An Investigation of Accrual-Based Earnings Management in the UK

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Abstract

This thesis aims to investigate the reliability of using accrual-based measures as a proxy for earning management in the UK. The earnings management literature has undergone immense development over the last decades, initially having focused on the establishment of abnormal accruals as a proxy for earnings management, thereafter more critical papers questioned the reliability of the previously developed measures resulting in modifications of pre-existing measures.

This thesis builds on the critique that earnings management is not as prevalent as commonly suggested and that there might be concerns about how earnings management is measured. Therefore, the main research question asks - how reliable are accrual-based measures in assessing earnings management in the UK? The following objectives have been set to answer this question: the first objective is to examine the association of abnormal accruals generated from different measures in the literature, and whether they differ from the actual accruals of a firm. The second objective is to examine the persistence of abnormal accruals generated from different measures, if earnings management are a one-time manipulation they should not be persistent. The third objective is to examine the power of accrual-based measures. The fourth objective is to examine the dependability of accrual-based measures in capturing earnings management in different scenarios.

In order to meet these objectives this thesis empirically tests the correlation, power and persistence of 37 accrual-based measures of earnings management identified in the literature. In addition, it replicates five published UK papers that use abnormal accruals as proxies for earnings management, altering the estimation of their earnings management proxies to abnormal accruals generated from the 37 different measures, as well as using placebo tests such as actual accruals, lead and lagged abnormal accruals.

The main findings of the thesis shows that abnormal accruals, which are used to proxy earnings management, generated from the 37 different measures are highly correlated to each other and to the actual accruals of the firm. These measures therefore have low power and could suffer from problems with regards to correlated omitted variables. The results of persistence show that abnormal accruals do not appear to reverse over time, which is a key assumption in earnings management. In terms of the replications, this research finds other explanations for the results which could have influenced the relationship with no direct attribution to earnings management. In other scenarios, results were not found using any of the 37 accrual-based measures of earnings management, or using the actual accruals of the firm, indicating that their relationship to accruals are not robust.

This thesis contributes to the earnings management literature in theory and practice. In particular it provides evidence that the accrual-based measures of earnings management literature are not as insightful as projected by researchers. Therefore, regardless of researchers' use of measures in estimating abnormal accruals, whether previously established, newly developed or actual accruals, the results do not differ. This may imply that the new measures still suffer from problems in correlated omitted variables, thus do not capture earnings management. Future research should contemplate the use of specific accruals such as allowance for bad debt, deferred revenue or tax expense instead of aggregated accruals.

Declaration

I hereby confirm that the work presented in this thesis is my own and original work. I declare that the material of this thesis has not been submitted either in whole or in part for the award of any other degree or diploma at this or any other university.

Fatema Aljalahma 15/3/2022

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Chapter 1

Introduction to the Research

This chapter serves as the introduction to this thesis: “An Investigation of Accrual-Based Earnings Management in the UK”. The aim of this thesis is to examine and investigate the reliability of accrual-based measures in capturing earnings management in the UK in different scenarios. Reliability is defined as the degree to which the measures can be depended upon in research settings, as well as the general consistency of the findings in earnings management studies across different accruals based measures. In this thesis, accrual-based measures refers to the use of abnormal accruals as a proxy for earnings management. In this thesis, estimates of abnormal accruals use three approaches identified in the literature. First, all accruals are abnormal (Healy, 1985). Second, any change from last year’s accruals is abnormal (DeAngelo, 1986; Friedlan, 1994). Third, and the most common approach, is the use of a statistical model to estimate normal accruals and any difference between estimated normal accruals and actual accruals is abnormal (e.g. Dechow et al., 1995; Jones, 1991;Kothari et al., 2005). All three approaches are used in this thesis and compared. Furthermore, the content of the thesis provides a detailed description of the underlining modelling used in the estimation of different measures of abnormal accruals as proxies for earnings management. It also demonstrates under which scenarios findings in earnings management studies are robust to the use of different abnormal accruals measures, and whether these findings are necessarily related to earnings management or to other, non-earnings management activities.

1.1 Research background and motives

Earnings management is defined as the process by which managers purposefully manipulate accounting transactions to alter financial reports to achieve private gain (Schipper, 1989). This is done by using the flexibility that accounting standards provide to structure the transactions in ways that influence the final figures of the financial report. Accordingly, the underlying economic performance of the firm is not appropriately represented, as the aim is to mislead various stakeholders that rely on the financial report, so as to influence their decisions (Healy and Wahlen, 1999). Earnings management as a concept is not periodical, as it does not necessarily occur within a firm every year; it is specific to an event or a setting in which earnings management is expected to occur (Healy, 1985; Jones, 1991). In terms of research into earnings management, there are two main types: accruasl-based earnings management and real economic choices to manage earnings (Roychowdhury, 2006). Accruals are non-cash transactions. They are the pure result of accounting standards and offer more room for judgement, unlike cash transactions, which are more of a result of the managers' business choices than accounting standards. This thesis focuses on accruals as the basis for proxies for earnings management. The main dilemma of accrual-based earnings management research is how to estimate of normal accruals (Ball, 2013). Researchers in the field use various assumptions about the accruals generating process to model normal accruals. Earlier research tends to assume that the previous year's accruals are normal – any amount above or below that is abnormal or discretionary and, hence, is earnings management (DeAngelo, 1986; Friedlan, 1994). This assumption is later questioned, as using last year's figure as normal does not incorporate the changes the firm has been through in the current year, in terms of metrics such as performance or growth. Thus, attention shifts to incorporate these factors into the estimation of normal accruals (Dechow et al, 1995; Jones, 1991; Kothari et al., 2005). Between the years 1991 and 2006, research in this area then focuses on differing ways of estimating the normal accruals and, up until the comments made by Ball (2013), these measures are considered established and reliable, and they are used in many contexts and regions.

