it is expected that the frequency distribution of non-discretionary changes in earnings is spread more smoothly after the removal of discretionary accruals if discretionary accruals were used for earnings manipulations. From Figure 6.10, it can be seen that by far the greatest number of small positive changes in earnings seems to be amongst PLCs in Panel C and Panel D. In addition, a visual comparison of Panel C and Panel D suggests that highly leveraged PLCs (i.e., Panel D) show the most distinct discontinuity around zero earnings. This implies that highly leveraged PLCs may be more prone to manipulate earnings to avoid declines in earnings compared to less leveraged PLCs in Panel C. With respect to the difference between a change in earnings and non-discretionary earnings, Figure 6.10 reveals that non-discretionary change in earnings is spread more widely than changes in earnings. Thus, it seems that all the sampled firms are using discretionary accruals to report small positive changes in earnings

to a certain extent. In addition, the histograms also suggest that despite the different level of leverage, PLCs (i.e., Panel C and Panel D) are inclined to use their discretion to reduce the frequency of largely positive changes in earnings.

6.7.4. Statistical significance of discontinuities

To test for the statistical significance of earnings management in private firms and PLCs across different levels of leverage in relation to earnings targets (i.e., loss avoidance and earnings decreases), this section tests the null hypothesis of smooth distribution (i.e., no deviations). As discussed previously in the fifth chapter, two statistical tests are used to test if discontinuities at zero earnings (i.e., intervals adjacent to zero earnings) are significantly different than what would be expected under the smooth distribution (i.e., no earnings management). In particular, Table 6.15 below provides Burgstahler and Dichev (1997) and Byzalov and Basu (2019) statistical significance of discontinuities tests for the previously examined frequency distributions in Figure 6.9 and Figure 6.10.

Table 6.15: Distributions of near-zero earnings and non-discretionary earnings relative to earnings benchmarks across different levels of leverage in private firms and PLCs for the period 2006 to 2018

	N	Std. Diff. i < 0	p-value	Std. Diff. i > 0	p-value	t-value
Panel A: Earnings level						
Low leveraged private firms	89,629	-7.20***	0.000	7.50***	0.000	9.46***
Highly leveraged private firms	90,673	-8.10***	0.000	8.43***	0.000	12.51***
Low leveraged PLCs	2,431	-1.87*	0.061	0.78	0.435	1.47
Highly leveraged PLCs	1,387	-1.51	0.131	0.53	0.596	0.73
Panel B: Non-discretionary earnings level						
Low leveraged private firms	89,629	2.50**	0.012	-2.24**	0.025	-2.43**
Highly leveraged private firms	90,673	0.04	0.966	-0.62	0.535	-0.08
Low leveraged PLCs	2,431	1.53	0.127	-0.94	0.349	-1.51
Highly leveraged PLCs	1,387	-0.50	0.616	-0.10	0.919	0.14
Panel C: Earnings changes level						
Low leveraged private firms	89,629	-0.32	0.746	2.39**	0.017	2.68***
Highly leveraged private firms	90,673	-0.24	0.809	4.24***	0.000	3.47***
Low leveraged PLCs	2,431	-0.61	0.543	1.75*	0.081	1.45
Highly leveraged PLCs	1,387	-1.91*	0.056	4.23***	0.000	3.20***
Panel D: Non-discretionary earnings changes level						
Low leveraged private firms	89,629	-0.76	0.447	0.07	0.940	0.88
Highly leveraged private firms	90,673	-1.50	0.135	1.19	0.235	1.49
Low leveraged PLCs	2,431	1.36	0.175	-0.91	0.364	-1.33
Highly leveraged PLCs	1,387	0.28	0.776	0.87	0.383	-0.09

Notes:

a) N is the total number of observations in the sample; i is the interval; Std. Diff. is the standardised difference statistics; all p-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

b) The table shows the Burgstahler and Dichev (1997) standardised difference statistic used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. This test statistics is measured as the difference between the actual and expected number of observations in an interval of interest, divided by the standard deviation of the difference. The expected number of observations in an interval of interest is assumed to be the average of the immediately adjacent intervals. The test statistics for an interval of interest *i* is shown below:

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

Where

n_i: is the number of observations in an interval i

N: is the total number of observations in the sample

p_i: is the probability that an observation will fall into the interval i

c) t-value shows the Byzalov and Basu (2019) distribution discontinuity test used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. All t-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

From Table 6.15 above, it can be seen that the discretionary accruals generally have the effect of increasing the number of small positive earnings. This table is quite revealing in several ways. First, in the case of the private firms, Panel A reveals that despite different levels of leverage, there is a significant difference (p = <0.01) between the expected number

of observations and the actual number of observations within the small loss (small profit) intervals. More specifically, for the small loss (small profit) intervals for the low leveraged private firms standardised difference of E_t is -7.20 (7.50) and t = 9.46. Similarly, in the case of highly leveraged private firms standardised difference of E_t is -8.10 (8.43) and t = 12.51. On the other hand, standardised difference test and t-values of discontinuity test of E_t for the sample of PLCs suggest that despite the different level of leverage, PLCs may not manipulate earnings to avoid losses. From the data comparison of Panel A and Panel B of Table 6.15, it seems that the removal of discretionary accruals results in generally smoother distribution. Nevertheless, in the case of low leveraged private firms, the comparison of Panel A and Panel B suggest that the removal of discretionary accruals does not result in a relatively smooth distribution. Specifically, the standardised difference of NDE_t in the loss (profit) interval of low leveraged private firms is 2.50 (-2.24), whereas t = -2.43, p = < 0.05. Therefore, at the 5% significance level, both standardised difference and Byzalov and Basu (2019) tests imply that low leveraged private firms may use another type of earnings management (i.e., RAM) rather than discretionary accruals to increase their reported earnings.

The comparison of Panel C and Panel D of Table 6.15 demonstrates that significantly higher standardised differences of ΔE_t in the intervals to the right of zero are reduced to insignificant levels after the exclusion of discretionary accruals (i.e., $ND\Delta E_t$). More specifically, the standardised differences of ΔE_t for the small positive change in earnings interval are reduced as follows: for low leveraged private firms from 2.39 to 0.07, for highly leveraged private firms from 4.24 to 1.19, for low leveraged PLCs from 1.75 to -0.91 and highly leveraged PLCs from 4.23 to 0.87. Further test by Byzalov and Basu (2019) have confirmed that the significantly different numbers of observations for ΔE_t in the interval right of zero changes in earnings are reduced to the insignificant levels after the removal of discretionary accruals (i.e., $ND\Delta E_t$).

To sum up, the results indicate that the avoidance of losses may be of more importance for the private firms across different levels of leverage than for the PLCs. On the contrary, it seems that a higher level of leverage in PLCs may drive earnings management to avoid earnings decreases. In other words, the results suggest that highly leveraged PLCs are using discretionary accruals to sustain positive earnings. Similarly, the results suggest that both low leveraged and highly leveraged private firms use their discretion to maintain positive earnings. Additionally, it has not been confirmed that low leveraged private firms use only discretionary accruals to avoid losses. To assess whether a different level of leverage affects levels of earnings management across private firms and PLCs differently, the next chapter provide further panel data regression analysis.

6.8. Earnings management across audited small, medium and large private firms

6.8.1. Descriptive statistics and correlations

In this section, descriptive statistics for the sample of private firms across the size of the firms and audit over the period 2006 to 2018 is provided in Table 6.16 below as follows: small audited firms (N = 34,213), medium audited (N = 69,169), large audited (N = 74,033), small unaudited (N = 2,213), medium unaudited (N = 326) and large unaudited (N = 348).

Table 6.16: Descriptive statistics for the private firms' sample across the size of the firm and audit

	N	Mean	Std. Dev.	25%	50%	75%	Min	Max
Panel A: Audited private firms								
Small audited private firms								
E_t	34,213	0.084	0.116	0.017	0.061	0.132	-0.322	0.668
NDE_t	34,213	0.084	0.198	-0.022	0.070	0.183	-0.963	1.131
ΔE_t	34,213	0.007	0.098	-0.034	0.003	0.043	-0.417	0.531
$ND\Delta E_t$	34,213	0.006	0.194	-0.089	0.007	0.107	-1.093	1.019
DAC	34,213	0.122	0.121	0.037	0.083	0.165	0.000	0.854
Lev	34,213	2.857	5.112	0.608	1.310	2.931	0.061	76.545
QR	34,213	2.183	1.831	1.188	1.610	2.456	0.083	17.027
Growth_REV	34,213	0.061	0.277	-0.074	0.035	0.156	-0.808	2.608
Growth_A	34,213	0.072	0.243	-0.062	0.047	0.178	-0.627	1.877
Log_A	34,213	8.315	0.917	7.755	8.375	8.902	4.970	14.141
Loss	34,213	0.146	0.255	0.000	0.000	0.231	0.000	1.000
ROA	34,213	0.084	0.116	0.017	0.061	0.132	-0.322	0.668
Medium audited private firms								
E_t	69,169	0.075	0.099	0.019	0.057	0.115	-0.320	0.667
NDE_t	69,169	0.078	0.155	-0.004	0.068	0.155	-0.842	1.159
ΔE_t	69,169	0.008	0.080	-0.025	0.004	0.037	-0.417	0.531
$ND\Delta E_t$	69,169	0.011	0.151	-0.061	0.012	0.086	-1.132	0.911
DAC	69,169	0.093	0.096	0.028	0.063	0.123	0.000	0.857
Lev	69,169	2.590	4.011	0.716	1.411	2.804	0.094	63.903
QR	69,169	1.805	1.217	1.105	1.453	2.097	0.142	10.799
Growth_REV	69,169	0.076	0.204	-0.029	0.054	0.152	-0.519	1.646
Growth_A	69,169	0.084	0.194	-0.025	0.058	0.167	-0.495	1.392
Log_A	69,169	9.124	0.639	8.701	9.066	9.476	6.267	13.784
Loss	69,169	0.130	0.240	0.000	0.000	0.182	0.000	1.000
ROA	69,169	0.075	0.099	0.019	0.057	0.115	-0.320	0.667
Large audited private firms								
E_t	74,033	0.064	0.089	0.016	0.049	0.098	-0.323	0.664
NDE_t	74,033	0.060	0.156	-0.016	0.052	0.135	-0.938	1.084
ΔE_t	74,033	0.006	0.072	-0.019	0.004	0.030	-0.414	0.530
$ND\Delta E_t$	74,033	0.003	0.154	-0.067	0.004	0.077	-1.082	0.960
DAC	74,033	0.096	0.104	0.028	0.063	0.125	0.000	0.931
Lev	74,033	3.296	5.341	0.843	1.712	3.583	0.077	90.223
QR	74,033	1.696	1.256	1.047	1.348	1.934	0.095	12.205
Growth_REV	74,033	0.088	0.228	-0.022	0.057	0.156	-0.556	2.281
Growth_A	74,033	0.090	0.208	-0.021	0.059	0.169	-0.516	1.916
Log_A	74,033	10.605	1.330	9.742	10.385	11.294	6.896	18.031
Loss	74,033	0.139	0.246	0.000	0.000	0.200	0.000	1.000
ROA	74,033	0.064	0.089	0.016	0.049	0.098	-0.323	0.664

Notes: E_t is the scaled earnings, measured as end-of-year net income divided by lagged total assets; NDE_t is the scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*; ΔE_t is the scaled change in earnings, measured as end-of-year net income less net income in year *t-1* divided by lagged total assets; $ND\Delta E_t$ is the scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t,* estimated with the performance-adjusted model in year *t*; *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.

Panel B: Unaudited private firms								
	N	Mean	Std. Dev.	25%	50%	75%	Min	Max
Small unaudited private firms								
E_t	2,213	0.110	0.119	0.028	0.089	0.174	-0.315	0.668
NDE_t	2,213	0.118	0.196	0.000	0.101	0.233	-0.711	1.073
ΔE_t	2,213	0.008	0.106	-0.038	0.004	0.050	-0.418	0.530
$ND\Delta E_t$	2,213	0.016	0.184	-0.081	0.010	0.112	-0.938	0.861
DAC	2,213	0.110	0.108	0.035	0.077	0.147	0.000	0.789
Lev	2,213	2.532	4.341	0.548	1.234	2.678	0.061	60.571
QR	2,213	2.075	1.741	1.133	1.547	2.375	0.086	17.027
Growth_REV	2,213	0.077	0.275	-0.064	0.042	0.162	-0.785	2.509
Growth_A	2,213	0.088	0.240	-0.045	0.052	0.185	-0.598	1.780
Log_A	2,213	7.261	0.884	6.645	7.249	7.812	4.990	10.995
Loss	2,213	0.112	0.221	0.000	0.000	0.143	0.000	1.000
ROA	2,213	0.110	0.119	0.028	0.089	0.174	-0.315	0.668
Medium unaudited private firms								
E_t	326	0.105	0.133	0.023	0.093	0.170	-0.211	0.649
NDE_t	326	0.090	0.175	-0.014	0.066	0.194	-0.562	0.701
ΔE_t	326	0.008	0.107	-0.035	0.003	0.044	-0.359	0.419
$ND\Delta E_t$	326	-0.008	0.171	-0.099	-0.016	0.082	-0.676	0.575
DAC	326	0.110	0.098	0.043	0.090	0.149	0.000	0.614
Lev	326	2.425	3.414	0.615	1.311	2.948	0.095	33.517
QR	326	1.863	1.403	1.075	1.536	2.234	0.142	10.801
Growth_REV	326	0.100	0.235	-0.037	0.065	0.190	-0.474	1.107
Growth_A	326	0.120	0.220	-0.018	0.089	0.233	-0.438	1.120
Log_A	326	9.205	0.722	8.700	9.040	9.620	7.545	11.976
Loss	326	0.133	0.214	0.000	0.000	0.200	0.000	1.000
ROA	326	0.105	0.133	0.023	0.093	0.170	-0.211	0.649
Large unaudited private firms								
E_t	348	0.068	0.089	0.019	0.051	0.102	-0.230	0.534
NDE_t	348	0.054	0.174	-0.025	0.053	0.147	-0.750	0.665
ΔE_t	348	0.006	0.074	-0.023	0.002	0.032	-0.347	0.475
$ND\Delta E_t$	348	-0.008	0.169	-0.083	-0.002	0.078	-0.859	0.422
DAC	348	0.112	0.113	0.033	0.077	0.147	0.000	0.821
Lev	348	3.945	6.425	0.839	1.641	4.311	0.077	46.234
QR	348	1.517	1.062	0.993	1.293	1.746	0.104	10.232
Growth_REV	348	0.109	0.278	-0.030	0.058	0.163	-0.464	2.205
Growth_A	348	0.108	0.211	-0.013	0.084	0.205	-0.378	1.286
Log_A	348	10.888	1.408	10.086	10.644	11.540	7.700	16.821
Loss	348	0.137	0.215	0.000	0.000	0.200	0.000	1.000
ROA	348	0.068	0.089	0.019	0.051	0.102	-0.230	0.534

Notes: E_t is the scaled earnings, measured as end-of-year net income divided by lagged total assets; NDE_t is the scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*; ΔE_t is the scaled change in earnings, measured as end-of-year net income less net income in year *t-1*; $ND\Delta E_t$ is the scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t,* estimated with the performance-adjusted model in year *t*; *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.

Regarding earnings levels, the data in Panel A demonstrate that in the case of audited private firms, both reported earnings and change in earnings are less scattered than non-discretionary earnings and non-discretionary earnings change. Specifically, the standard deviations for E_t and ΔE_t are lower than the standard deviation of NDE_t and $ND\Delta E_t$ for all the sizes of audited private firms. In the same way, Panel B indicate that unaudited private firms exhibit similar results.

What is interesting about the data from Panel A above is that by far the greatest mean and median values of *DAC* (0.122 and 0.083, respectively) are for small audited private

firms. These results suggest that, on average, audited small private firms manipulate earnings more than the rest of the sampled private firms. Interestingly, Panel B demonstrate that there is only a slight difference in the mean values of *DAC* for all sampled unaudited private firms, whereas medium unaudited private firms have the highest median values of *DAC* (0.090). The further comparison of the *DAC* values in Panel A and Panel B reveals that the effect of audit may depend on the firm's size.

Table 6.17 below presents the Pearson correlation coefficients for the sample of private firms across the firms' size and audit. It is apparent from Panel A that there is a positive and significant correlation between *Lev* and *DAC* for all the sizes of audited firms. The correlations between *QR* and *DAC* suggest that liquidity risk is the most important to large audited private firms. Specifically, there is a positive and statistically significant correlation for large audited private firms (0.015, significant at the p = 0.05), while negative and significant in the sample of small audited private firms (-0.014, significant at the p = 0.05). The correlation coefficients of *Log_A* and *DAC* are negative for all the audited private firms in Panel A. Nevertheless, this correlation is not significant for large audited private firms. One explanation for this could be that a third factor, such as audit quality, affects *DAC*. Also, similar to previous correlation tables, Panel A (i.e., audited firms across all sizes) reveals significant and positive correlations for both *Growth_REV* and *Growth_A* with *DAC*. In terms of correlations of *Loss* with *DAC* it seems that *Loss* does not drive earnings management levels, while there is a positive correlation with *ROA.*

A comparison of the cross-sectional distributions of earnings variables across different sizes of audited private firms and a test statistic that the frequency distribution is smooth are discussed in the following sections.

Table 6.17: Pearson correlations for the private firms' sample across the size of the firm and audit

Panel A: Pearson correlations for audited private firms

Small audited private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.054*	1.000						
(3) QR	-0.014*	-0.258*	1.000					
(4) Growth_REV	0.091*	0.046*	-0.091*	1.000				
(5) Growth_A	0.198*	0.049*	-0.052*	0.362*	1.000			
(6) Log_A	-0.073*	-0.004	0.060*	0.010	0.088*	1.000		
(7) Loss	-0.007	0.167*	-0.072*	-0.054*	-0.121*	-0.035*	1.000	
(8) ROA	0.139*	-0.194*	0.109*	0.218*	0.340*	-0.101*	-0.439*	1.000

Medium audited private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.065*	1.000						
(3) QR	0.007	-0.293*	1.000					
(4) Growth_REV	0.081*	0.049*	-0.076*	1.000				
(5) Growth_A	0.209*	0.037*	-0.033*	0.400*	1.000			
(6) Log_A	-0.021*	-0.066*	0.141*	-0.005	0.075*	1.000		
(7) Loss	0.002	0.181*	-0.117*	-0.064*	-0.143*	0.034*	1.000	
(8) ROA	0.127*	-0.204*	0.197*	0.225*	0.361*	-0.052*	-0.435*	1.000

Large audited private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.076*	1.000						
(3) QR	0.015*	-0.228*	1.000					
(4) Growth_REV	0.108*	0.058*	-0.071*	1.000				
(5) Growth_A	0.237*	0.067*	-0.036*	0.377*	1.000			
(6) Log_A	-0.001	0.016*	0.048*	0.003	0.037*	1.000		
(7) Loss	-0.015*	0.161*	-0.105*	-0.042*	-0.118*	0.036*	1.000	
(8) ROA	0.130*	-0.199*	0.176*	0.175*	0.302*	-0.040*	-0.431*	1.000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.
* Indicates significance at the 5 percent level.

Panel B: Pearson correlations for unaudited private firms

Small unaudited private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.031	1.000						
(3) QR	-0.018	-0.284*	1.000					
(4) Growth_REV	0.096*	0.031	-0.080*	1.000				
(5) Growth_A	0.165*	0.065*	-0.040	0.410*	1.000			
(6) Log_A	-0.026	-0.071*	0.111*	0.027	0.118*	1.000		
(7) Loss	-0.011	0.065*	-0.085*	-0.046*	-0.129*	0.019	1.000	
(8) ROA	0.161*	-0.150*	0.075*	0.286*	0.423*	-0.082*	-0.380*	1.000

Medium unaudited private firms

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	-0.009	1.000						
(3) QR	0.020	-0.336*	1.000					
(4) Growth_REV	-0.015	0.155*	-0.026	1.000				
(5) Growth_A	0.243*	0.109*	-0.032	0.313*	1.000			
(6) Log_A	0.013	-0.046	0.050	-0.131*	0.034	1.000		
(7) Loss	-0.074	0.160*	-0.189*	-0.047	-0.173*	0.115*	1.000	
(8) ROA	0.104	-0.276*	0.201*	0.215*	0.343*	-0.047	-0.439*	1.000

Large unaudited private firms

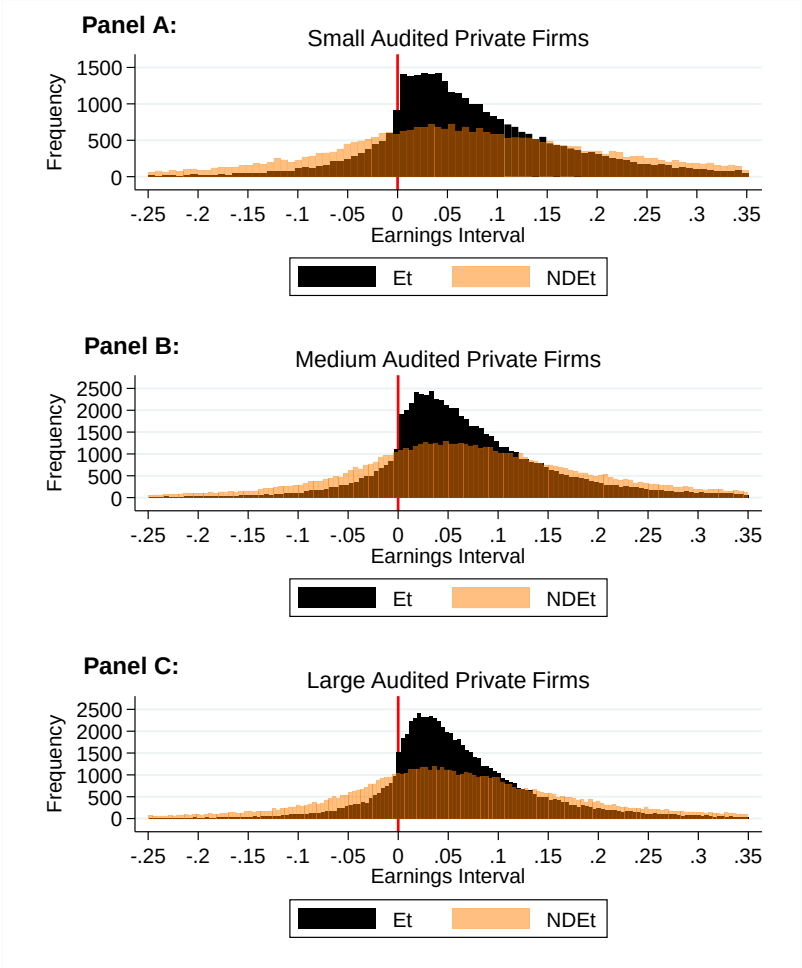
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) DAC	1.000							
(2) Lev	0.072	1.000						
(3) QR	0.068	-0.275*	1.000					
(4) Growth_REV	-0.012	0.095	-0.115*	1.000				
(5) Growth_A	0.320*	0.128*	-0.045	0.353*	1.000			
(6) Log_A	0.079	0.140*	-0.199*	0.009	0.066	1.000		
(7) Loss	-0.070	0.138*	-0.047	-0.015	-0.134*	0.269*	1.000	
(8) ROA	0.024	-0.239*	0.105*	0.162*	0.303*	-0.174*	-0.435*	1.000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model; *Lev* is the debt ratio measured as end-of-year total liabilities divided by end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets.
* Indicates significance at the 5 percent level.

6.8.2. The distribution of scaled earnings

To compare earnings management levels between audited private firms of different sizes (H6), the distributions of earnings and non-discretionary earnings for the period 2006 to 2018 are presented in Figure 6.11 below.

Figure 6.11: The frequency distribution of scaled annual earnings compared to annual non-discretionary scaled earnings across audited small, medium and large private firms for the period 2006 to 2018 (E_t vs NDE_t)



Notes: The distribution of annual net income divided by lagged total assets and the distribution of annual non-discretionary earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: small audited private firms (0.007), medium audited private firms (0.005) and large audited private firms (0.004). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.007) for the small audited private firms, [0, 0.005) for the medium audited private firms, [0, 0.004) and for the large audited private firms. The vertical axis labelled frequency represents the number of observations in each scaled earnings and non-discretionary scaled earnings interval.

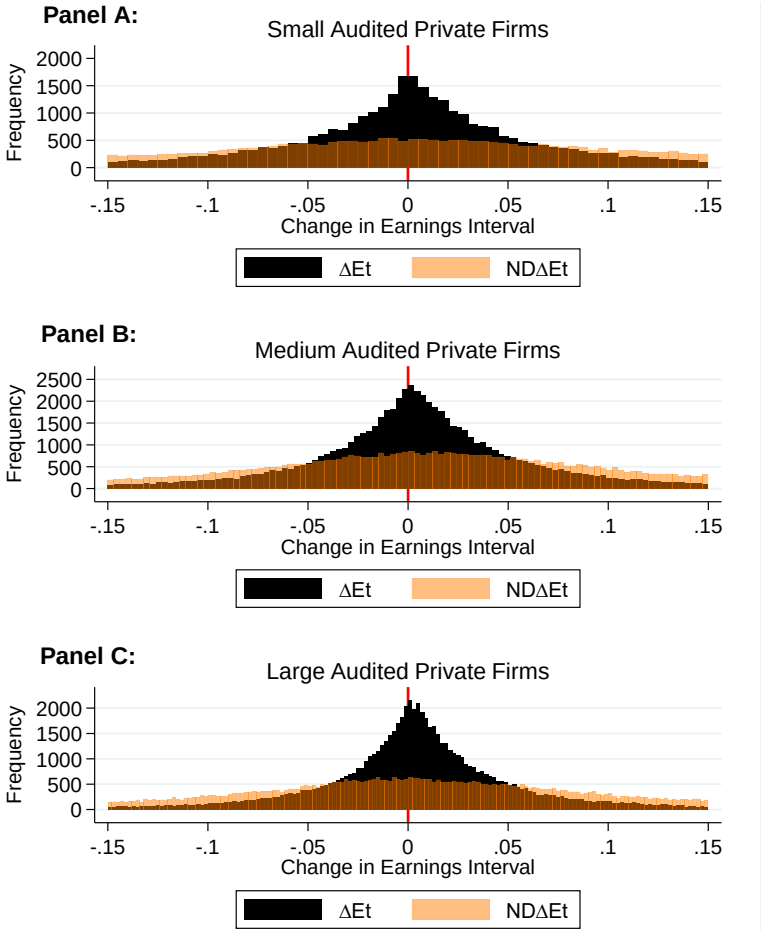
As stated before in the previous chapter, if there is earnings management, the frequency distribution of earnings would show a small number of observations on the left side from zero earnings, while a large number of observations on the right size from zero earnings. Furthermore, the removal of discretionary accruals should result in minimised discontinuity around zero earnings if there is earnings management. A visual inspection of Figure 6.11 shows that all the audited private firms exhibit a discontinuity around zero earnings to a

certain extent. The difference between earnings distributions and non-discretionary earnings suggests that firms may use their discretion to avoid reporting losses. Similar to the earnings frequency distribution, it seems that there are no notable differences in the distributions of non-discretionary earnings between Panel A, Panel B and Panel C. Hence, it may be said that despite different sizes, the audited private firms are prone to use discretionary accruals to avoid reporting losses.

6.8.3. The distribution of scaled change in earnings

To gain a deeper insight into earnings management levels between audited private firms of different sizes (H6), the distributions of change in earnings and non-discretionary change in earnings for the period 2006 to 2018 are presented in Figure 6.12 below.

Figure 6.12: The frequency distribution of scaled changes in earnings compared to non-discretionary changes in scaled earnings across audited small, medium and large private firms for the period 2006 to 2018 (ΔE_t vs $ND\Delta E_t$)



Notes: The distributions of changes in annual net income divided by lagged total assets and the distributions of non-discretionary changes in earnings divided by lagged total assets. The distribution interval widths are measured as $2(IQR)n^{-1/3}$, where IQR is the sample interquartile range of the change in earnings and n is the number of available observations. The distribution interval widths are different for each sample and they are as follows: small audited private firms (0.005), medium audited private firms (0.003) and large audited private firms (0.002). The location of zero earnings on the horizontal axis is marked by the vertical line commencing from zero earnings. The first interval to the right of zero contains all observations in the interval [0, 0.005) for the small audited private firms, [0, 0.003) for the medium audited private firms, [0, 0.002) and for the large audited private firms. The vertical axis labelled frequency represents the number of observations in each scaled earnings change and non-discretionary scaled earnings change interval.

In a similar vein to the above test, it is expected that there are unusually low frequencies of small earnings declines and unusually high frequencies of small positive changes in earnings under the assumption of earnings management to avoid earnings declines. Furthermore, the assumption of earnings management to avoid earnings declines is further extended to include discretionary accruals. In particular, if earnings are managed, it would be expected that the removal of discretionary accruals from the changes in earnings results in the lower frequency of the firms reporting small positive earnings changes. With respect to changes in earnings, it seems that all the panels (i.e., all audited private firms) in Figure 6.12 manipulate earnings to a certain extent to avoid reporting earnings declines. Interestingly, it seems that large audited private firms in Panel C report slightly larger positive changes in earnings than the rest of the private firms. Under the assumption that removal of discretionary accruals results in wider distribution of changes in earnings, it seems that all the audited private firms use their discretion to report small positive changes in earnings. The comparison of Panel A, Panel B and Panel C of Figure 6.12 does not reveal any pronounced differences; thus, it may be said that all the audited private firms manipulate earnings to avoid earnings declines to a similar extent.

6.8.4. Statistical significance of discontinuities

The above analysis of frequencies distributions suggests that audited private firms across all sizes are prone to use discretionary accruals to avoid reporting losses, as well as to report small positive changes in earnings. To further confirm the significance of the discontinuities within frequency distributions (i.e., earnings management) and to determine whether the exclusion of discretionary accruals results in smoother distribution, this section focuses on the statistical significance of the deviations in the above frequency distributions. More precisely, to test for the discontinuity at zero earnings in Figure 6.11 and Figure 6.12, this section tests the null hypothesis of no discontinuities (i.e., smooth distributions) in the adjacent intervals to zero earnings. Table 6.18 below shows the results obtained from the Burgstahler and Dichev (1997) and Byzalov and Basu (2019) statistical significance of discontinuities tests.

Table 6.18: Distributions of near-zero earnings and non-discretionary earnings relative to earnings benchmarks across audited small, medium and large private firms for the period 2006 to 2018

	N	Std. Diff. i < 0	p-value	Std. Diff. i > 0	p-value	t-value
Panel A: Earnings level						
Small audited private firms	34,213	-7.65***	0.000	8.64***	0.000	9.46***
Medium audited private firms	69,169	-9.86***	0.000	9.82***	0.000	12.78***
Large audited private firms	74,033	-5.81***	0.000	6.09***	0.000	8.52***
Panel B: Non-discretionary earnings level						
Small audited private firms	34,213	-0.22	0.827	-0.12	0.907	0.12
Medium audited private firms	69,169	0.65	0.513	-0.24	0.811	-0.11
Large audited private firms	74,033	1.52	0.128	-1.83*	0.068	-2.36**
Panel C: Earnings changes level						
Small audited private firms	34,213	0.76	0.448	4.88***	0.000	2.47**
Medium audited private firms	69,169	-1.19	0.235	4.40***	0.000	3.54***
Large audited private firms	74,033	0.26	0.793	3.31***	0.001	2.37**
Panel D: Non-discretionary earnings changes level						
Small audited private firms	34,213	-2.07**	0.038	0.97	0.331	1.50
Medium audited private firms	69,169	0.21	0.830	0.72	0.474	0.10
Large audited private firms	74,033	-0.18	0.854	0.70	0.486	1.01

Notes:

a) N is the total number of observations in the sample; i is the interval; Std. Diff. is the standardised difference statistics; all p-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

b) The table shows the Burgstahler and Dichev (1997) standardised difference statistic used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. This test statistics is measured as the difference between the actual and expected number of observations in an interval of interest, divided by the standard deviation of the difference. The expected number of observations in an interval of interest is assumed to be the average of the immediately adjacent intervals. The test statistics for an interval of interest *i* is shown below:

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

Where

n_i: is the number of observations in an interval i

N: is the total number of observations in the sample

p_i: is the probability that an observation will fall into the interval i

c) t-value shows the Byzalov and Basu (2019) distribution discontinuity test used to test the null hypothesis of smooth distribution for the bins at the immediate left and right of zero in the distributions of annual scaled earnings and annual non-discretionary earnings levels, scaled earnings change and scaled non-discretionary earnings change. All t-values are two-tailed. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table 6.18 above illustrates how discretionary accruals affect the frequency distributions of earnings and changes in earnings. Panel A demonstrates that at the 1% level, all audited private firms exhibit a significant difference between the actual number of earnings observations and the expected number of observations within the small loss (small profit) interval is significantly less (more) than expected. In particular, the standardised difference of E_t across different sizes of audited private firms are as follows: for small private

firms is -7.65 (8.64), for medium private firms is -9.86 (9.82), and for large private firms is -5.81 (6.09). The standardised differences of NDE_t in Panel B suggest that audited private firms may use discretionary accruals to avoid reporting losses. However, in the case of large private firms, the standardised difference in the loss (profit) interval of NDE_t is 1.52 (-1.83). Subsequently, it may be said that in addition to discretionary accruals, large audited private firms may use RAM as an alternative to avoid reporting losses. All the discussed results of the standardised difference test are confirmed by Byzalov and Basu (2019) tests.