Comments brought forward by Ball (2013) challenge the earnings management literature, in particular the suggestion that earnings management is rife, describing such research as “scandalous”. It is well known that earnings management does actually exist, however, the ability of researchers to accurately capture it is not evident (Ball, 2013). The lack of reports by authors to authorities of the discovery of earnings management in a firm, may be an indicator that even researchers themselves are not convinced by the findings they are publishing (Ball, 2013). Otherwise, it is unethical to withhold such information of manipulation from the public. Ball (2013) raises several concerns about earnings management research with regards to its accuracy in capturing earnings management. First, the paper is sceptical that manipulation in the form of discretionary accruals represents the majority of the variation in accruals. Second, the paper is sceptical that manipulation in the form of earnings management is as widespread and commonly found as implied within earnings management studies. Third, the paper is sceptical that manipulation occurs in such enormous amounts, even if disguised in literature by the expression "as a proportion of total assets" (Ball, 2013, p.850). Fourth, the paper is sceptical that the accruals being questioned, generally referred to as working capital accruals and frequently audited, can be used for such extensive manipulation. Fifth, the paper is sceptical that academic researchers are able to identify what remains hidden and undetected by parties with a greater interest in catching manipulation. Zimmerman (2013) expresses similar concerns on the reliance on accruals as the basis for measures of earnings quality.

The comments by Ball (2013) are of great importance to the earnings management literature as they led to a new stream of research more sceptical of the previously established measures of earnings management and the general approach to studying earnings management (Brennan, 2021; Chen et al., 2018; Christodoulou et al., 2018; Collins et al., 2017; Jackson 2018; McNichols and Stubben, 2018). For example, some question the research design used in earnings management studies, in particular the use of two stage regression processes, which scholars argue can bias findings (Chen et al., 2018; Christodoulou et al., 2018). Other scholars assess the misspecifications of the previously established measures of abnormal accruals, such as not appropriately controlling for the underlying economic circumstances that affect firms' performance (Owens et al., 2017), or that accruals have a strong non-linear relationship to firm characteristics that are not previously used in the literature as a measure of growth (Collins et al., 2017). Likewise, it is demonstrated that, even in proven cases of manipulation such as Enron, accrual-based earnings management measures fail to capture this fraud (Jackson, 2018).

Some of the arguments about potentially incorrect inferences when using accruals-based measures as proxies for earnings management are presented with suggested amendments. For example, to reduce the bias in findings due to two stage regressions an alteration in research design is suggested by using a single regression instead, with an accruals measure as the dependent variable, including all the variables from the first and second regression (Chen et al., 2018; Christodoulou et al., 2018). Alternatively, the variables in the first stage should be included in the second stage regression, which uses abnormal accruals as the dependent variable.

Likewise, new approaches to estimating normal accruals have been suggested that attempt to deal with the problems in previously established measures, by adequately controlling for identified problems (Collins et al., 2017; Owens et al., 2017), for example, including quantile dummies of growth measures (Collins et al., 2017), or including a variable that captures the idiosyncratic economic shocks affecting firms (Owens et al., 2017) in the estimation of normal accruals. Such improvements should therefore provide enhanced accruals based measures of earnings management.

It is from these lines of argument that this thesis is motivated, as current earnings management research is particularly concerned with increasing the validity of earnings management studies by redeveloping measurements and further advancing the research design of such studies. Thus, this thesis seeks to understand the reliability of accruals-based earnings management measures.

1.2 Research context: What we know about accrual-based measures

The main assumption of accruals-based earnings management studies is that the normal accruals of a firm are determined using a linear function of some firm characteristics, the linear function being estimated using the firm together with the firm's peers in the industry. The firm characteristics that are included vary according to the measures used. This thesis discusses previous research on accruals-based earnings management through three main phases. The first is the establishment of abnormal accruals as a proxy for earnings management. The second is the belief that accruals-based measures used in research are capable of capturing earnings management adequately. The third is the development of earnings management research to develop previously established proxies in response to problems with them identified by research, and provide solutions to these problems.

1.2.1 The establishment of abnormal accruals as a proxy for earnings management

Between the years 1985 to 2006, researchers focused on the development of accruals-based measures of earnings management. These measures became the standard for measuring earnings management in many contexts and globally. Within this phase of earnings management research, four different streams are identified. The first is related to specific scenarios in which earnings management is expected to occur in a small sample of firms. The second is via simulation studies where earnings management is artificially induced. The third is related to studies that examine earnings management in different scenarios by using large group samples. The fourth stream is not related to earnings management; however, the papers in this stream provide an estimator of normal accruals. Some researchers use these to estimate abnormal accruals in earnings management studies, such as Dechow and Dichev (2002), which derives an accruals quality measure, yet it is often compared to the earnings management measure of Jones (1991).