Panel C and Panel D provide the statistical significances of discontinuities for the frequency distributions of ΔE_t and $ND\Delta E_t$. As can be seen from Table 6.18 above, in the case of ΔE_t, the intervals to the right of zero exhibits significantly ($p = <0.01$) more observations than what would be expected under the smooth distribution. As expected, the results for $ND\Delta E_t$ in Panel D show that the number of observations for the intervals immediately to the right of zero is reduced to an insignificant level after the removal of discretionary accruals. Specifically, the standardised differences of ΔE_t for small positive change in earnings intervals are reduced as follows: for small firms from 4.88 to 0.97, for medium firms from 4.40 to 0.72, and large firms from 3.31 to 0.70. Further discontinuity test by Byzalov and Basu (2019) confirms that private firms use their discretion to report positive changes in earnings. In other words, the test confirms that significant discontinuity in the frequency distribution of ΔE_t diminishes in the frequency distribution of $ND\Delta E_t$.

The results in this section indicate that audited private firms across different sizes manipulate reported earnings to avoid reporting losses and decreases in earnings. Nonetheless, in the case of large private firms, it seems that they use another type of earnings management besides discretionary accruals to avoid reporting losses. The next chapter provides the results of the panel data regression model to analyse further differences in levels of earnings management across different sizes of audited private firms.

6.9. Conclusion

This chapter provides descriptive statistics and various univariate analyses across six testable hypotheses. In terms of hypothesis 1, the initial univariate analysis compares frequency distributions of earnings benchmarks and non-discretionary earnings of the small, medium, and large private firms and PLCs. A visual inspection of these histograms reveals that private firms manipulate earnings to avoid losses more than PLCs. Interestingly, it is found that small private firms exhibit more discontinuities around zero earnings. On the contrary, the histograms of changes in earnings imply that PLCs are more inclined to reduce a positive change in earnings than private firms. The statistical tests of the significance provide evidence of earnings management to reach certain earnings targets in both private firms and PLCs. These results are in line with those of Gore, Pope and Singh (2007), who showed that discretionary accruals removal affects the number of observations in the

intervals around zero earning threshold. Overall, the findings of initial tests clearly support the relevance of accrual manipulation in the UK.

The second set of analyses addresses hypothesis 2. The first analysis compares frequency distributions of earnings benchmarks and non-discretionary earnings of stand-alone private firms and private subsidiaries of PLCs. The results of the frequencies distributions of earnings indicate that stand-alone private firms undertake more earnings management to avoid reporting losses compared to private subsidiaries of PLCs. Regarding the inspection of frequencies distributions of changes in earnings, it seems that both types of private firms are likely to use their discretion to report a positive change in earnings. Nevertheless, it seems that private subsidiaries of PLCs are more likely to report more positive changes in earnings compared to stand-alone private firms. The standardised differences test reveals evidence of earnings management to reach certain earnings targets in both stand-alone private firms and private subsidiaries of PLCs. One interesting finding is that in the case of stand-alone private firms' removal of discretionary accruals does not reduce standardised differences significantly in the intervals to the right of zero earnings and change in earnings. In other words, it has not been confirmed that stand-alone private firms use their discretion to reach earnings targets. To sum up, the results suggest that both stand-alone private and private subsidiaries of PLCs manage earnings to reach certain earnings targets. However, it seems that they may undertake a different type of earnings management to reach those targets.

Regarding earnings management in private firms across ownership dispersion (H3), the comparison of frequency distributions of earnings with the frequency distributions of non-discretionary earnings indicates that despite different ownership levels in private firms, they manipulate earnings to avoid losses to a similar extent. A visual comparison of the frequency distributions of changes in earnings and non-discretionary changes in earnings also suggests that private firms with concentrated ownership as well as private firms with dispersed ownership are likely to use discretionary accruals to avoid reporting negative changes in earnings. Further statistical significance tests of discontinuities confirmed that private firms manipulate earnings to avoid losses despite different levels of ownership concentration. Likewise, tests for the changes in earnings has revealed that both types of private firms are avoiding decreases in earnings. Nonetheless, in relation to private firms with more dispersed ownership, it has not been confirmed that they use discretionary accruals to avoid earnings decreases. To put it differently, the exclusions of discretionary accruals from changes in earnings have not resulted in a relatively smooth distribution. Despite that, together, these results provide an important insight into levels of earnings management in private firms across ownership dispersion.

With respect to earnings management across accounting standard in private firms (H4), the results suggest that despite different reporting standards (i.e., UK GAAP vs IFRS),

private firms are likely to use their discretion to manipulate earnings to avoid losses. In other words, the comparative analysis of frequency distributions of scaled earnings and non-discretionary earnings, as well as the further statistical tests of discontinuities, demonstrated that private firms are inclined to use discretionary accruals to avoid losses. The frequency distribution of earnings changes and non-discretionary earnings changes suggest similar results. Specifically, the difference between these frequency distributions demonstrates that private firms use discretionary accruals to report positive changes in earnings. The discontinuity significance test supports these findings for the sample of UK GAAP private firms. However, for private firms reporting under IFRS, discontinuity significance tests provide a rather unexpected result. In particular, after the removal of discretionary accruals from the changes in earnings, the statistical significance of discontinuity around zero earnings remained. Nevertheless, the univariate analysis above provides some interesting insight into potential differences in earnings management practices between private firms reporting under UK GAAP and IFRS.

The fifth set of performed univariate analyses examines the effect of leverage on earnings management levels across private firms and PLCs (H5). An initial comparison of frequencies distributions of earnings and non-discretionary earnings across different levels of leverage and type of firm (i.e., private firms, PLCs) suggest that the effect of discretionary accruals generally increases the discontinuities around zero earnings. Not surprisingly, given higher reliance on bank debt, the visual inspection revealed the most apparent discontinuity within reported earnings in highly leveraged private firms. With respect to changes in earnings, the analysed frequency distributions suggest that all the sampled firms are using discretionary accruals to report small positive changes in earnings. Not surprisingly, similar to the findings of the first hypothesis, it seems that PLC use discretionary accruals to avoid reporting large positive changes in earnings. Furthermore, the more pronounced discontinuity around zero changes in earnings in the frequency distribution of highly leveraged PLCs implies that they may be more prone to manipulate earnings to avoid declines in earnings compared to less leveraged PLCs. The further statistical tests of discontinuity significance mainly confirm these findings. Nonetheless, for the histogram of low leveraged private firms' earnings, the statistical significance tests suggest that discontinuity remained after removing discretionary accruals. Despite that, this preliminary analysis demonstrates that discretionary accruals affect the frequency of observations in the immediately adjacent intervals to zero earnings thresholds.

The final set of univariate analysis examines whether earnings management levels differ between audited private firms across different sizes (H6). The first analysis of frequency distributions of earnings and non-discretionary earnings implies that all audited private firms (i.e., small, medium, and large) use discretionary accruals to a certain extent to avoid reporting losses. Moreover, the comparison of the frequency distribution of changes

in earnings with non-discretionary changes in earnings reveals similar patterns. In other words, at first glance, it seems that all the audited private firms manipulate earnings to avoid earnings declines. However, a closer inspection of the changes in earnings histograms reveals that large audited private firms seem to report slightly greater positive changes in earnings compared to others. The final statistical tests generally confirm the findings of visual inspection and confirm that the removal of discretionary accruals leads to smoother distributions. Nonetheless, the results also suggest that large private firms may use another type of earnings manipulation to maintain positive changes in earnings.

Taken together, the results of the univariate analyses of frequency distributions and discontinuity tests reveal that both private firms and PLCs use their discretion to manipulate earnings to reach certain earnings targets. To gain a better understanding of differences in earnings management levels next chapter present and discusses the results of between-within panel data regression models for all the testable hypotheses.

Chapter Seven

Analysis and Discussion

7.1. Objectives and main findings

The primary objective of this chapter is to present and interpret the empirical results of this study. The first hypothesis of this chapter considers earnings management between small, medium, and large private firms and PLCs. The results below indicate different levels of earnings management across different sizes of firms in the UK. The second hypothesis of this chapter predicts that private subsidiaries of PLCs manage earnings to a greater extent than other private firms. In line with expectation, the findings suggest that private subsidiaries exhibit higher levels of earnings management compared to stand-alone private firms. The third hypothesis of this chapter predicts that earnings management in private firms with more dispersed ownership is lower than in private firms with less dispersed ownership. As expected, the results indicate that private firms with more dispersed ownership are less likely to manipulate earnings than private firms with more concentrated ownership. The fourth hypothesis of this chapter concerns earnings management between private firms that prepare financial statements under the UK GAAP and private firms that report under IFRS. The results support the evidence that private firms reporting under IFRS are more likely to manipulate earnings than private firms reporting under UK GAAP. The fifth hypothesis of this chapter considers the effect of leverage on earnings manipulation across private firms relative to PLCs. The findings reveal that higher levels of leverage in private firms seem to influence earnings management levels more than in PLCs. Finally, the sixth hypothesis of this thesis concerns earnings management between audited accounts of the small, medium, and large private firms. The results indicate different levels of earnings management across audited small, medium and large private firms in the UK.

7.2. Introduction

A number of studies suggest that the level of earnings management varies between private firms and PLCs. Existing research also recognises the critical role of firm size. Despite that, most studies in the field of earnings management have only focused on total assets as the determinant for firm size. Such approaches, however, have failed to address the effect of regulatory size; hence, the effect of regulatory size on earnings management levels amongst firms is still somewhat limited. Therefore, the next section of this chapter assesses the differences in earnings management levels between small, medium, and large private firms and PLCs in the UK (H1).

As indicated previously in the second and third chapter of this thesis, there are several reasons why different levels of earnings management may exist between differently sized firms. For example, the separation of management and ownership may lead to rather different financial reporting practices. Previous studies have explored earnings management in parent companies and their subsidiaries. The evidence from discussed studies illustrates that PLCs use their subsidiaries to meet specific objectives. Despite this evidence, the effect of type of firm (i.e., stand-alone or subsidiary) on earnings management levels within private firms is still not known. To address this, section 7.4 tests if private subsidiaries of PLCs manage earnings to a greater extent than stand-alone private firms (H2).

The literature review has also suggested that the concentration of ownership may be another critical factor that may influence earnings management levels. In other words, it has been found that more concentrated ownership is associated with lower quality of earnings. Nevertheless, all discussed studies have only focused on the effect of ownership on earnings management in PLCs. In other words, the implication of ownership concentration on earnings management in private firms has not been investigated. Therefore, section 7.5 assesses if the levels of earnings management in private firms with more dispersed ownership is lower than in private firms with less dispersed ownership (H3).

Another critical factor to consider is the effect of financial reporting standards. As discussed previously, there are dissimilarities in financial reporting regulation concerning accounting standards for private firms and PLCs. In particular, private firms may report under UK GAAP or IFRS, whereas PLCs have to prepare consolidated financial statements under IFRS. Besides, even though the empirical studies addressed the effect of applied accounting standards on earnings quality, there has been little agreement on their effect on the quality of reported earnings. More importantly, there has been no detailed investigation of the impact of adopted accounting standards on levels of discretionary in private firms. Subsequently, section 7.6 assesses the differences in earnings management levels

between private firms that prepare financial statements under the UK GAAP and ones reporting under IFRS (H4).

Another significant aspect that influences earnings management practices is financing. Evidence from discussed studies demonstrates that firms are motivated to manipulate earnings before and after the credit approval. Furthermore, as discussed in the second chapter, private firms have fundamentally different financing structure than PLCs. Consequently, it may be expected that the effect of leverage on earnings manipulation varies across private firms relative to PLCs (H5); thus, section 7.7 tests this hypothesis.

The final set of analysis in section 7.8 addresses the effect of audit on earnings management levels in private firms. The empirical studies demonstrated that audit generally improves the credibility of reported earnings and mitigates agency costs. Nonetheless, as discussed in the second chapter, small and medium-sized private firms may be exempt from the audit. The literature also suggests that the purpose and incentives for undertaking audits may differ between firms of different sizes. More importantly, some studies suggested that private firms exhibit different levels of earnings management across different sizes. Therefore, section 7.8 assesses the differences in earnings management between audited accounts of small, medium and large private firms (H6).

7.3. Earnings management across small, medium, and large private firms and PLCs

Based on conflicting evidence and discussed theories, hypothesis 1 proposes a null hypothesis that earnings management does not differ between small, medium, and large private firms and PLCs. In the following subsections, the research methodology described in chapter five is followed and the results of the multivariate between-within panel data model are presented. Finally, the discussion and summary of the main findings are provided.

7.3.1. Regression analysis and PSM results

This section presents the results of multivariate analysis of hypothesis 1 investigating the difference in the level of earnings management across small, medium and large private firms and PLCs. The preliminary results of the univariate analyses in the previous chapter suggest that all the sampled firms manipulate earnings using discretionary accruals. To test for differences in earnings management between small, medium, and large private firms and PLCs, multivariate analysis is adopted next. Based on panel data regressions models discussion in the fifth chapter, the between-within panel data model has been adopted. Prior to multivariate analysis, the pre-testing of the data is performed to ensure that the adopted regression model is appropriate. Table 7.1 below shows the results of pre-testing.

Table 7.1: Preliminary testing (H1)

Preliminary Test	Null hypothesis	Prob > chi2	
Breusch-Pagan Lagrange multiplier test (LM)	Variances across entities is zero	0.0000	Reject
Wald test: Time effect	The coefficients for all years are jointly equal to zero	0.0000	Reject
Wald test: Industry effect	The coefficients for all industries are jointly equal to zero	0.0000	Reject

The first step in the process was to test for random effects with the Breusch-Pagan Lagrange multiplier test. The result suggests significant differences across firms (Prob > chi2 = 0.0000); thus, it confirms that a random panel effects regression model is appropriate. The next step was to test for time and industry effects. The results confirmed that both time (Prob > chi2 = 0.0000) and industry effects (Prob > chi2 = 0.0000) are required.

Table 7.2 below shows the results of the testing differences in earnings management between small, medium, and large private firms and PLCs by full between-within panel data regression model. Note that for simplicity, the full between-within model equation is not presented. In other words, only *SIZE* estimates and within-estimates are included in the model below. In addition, the left part of the table shows regression results using a full sample across size categories. The right part of the table shows regression results using two different PSM samples of a set of large private firms and PLCs.[67] To reduce substantial and significant differences in covariates between two groups, a logit regression of a *Treatment* indicator (it equals 1 for PLCs, 0 for large private firms) on nine firm characteristics from the main models is estimated first. Specifically, *Lev*, *QR*, *Growth_REV*, *Growth_At*, *Log_At*, *Loss*, *ROA*, *Year* and *Industry* are included for matching. To ensure the closeness of the match, propensity scores with the nearest neighbour match (i.e., closest propensity score), maximum caliper distances of 0.01 and 0.00005, and one-to-one match without replacement are used to match each PLC to a large private firm. The assessment of the quality of the matched sample is outlined in Appendix IV.

[67] It is most likely that the large private firms and PLCs have similar attributes.

Table 7.2: Earnings management across small, medium, and large private firms vs PLCs

$$DAC_{it} = \alpha_0 + \alpha_1 SIZE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across size categories	Propensity Score Matching (PSM) sample of large private vs PLCs	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Small private	0.045***		
	(0.002)		
Medium private	0.029***		
	(0.002)		
Large private	0.033***	0.031***	0.032***
	(0.002)	(0.003)	(0.003)
Lev	0.001***	0.004***	0.005***
	(0.000)	(0.001)	(0.001)
QR	-0.002***	0.003	0.003
	(0.000)	(0.002)	(0.002)
Growth_REV	0.004***	0.000	0.000
	(0.001)	(0.000)	(0.000)
Growth_A	0.087***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.014***	-0.013***	-0.013**
	(0.001)	(0.004)	(0.005)
Loss	0.018***	0.000	0.000
	(0.002)	(0.000)	(0.000)
ROA	0.036***	-0.023	-0.004
	(0.005)	(0.023)	(0.027)
Constant	0.083***	0.087***	0.083***
	(0.010)	(0.018)	(0.020)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	184,120	7,420	5,838
Prob >chi2	0.0000	0.0000	0.0000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *SIZE* is an indicator variable of the size of the firm dummies; it equals 1 for small private firms, 2 for medium private, 3 for large private and 4 for PLCs. Group No. 4 is the *SIZE* of the reference group. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. *Year* & *Industry* are included. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

From Table 7.2 above, it can be seen that on average private firms have higher levels of *DAC* compared to PLCs. Specifically, the results suggest that small private firms are significantly more likely to manage earnings (coefficient = 0.045), followed by large private firms (coefficient = 0.033) and medium private firms (coefficient = 0.029).

Furthermore, similar results are observed using PSM in a set of large private firms and PLCs. In particular, the results after PSM matching with 0.01 caliper distance suggest that large private firms are significantly more likely to manage earnings compared to PLCs (coefficient = 0.031, significant at the 1% level using 0.01 caliper). Furthermore, the results on the PSM sample with a narrower caliper distance of 0.00005 also confirm the findings.

In addition, the results using OLS analysis provide similar inferences (see Appendix IV). Further, to enhance the robustness of the findings, an alternative between-within panel data specification with the absolute discretionary accruals estimated with the modified Jones model is used. The results of this regression confirm inferences from the main regression and are presented in Appendix IV.

7.3.2. Discussion and summary of the main findings

Previous studies evaluating differences in earnings management practices between private firms and PLCs observed inconsistent results on whether private firms manipulate earnings more or PLCs. More importantly, very little was found in the literature on the question of the effect of regulatory size on the levels of earnings management. Subsequently, the first hypothesis sought to assess differences in earnings management levels between small, medium, and large private firms compared to PLCs in the UK.

The multiple between-within panel data regression analysis' results affirmed that private firms manipulate earnings more than PLCs. This finding is consistent with those of Ball and Shivakumar (2005) and Liu and Skerratt (2018) who compare the earnings management levels between private firms and PLCs in the UK. Surprisingly, in contrast to Liu and Skerratt's (2018) findings that large and medium private firms have the lowest quality of earnings, the results suggest that small private firms manipulate earnings the most, followed by large and medium private firms. There are several possible explanations for this result. First, they considered micro firms and excluded subsidiaries from their sample. In addition, these results may be due to different classification of private firms across sizes (i.e., different regulatory size-based thresholds), sample period or a different proxy for earnings management levels (i.e., income smoothing).

Further tests support the findings of the main tests on the PSM samples. In other words, the difference in the level of accruals manipulations between large private firms and PLCs is neither eliminated nor reduced. Furthermore, an alternative between-within panel data regression with an alternative measure of discretionary accruals also confirms the main findings. Taken together, the evidence implies that differences in accounting requirements may influence the level of managerial discretion among different sizes of firms in the UK. Nevertheless, it is important to bear in mind that various other factors besides the firm's regulatory size or type (i.e., private, PLCs) may influence earnings management levels. For instance, it is possible that the difference in the level of earnings management reflects a different type of firm (i.e., stand-alone or subsidiary of PLCs), the concentration of ownership, accounting standards, type of financing, or audit quality. Therefore, in the following sections, further hypotheses are tested to develop a comprehensive picture of earnings management practices in small, medium, large private and PLCs in the UK.

7.4. Earnings management across stand-alone private firms and private subsidiaries of PLCs

Prior studies have noted that PLCs manipulate their earnings through their subsidiaries. Subsequently, hypothesis 2 proposes that subsidiaries manage earnings to a greater extent than the rest of the private firms. In the following subsections, the research methodology outlined in the fifth chapter has been used with one exception in PSM sampling. More precisely, *SIZE* has been introduced as an additional variable for better matching. First, preliminary testing is presented, followed by the analysis of the multivariate between-within panel data model. Finally, the discussion and summary of the main findings are provided.

7.4.1. Regression analysis and PSM results

The univariate analyses' initial results indicate that there may be differences in earnings management levels between stand-alone private firms and private subsidiaries of PLCs. To test these differences between stand-alone private and private subsidiaries of PLCs, multivariate analysis is run next. As noted in the fifth chapter, the between-within panel data model has been adopted. In addition, the pre-testing of the data is performed to ensure that the adopted regression model is appropriate. All the pre-testing results are provided below in Table 7.3.

Table 7.3: Preliminary testing (H2)

	Null hypothesis	Prob > chi2	
Breusch-Pagan Lagrange multiplier test (LM)	Variances across entities is zero	0.0000	Reject
Wald test: Time effect	The coefficients for all years are jointly equal to zero	0.0000	Reject
Wald test: Industry effect	The coefficients for all industries are jointly equal to zero	0.0000	Reject

The Breusch-Pagan Lagrange multiplier test is used to determine if the random-effects model is appropriate for the analysis. The result suggests that the null hypothesis is rejected due to significant differences across firms (Prob > chi2 = 0.0000); thus, it confirms that a random panel effects regression model is appropriate. The further tests for a time and industry effects confirmed that both time (Prob > chi2 = 0.0000) and industry effects (Prob > chi2 = 0.0000) are required.

Table 7.4 below present the results of the testing differences in levels of earnings management between stand-alone private firms and private subsidiaries of PLCs by full between-within panel data regression model. Note that for simplicity, the full between-within model equation is not presented. In other words, only *TYPE* estimates and within-estimates are included in the model below. The left part of Table 7.4 provides regression results using

a full sample across stand-alone private firms and private subsidiaries of PLCs. The further regression results using two PSM samples of stand-alone private firms and private subsidiaries of PLCs are included in the right part of Table 7.4. To ensure that matched sample does not have significant differences in covariates, a logit regression model is estimated with a *Treatment* indicator (it equals 1 for stand-alone private firms, 0 for private subsidiaries of PLCs). The covariates from the main model (i.e., *Lev*, *QR*, *Growth_REV*, *Growth_At*, *Log_At*, *Loss*, *ROA*, *Year, Industry*) are included. Additionally, to ensure that the firm's size does not drive that results, the *SIZE* variable is also included in PSM matching. Using propensity scores and two caliper distances (i.e., 0.01 and 0.00005), a one-to-one matching without replacement and the nearest neighbour matching (i.e., closest propensity score) is used to match stand-alone private firms with private subsidiaries of PLCs.

Table 7.4: Earnings management across stand-alone private firms and private subsidiaries of PLCs

$$DAC_{it} = \alpha_0 + \alpha_1 TYPE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across type categories	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Private subsidiaries of PLCs	0.030***	0.032***	0.033***
	(0.001)	(0.001)	(0.001)
Lev	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
QR	-0.002***	-0.002***	-0.002**
	(0.001)	(0.001)	(0.001)
Growth_REV	0.010***	0.000***	0.000***
	(0.002)	(0.000)	(0.000)
Growth_A	0.082***	0.001***	0.001***
	(0.004)	(0.000)	(0.000)
Log_A	-0.015***	-0.013***	-0.012***
	(0.002)	(0.003)	(0.003)
Loss	0.019***	0.000***	0.000***
	(0.004)	(0.000)	(0.000)
ROA	0.035***	0.026**	0.021*
	(0.008)	(0.011)	(0.011)
Constant	0.143***	0.145***	0.140***
	(0.012)	(0.011)	(0.010)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	73,477	45,326	41,110
Prob >chi2	0.0000	0.0000	0.0000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *TYPE* is a dummy variable of the firm's type; it equals 0 for stand-alone private firms and 1 for private subsidiaries of PLCs. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

From Table 7.4 above, the results indicate that, on average, there is a difference in levels of *DAC* depending on the type of the private firms. As expected, the results suggest that private subsidiaries of PLCs are significantly more likely to undertake earnings management (coefficient = 0.030) compared to stand-alone private firms.

Moreover, the results are robust on various further tests. In particular, the regression using the PSM sample[68] of private stand-alone and private subsidiaries of PLCs confirms inferences from the main regression. Specifically, findings imply that private subsidiaries of PLCs are significantly more likely to manage earnings compared to stand-alone private firms (coefficient = 0.032, significant at 1% level using 0.01 caliper). Qualitatively similar results are obtained in the PSM sample with a narrower caliper (i.e., 0.00005).

The further robustness analysis using OLS provides similar inferences (see Appendix V). The results of additional regression with alternative estimates for discretionary accruals (i.e., *MJ_DAC*) also confirm conclusions from the main regression and are presented in Appendix V.

7.4.2. Discussion and summary of the main findings

As discussed in chapter four of this thesis, the literature suggests that PLCs meet their earning objectives through their subsidiaries. Despite that, most of the comparative studies of earnings management between private firms and PLCs exclude subsidiaries from their sample. Therefore, the second hypothesis of this thesis compares earnings management levels in stand-alone private firms and private subsidiaries of PLCs.

As expected, the multiple between-within panel data regression analysis' results confirm that private subsidiaries of PLCs have higher levels of earnings management than stand-alone private firms. This finding broadly supports the work of comparative studies of earnings management levels between subsidiaries and their parent companies (i.e., Shuto, 2009; Prencipe, 2012; Bonacchi, Cipollini and Zarowin, 2018; Beuselinck *et al.*, 2019). In other words, it indicates that parent PLCs may use their subsidiaries to manipulate earnings.

Further tests on the PSM samples clearly support the findings of the main multivariate analysis. In particular, the difference in the level of accruals manipulations between stand-alone private firms and private subsidiaries of PLCs is neither eliminated nor reduced. Overall, the evidence implies that institutional differences may influence the levels of managerial discretion among different types of private firms in the UK. Despite that, it is important to bear in mind that there are various other factors besides the type of the private firm (i.e., stand-alone, subsidiary of PLCs) that may influence earnings management levels. For instance, it may be that the difference in the level of earnings management reflects a

[68] To ensure that results are not driven by the size of the firm, *SIZE* variable is included in PSM matching.

different level of ownership concentration, accounting standards, type of financing, or audit quality. To develop a more comprehensive picture of earnings management practices in small, medium, large private and PLCs in the UK, the sections that follow tests further hypotheses.

7.5. Earnings management across ownership dispersion in private firms

As discussed in the fourth chapter of this thesis, previous studies suggest an association between ownership concentration and levels of earnings management. Studies have generally demonstrated that a higher concentration of ownership results in a lower quality of reported earnings. Consequently, hypothesis 3 predicts that earnings management in private firms with more dispersed ownership is lower than in private firms with less dispersed ownership (i.e., concentrated ownership). To test this hypothesis following subsections discuss the performed analysis. Specifically, preliminary testing is presented first, followed by the results of between-within panel data regression models on different samples (i.e., full sample, PSM matched samples). In addition, the adopted steps of the PSM approach are provided. Finally, the discussion and summary of the main findings are provided.

7.5.1. Regression analysis and PSM results

The preliminary results of the univariate analysis suggest that private firms across different level of ownership concentration use discretionary accruals to avoid reporting losses. However, in the case of changes in earnings, the results indicated that different manipulation practices might drive earnings management in private firms with more dispersed ownership, compared to private firms with more concentrated ownership. To test for the differences in earnings management levels between private firms across a different concentration of the ownership further multivariate analysis is conducted below. As discussed on the previous pages, the panel data between-within model is performed. To determine the appropriateness of the model, preliminary testing is presented in Table 7.5 below.

Table 7.5: Preliminary testing (H3)

	Null hypothesis	Prob > chi2	
Breusch-Pagan Lagrange multiplier test (LM)	Variances across entities is zero	0.0000	Reject
Wald test: Time effect	The coefficients for all years are jointly equal to zero	0.0000	Reject
Wald test: Industry effect	The coefficients for all industries are jointly equal to zero	0.0000	Reject

To determine the appropriateness of the random-effects model, the Breusch-Pagan Lagrange multiplier test is used first. As can be seen from the table above, the null

hypothesis is rejected. In other words, the results (Prob > chi2 = 0.0000) suggest that there are significant differences across firms; hence it confirms that the random-effects model is appropriate. To test for time and industry effects, Wald tests are estimated. The results for time effects (Prob > chi2 = 0.0000) and industry effects (Prob > chi2 = 0.0000) demonstrate that *Time* and *Industry* variables are required.

As discussed previously, to assess whether private firms with more dispersed ownership have lower earnings management levels than private firms with more concentrated ownership panel data regression model is estimated. The results of the main between-within panel data regression analysis are presented in Table 7.6 below. Note that for simplicity, only *OWN* estimate and within-estimates are included in the model below. In other words, the full between-within model equation is not presented. The left part of Table 7.6 shows the regression analysis results using the full sample of private firms across different ownership dispersion. The further sensitivity results of the regression using PSM samples are presented in the right part of Table 7.6. In addition, to ensure that the samples generated by the PSM approach are closely matched (i.e., no significant differences in covariates), a logit regression is estimated first. In particular, given a set of main characteristics from the main model (i.e., *Lev*, *QR*, *Growth_REV*, *Growth_At*, *Log_At*, *Loss*, *ROA*, *Year*, *Industry*) and *SIZE* as an additional variable, the probability that a firm is private with dispersed ownership is estimated first. Further, propensity scores are then matched in a one-to-one matching with the nearest neighbour and caliper distances of 0.01 and 0.00005. The quality of matching is further assessed, and the results are outlined in Appendix VI.

Table 7.6: Earnings management across ownership dispersion in private firms

$$DAC_{it} = \alpha_0 + \alpha_1 OWN_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across ownership dispersion	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Dispersed ownership	-0.021***	-0.021***	-0.021***
	(0.001)	(0.001)	(0.001)
Lev	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
QR	-0.001***	-0.002***	-0.002***
	(0.000)	(0.001)	(0.001)
Growth_REV	0.004***	0.000***	0.000***
	(0.001)	(0.000)	(0.000)
Growth_A	0.088***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.015***	-0.015***	-0.015***
	(0.001)	(0.002)	(0.002)
Loss	0.017***	0.000***	0.000***
	(0.002)	(0.000)	(0.000)
ROA	0.035***	0.010	0.013
	(0.005)	(0.008)	(0.008)
Constant	0.124***	0.117***	0.114***
	(0.011)	(0.008)	(0.008)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	171,488	79,896	79,456
Prob >chi2	0.0000	0.0000	0.0000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *OWN* is a dummy variable of the private firms' ownership divided into two groups based on the value of the median value of the number of shareholders; it equals 0 for private firms with concentrated ownership and 1 for private firms with dispersed ownership. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

As can be seen from Table 7.6 above, there is a clear and significant difference in *DAC* levels between private firms with concentrated ownership and those with dispersed ownership. The results confirm that levels of earnings management are associated with ownership dispersion. As predicted, the *OWN* coefficient is negative and significant, indicating that private firms with more dispersed ownership are significantly less likely to manipulate earnings compared to private firms with more concentrated ownership.

The right side of Table 7.6 provides qualitatively similar results using the PSM samples. Specifically, the results from both PSM samples have the same *OWN* coefficients (-0.021, significant at 1% level), suggesting that private firms with more concentrated ownership are significantly more likely to manipulate earnings.

Similar results are obtained in an additional sensitivity analysis presented in Appendix VI. More specifically, the results of OLS regression and the additional between-within regression with an alternative measure of discretionary accruals (i.e., *MJ_DAC*) support the findings from the main regressions above.

7.5.2. Discussion and summary of the main findings

As discussed in the fourth chapter of this thesis, the literature implies that private firms with more concentrated ownership have a lower quality of reported earnings. Nevertheless, the evidence about the association between discretionary accruals and ownership concentration is relatively scarce. Thus, the third hypothesis compares earnings management levels between private firms across concentrated and more dispersed ownership in the UK.

As predicted, the findings of the multivariate between-within panel data regression confirm that more dispersed ownership generally have a positive impact on reported earnings. In other words, the results suggest that on average private firms with more dispersed ownership are significantly more likely to exhibit lower levels of earnings management than private firms with more concentrated ownership. The results are in line with Clatworthy and Peel's (2013) study that found that the accounts of small UK private firms with more concentrated ownership are more likely to have accounting errors. In terms of theory, these findings support the stakeholder theory notion that demand for a higher quality of reported earnings decreases earnings management.

The sensitivity analysis on the PSM samples confirms the main findings. In other words, although the main differences in the characteristic of firms are removed, the difference between the level of accruals manipulations between private firms of different ownership concentration remains. In summary, these results show that ownership concentration is an important factor that influences earnings management practices. Nevertheless, it is important to highlight that there are other factors such as accounting standards or type of financing that may influence earnings management levels; thus, they are examined below.

7.6. Earnings management across accounting standard in private firms

As previously discussed in the fourth chapter of this thesis, the empirical studies provide rather inconsistent evidence about the effect of the adopted accounting standard on earnings management levels. Therefore, hypothesis 4 proposes a null hypothesis that earnings management differs between private firms that prepare financial statements under the UK GAAP and private firms that report under IFRS accounting standards. The following subsections follow the previously outlined research methodology. The results of between-

within panel data regression for different samples (i.e., full sample and PSM samples) are presented, followed by the discussion and summary of the main findings.

7.6.1. Regression analysis and PSM results

The univariate analysis in the previous chapter demonstrated that private firms are using discretionary accruals to manipulate earnings to a certain extent. Interestingly, the analysis has revealed that there are some subtle distinctions between private firms reporting under UK GAAP and the ones reporting under IFRS. Subsequently, further multivariate analysis is performed to test for unique differences in earnings management levels between private firm across accounting standards. To ensure that the adopted model is appropriate, preliminary testing of data is carried out, and results are presented in Table 7.7 below.

Table 7.7: Preliminary testing (H4)

	Null hypothesis	Prob > chi2	
Breusch-Pagan Lagrange multiplier test (LM)	Variances across entities is zero	0.0000	Reject
Wald test: Time effect	The coefficients for all years are jointly equal to zero	0.0000	Reject
Wald test: Industry effect	The coefficients for all industries are jointly equal to zero	0.0000	Reject

As can be seen from the table above, the results of the first test confirm that a random-effects panel data regression model is appropriate. Specifically, the Breusch-Pagan Lagrange multiplier test suggest that there are significant differences between private firms (Prob > chi2 = 0.0000); hence, the random-effects model is appropriate. Further tests for a time effects (Prob > chi2 = 0.0000) and industry effects (Prob > chi2 = 0.0000) have confirmed that they are required in the model.