1.2.1.1 Specific scenario studies

Healy (1985) first theorise that if managers were to manage earnings for personal gain, such as via bonus contracts that are linked to earnings, it is likely going to be in the accruals component of earnings rather than in the cash component. Healy (1985) looks at a small sample of firms to understand the relationship between the amounts of total accruals firms have, as an indicator of manipulation relative to the bonus scheme of the firm. Other authors also consider specific scenarios using small samples of firms to test for earnings management, such as stock buyouts (DeAngelo, 1986), import relief investigations (Jones, 1991), to increase the public issue price during an initial public offering (Friedlan, 1994), or during the last year of office of a chief executive officer (CEO) (Dechow and Sloan, 1991). This stream of early research focuses on small samples where earnings management is likely to occur, making it more focused. In such research, mostly the total accruals of the firm are compared to those of other firms (Healy, 1985), the difference between this year's and last year's accruals (DeAngelo, 1986; Friedlan, 1994), industry median of accruals as a benchmark for normal accruals (Dechow and Sloan, 1991) or using sales and gross property, plant and equipment to estimate the normal accruals, which is compared to actual accruals to find estimated abnormal accruals (Jones, 1991).

1.2.1.2 Simulation studies

After the initial focus on small samples, researchers (Dechow et al., 1995; Dechow et al., 2003; Jeter and Shivakumar, 1999; Kothari et al., 2005; Peasnell et al., 2000a) advance earnings management research further by the employment of the measures identified above (DeAngelo, 1986; Dechow and Sloan, 1991; Friedlan, 1994; Healy, 1981; Jones, 1991) in simulation studies, where they compare the power and specification of these measures for their ability to identify earnings management. Each of these papers develops a measure of accrual-based earnings management which is argued to be stronger in terms of the power and specification and its ability to detect earnings management. In simulation studies, accruals figures are altered artificially and then authors use the measures of earnings management to examine if they can capture this alteration. This includes tests for type I and type II of errors when the null hypothesis is that there is no earnings management (Dechow et al., 1995; Kothari et al., 2005). For example, Dechow et al. (1995) argue that normal accruals should be estimated using cash sales relative to total sales as used in Jones (1991) in addition to gross property, plant and equipment as explanatory variables. In their findings, they highlight the importance of controlling for financial performance when investigating earnings management. Likewise, Peasnell et al. (2000a) conclude from their findings that three of their measures have the ability to capture economically plausible levels of earnings management, as they are relatively powerful in tests on UK data and, thus, can be applied in a random sample of firm-years.

1.2.1.3 Larger sample studies

Due to the continuous refinement and establishment of accruals-based measures of earnings management research (e.g., Dechow et al., 1995; Jones, 1991 and Kothari et al., 2005), studies start to apply these measures in broader contexts with larger sample sizes. The frequency of publications in the earnings management literature materially increases in 10 of the leading journals in accounting for the period from 2006-2011 relative to 2000-2005 (Walker, 2013). These publications focus on the use of accruals-based measures instead of further developing or comparing these measures, making them established proxies in earnings management literature during that time.

Taking the UK as an example, accruals-based measures (e.g. Dechow et al., 1995; Jones, 1991; Kothari et al., 2005) are used to test various scenarios, from which conclusions are drawn. Such scenarios include the association between earnings management and the composition of a board in the period pre and post the Cadbury report (Peasnell et al., 2000b), managing earnings to meet the expectations of analysts (Athanasakou et al., 2009; Athanasakou et al., 2011), the relationship between dividend-paying firms and earnings management (Atieh and Hussain, 2012), the effect of types of institutional investor (Wang, 2014), the influence of female directors on the board on the level of earnings management (Arun et al., 2015; Harakeh et al., 2019), the regulatory environment and earnings management in IPO firms (Alhadab et al., 2016), the relationship between having forecasted earnings in the prospectuses of IPO firms and earnings management (Buchner et al., 2017), and the relationship between audit quality and earnings management in IPO firms (Alhadab and Clacher, 2018), and many more studies that use accruals-based measures to assess earnings management in large group studies. This thesis investigates the robustness of the findings of some of these studies and the conclusions drawn in relation to earnings management.

1.2.1.4 Studies that estimate accruals not related to earnings management

Besides the earnings management literature, another stream of literature studies the behaviour of accruals in firms which, for the purposes of this study, is important to understand, as it is centres on accruals-based earning management and is used by researchers to estimate earnings management (Dechow and Dichev 2002, Ball and Shivakumar 2006). For example, Dechow and Dichev (2002) developed a measure for the quality of accruals through the observation that cash flows current, past and future affect accruals. Ball and Shivakumar (2006) investigate whether accruals have a role in the asymmetrical timely recognitions of gains or losses. These studies use different models in the estimation of normal accruals, which are then used by other researchers to estimate abnormal accruals as a proxy for earnings management. Moreover, these measures are referred to, and further developed, in the earnings management literature (Francis et al., 2005; McNichols, 2002; Owens et al., 2017)

1.2.2 The belief that accruals-based measures are not reliable measures of earnings management

More recent research questions the reliability of the assumptions used to estimate accrual-based earnings management (Ball, 2013; Chen et al., 2018; Christodoulou et al., 2018; Jackson 2018;

McNichols and Stubben, 2018). It is after the comments made by Ball (2013) that authors start to approach accruals earnings management research with more scepticism. Ball (2013) raises several concerns about earnings management research with regards to its ability to capture earnings management. First, the paper is sceptical that manipulation in the form of discretionary accruals represents the majority of the variation in accruals. Second, the paper is sceptical that manipulation in the form of earnings management is as widespread and commonly found as implied within the studies. Third, the paper is sceptical that manipulation occurs in such enormous amounts, even if disguised in literature by the expression "as a proportion of total assets" (Ball, 2013, p.850). Fourth, the paper is sceptical that the accruals being questioned, generally referred to as working capital accruals and frequently audited, can be used for such extensive manipulation. Fifth, the paper is sceptical that academic researchers are able to identify what remains hidden and undetected by parties with greater interest in catching manipulation. Zimmerman (2013) expresses similar concerns on the reliance on accruals-based measures of earnings quality.

Research in accruals-based earnings management, particularly after 2006, tends to focus on large firm samples and testing the normal behaviour of accruals in these firms; it does not examine individual firm practices or small groups. This stands in strong contrast to the early research by Healy (1985) and Jones (1991), where the focus is on smaller samples of less than 100 observations and on a specific scenario in which earnings management is likely to occur. It is when aggregated accruals are used, and firms are grouped according to their industry and compared to their industry norm, using statistical indicators of earnings management, that the apparent observation that earnings management is rife is created (Ball, 2013). Given it is not surprising that some firms manage earnings (Walker, 2013), the null hypothesis that there is zero earnings management in firms is not hard to reject.

Some suggest that there is a need for accounting research to be more aligned to practice (Rajgopal, 2021), as it has been shown that, in cases of known earnings management, such as Enron, the conventional accruals-based measures of earnings management are incapable of detecting manipulation (Jackson, 2018). Thus, it is not clear that a researcher can assume that the current research approach in earnings management studies is reliable in establishing earnings management inferences associated with a hypothesised factor or, as stated by McNichols and Stubben: "*Correlation between discretionary accruals and a hypothesized factor is generally not an adequate basis for valid inferences about earnings management*" (McNichols and Stubben, 2018, p. 227). These accruals-based measures have been said to be "*inappropriate measures for earnings management*" (Jackson, 2018, p. 136), and Ball has gone to the extent of choosing to "*fulminate against the earnings management literature*" (Ball, 2013, p. 848), viewing this body of work as "*scandalous in more ways than one*" (Ball, 2013, p. 848).

1.2.3 Measures redevelopment

These issues lead researchers to re-examine underlying assumptions of accruals-based earnings management measures, and alter how normal accruals are modelled, research design and suggest changes, which in theory should improve how earnings management is measured and reliably identified (e.g. Chen et al., 2018; Collins et al., 2017; Owens et al., 2017).

One of the issues raised is that firms in the same industry do not operate in the same way (Owens et al., 2017). In earnings management research, firms are grouped per industry to obtain the benchmark of normal accruals in relation to different explanatory variables such as sales and gross property plant and equipment; however, one of the ways firms compete is through the cash-generating cycle (Owens et al., 2017). As a consequence, a firm that has high accruals compared to other firms in the same industry, due to its business strategy or firm-specific characteristics, is expected to have higher normal accruals, but instead it may be interpreted as earnings management by researchers. One possible way to accommodate this, according to Owens et al. (2017), is to include idiosyncratic economic shocks to improve the estimation of abnormal accruals as a proxy for earnings management.

A second issue is raised by Collins et al. (2017) with regards to the growth changes of firms and those impacting investment in inventory. The paper provides evidence, via a simulation study, that various estimators of abnormal acruals that are used in literature are correlated with firm growth measures, which will lead to specification bias, and type I errors, when firm growth is not controlled for properly. Such growth firm characteristics include the market-to-book ratio, the earnings-to-price ratio, market value, return on assets and sales growth. The paper suggests that these growth characteristics can be controlled for by estimating normal accruals using quantile dummies for the growth proxies.

A third issue that is raised relates to the research design of accruals-based earnings management studies, particularly the two-stage regression process and how it can bias the coefficients at the second stage (Chen et al., 2018; Christodoulou et al., 2018). When using the error term from the first stage (estimating normal accruals) as a dependent variable in the second stage (examining the determinants of abnormal accruals) , it can bias the resulting coefficients if there is correlation between the independent variables used in the first stage regression and the independent variables used in the second stage regression (Chen et al., 2018). Suggested alterations to the research design include the use of a single stage regression with accruals as the dependent variable, instead of using two stages (Chen et al., 2018; Christodoulou et al., 2018), as the power of such an approach is higher when done in a single stage rather than two (Christodoulou et al., 2018). Alternatively, the independent variables in the first stage have to be added in to the second stage as additional control variables.

1.3 Research gap

From the concerns explained earlier, current earnings management research is particularly concerned with increasing the validity of earnings management studies by redeveloping measures of abnormal accruals and further advancing the research design of earnings management studies. This thesis identifies various gaps in research, first in terms of the the extent to which different measures of abnormal accruals are correlated with each other and with actual accruals. If these measures suffer from problems with correlated omitted variables, as suggested by Ball (2013), then a high correlation to actual accruals is expected, moreover the degree of correlation should be reduced in using the measures recently developed. The second gap identified relates to understanding whether abnormal accruals are persistent (the extent to which measures of abnormal accruals persist over time). One of the key assumptions of earnings management studies is that earnings management is a onetime manipulation and thus should reverse over time. Consequently, if abnormal accruals estimate earnings management, then abnormal accruals should not be persistent and should reverse over time. Therefore, if abnormal accruals measures are persistent, they are unlikely to be reliable measures of earnings management. The third is exploring the impact of using different measures and abnormal and research designs on accrual-based on the findings of previous earnings management studies, in particular whether using the more recently developed measures of abnormal accruals and/or research designs will have an influence on the findings of these studies. In order to address these gaps, this thesis examines the more recently developed, as well as the commonly used, measures of earnings management in order to assess the reliability of the more recently developed accruals-based measures.