The main findings of the differences in earnings management levels between private firm reporting under UK GAAP and private firms that report under IFRS are presented in Table 7.8 below. Note that for simplicity, the full between-within model equation is not presented. In other words, only *STDN* estimate and within-estimates are included in the model below. The second column of Table 7.8 provides the results for the full sample across UK GAAP and IFRS private firms. The third and fourth columns contain additional results for the two PSM samples of UK GAAP and IFRS private firms. To ensure that covariates of matched samples do not have a significant difference, a logit regression is estimated first with a *Treatment* indicator (it equals 1 for IFRS, 0 for UK GAAP). Besides the variables from the main model (i.e., *Lev*, *QR*, *Growth_REV*, *Growth_At, Log_At*, *Loss*, *ROA* and *Industry*), the *SIZE* variable is included to ensure that PSM samples are closely matched. On the other hand, *Year* is excluded due to the deficient number of observations of small and medium private firms that report under IFRS over specific periods. Furthermore, using one-to-one closest neighbour matching and two different caliper distances (i.e., 0.01 and 0.00005), the

matched samples of IFRS and UK GAAP private firms are generated. The quality of the PSM matching is further assessed in Appendix VII.

Table 7.8: Earnings management across accounting standard in private firms

$$DAC_{it} = \alpha_0 + \alpha_1 STND_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across accounting standards	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
IFRS	0.010***	0.011***	0.013***
	(0.002)	(0.002)	(0.002)
Lev	0.001***	0.000	0.000
	(0.000)	(0.000)	(0.001)
QR	-0.002***	0.003	0.003
	(0.000)	(0.002)	(0.002)
Growth_REV	0.006***	0.000**	0.000**
	(0.002)	(0.000)	(0.000)
Growth_A	0.086***	0.001***	0.001***
	(0.003)	(0.000)	(0.000)
Log_A	-0.018***	-0.022***	-0.024***
	(0.002)	(0.006)	(0.006)
Loss	0.018***	0.000	0.000*
	(0.003)	(0.000)	(0.000)
ROA	0.029***	-0.018	-0.019
	(0.006)	(0.027)	(0.028)
Constant	0.151***	0.128***	0.126***
	(0.032)	(0.014)	(0.016)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	145,925	12,104	11,178
Prob >chi2	0.0000	0.0000	0.0000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *STND* is a dummy variable of the reporting accounting standards; it equals 0 for private firms reporting under UK GAAP and 1 for private firms reporting under IFRS. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

It can be seen from the data in Table 7.8 that the *STDN* coefficient is positive and significant in the case of all the analysed samples. For the full sample analysis, the *STDN* coefficient is 0.010 at the p = 0.01 level. This result suggests that the levels of discretionary accruals are higher for private firms reporting under IFRS. In other words, private firms that report under UK GAAP are on average significantly less likely to manipulate earnings than ones reporting under IFRS.

Similar results are obtained using the PSM samples. Specifically, the results of the analysis with the 0.01 caliper distance PSM sample indicate that IFRS private firms are significantly more likely to manage earnings compared to UK GAAP (coefficient = 0.11,

significant at 1% level). Also, the *STDN* coefficient of 0.013 at the p = 0.01 level using 0.00005 caliper confirms the findings.

The additional OLS analysis and the analysis with an alternative measure of discretionary accruals (i.e., *MJ_DAC*) confirm the findings from the above table. The results of the robustness regressions are presented in Appendix VII. Moreover, to ensure that switching standards do not influence inferences, the main between-within regression analyses from Table 7.8 is repeated on the sample excluding firms that switched accounting standards. The inferences are unchanged, and the results are provided in Appendix VII.

7.6.2. Discussion and summary of the main findings

Previously discussed literature on the effect of applied accounting standards on earnings management in private firms observed inconsistent results. More importantly, the empirical literature mainly focused on PLCs, whereas there is very scarce evidence on the implication of different accounting standards on earnings management practices within private firms. Therefore, the fourth hypothesis assesses the differences in earnings management levels between private firms that prepare financial statements under the UK GAAP and private firms that report under IFRS.

Consistent with Cameran, Campa and Pettinicchio's (2014) study, the panel data regression model results found that private firms who reported under IFRS exhibit higher levels of discretionary accruals than private firms reporting under national standards. Surprisingly, contrary to a previous UK-based study by Liu and Skerratt (2018), which have suggested that there are no differences in the levels of earnings smoothing for IFRS and UK GAAP private firms, significant differences were found in this thesis. Specifically, the performed analysis demonstrated that there is a significant difference in the levels of discretionary accruals between private firms reporting under different accounting standards (i.e., IFRS vs UK GAAP). The results of the main analysis are also confirmed by further test on the PSM samples. These differences in findings can be explained in part by the different sampling requirement (i.e., exclusion criteria), a different analysis period or a different proxy for earnings management (i.e., income smoothing), or a different sizes classification.

To sum up, the evidence in this section suggests that the effect of different accounting standards on levels of discretionary accruals may vary amongst private firms in the UK. These findings may be somewhat limited by not considering audit quality, ownership dispersion or whether examined private firms are stand-alone or subsidiaries of PLCs. The next section of this thesis is concerned with the direct implications of leverage on earnings management levels.

7.7. Earnings management across different levels of leverage in private firms and PLCs

As explained earlier, the financing of private firms fundamentally differs compared to PLCs. Also, a number of studies have shown that leverage is generally associated with the quality of reported earnings. However, none of the reviewed studies has investigated if the effect of financing varies between private firms and PLCs. Therefore, hypothesis 5 predicts that the effect of leverage on earnings manipulation varies across private firms relative to PLC. To test this hypothesis, the following subsections follow the research methodology that is outlined in chapter five. The preliminary analysis of the regression is presented first, followed by the results of the adopted regression model. Finally, the discussion and summary of the main findings are provided.

7.7.1. Regression analysis and PSM results

The findings of the univariate analysis in the previous chapter highlighted differences between private firms and PLCs. The most interesting result to emerge from the previous chapter is the dissimilarities between highly leveraged private firms and highly leveraged PLCs. To further examine whether these differences result in significantly more/less earnings manipulation, a panel data between-within regression is estimated in this subsection. To ensure that the adopted regression model is appropriate, preliminary testing of the data is performed, and the results are provided in Table 7.9.

Table 7.9: Preliminary testing (H5)

	Null hypothesis	Prob > chi2	
Breusch-Pagan Lagrange multiplier test (LM)	Variances across entities is zero	0.0000	Reject
Wald test: Time effect	The coefficients for all years are jointly equal to zero	0.0000	Reject
Wald test: Industry effect	The coefficients for all industries are jointly equal to zero	0.0000	Reject

To assess the suitability of the random effect model, the Breusch-Pagan Lagrange multiplier test is performed. As can be seen from Table 7.9, significant differences across firms (Prob > chi2 = 0.0000) have been confirmed; hence, the random-effects model is appropriate. Further test for time fixed effects (Prob > chi2 = 0.0000) and industry effects (Prob > chi2 = 0.0000) confirms that they are required.

The results of the main between-within panel data regressions are presented in Table 7.10. More specifically, the empirical results of testing earnings management across different levels of leverage in private firms and PLCs. Note that for simplicity, the full between-within model equation is not presented. In other words, only *LEV_TYPE* estimates and within-estimates are presented in the model below. The coefficient estimates for the full

sample are presented in the left part of the table below. The right part of the table contains estimates for two different PSM samples of low leveraged and highly leveraged firms. First, to generate closely matched PSM samples, a logit regression is estimated first. To put it differently, the probability of a firm being low leveraged is estimated first with a set of some main characteristics of the firms from the main model. In addition, the sample of low leveraged firms and highly leveraged firms are matched on the *SIZE, Growth_REV*, *Growth_At*, *Log_At*, *Loss*, *ROA*, *Year* and *Industry*. The financing variables such as *Lev* and *QR* are excluded from the matching because the maximum likelihood estimation of the model failed to converge. The propensity scores of low leveraged firms and highly leveraged firms are then matched as a one-to-one nearest neighbour without replacement and with the imposed caliper restrictions of 0.01 and 0.00005. A further assessment of the matching quality is provided in Appendix VIII.

Table 7.10: Earnings management across different levels of leverage in private firms and PLCs

$$DAC_{it} = \alpha_0 + \alpha_1 LEV\_TYPE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across leverage	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Low leveraged private firms	0.028***	0.023***	0.021***
	(0.002)	(0.003)	(0.003)
Highly leveraged private firms	0.039***	0.035***	0.033***
	(0.002)	(0.003)	(0.003)
Highly leveraged PLCs	0.009***	0.008**	0.007**
	(0.003)	(0.004)	(0.004)
Lev	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
QR	-0.001	-0.001	-0.001*
	(0.000)	(0.001)	(0.001)
Growth_REV	0.003**	0.000***	0.000***
	(0.001)	(0.000)	(0.000)
Growth_A	0.086***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.016***	-0.015***	-0.015***
	(0.001)	(0.001)	(0.001)
Loss	0.017***	0.000***	0.000***
	(0.002)	(0.000)	(0.000)
ROA	0.041***	0.035***	0.048***
	(0.005)	(0.006)	(0.007)
Constant	0.096***	0.092***	0.092***
	(0.010)	(0.008)	(0.007)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	184,120	133,970	131,500
Prob >chi2	0.0000	0.0000	0.0000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *LEV_TYPE* is an indicator variable of the level of leverage by the type of the firm dummies divided into four groups based on the value of the median value of the leverage and the type of the firm; it equals 1 for low leveraged private firms, 2 for highly leveraged private firms, 3 for low leveraged PLCs and 4 for highly leveraged PLCs. Group No. 3 is the *LEV_TYPE* of the reference group. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

As shown in Table 7.10, private firms on average generally have higher levels of *DAC* compared to PLCs. The findings demonstrate that private firms with high levels of leverage are significantly more likely to manipulate earnings (coefficient = 0.039), followed by low leveraged private firms (coefficient = 0.028) and PLCs with high levels of leverage (coefficient = 0.009). In addition, the positive and significant coefficient of 0.009 for PLCs also suggest that more leveraged PLCs on average are significantly more likely to manage earnings compared to PLCs with low levels of leverage.

The sensitivity analysis using PSM samples confirm the findings of the main analysis. Specifically, the result after PSM matching with 0.01 caliper restriction implies that highly leveraged private firms are at a 1% significance level more likely to manage earnings (coefficient = 0.035), followed by low leveraged private firms (coefficient = 0.023) and highly leveraged PLCs (coefficient = 0.008, significant at the 5% level). The results with 0.00005 caliper restriction provide qualitatively similar results.

Furthermore, an additional estimation using OLS analysis and an alternative between-within panel data regression analysis with an alternative proxy for earnings management (i.e., *MJ_DAC*) validate inferences from the main regression. The results of these additional sensitivity analyses are presented in Appendix VIII.

7.7.2. Discussion and summary of the main findings

As was pointed out previously, private firms generally rely on different sources of financing than PLCs. With respect to empirical research, it has been found that more leveraged firms are more likely to manage earnings. However, there is a lack of comparative studies on the effect of leverage across different types of firms (i.e., private vs PLCs). Therefore, the fifth hypothesis sought to assess dissimilarities in the levels of earnings management between private firms and PLCs in the UK.

Similar to the first hypothesis test of this thesis, the multivariate regression analysis of hypothesis 5 affirmed that private firms, on average, are more likely to manipulate earnings more than PLCs in the UK. This finding is consistent with that of Ball and Shivakumar (2005) and Liu and Skerratt (2018) who analyse the differences in earnings management levels between private firms and PLCs in the UK. Furthermore, consistent with the literature (e.g., Dichev and Skinner, 2002; Iatridis and Kadorinis, 2009; Clatworthy and Peel, 2013), this study found that firms who are more leveraged are generally more likely to manage reported earnings. More interestingly, the results suggest that private firms with high leverage manipulate earnings the most, followed by low leveraged private firms and highly leveraged PLCs in relation to low leveraged PLCs. In other words, it may be said that leverage does not have the same effect on discretionary accruals levels in private firms as in PLCs. A possible explanation for these results may be the fact that private firms rely more on debt financing. However, these results need to be interpreted with caution because the debt classification is unknown.

An additional sensitivity analysis on the PSM samples has clearly affirmed the main findings. To put it differently, despite PSM on similar characteristics, findings suggest that the levels of earnings manipulations in not reduced. In a similar vein, additional regression analysis with an alternative measure of discretionary accruals supported the main findings.

To sum up, the evidence suggests that higher levels of leverage in private firms and PLC may influence the levels of managed earnings somewhat differently. Nevertheless, it is important to highlight that other factors such as debt classification, or whether a firm is stand-alone or subsidiary of PLCs, level of ownership or audit quality are not considered.

7.8. Earnings management across audited small, medium and large private firms

Based on empirical evidence, it has been affirmed that audit generally increases the quality of reported and decreases agency cost. Also, some studies suggested that the decision to audit financial reports is influenced by different factors as well as the size of the firm. More importantly, from the discussion in the fourth chapter, it has been demonstrated that the effect of audit may vary depending on the size of the private firms; thus, hypothesis 6 proposes that earnings management differs between audited accounts of small, medium and large private firms. In the subsections that follow pre-testing of the adopted regression model, and the results of the adopted multivariate regression model is presented and discussed. Specifically, the results of between-within panel data regression analyses on the full sample, and the PSM samples are provided. Also, a detailed process of the PSM approach is included, followed by the discussion and summary of the main findings.

7.8.1. Regression analysis and PSM results

The findings from the univariate analysis in the previous chapter suggest that even though analysed audited private firms are of different sizes, all the audited private firms use their discretion to manage earnings to reach zero earnings benchmarks (i.e., avoidance of loss and earnings changes). Nevertheless, the results also imply that levels of discretionary accruals may vary across different sizes. In particular, it seems that the effect of audit on earnings management levels varies between different sizes of private firms. Therefore, to assess the significance of differences, the between-within panel data regression analysis is performed. Prior to regression analysis, preliminary testing of data is performed to ensure the appropriateness of the adopted model. Table 7.11 below provides all the results of the preliminary tests.

Table 7.11: Preliminary testing (H6)

	Null hypothesis	Prob > chi2	
Breusch-Pagan Lagrange multiplier test (LM)	Variances across entities is zero	0.0000	Reject
Wald test: Time effect	The coefficients for all years are jointly equal to zero	0.0000	Reject
Wald test: Industry effect	The coefficients for all industries are jointly equal to zero	0.0000	Reject

The Breusch-Pagan Lagrange multiplier test is performed first to determine if the random-effects model is suitable. Prob > chi2 = 0.0000 suggest that there are significant differences across firms; hence, the suitability of a random panel effects regression model is confirmed. The results of further Wald tests for time (Prob > chi2 = 0.0000) and industry (Prob > chi2 = 0.0000) effects have also confirmed that both effects are required in the model.

Table 7.12 below provides the results of the testing for differences in audit effect on earnings management levels across private firms of different sizes. Note that although the results are obtained with full between-within panel data regressions, the full between-within model equation is not presented for simplicity. To put it differently, only *SIZE* estimates and within-estimates are included in the model below. The second column of the table includes regression results using a full sample of private firms. The third and fourth column of the table below present the results using PSM samples with imposed wider (0.01) and narrower (0.00005) matching restrictions. To reduce substantial and significant differences in covariates between analysed firms, the probability of the firm being audited is estimated first. More specifically, a *Treatment* indicator (it equals 1 for audited private firms, 0 for not audited) is regressed on *SIZE, Lev*, *QR*, *Growth_REV*, *Growth_At*, *Log_At*, *Loss*, *ROA*. *Year* and *Industry* variables are excluded as matching variables due to a lack of observations for unaudited medium and large private firms for certain years and industries. A one-to-one matching nearest neighbour matching without replacement is used to ensure that samples of unaudited and audited private firms are closely matched. The detailed assessment of the quality of matching is outlined in Appendix IX.