1.4 Intended contribution

Prior earnings management research suggests improvements to the research design and measures of accruals-based earnings management, as some have expressed doubt concerning the ability of accruals-based measures to reliably capture earnings management (e.g. Ball, 2013; Chen et al., 2018; Christodoulou et al., 2018; Collins et al., 2017; Jackson, 2018; McNichols and Stubben, 2018; Owens et al., 2017).

This thesis provides knowledge on the reliability of using accruals-based measures as proxies for earnings management, in particular with regards to understanding the persistence of abnormal accruals and whether they reverse over time, which is a key assumption in the accruals-based earnings management literature. It provides a greater understanding of the correlation of abnormal accruals to the actual accruals of a firm and whether this correlation is reduced in more recently developed measures of abnormal accruals. This thesis provides scholars with an empirical literature review that examines available measures in that literature that use aggregated accruals-based earnings management measures and compares abnormal accruals estimated from these measures, as well as examining the power (by which is meant, the extent to which measures of the abnormal accruals component of total accruals or working capital accruals are different from total accruals or working capital accruals; and the extent to which models of the accruals generating process for total accruals or working capital accruals explain total accruals or working capital accruals by industry) of accruals-based measures in general and per industry.

It provides a guide for future research on the impact of using different measures and research designs on the findings of earnings management studies by assessing if the latest suggested improvements made by Collins et al., (2017), Chen et al., (2018) and Owens et al. (2017) make a difference to the findings of earnings management studies. It explores other possible reasons for empirical findings found in UK-based studies, for example, results that could be explained in ways other than earnings management. Five replication studies are conducted to explore the impact of using different measures of earnings management on the overall conclusions of a study: 1. The relationship between firms that pay dividends and earnings management in the UK (Atieh and Hussain, 2012): 2. The relationship between firms that report forecasts in their prospectuses and post IPO earnings management in the UK (Buchner et al., 2017); 3. The relationship between the regulatory environment and earnings management in IPO firms in the UK (Alhadab et al., 2016); 4. The relationship between audit quality and earnings management in IPO firms in the UK (Alhadab and Clacher, 2018); and 5. The relationship between board gender diversity and earnings management in the UK (Arun et al., 2015). This thesis extends Ball (2013), Jackson (2018) and McNichols and Stubben (2018) by critically examining the findings of several UK based studies and contributes to literature by providing interpretations of the results that do not resort to earnings management stories. This thesis attempts to understand the reason for the inconsistencies in some of the findings and whether the measures used in estimating earnings management are related to these inconsistencies.

This thesis also provides an empirical contribution via a thorough examination of the measures available in the literature for estimating accruals-based earnings management. It provides scholars with an empirical literature review that examines available measures in the literature that use aggregated accruals-based earnings management measures. It provides a guide to the specifications and empirically examines these measures' validity. This thesis also makes contributions to the literature by assessing if the latest suggested methodological improvements by Chen et al., (2018) Collins et al., (2017), and Owens et al. (2017) improve the reliability of accruals-based measures as proxies for earnings management.

1.5 Research questions

Based on the previous discussion, the identified gaps, and the main aim of this thesis, which is to investigate the reliability of accrual-based measures used in the literature in capturing earnings management in the UK, the main research question of this thesis is:

"How reliable are accruals-based measures in assessing earnings management in the UK?"

The reliability will be examined through the following sub-questions:

- What is the association between accruals-based earnings management estimates generated from different measures found in the literature? To what extent are these estimates associated with the actual accruals of the firm?
- What is the relationship between current earnings management estimates and the subsequent years' estimates?

- How capable are the models of the accruals generating process in estimating the accruals of a firm? Does industry classification affect the ability of these models to explain accruals?
- What is the effect of using different measures of abnormal accruals in UK-based studies of earnings management? How do the conclusions of a study change if a different measure is used?

1.6 Research objectives

To achieve the aim of this research, the following objectives of the thesis are specified:

- To examine the association between abnormal accruals measures generated from different approaches in the literature and the extent to which they differ from the actual accruals of a firm.
- To examine the persistence of abnormal accruals measures generated from different approaches - if abnormal accruals capture manipulation reliably, they should reverse in the years after manipulation.
- To examine the power of accrual-based measures, testing the ability of models of the accruals generating process in modelling the accruals of the firm, from which abnormal accruals are then estimated.
- To examine the dependability of accruals-based measures of abnormal accruals in capturing earnings management in different scenarios.

1.7 Structure of the thesis

This chapter is the introduction of the thesis. It provides the topic background, study motives, research gap, research objectives, research questions, as well as the contribution.

Chapter two is the main basis of this thesis. It starts with a discussion of the earnings management literature, the main hypothesis of the full thesis, it presents the first empirical findings in terms of comparing the power of 37 abnormal accruals measures, as well as the persistence of abnormal accruals generated from these 37 measures. After comparing the measures, understanding how they are similar and how they differ, and the measures are tested in different scenarios to understand to what extent they are reliable estimates of earnings management. Thus, chapters' three to six each examine a scenario in the UK. These scenarios examine the relationship between earnings management and: dividend-paying firms (chapter three), forecasts in IPO firms (chapter four), audit quality and theregulatory environment (chapter five) and female board members (chapter six). In each chapter, the literature related to the scenario is presented, as well as discussions of the methodology, theory and objectives. Each chapter also presents the findings of the examined scenario using alternative research designs, different measure of abnormal accruals and placebo tests. The last chapter in this thesis is the conclusion, where the findings are summarised, related back to the research objectives and aims, and further potential research and limitations are discussed.