Table 7.12: Earnings management across audited small, medium and large private firms

$$DAC_{it} = \alpha_0 + \alpha_1 SIZE_i + \alpha_2 AUDIT_{it} + \alpha_3 SIZE_i * AUDIT_{it} + \alpha_4 Lev + \alpha_5 QR_{it} + \alpha_6 Growth\_REV_{it} + \alpha_7 Growth\_A_{it} + \alpha_8 Log\_A_{it} + \alpha_9 Loss_{it} + \alpha_{10} ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across audit	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Medium private firms	-0.016***	-0.018***	-0.026***
	(0.001)	(0.006)	(0.006)
Large private firms	-0.012***	-0.037***	-0.026***
	(0.001)	(0.007)	(0.009)
AUDIT	-0.018**	-0.002	0.010
	(0.009)	(0.014)	(0.017)
SIZE*AUDIT	0.008	0.013	-0.001
	(0.005)	(0.010)	(0.012)
Lev	0.001***	0.000	0.001
	(0.000)	(0.001)	(0.001)
QR	-0.002***	-0.005**	-0.005*
	(0.000)	(0.002)	(0.003)
Growth_REV	0.005***	0.000	0.000
	(0.001)	(0.000)	(0.000)
Growth_A	0.088***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.014***	-0.007	-0.012
	(0.001)	(0.010)	(0.013)
Loss	0.018***	0.000	0.000
	(0.002)	(0.000)	(0.000)
ROA	0.036***	0.052	0.036
	(0.005)	(0.032)	(0.037)
Constant	0.130***	0.122***	0.102***
	(0.010)	(0.024)	(0.024)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	180,302	5,756	5,158
Prob >chi2	0.0000	0.0000	0.0000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *SIZE* is an indicator variable of the size of the firm dummies; it equals 1 for small private firms, 2 for medium private firms and 3 for large private firms. Group No. 1 is the *SIZE* of the reference group. *AUDIT* is a dummy variable for the unaudited accounts; it equals 0 for audited accounts and 1 for unaudited accounts. *SIZE*AUDIT* is the interaction term for the size of the firm and unaudited accounts. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Based on the regression results above, the *AUDIT* coefficient is negative and significant (- 0.018, p = <0.05), indicating that small unaudited private firms are significantly less likely to manage earnings. In other words, it seems that small audited private firms are significantly more likely to have higher levels of discretionary accruals compared to unaudited ones. The coefficient for medium audited private firms is -0.016 (p = <0.01), and for large audited private firms, it is -0.012 (p = <0.01), indicating that they are significantly less likely to manipulate earnings than small audited private firms. Interestingly, the interaction coefficient of variable *SIZE*AUDIT* is positive but not statistically significant,

suggesting that there is no difference between different sizes of firms conditional on audit effect within firms.

The results obtained using the PSM sample with 0.01 caliper restriction provide slightly conflicting results. In particular, the coefficient for large audited private firms (-0.037, p = <0.01) is lower than the coefficient for medium audited private firms (-0.018, p = <0.01), implying that large audited private firms have lower levels of discretionary accruals than medium audited private firms. Nevertheless, it is important to bear in mind that significant differences in covariates such as *Log_At* and *SIZE* remained after the matching (see Appendix IX). Interestingly, on the successfully matched sample with a narrower caliper (i.e., 0.00005), the coefficients for medium and for large audited private firms are the same (coefficient = -0.026, p = <0.01), implying that they have lower levels of earnings management than small audited private firms. To put it differently, the effect of audit seems to be the same in both medium and large private firms. What stands out is that when the effect of *SIZE* on *DAC* is reduced to an insignificant level between audited and unaudited firms, the coefficient of the *AUDIT* variable becomes positive but not significant, whereas the interaction coefficient of *SIZE*AUDIT* becomes negative but not significant. Together these findings suggest that the effect of audit on levels of earnings management is associated with the size of the firm.

The further OLS robustness regression analysis provides qualitatively similar findings. In addition, the results of the between-within regression model with an alternative measure of discretionary accruals (i.e., *MJ_DAC*) also confirms the results from the main analysis. The results of these robustness analyses are presented in Appendix IX.

7.8.2. Discussion and summary of the main findings

As indicated previously in the fourth chapter, although some studies on PLCs agree that audited accounts have a higher quality of reported earnings, other studies on private firms reveal that the audit effect might vary depending on the size of the private firms. The empirical studies have also revealed that private firms undertake audit opportunistically. Despite the importance of audit, there remains a paucity of evidence on the effect of audit on levels of earnings management between small, medium and large private firms. Therefore, the sixth hypothesis assesses the effect of audit across small, medium and large private firms in the UK.

As expected, the findings of the main panel data regression analysis imply that the effect of audit is associated with the size of the firm. More specifically, the results suggest that small audited private firms are more likely to manipulate earnings than unaudited ones. These findings seem to be consistent with Liu and Skerratt (2018) who suggested that disciplining effect of audit on the quality of earnings in small private UK's firms deteriorate

after the recession period. Also, the results are in similar line with Paiva and Dias's (2019) findings which found that Portuguese and Irish private firms under the economic adjustment programme have higher levels of discretionary accruals.

With respect to medium and large audited private firms, the results reveal that they are less likely to manipulate earnings compared to small audited private firms. This outcome is contrary to that of Paiva and Dias (2019), who found that audit in large private firms is associated with higher levels of earnings management, while there is no difference in levels of earnings management between small audited and unaudited private firms. This discrepancy could be attributed to specific country factors, the possible effects of adjustment programme or due to different definition of small and large private firms. In particular, they divided firms on small and large by using mean values of the natural logarithm of total assets; thus, they failed to address the effect of regulatory size.

The further sensitivity analysis on the PSM samples has clearly affirmed that the effect of audit on levels of earnings management is associated with the size of the firm. In other words, after decreasing the differences in size covariates, the result confirmed that medium and large audited private firms exhibit lower levels of earnings management than small audited private firms. Another interesting result from analysis on the matched sample is the change of direction of the *AUDIT* coefficient (i.e., from negative and significant to positive and not significant). These differences in the results may be explained by the fact that private firms are likely to take audit opportunistically with a different purpose. The robustness regression analyses with an alternative measure of discretionary accruals (i.e., *MJ_DAC*) have also supported the main findings.

Taken together, the evidence indicates that the audit effect varies across different sizes of private firms. The comparison of firms across sizes and the analysis on PSM samples revealed that the audit in private firms seems to be not strictly associated with a lower level of earnings management. However, with a small sample size of unaudited firms, these results need to be interpreted with caution. Also, other factors such as audit quality, whether a firm is a stand-alone or subsidiary of PLCs, or a concentration of ownership are not considered.

7.9. Conclusion

This chapter provides a comprehensive assessment and evidence of the degree of earnings management in small, medium, and large private and PLCs in the UK. To address key aspects that may influence earnings management levels in private firms differently than those of PLCs, six testable hypotheses are tested. The first set of analysis aimed to address the effect of specific regulatory requirements. Specifically, the effect of regulatory size on earnings management levels amongst small, medium, and large private firms and PLCs

analysed. Then to assess the extent of earnings management within private firms, the specific ownership effects are considered next. In particular, the differences between stand-alone private firms and private subsidiaries of PLCs are examined first, followed by the effect of different ownership concentration on the levels of earnings management. Another regulatory peculiarity about private firms relates to their statutory entitlement to choose accounting standards for financial reporting purposes. Therefore, the differences in levels of earnings management between private firms preparing financial statement under the UK GAAP and ones that report under IFRS are analysed next. Capital structure is another fundamental difference between private firms and PLCs; thus, the effect of different leverage levels on the earnings management in private firms and PLCs is investigated. Returning to regulation specifics, the effect of audit on earnings management levels across small, medium and large private firms is examined due to different audit requirements across different sizes of firms.

The evidence in this chapter indicates that that differences in accounting requirements may influence levels of earnings management across small, medium, and large private firms and PLCs. The results of the first set of the analysis suggest that private firms are more likely to manipulate earnings than PLCs. In particular, small private firms manipulate earnings the most, followed by large and medium private firms. These findings are in agreement with Ball and Shivakumar's (2005) and Liu and Skerratt's (2018) findings which showed that private firms in the UK exhibit a lower quality of earnings than PLCs in the UK. However, the observed levels of earnings management across small, medium and large private firms are slightly different from those observed by Liu and Skerratt (2018) who found that medium and large private firms had the lowest quality of earnings. Closer inspection of private firms reveals that earnings management behaviour might be associated with the type of firm. More specifically, the evidence in this chapter implies that private subsidiaries of PLCs exhibit greater levels of earnings management than stand-alone private firms. This finding is along similar lines to the findings of studies on earnings management between subsidiaries and their parent companies (i.e., Shuto, 2009; Prencipe, 2012; Bonacchi, Cipollini and Zarowin, 2018; Beuselinck *et al.*, 2019) which showed that parent PLCs use their subsidiaries to manipulate earnings. On the question of the effect of concentration of ownership on earnings management levels, this thesis found that private firms with a greater number of shareholders exhibit lower earnings management than private firms with more concentrated ownership. This result confirms Clatworthy and Peel's (2013) findings which found that the UK's private firms with more dispersed ownership have a higher quality of financial reports. Regarding the adoption of different accounting standards, the results indicate that levels of earnings management are higher in private firms that report under IFRS than the ones reporting under the UK GAAP. These findings reflect those of Cameran, Campa and Pettinicchio (2014) who also found that private firms reporting under national standard have lower discretionary accruals levels than those that adopted IFRS.

Surprisingly, this outcome is contrary to that of Liu and Skerratt (2018) whose findings suggested that all sizes of firms have similar quality of earnings despite applying different accounting standards (i.e., IFRS and UK GAAP). In terms of the association between leverage and earnings management levels, findings are consistent with those of Dichev and Skinner (2002), Iatridis and Kadorinis (2009) and Clatworthy and Peel (2013), who found that higher leveraged firms are more likely to manipulate their earnings. Not surprisingly, given that private firms depend more on debt financing, the findings confirmed that highly leveraged private firms exhibit higher levels of earnings management than highly leveraged PLCs. Regarding the audit, it seems that the effectiveness of the audit is associated with the size of the firm. In contrast to Paiva and Dias (2019) but consistent with Liu and Skerratt (2018), the findings suggest that earnings management is more pervasive amongst small private firms with audited accounts than in unaudited ones.

The empirical findings in this chapter provide an important insight into earnings management practices across small, medium, and large private firms compared to PLCs. Due to distinctive features of private firms and limited evidence about their earnings management practices, these findings make a major contribution to research on earnings management by demonstrating how regulatory requirements, ownership and capital structure affect earnings management pervasiveness. A summary of the thesis and its findings, research implications, and limitations, including suggestions for future research, are provided in the next chapter.

Chapter Eight

Conclusion

8.1. Summary of the literature

The discussion about the regulatory and institutional environment has highlighted fundamental differences between private firms and PLCs that may influence their financial reporting practices somewhat differently. In particular, it has been shown that private firms are subject to more flexible requirements for financial disclosures, audit, and accounting standards adoption compared to PLCs. Private firms also have a specific nature of ownership structure, agency relationships and capital structure. Subsequently, there is no doubt that the choices of financial reporting practices vary between the two. In line with this, it is expected that earnings management levels (i.e., opportunistic manipulations of reported earnings to mislead stakeholders or to influence contractual outcomes) may vary between private firms and PLCs. This is also supported by agency theory, stakeholder theory, and prospect theory, even though they offer contradictory predictions about the degree of earnings management in private firms compared to PLCs. On the other side, transaction cost theory suggests no difference is expected in the earnings management levels. Overall, the literature review has highlighted that distinctive characteristics of private firms may influence their earnings management practices differently compared to PLCs.

8.2. Research objectives

The primary purpose of financial disclosures is to provide information about the performance of the business to the internal and external users of financial reports. More importantly, this information must give a true and fair view of the financial position at the end of the year and profit or losses for the year (Companies Act 2006). Despite that, all of the studies reviewed support the hypothesis that this is not always the case. In other words, the evidence suggests a pertinent role of opportunism in manipulating earnings (i.e., distorting earnings). However, research on earnings management has been primarily focused on PLCs that fundamentally differ from private firms. In particular, PLCs are subject to more stringent statutory financial reporting requirements. Moreover, they also have different institutional settings than private firms; hence, the results from these studies might not be generalisable to private firms. This thesis aims to cover this research gap and more specifically shed light on factors that may be associated with different level of earnings

management, such as more flexible regulatory requirements, controlling interests, ownership dispersion and the particular capital structure of private firms.

In particular, the following research objectives are investigated by this study: First, this thesis was designed to investigate if earnings management levels vary between small, medium and large private firms and PLCs. Second, this study intends to assess whether private subsidiaries of PLCs manipulate earnings more than stand-alone private firms. Third, this thesis also aims to assess whether private firms with more dispersed ownership engage in earnings manipulations less than private firms with more concentrated ownership. Fourth, this study investigates if the degree of earnings management varies between private firms reporting under UK GAPP and IFRS. The fifth objective of this thesis was to determine if the association of leverage levels with earnings management vary in private firms relative to PLCs. The sixth specific objective of this study was to investigate the differences in earnings manipulations amongst audited private firms across different sizes.

8.3. Summary of the main findings and research contributions

The financial reporting regulation plays a critical role in the maintenance of the quality of financial reports. However, regulators classify private firms in small, medium and large private firms for financial reporting and auditing purposes. Subsequently, financial reporting requirements differ between the sizes of private firms and between private firms and PLCs. In particular, statutory requirements for private firms are more flexible compared to ones for PLCs. For instance, small private firms have reduced disclosure and audit requirements. Also, private firms can voluntarily adopt IFRS for their financial reporting, whereas PLCs are required to prepare consolidated financial statements under IFRS. Besides that, other institutional effects may influence the quality of reported earnings. This thesis raises the questions of whether size matter (i.e., regulatory, ownership and leverage) in the context of the quality of reported earnings (i.e., earnings management).

First, although the results of this thesis generally show that both private firms and PLCs manage reported earnings around earnings benchmarks, the findings of this study complement those of earlier studies. Specifically, this study provides evidence of earnings management within private firms which generally have a prominent role in the UK and EU economies.

Second, as far as my knowledge is concerned, this is the first study that has compared accruals manipulations across different sizes of firms in the UK. The results of this study suggest that size-based disclosure requirements may negatively influence the quality of reported earnings. Specifically, this study has found that the pervasiveness of earnings manipulation is greatest in small private, followed by large and medium private firms. In

other words, it has been found that highly regulated PLCs have the lowest levels of earnings management.

Third, the findings of this thesis provide original insight into the inequality of earnings management levels between private subsidiaries of PLCs and stand-alone private firms. The exciting finding to emerge from this study is that earnings management prevalence is higher in subsidiaries than stand-alone private firms. This result suggests that PLCs with controlling interest in private firms exploit their subsidiaries for earnings manipulations. Consequently, the findings suggest that the controlling interests negatively influences the quality of reported earnings.

Fourth, this study also adds to the understanding of the association between ownership dispersion and earnings management. The evidence from this study suggests that the quality of reported earnings is associated with the ownership dispersion in private firms. In particular, even after removing differences in the characteristics of firms, including size, private firms with more dispersed ownership exhibited lower levels of discretionary accruals than those with more concentrated ownership. Therefore, the findings support the notion that ownership dispersion is a crucial determinant of the reported earnings quality (i.e., lower earnings management).

Fifth, this study provides new insight into discretionary accruals manipulations across private firms that prepare financial statements under different accounting standards. The evidence highlights that discretionary accruals levels are higher within financial reports of private firms under IFRS than UK GAAP. The findings of this study strengthen the idea that voluntarily adoption of IFRS is associated with greater earnings manipulations. This result also suggests that there may be more discretion under IFRS than under UK GAAP for private firms.

Sixth, as far as my knowledge is concerned, this is the first study to assess the effects of leverage on earnings management in private firms compared to PLCs. The results show that higher leverage may negatively influence the reported earnings quality in private firms and PLCs. The evidence also highlights substantial variations in the association of leverage and earnings management levels between private firms and PLCs. In particular, the findings show a stronger association of high leverage with levels of earnings management in private firms than in PLCs.

Seventh, to the best of my knowledge, this is the first study that investigates audit effectiveness in reducing earnings management levels between small, medium and large private firms. The exciting finding that emerges from this study is that the audit effectiveness varies between differently sized private firms. The evidence highlights that the effectiveness of audit to control earnings management diminishes only in small private firms. The findings support the notion that private firms are likely to undertake audit opportunistically.

To sum up, this study provides the first comprehensive assessment of the earnings management association with the various private firms' specific factors. One of the major contributions to emerge from this study is that size matters. The following section outlines the implications of this thesis.

8.4. Research implications

Although the financial reporting framework requires that financial statements show a truthful and fair view of the disclosed financial information, earnings management research demonstrates that managers may behave opportunistically. In other words, managers may misrepresent accounting information and mislead users of financial statements due to self-interests. As a consequence, investors, creditors, governments, and other stakeholders' decisions may be based on unreliable financial information, leading to substantial financial and economic losses and loss of confidence in financial information. Therefore, the insights gained from this study are likely to be of assistance to users of financial statements and policymakers in developing future accounting standards and legislative framework.

The findings of this thesis demonstrate that flexibility in financial reporting and audit requirements for private firms may negatively influence the quality of reported earnings. In particular, the findings have demonstrated that private firms across different sizes have significantly different quality of reported earnings (i.e., levels of earning management). The results have also shown that voluntary adoptions of IFRS have a negative effect on the quality of reported earnings in private firms. This study has also raised important questions about the effectiveness of the audit within private firms across different sizes. In particular, the findings have shown that audit in small private firms is not as effective as in medium and large private firms. Thus, the findings have suggested that there may be an inconsistency in the effect of voluntary and statutory audits on the quality of reported earnings within private firms. Specifically, the findings suggest higher earnings management levels in small private firms that are not subject to statutory audit. These findings indicate that audits in small private firms is undertaken opportunistically (i.e., to lower borrowing cost); hence, it does not reduce managers' opportunistic behaviour. While this information is important for policymakers, it may be vital for stakeholders who rely on information from audited financial statements. This finding raises awareness of lower audit assurance within voluntary adopters.