Chapter 2

Evaluation of Accrual-based Earnings Management Measures

2.1 Introduction to Chapter 2

This chapter reviews literature that deals with accruals-based earnings management. This includes discussions of the definition, theoretical background and research designs in earnings management studies, as well as measures of abnormal accruals. The chapter identifies the problems in earnings management studies and identifies the research gaps and hypotheses questioning the reliability of measures of abnormal accruals as proxies for earnings management. Findings of initial tests of reliability are presented.

2.1.1 Literature summary

Accruals are non-cash accounting transactions such as depreciation, accounts receivables and accounts payables. Past research has assumed that there is an amount of normal accruals that is related to normal business activities and an amount of abnormal accruals that is related to management's manipulation of accounts. Differentiating between normal and abnormal accruals is a major concern for researchers. Since the 1980s, there has been a rapid growth in research on earnings management, particularly involving the usage of abnormal accruals as a proxy for earnings management. The first measure of earnings management is introduced by Healy (1985). This paper argues that managers manage earnings through accruals; therefore, all accruals are potentially discretionary. Between the years 1985 and 2006, scholars develop different methods to measure normal accruals, from which abnormal accruals are estimated as a proxy for earnings management. This development has led to many methods of measuring abnormal accruals; some of them are used extensively (e.g. Dechow et al,. 1995; Dechow and Dichev, 2002; Jones, 1991; Kothari et al., 2005) and, as a consequence, these methods have become established and subsequently used in numerous other earnings management studies, while others do not get as much consideration in the literature (e.g., Jeter and Shivakumar 1999; Peasnell et al. 2000a; Larcker and Richardson 2004). Having such established proxies in measuring abnormal accruals in the literature has led to widespread earnings management studies in various contexts and regions (see Dechow et al., 2010; Walker, 2013).

2.1.1.1 Concerns in earnings management studies

Concerns and doubts are expressed by Ball (2013) on the ability of these measures of abnormal accruals to capture manipulation. Ball (2013) argues that earnings management cannot be as rife as implied by the methods used to capture earnings management, be missed by auditors and regulators, but detected by researchers. Due to the lack of knowledge of what normal accruals should be in a firm with no earnings management, there are also concerns about the possibility of problems regarding correlated omitted variables (Ball, 2013).

2.1.1.2 New developments

These concerns motivate researchers to re-examine certain assumptions underlying measures of normal and abnormal accruals (Collins et al., 2017; Owens et al., 2017). Normal accruals are often estimated by comparing a firm’s total accruals to their peers in the same industry, after controlling for certain aspects of firms’ performance and structure. This approach assumes that all firms in an industry, for example, have identical accruals generating processes. Researchers highlight that the primary deficiency of this assumption is that business strategies and environments are unique and, hence, firms in the same industry do not necessarily operate similarly; they also provide some amendments and solutions to this assumption (Owens et al., 2017). Firms in the same industry do not operate in the same way, and one of the ways they compete is through the cash-generating cycle (Owens et al., 2017). Therefore, a firm with high accruals compared to other firms in the same industry, due to its business strategy or firm-specific characteristics, might also appear to have high abnormal accruals.

Following the concerns expressed by Ball (2013) concerning the ability of these measures to estimate normal accruals from which measures of abnormal accruals are estimated as proxies for earnings management, this study investigates the reliability of measures of abnormal accruals as proxies for earnings management in the UK, and whether the recently developed solutions provided by researchers (e.g. Collins et al., 2017; Owens et al., 2017) affect the estimation of abnormal accruals.

2.1.1.3 Earnings management in the UK as a setting

All of the existing methods of estimating normal accruals are developed in the US, with the exception of Peasnell et al. (2000a); however, they are continuously used as measures of accruals-based earnings management in UK-based studies (e.g. Al-Attar et al., 2008; Athanasakou et al., 2009; Athanasakou et al., 2011; Atieh and Hussain, 2012; García Lara et al., 2009; Gore et al., 2007; Iatridis and Kadorinis, 2009; Osma and Young, 2009; Peasnell et al., 2000b; Peasnell et al., 2005; Young, 1998; Young and Yang, 2011).

There are differences in institutional and capital market characteristics across countries which can influence financial reporting practices (Leuz et al., 2003; Pope and Rees, 1992; Pope and Walker, 1999). The UK, for example, is characterised as having lower political involvement in accounting compared to the US, and lower issuance of public debt and litigation costs (Ball et al., 2000). In addition, UK GAAP provides greater discretion in reporting extraordinary items compared to US GAAP due to the difference in the timeliness of income recognition (Pope and Walker, 1999). Earnings before extraordinary items in UK firms are less sensitive to bad news compared to US firms (Pope and Walker, 1999). Therefore, the findings of studies conducted in the US cannot be automatically generalised and implemented in other countries such as the UK.

Young (1999) compares five methods used in estimating normal accruals that were of importance at the time and observes whether they give similar or different results in the UK setting. Peasnell et al. (2000a) compares two measures of normal accruals and develops their own measure in the UK. However, the methods used by Young (1999) and Peasnell et al. (2000a) have undergone various developments since they were examined more than 20 years ago, and it is worth examining the situation again, especially after Ball's (2013) comments and the potential solutions suggested by Collins et al. (2017) and Owens et al. (2017).