Further findings of this thesis also demonstrate that institutional factors such as ownership and capital structure may influence the quality of reported earnings. Specifically, the findings indicate that the quality of reported earnings deteriorates due to controlling interests. In other words, the findings have demonstrated that earnings management levels within private firms significantly differ between firms with and without controlling interests. These findings indicate that subsidiaries of PLCs exhibit higher levels of earnings

manipulations. An implication of these findings is the possibility that PLCs manipulate earnings at the subsidiary level. This study has also shown that greater ownership dispersion reduces earnings management in private firms. To this end, there is inconsistency in the quality of reported earnings between private firms depending on ownership dispersion. This study also provided a valuable insight into the implications of leverage on the quality of reported earnings. Notably, the findings of this study have confirmed that leverage may influence financial reporting practices more profoundly in private firms than in PLCs. Together with findings of the audits' inconsistent effectiveness, this information may be of great importance to creditors that rely on the financial statements for credit approvals.

To sum up, the principal policy implication of this study is that the divergence in financial reporting requirements may influence the quality of reported earnings. The findings have raised an important question about the size-based financial reporting requirements. It has also revealed that other institutional factors such as ownership and capital structure may be crucial determinants of the quality of reported earnings. Therefore, policymakers could review the size-based reporting requirements of private firms. They could also potentially benefit from the consideration of ownership and capital structure when setting up future financial reporting requirements. This study also raises awareness of inconsistency in the reliability of reported earnings. Consequently, greater efforts are needed to avoid losing stakeholders' confidence and ensuring financial reporting truthfulness.

8.5. Research limitations and suggestions for future research

One source of weakness in this study is the potential misclassification issue related to the FAME database. In particular, firms that changed listing status from private to PLCs may be considered as PLCs because FAME classifies all the past year information as the last available classification. The findings of this study may also be somewhat limited by the lack of information on small private firms that do not file profit and loss accounts.[69]

An additional limitation that could have affected the inferences is the measure of earnings management. Since this study was limited to absolute discretionary accruals, the inferences of this study are limited, and further investigation is needed to determine the direction of accruals manipulations (i.e., upward or downward earnings manipulations). Furthermore, future research might also investigate whether alternative measures of earnings management such as RAM affects the inferences.

An issue that is not addressed in this study is whether the audit quality drives the results. A further study could also assess whether private firms manipulate their size

[69] Firms that file abbreviated accounts.

threshold variables (i.e., sales or costs) to avoid income statement disclosure and statutory audits (i.e., to minimise proprietary costs). Also, the topic of earnings management at subsidiary levels is an intriguing one that could be explored in more depth in future research. Therefore, although the current study provides a comprehensive assessment of earnings management within the small, medium, large private and PLCs in the UK, further work is needed to fully understand the implications of flexible reporting requirements and the audit on earnings management levels in private firms.

A further limitation is that this study has not addressed pay incentives that may drive earnings management, such as managers compensation. Furthermore, this study has not controlled for monitoring through the governance structure; hence, future research could also be conducted to determine how these factors are linked to the levels of earnings management in private firms.

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Appendix I Regulatory size-based thresholds

Table AI.1: The size-based thresholds

	Applicable from January 2016 but could be used from January 2015[70]	Applicable for the financial year beginning on or after 6 of April 2008[71]	Applicable between 30 January 2004 and 6 of April 2008[72]
Small firms[73]			
Turnover	< £10.2 million	< £6.5 million	< £ 5.6 million
Balance sheet total	< £5.1 million	< £3.26 million	< £2.8 million
Number of employees	≤ 50	≤ 50	≤ 50
Small groups			
Aggregate turnover	< £10.2 million net (or £7.8 million gross)	< £6.5 million net (or £7.8 million gross)	< £5.6 million net (or £6.72 million gross)
Aggregate balance sheet total	< £ 5.1 million net (or £6.1 million gross)	< £3.26 million net (or £3.9 million gross)	< £2.8 million net (or £3.36 million gross)
Number of employees	≤ 50	≤ 50	≤ 50
	Applicable from January 2016 but could be used from January 2015[74]	Applicable for the financial year beginning on or after 6 of April 2008[75]	Applicable between 30 January 2004 and 6 of April 2008[76]
Medium-sized firm[77]			
Turnover	< £36 million	< £25.9 million	< £2.8 million
Balance sheet total	< £18 million	< £12.9 million	< £1.4 million
Number of employees	≤ 250	≤ 250	≤ 250
Medium-sized groups			
Aggregate turnover	< £ 36 million net (or £43.2 gross)	< £25.9 million net (or £31.1 million gross)	< £22.8 million net (or £27.36 million gross)
Aggregate balance sheet total	< £18 million net (or £21.6 million gross)	< £12.9 million net (or 15.5 million gross)	< £11.4 million net (or £13.68 million gross)
Number of employees	≤ 250	≤ 250	≤ 250

[70] Statutory Instruments No. 980 (2015)
[71] Statutory Instruments No. 393 (2008)
[72] Statutory Instruments No. 16 (2004)
[73] Section 382 of the Companies Act 2006
[74] Statutory Instruments No. 980 (2015)
[75] Statutory Instruments No. 393 (2008)
[76] Statutory Instruments No. 16 (2004)
[77] Section 465 of the Companies Act 2006

Appendix II Requirements for filing of accounts at Companies House

Table AII.1: Requirements for filing of accounts at Companies House

Type of Firm	Profit and Loss Account	Balance Sheet	Notes	Group Accounts	Directors' Report & Strategic Report	Directors' Remuneration Report & any Separate Corporate Governance statement	Auditor Report
Small[78]		✓	✓	✓ (if small parent company chooses to prepare them)			✓ Unless the company qualifies for exemption from audit and takes advantage of that exemption
Medium[79]	✓	✓	✓	✓ (if appropriate)	✓		✓ Unless the company qualifies for exemption from audit (i.e., subsidiary)
Unquoted[80]	✓	✓	✓	✓ (if appropriate)	✓		✓
Quoted[81]	✓	✓	✓	✓ (if appropriate)	✓	✓	✓

[78] Section 444 of the Companies Act 2006
[79] Section 445 of the Companies Act 2006
[80] Section 446 of the Companies Act 2006
[81] Section 447 of the Companies Act 2006

Appendix III Variable Definitions

Table AIII.1: Variable Definitions

Variable	Description
E_t	Scaled earnings, measured as end-of-year net income divided by lagged total assets.
ΔE_t	Scaled change in earnings, measured as end-of-year net income less net income in year *t-1* divided by lagged total assets.
NDE_t	Scaled non-discretionary earnings, measured as end-of-year net income less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*.
$ND\Delta E_t$	Scaled non-discretionary earnings change, measured as change in earnings less discretionary accruals in year *t*, estimated with the performance-adjusted model in year *t*.
DAC	The absolute value of discretionary accruals, measured by the performance-adjusted model (i.e., Kothari, Leone and Wasley, 2005).
Lev	Debt ratio, measured as end-of-year total liabilities divided by end-of-year book value of equity.
QR	Quick ratio, measured as end-of-year current assets divided by end-of-year current liabilities.
Growth_REV	Growth in revenue, measured as the percentage change in sales in the current year *t* from year *t-1*.
Growth_A	Growth in assets, measured as the percentage change in total assets in the current year *t* from year *t-1*.
Log_A	Natural logarithm of total assets.
Loss	The cumulative percentage of sample years that the firm reported a loss.
ROA	Return on assets, measured as end-of-year net income divided by lagged total assets.
SIZE	Indicator variable of the size of the firm dummies; it equals 1 for small private firms, 2 for medium private, 3 for large private and 4 for PLCs.
TYPE	Dummy variable of the firm's type; it equals 0 for stand-alone private firms and 1 for private subsidiaries of PLCs.
OWN	Dummy variable of the private firms' ownership divided into two groups based on the value of the median value of the number of shareholders; it equals 0 for private firms with concentrated ownership and 1 for private firms with dispersed ownership.
STND	Dummy variable of the reporting accounting standards; it equals 0 for private firms reporting under UK GAAP and 1 for private firms reporting under IFRS.
LEV_TYPE	Indicator variable of the level of leverage by the type of the firm dummies divided into four groups based on the value of the median value of the leverage and the type of the firm; it equals 1 for low leveraged private firms, 2 for highly leveraged private firms, 3 for low leveraged PLCs and 4 for highly leveraged PLCs.
AUDIT	Dummy variable for the unaudited accounts; it equals 0 for audited accounts and 1 for unaudited accounts.
MJ_DAC	The absolute value of discretionary accruals measured by the modified Jones model (i.e., Dechow, Sloan and Sweeney, 1995).

Appendix IV Earnings management across small, medium, and large private firms and PLCs

Table AIV.1: The assessment of PSM matching (H1)

PSM sample (Caliper distance)	Test	Null hypothesis α = 5%	
0.01			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted
0.00005			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted

To assess the quality of the PSM sample t-test of propensity scores is assessed first. As illustrated in the table above, the results suggest that there are no significant differences in propensity scores between PLCs and large private firms across both samples (i.e., 0.01 and 0.00005). Furthermore, the results of logit regression reveal that significant differences between covariates have diminished after the matching.

Table AIV.2: OLS Regression with DAC

$$DAC_{it} = \alpha_0 + \alpha_1 SIZE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \varepsilon_{it}$$

OLS Regression			
	Sample across size categories	Propensity Score Matching (PSM) sample of large private vs PLCs	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Small private	0.053***		
	(0.002)		
Medium private	0.029***		
	(0.002)		
Large private	0.035***	0.032***	0.033***
	(0.002)	(0.002)	(0.002)
Lev	0.001***	0.006***	0.006***
	(0.000)	(0.001)	(0.001)
QR	0.002***	0.007***	0.006***
	(0.000)	(0.001)	(0.001)
Growth_REV	0.001	0.002	0.001
	(0.001)	(0.005)	(0.006)
Growth_A	0.092***	0.081***	0.083***
	(0.002)	(0.008)	(0.010)
Log_A	-0.002***	-0.004***	-0.004***
	(0.000)	(0.001)	(0.001)
Loss	0.021***	0.006	0.011**
	(0.001)	(0.005)	(0.005)
ROA	0.098***	0.004	0.024
	(0.004)	(0.018)	(0.020)
Constant	0.065***	0.104***	0.103***
	(0.005)	(0.012)	(0.013)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
N of firm-years	184,120	7,420	5,838
R2	0.081	0.129	0.125

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *TYPE* is a dummy variable of the firm's type; it equals 0 for stand-alone private firms and 1 for private subsidiaries of PLCs. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table AIV.3: An alternative between-within panel data model with MJ_DAC

$$MJ\_DAC_{it} = \alpha_0 + \alpha_1 SIZE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across size categories	Propensity Score Matching (PSM) sample of large private vs PLCs	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Small private	0.045***		
	(0.002)		
Medium private	0.029***		
	(0.002)		
Large private	0.033***	0.031***	0.032***
	(0.002)	(0.003)	(0.003)
Lev	0.001***	0.004***	0.005***
	(0.000)	(0.001)	(0.001)
QR	-0.001***	0.003	0.003
	(0.000)	(0.002)	(0.002)
Growth_REV	0.004***	0.000	0.000
	(0.001)	(0.000)	(0.000)
Growth_A	0.087***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.014***	-0.014***	-0.013***
	(0.001)	(0.004)	(0.005)
Loss	0.020***	0.000	0.000
	(0.002)	(0.000)	(0.000)
ROA	0.033***	-0.027	-0.010
	(0.005)	(0.023)	(0.027)
Constant	0.084***	0.090***	0.085***
	(0.010)	(0.018)	(0.020)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	184,120	7,420	5,838
Prob >chi2	0.0000	0.0000	0.0000

Notes: *MJ_DAC* is the absolute value of discretionary accruals measured by the modified Jones model. *SIZE* is an indicator variable of the size of the firm dummies; it equals 1 for small private firms, 2 for medium private, 3 for large private and 4 for PLCs. Group No. 4 is the *SIZE* of the reference group. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. *Year* & *Industry* are included. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Appendix V Earnings management across stand-alone private firms and private subsidiaries of PLCs

Table AV.1: The assessment of PSM matching (H2)

PSM sample (Caliper distance)	Test	Null hypothesis α = 5%	
0.01			
	T-test of propensity scores	No significant differences between groups	Rejected
	Logit regression	No significant differences in covariates between groups	Accepted
0.00005			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted

To ensure the quality of the PSM samples t-test of propensity scores is assessed first. As illustrated in the table above, the results suggest that there are significant differences between propensity scores in the PSM sample of private subsidiaries of PLCs and stand-alone private firms matched with 0.01 caliper distances. Despite that, the logit regression confirms that all the significant differences in covariates have diminished in the matched sample. A further matching with a smaller caliper distance of 0.00005 seems to be more successful. In particular, both t-tests of propensity scores and logit regression suggest that there are no statistically significant differences between covariates and propensity scores amongst matched firms.

Table AV.2: OLS Regression with DAC

$$DAC_{it} = \alpha_0 + \alpha_1 TYPE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \varepsilon_{it}$$

OLS Regression			
	Sample across type categories	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Private subsidiaries of PLCs	0.032***	0.030***	0.031***
	(0.001)	(0.001)	(0.001)
Lev	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
QR	0.001***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
Growth_REV	0.006***	0.008***	0.009***
	(0.002)	(0.003)	(0.003)
Growth_A	0.086***	0.084***	0.086***
	(0.003)	(0.004)	(0.005)
Log_A	-0.006***	-0.007***	-0.007***
	(0.000)	(0.000)	(0.001)
Loss	0.019***	0.017***	0.020***
	(0.002)	(0.003)	(0.003)
ROA	0.087***	0.076***	0.077***
	(0.007)	(0.008)	(0.009)
Constant	0.126***	0.130***	0.128***
	(0.006)	(0.008)	(0.008)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
N of firm-years	73,477	45,326	41,110
R2	0.093	0.086	0.089

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *TYPE* is a dummy variable of the firm's type; it equals 0 for stand-alone private firms and 1 for private subsidiaries of PLCs. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table AV.3: An alternative between-within panel data model with *MJ_DAC*

$$MJ\_DAC_{it} = \alpha_0 + \alpha_1 TYPE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across type categories	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Private subsidiaries of PLCs	0.030***	0.032***	0.033***
	(0.001)	(0.001)	(0.001)
Lev	0.001***	0.001***	0.001**
	(0.000)	(0.000)	(0.000)
QR	-0.002***	-0.002***	-0.002**
	(0.001)	(0.001)	(0.001)
Growth_REV	0.010***	0.000***	0.000***
	(0.002)	(0.000)	(0.000)
Growth_A	0.083***	0.001***	0.001***
	(0.004)	(0.000)	(0.000)
Log_A	-0.015***	-0.013***	-0.013***
	(0.002)	(0.003)	(0.003)
Loss	0.021***	0.000***	0.000***
	(0.004)	(0.000)	(0.000)
ROA	0.035***	0.025**	0.019*
	(0.008)	(0.011)	(0.011)
Constant	0.144***	0.146***	0.141***
	(0.012)	(0.011)	(0.011)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	73,477	45,326	41,110
Prob >chi2	0.0000	0.0000	0.0000

Notes: *MJ_DAC* is the absolute value of discretionary accruals measured by the modified Jones model. *TYPE* is a dummy variable of the firm's type; it equals 0 for stand-alone private firms and 1 for private subsidiaries of PLCs. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Appendix VI Earnings management across ownership dispersion in private firms

Table AVI.1: The assessment of PSM matching (H3)

PSM sample (Caliper distance)	Test	Null hypothesis α = 5%	
0.01			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted
0.00005			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted

To assess the quality of the PSM sample t-test of propensity scores is assessed first. It can be seen from the table above, for both matched samples (i.e., 0.01 and 0.00005), there are no significant differences in propensity scores between private firms with dispersed and more concentrated ownership. Also, the results of logit regression demonstrate that all the significant differences in covariates are insignificant after the matching.

Table AVI.2: OLS Regression with *DAC*

$$DAC_{it} = \alpha_0 + \alpha_1 OWN_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \varepsilon_{it}$$

OLS Regression			
	Sample across ownership dispersion	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Dispersed ownership	-0.022***	-0.021***	-0.021***
	(0.001)	(0.001)	(0.001)
Lev	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
QR	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
Growth_REV	0.001	0.002	0.002
	(0.002)	(0.002)	(0.002)
Growth_A	0.093***	0.086***	0.086***
	(0.002)	(0.003)	(0.003)
Log_A	-0.004***	-0.004***	-0.004***
	(0.000)	(0.000)	(0.000)
Loss	0.020***	0.019***	0.019***
	(0.001)	(0.002)	(0.002)
ROA	0.095***	0.072***	0.076***
	(0.004)	(0.006)	(0.006)
Constant	0.121***	0.113***	0.112***
	(0.005)	(0.006)	(0.006)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	171,488	79,896	79,456
R2	0.080	0.075	0.081

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *OWN* is a dummy variable of the private firms' ownership divided into two groups based on the value of the median value of the number of shareholders; it equals 0 for private firms with concentrated ownership and 1 for private firms with dispersed ownership. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table AVI.3: An alternative between-within panel data model with *MJ_DAC*

$$MJ\_DAC_{it} = \alpha_0 + \alpha_1 OWN_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across ownership dispersion	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Dispersed ownership	-0.021***	-0.021***	-0.021***
	(0.001)	(0.001)	(0.001)
Lev	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
QR	-0.001***	-0.002***	-0.002***
	(0.000)	(0.001)	(0.001)
Growth_REV	0.004***	0.000***	0.000***
	(0.001)	(0.000)	(0.000)
Growth_A	0.089***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.016***	-0.015***	-0.015***
	(0.001)	(0.002)	(0.002)
Loss	0.019***	0.000***	0.000***
	(0.002)	(0.000)	(0.000)
ROA	0.032***	0.005	0.008
	(0.005)	(0.008)	(0.008)
Constant	0.124***	0.118***	0.115***
	(0.011)	(0.008)	(0.008)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	171,488	79,896	79,456
Prob >chi2	0.0000	0.0000	0.0000

Notes: *MJ_DAC* is the absolute value of discretionary accruals measured by the modified Jones model. *OWN* is a dummy variable of the private firms' ownership divided into two groups based on the value of the median value of the number of shareholders; it equals 0 for private firms with concentrated ownership and 1 for private firms with dispersed ownership. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Appendix VII Earnings management across accounting standard in private firms

Table AVII.1: The assessment of PSM matching (H4)

PSM sample (Caliper distance)	Test	Null hypothesis α = 5%	
0.01			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted
0.00005			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted

The table above illustrates the assessment of the quality of the PSM samples. It is clear that both matched samples (i.e., 0.01 and 0.00005) are closely matched. More specifically, additional tests suggest that there are no significant differences in propensity scores of private firms reporting under UK GAAP and IFRS. The results of logit regression confirmed that all significant differences in covariates are diminished after the matching.

Table AVII.2: OLS Regression with *DAC*

$$DAC_{it} = \alpha_0 + \alpha_1 STND_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \varepsilon_{it}$$

OLS Regression			
	Sample across accounting standards	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
IFRS	0.011***	0.007***	0.009***
	(0.002)	(0.002)	(0.002)
Lev	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)
QR	0.002***	0.002**	0.002**
	(0.000)	(0.001)	(0.001)
Growth_REV	0.002	0.003	0.006
	(0.002)	(0.005)	(0.006)
Growth_A	0.091***	0.090***	0.087***
	(0.003)	(0.008)	(0.009)
Log_A	-0.004***	-0.006***	-0.006***
	(0.000)	(0.001)	(0.001)
Loss	0.020***	0.006	0.009*
	(0.002)	(0.005)	(0.005)
ROA	0.098***	0.086***	0.088***
	(0.005)	(0.015)	(0.015)
Constant	0.102***	0.137***	0.123***
	(0.013)	(0.016)	(0.018)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	145,925	12,104	11,178
R2	0.069	0.077	0.076

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *STND* is a dummy variable of the reporting accounting standards; it equals 0 for private firms reporting under UK GAAP and 1 for private firms reporting under IFRS. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table AVII.3: An alternative between-within panel data model with *MJ_DAC*

$$MJ\_DAC_{it} = \alpha_0 + \alpha_1 STND_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across accounting standards	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
IFRS	0.009***	0.011***	0.012***
	(0.002)	(0.002)	(0.002)
Lev	0.001***	0.000	0.000
	(0.000)	(0.000)	(0.001)
QR	-0.002***	0.003	0.003
	(0.000)	(0.002)	(0.002)
Growth_REV	0.006***	0.000**	0.000**
	(0.002)	(0.000)	(0.000)
Growth_A	0.086***	0.001***	0.001***
	(0.003)	(0.000)	(0.000)
Log_A	-0.019***	-0.022***	-0.024***
	(0.002)	(0.006)	(0.006)
Loss	0.020***	0.000*	0.000*
	(0.003)	(0.000)	(0.000)
ROA	0.027***	-0.018	-0.019
	(0.006)	(0.027)	(0.028)
Constant	0.151***	0.129***	0.127***
	(0.033)	(0.014)	(0.016)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	145,925	12,104	11,178
Prob >chi2	0.0000	0.0000	0.0000

Notes: *MJ_DAC* is the absolute value of discretionary accruals measured by the modified Jones model. *STND* is a dummy variable of the reporting accounting standards; it equals 0 for private firms reporting under UK GAAP and 1 for private firms reporting under IFRS. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table AVII.4: An alternative between-within panel data analysis excluding firms that switched accounting standards

$$DAC_{it} = \alpha_0 + \alpha_1 STND_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across accounting standards	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
IFRS	0.010***	0.009**	0.008*
	(0.004)	(0.004)	(0.005)
Lev	0.001***	-0.001	-0.001
	(0.000)	(0.001)	(0.001)
QR	-0.002***	0.000	-0.001
	(0.001)	(0.004)	(0.004)
Growth_REV	0.005***	0.010	0.018
	(0.002)	(0.011)	(0.013)
Growth_A	0.087***	0.109***	0.111***
	(0.003)	(0.019)	(0.022)
Log_A	-0.018***	-0.036***	-0.039***
	(0.002)	(0.009)	(0.011)
Loss	0.019***	0.007	0.009
	(0.003)	(0.020)	(0.025)
ROA	0.031***	-0.041	-0.048
	(0.006)	(0.050)	(0.054)
Constant	0.165***	0.230***	0.188***
	(0.035)	(0.047)	(0.039)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	134,337	4,236	3,828
Prob >chi2	0.0000	0.0000	0.0000

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *STND* is a dummy variable of the reporting accounting standards; it equals 0 for private firms reporting under UK GAAP and 1 for private firms reporting under IFRS. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Appendix VIII Earnings management across different levels of leverage in private firms and PLCs

Table AVIII.1: The assessment of PSM matching (H5)

PSM sample (Caliper distance)	Test	Null hypothesis α = 5%	
0.01			
	T-test of propensity scores	No significant differences between groups	Rejected
	Logit regression	No significant differences in covariates between groups	Accepted
0.00005			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted

The assessment of the PSM samples is assessed in the table above. For the first sample that is matched with 0.01 caliper distance, the results of the t-test suggest that there are significant differences in the propensity scores after the matching. Nevertheless, the logit regression confirmed that all the significant differences in covariates are insignificant in the matched sample. With respect to the sample that is matched with narrower caliper (i.e., 0.00005) t-test and the logit regression results illustrate that there are no significant differences in the matched sample.

Table AVIII.2: OLS Regression with *DAC*

$$DAC_{it} = \alpha_0 + \alpha_1 LEV\_TYPE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \varepsilon_{it}$$

OLS Regression			
	Sample across leverage	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Low leveraged private firms	0.027***	0.022***	0.020***
	(0.002)	(0.003)	(0.002)
Highly leveraged private firms	0.042***	0.038***	0.036***
	(0.002)	(0.003)	(0.002)
Highly leveraged PLCs	0.010***	0.008***	0.006**
	(0.003)	(0.003)	(0.003)
Lev	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
QR	0.004***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)
Growth_REV	-0.001	0.002	-0.001
	(0.001)	(0.002)	(0.002)
Growth_A	0.089***	0.068***	0.064***
	(0.002)	(0.003)	(0.003)
Log_A	-0.004***	-0.004***	-0.004***
	(0.000)	(0.000)	(0.000)
Loss	0.022***	0.025***	0.025***
	(0.001)	(0.002)	(0.002)
ROA	0.110***	0.121***	0.132***
	(0.004)	(0.005)	(0.005)
Constant	0.081***	0.083***	0.085***
	(0.005)	(0.005)	(0.005)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	184,120	133,970	131,500
R2	0.079	0.064	0.063

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *LEV_TYPE* is an indicator variable of the level of leverage by the type of the firm dummies divided into four groups based on the value of the median value of the leverage and the type of the firm; it equals 1 for low leveraged private firms, 2 for highly leveraged private firms, 3 for low leveraged PLCs and 4 for highly leveraged PLCs. Group No. 3 is the *LEV_TYPE* of the reference group. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table AVIII.3: An alternative between-within panel data model with *MJ_DAC*

$$MJ\_DAC_{it} = \alpha_0 + \alpha_1 LEV\_TYPE_i + \alpha_2 Lev_{it} + \alpha_3 QR_{it} + \alpha_4 Growth\_REV_{it} + \alpha_5 Growth\_A_{it} + \alpha_6 Log\_A_{it} + \alpha_7 Loss_{it} + \alpha_8 ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across leverage	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Low leveraged private firms	0.028***	0.023***	0.021***
	(0.002)	(0.003)	(0.003)
Highly leveraged private firms	0.039***	0.035***	0.032***
	(0.002)	(0.003)	(0.003)
Highly leveraged PLCs	0.009***	0.008**	0.007**
	(0.003)	(0.004)	(0.004)
Lev	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
QR	-0.001	-0.001	-0.001*
	(0.000)	(0.001)	(0.001)
Growth_REV	0.003**	0.000***	0.000***
	(0.001)	(0.000)	(0.000)
Growth_A	0.086***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.016***	-0.016***	-0.015***
	(0.001)	(0.001)	(0.001)
Loss	0.019***	0.000***	0.000***
	(0.002)	(0.000)	(0.000)
ROA	0.039***	0.032***	0.044***
	(0.005)	(0.006)	(0.007)
Constant	0.097***	0.094***	0.095***
	(0.010)	(0.008)	(0.007)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	184,120	133,970	131,500
Prob >chi2	0.0000	0.0000	0.0000

Notes: *MJ_DAC* is the absolute value of discretionary accruals measured by the modified Jones model. *LEV_TYPE* is an indicator variable of the level of leverage by the type of the firm dummies divided into four groups based on the value of the median value of the leverage and the type of the firm; it equals 1 for low leveraged private firms, 2 for highly leveraged private firms, 3 for low leveraged PLCs and 4 for highly leveraged PLCs. Group No. 3 is the *LEV_TYPE* of the reference group. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Appendix IX Earnings management across audited small, medium and large private firms

Table AIX.1: The assessment of PSM matching (H6)

PSM sample (Caliper distance)	Test	Null hypothesis α = 5%	
0.01			
	T-test of propensity scores	No significant differences between groups	Rejected
	Logit regression	No significant differences in covariates between groups	Rejected
0.00005			
	T-test of propensity scores	No significant differences between groups	Accepted
	Logit regression	No significant differences in covariates between groups	Accepted

The detailed assessment of the PSM samples of audited and unaudited private firms is provided in the table above. The matching with the restriction of 0.01 for the propensity scores seems to be unsuccessful. Specifically, the t-test of propensity scores illustrates that significant differences between groups remained after the matching. Likewise, the logit regression confirmed significant differences in covariates such as *Log_At*, and *SIZE* remained in the matched sample. The matching with a narrower caliper of 0.00005 seems to be more successful. Particularly, the results of t-test and logit regression suggest that significant differences diminished in the matched sample.

Table AIX.2: OLS Regression with DAC

$$DAC_{it} = \alpha_0 + \alpha_1 SIZE_i + \alpha_2 AUDIT_{it} + \alpha_3 SIZE_i * AUDIT_{it} + \alpha_4 Lev + \alpha_5 QR_{it} + \alpha_6 Growth\_REV_{it} + \alpha_7 Growth\_A_{it} + \alpha_8 Log\_A_{it} + \alpha_9 Loss_{it} + \alpha_{10} ROA_{it} + \varepsilon_{it}$$

OLS Regression			
	Sample across audit	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Medium private firms	-0.025***	-0.015	-0.036***
	(0.001)	(0.010)	(0.007)
Large private firms	-0.019***	-0.037***	-0.024***
	(0.001)	(0.006)	(0.008)
AUDIT	-0.017***	-0.027***	-0.027***
	(0.003)	(0.004)	(0.004)
M.SIZE*AUDIT	0.027***	0.014	0.036***
	(0.007)	(0.012)	(0.009)
L.SIZE*AUDIT	0.031***	0.047***	0.031***
	(0.008)	(0.010)	(0.010)
Lev	0.001***	0.001*	0.001**
	(0.000)	(0.000)	(0.000)
QR	0.001***	-0.002*	0.000
	(0.000)	(0.001)	(0.001)
Growth_REV	0.001	0.000	-0.007
	(0.001)	(0.007)	(0.008)
Growth_A	0.092***	0.079***	0.090***
	(0.002)	(0.011)	(0.012)
Log_A	-0.002***	-0.003*	-0.001
	(0.000)	(0.002)	(0.002)
Loss	0.020***	0.019**	0.007
	(0.001)	(0.008)	(0.008)
ROA	0.100***	0.088***	0.072***
	(0.004)	(0.019)	(0.021)
Constant	0.118***	0.110***	0.106***
	(0.005)	(0.021)	(0.022)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	180,302	5,756	5,158
R2	0.079	0.083	0.076

Notes: *DAC* is the absolute value of discretionary accruals measured by the performance-adjusted model. *SIZE* is an indicator variable of the size of the firm dummies; it equals 1 for small private firms, 2 for medium private firms and 3 for large private firms. Group No. 1 is the *SIZE* of the reference group. *AUDIT* is a dummy variable for the unaudited accounts; it equals 0 for audited accounts and 1 for unaudited accounts. *SIZE*AUDIT* is the interaction term for the size of the firm and unaudited accounts. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.

Table AIX.3: An alternative between-within panel data model with MJ_DAC

$$MJ\_DAC_{it} = \alpha_0 + \alpha_1 SIZE_i + \alpha_2 AUDIT_{it} + \alpha_3 SIZE_i * AUDIT_{it} + \alpha_4 Lev + \alpha_5 QR_{it} + \alpha_6 Growth\_REV_{it} + \alpha_7 Growth\_A_{it} + \alpha_8 Log\_A_{it} + \alpha_9 Loss_{it} + \alpha_{10} ROA_{it} + \upsilon_i + \varepsilon_{it}$$

Panel between-within effect model regressions			
	Sample across audit	Propensity Score Matched (PSM) samples	
		Caliper (0.01)	Caliper (0.00005)
Variables	Coef.	Coef.	Coef.
Medium private firms	-0.016***	-0.019***	-0.026***
	(0.001)	(0.006)	(0.006)
Large private firms	-0.012***	-0.038***	-0.026***
	(0.001)	(0.007)	(0.009)
AUDIT	-0.014	0.008	0.015
	(0.009)	(0.014)	(0.018)
SIZE*AUDIT	0.007	0.012	-0.002
	(0.005)	(0.010)	(0.012)
Lev	0.001***	0.000	0.001
	(0.000)	(0.001)	(0.001)
QR	-0.001***	-0.005*	-0.005
	(0.000)	(0.003)	(0.003)
Growth_REV	0.004***	0.000	0.000
	(0.001)	(0.000)	(0.000)
Growth_A	0.088***	0.001***	0.001***
	(0.002)	(0.000)	(0.000)
Log_A	-0.014***	-0.005	-0.010
	(0.001)	(0.010)	(0.013)
Loss	0.020***	0.000	0.000
	(0.002)	(0.000)	(0.000)
ROA	0.035***	0.060*	0.037
	(0.005)	(0.035)	(0.040)
Constant	0.131***	0.125***	0.103***
	(0.010)	(0.023)	(0.024)
Industry	Yes	Yes	Yes
Year	Yes	Yes	Yes
Between-coefficients	Yes	Yes	Yes
N of firm-years	180,302	5,756	5,158
Prob >chi2	0.0000	0.0000	0.0000

Notes: *MJ_DAC* is the absolute value of discretionary accruals measured by the modified Jones model. *SIZE* is an indicator variable of the size of the firm dummies; it equals 1 for small private firms, 2 for medium private firms and 3 for large private firms. Group No. 1 is the *SIZE* of the reference group. *AUDIT* is an indicator variable for the unaudited accounts; it equals 0 for audited accounts and 1 for unaudited accounts. *SIZE*AUDIT* is the interaction term for the size of the firm and unaudited accounts. *Lev* is the debt ratio measured as end-of-year total liabilities divided by the end-of-year book value of equity; *QR* is the quick ratio measured as end-of-year current assets divided by end-of-year current liabilities; *Growth_REV* is the percentage change in sales in the current year *t* from year *t-1*; *Growth_A* is the percentage change in total assets in the current year *t* from year *t-1*; *Log_A* is the natural logarithm of total assets; *Loss* is the cumulative percentage of sample years that the firm reported a loss; *ROA* is the return on assets measured as end-of-year net income divided by lagged total assets. The full form of the between-within panel data regression model is not presented for simplicity. Robust standard errors (clustered at the firm level) are reported in parentheses. ***, **, and * denote significance at the 1%, 5% and 10% levels, respectively.