2.1.2 Research method

From the above discussions, it can be concluded that it is of great importance to understand whether abnormal accruals figures are reliable in estimating earnings management in the UK. This chapter will test for reliability in three ways:

2.1.2.1 Correlation between abnormal accruals and actual accruals

The methods used to estimate normal accruals have been argued to have low power (Ball, 2013). When a method has low power, it means it explains very little of the variance in the dependent variable. Abnormal accruals are the residual of a regression of total accruals on various explanatory variables, and abnormal accruals are the difference between actual total accruals and estimated total accruals which is equal to the error term (residual) of the regression. In the case of earnings management, low-power measures will result in abnormal accruals being little different from the dependent variable itself (the actual accruals of the firm). Therefore, this chapter examines the correlation between the actual accruals of the firm and abnormal accruals. Having highly correlated results indicates that the methods used to estimate normal accruals are very low in power and, as a result, the actual accruals of the firm essentially are all being considered as abnormal accruals and, hence, all accruals are evidence of earnings management.

This chapter also reports on the correlations between measures of abnormal accruals generated from different approaches. If these correlations are high, it suggests that the different measures differ from each other very little and, hence, that it is possible that it might matter little which ones are used in earnings management studies, especially if measures of abnormal accruals are highly correlated with total accruals.

2.1.2.2 Power of accruals-based measures

This chapter also investigates the power of these measures in modelling accruals through the adjusted R-squared of the models of the accruals generating process, as a complement to looking at the correlation between actual accruals and abnormal accruals. Similarly, it examines whether the measure of power across industries differs by comparing the adjusted R-squared of these models of accruals across industries.

2.1.2.3 Persistence of abnormal accruals

Abnormal accruals are argued to reflect manipulations of the earnings figure. However, this manipulation is assumed to be a one time event and should be reversed in the following year or years afterwards (Jones, 1991). Therefore, by assumption, abnormal accruals are not persistent.

However, if abnormal accruals have positive persistence, this is likely due to correlated omitted variables in modelling accruals. If earnings manipulation has taken place, abnormal accruals should have negative persistence and reverse in subsequent periods. This chapter examines whether abnormal accruals are persistent for a period of up to five years, which will help in understanding if abnormal accruals capture manipulation.

2.1.3 Sample

This chapter examines 37 different measures of abnormal accruals, and uses a sample of all UK-listed firms in both the Main Market and AIM (Alternative Investment Market), active and non-active, with the exception of financial and utility firms as they are subject to different reporting regulations and requirements. The study covers the period from 1998 to 2015. For comparative reasons, this chapter uses one sample in the estimation of all abnormal accruals measures. This reduces the possibility of a sampling effect on the results. All industries that have fewer than 30 observations are excluded, because the most complex method of estimating normal accruals includes 22 independent variables. A final sample of 12,850 firm-year observations is used.

2.1.4 Results

The measures of abnormal accruals are split into two groups: measures that use total accruals as the dependent variable, "total accruals measures", and measures that use working capital accruals as the dependent variable, "working capital accruals measures".

2.1.4.1 Correlation results

Results show that there are significant and high correlations between abnormal accruals measures and the dependent variable from which they are derived (total accruals or working capital accruals). The correlations are also significant and high between different abnormal accruals measures generated from different models of the accruals generating process that are derived from the same dependent variable. The high correlations are an indicator that abnormal accruals measures do not differ much when using different methods to estimate normal accruals, and this might be due to the low power of the measures. Moreover, measures potentially still have problems with correlated omitted variables as abnormal accruals are highly correlated with total accruals.

2.1.4.2 Power of normal accrual models

Complementarily to the results reported in the previous sub-section, the findings of the power of the various methods of modelling accruals across industries show that the highest mean adjusted R-squared is 28.66% for personal and household goods, and the lowest industry mean adjusted R-squared is 9.57%, which is for healthcare firms. For measures developed in recent years (e.g., Owens et al., 2017), the mean adjusted R-squared is 21.3%, the maximum is 54.4% and the minimum is 3.4% across all industries, while the results for Collins et al.'s (2017) provide a mean of 13.3%, a maximum of 29.2% and a minimum of 1.7% across all industries. Thus, the conclusion is the underlying models of the accruals generating process do not always explain much about the dependent variable even with the latest improvements, suggesting that there is still potentially the problem of correlated omitted variables that these methods do not eliminate.

2.1.4.3 Persistence results

Finally, abnormal accruals are split into five time periods (t, t-1, t-2, t-3, t-4 and t-5). Four different statistics are produced: Spearman correlation, Pearson correlation, Chi-square tests and regressions throughout five years. All tests show that abnormal accruals generated from "total accrual measures" have positive persistence throughout five years, with the exception of the measures that calculate abnormal accruals as the difference between this year and last year's total accruals (DeAngelo, 1986; Friedlan, 1994). The persistence of abnormal accruals measures derived from total accruals, follows the same pattern, in terms of sign and magnitude, as the persistence of the actual total accruals over the period of five years.

All abnormal accruals measures generated from working capital accruals have a one-year reversal pattern. However, the coefficient of the regressions is not very high (highest regression beta = -0.186), meaning the reversal is not 100% of last year as one might anticipate if abnormal accruals capture manipulation. The results of abnormal accruals persistence, when using working capital accrual measures, is the same in terms of sign and magnitude of the persistence of actual working capital accruals, which is a slightly negative in the first year and no relationship in the years after.

The difference between total accruals and working capital accruals persistence could be explained as follows: total accruals have long-term components, such as depreciation and amortisation, which are more persistent than working capital accruals, which has short-term components only, such as accounts receivable and accounts payable.

2.1.5 Summary

To summarise, the results show that abnormal accruals estimates are highly correlated when measures have the same dependent variable (total accruals / working capital accruals), and in addition they are highly correlated with the dependent variable of the measure used to capture normal accruals (total accruals / working capital accruals). The explanatory power of the regressions used to estimate normal accruals is low and differs per industry and, finally, abnormal accruals generated from total accruals measures are positively persistent for up to five years, while abnormal accruals generated from working capital accrual measures show a slightly negative persistence in the year after. This suggests that measures of abnormal accruals are not reliable as proxies for earnings management.

2.2 Literature review – earnings management

2.2.1 Earnings management

Earnings management is defined by Walker (2013) as: "The use of managerial discretion over (within GAAP) accounting choices, earnings reporting choices, and real economic decisions to influence how underlying economic events are reflected in one or more measures of earnings" (p.46). Some authors view earnings management as a positive action that managers undertake, as managers use the advantages of flexibility of the accounting choices to convey the internal information that they have in regard to the future cash flows of the firm (Beneish, 2001). Others view earnings management as an negative action that managers take with the intention of misrepresenting the underlying economic performance of the firm, which reduces the transparency of the financial reports and is considered as purposefully interfering with the financial statements with the aim of obtaining private gains (Schipper, 1989). Earnings management occurs when managers take advantage of the flexibility in accounting choices to manipulate the earnings figure with the aim of misleading various stakeholders about the underlying economic performance of the firm (Healy and Wahlen, 1999). Hence, earnings management is a choice that managers make regarding accounting policies or real actions to achieve specific objectives; the objectives can either be negative or positive (Scott, 2015).

Much of the literature on earnings management focuses on large firm samples; it does not look at individual firm practices. The research is conducted by grouping firms according to their industry, then comparing their accruals to industry norms, to produce indicators of earnings management. Typically, the null hypothesis is no earnings management, which is not hard to reject, as it is not a surprise that firms manage earnings (Walker, 2013). Hence, research in this area does not provide answers as to whether firms manage earnings to some extent or have no earnings management. There is a lack of understanding of what a firm that does not manage earnings should look like (Ball, 2013).

2.2.2 Managers' motives to manage earnings in theory

In theory, managers have various objectives when managing earnings, depending on the motives, such as earnings maximisation, earnings minimisation, income smoothing or taking a bath (severely reducing earnings) (Scott, 2015). Each objective is pursued for a different reason. Managers may seek to maximise earnings for either bonus purposes or when the firm is close to violating a debt covenant. Earnings minimisation, which is less extreme than taking a bath, may be used, for example, by managers when firms seek legislation to give protection from foreign competitors. Income smoothing may be used by managers that are risk averse and would prefer constant compensation and, therefore, seek to smooth earnings over time. Taking a bath occurs when firms are under organisational stress or during restructuring; since they are reporting a loss anyway, managers may consider further reducing the loss by writing off some assets. These reasons are conflicting as managers may seek to manage earnings in different ways depending on the situation the firm is in (Scott, 2015).

Earnings management and motives are hypothesised in prior research following positive accounting theory in combination with agency theory. In accordance with positive accounting theory managers' accounting choice is influenced by various incentives mechanisms and is systematically related to the level of managerial ownership (Watts and Zimmerman, 1978). Hence, this theory predicts that, in a principal-agent relationship, managers are more likely to adopt accounting methods and choices which increase reported earnings than in an owner controlled firm (Watts and Zimmerman, 1990). Thus, the view of positive accounting theory is that firms that achieve efficient corporate governance minimise contracting costs via accounting choice. In positive accounting theory, managers and investors are assumed to be rational, so this will result in the best choice of accounting procedures that will be in their best interests. Accordingly, it is assumed that when managers are provided with flexibility in the choice of accounting policies, they will make choices based on their own benefits, thus resulting in opportunistic behaviour. Hence, Watts and Zimmerman (1978) hypothesise that managers may try to influence contractual outcomes by exercising their judgement and choice in accounting policies. This will occur for various reasons, such as because of bonus plan or debt covenants, and these various reasons are discussed in detail later in this section.

The contractual incentives for earnings management by managers can be explained by agency theory. Agency theory is applied in positive accounting theory by Watts and Zimmerman (1978), arguing that shareholders use tools such as compensation contracts to reduce agency costs and to motivate managers to act in the best interests of the shareholders. However, when there are conflicts of interest between principals and managers or different stakeholders such as creditors, contracting incentives vary.

Agency theory argues that there is a conflict of interest when there is separation between ownership and management (Jensen and Meckling, 1976). The conflict arises particularly when one party should act in the best interest of the other. Jensen and Meckling (1976) define the agency relationship as when there is a contract between one individual or more (the principal or principals/owners) and a second individual (the agent/manager), where the agent has decision-making authority and is in charge of performing a service on behalf of the principal or principals. In earnings management studies, principals are shareholders, or different stakeholders, while agents are in charge of managing the firm. Thus, agency theory considers the relationship between the two parties: principal and agent. The agent is the one performing the work that is delegated by the principal and should act in the best interests of the principal (Eisenhardt, 1989). This relationship between agent and principal becomes problematic when there is a misalignment of interests and when the outcomes are non-observable. This may result in agents pursuing their individual interests rather than the interests of the principal; for example, they may indulge in spending on unnecessary luxuries at the expense of the wealth of the shareholders. Thus, at times, managers may not always act in the best interests of the shareholders, and this is often examined in earnings management research. For example, researchers may look to establish whether the reinforcement mechanisms of corporate governance will have an effect on the monitoring of such relationships.

Thus, earnings management studies concentrate on evaluating earnings management through the analysis of managers' accounting choices, in particular the choices in relation to accruals. There are various reasons why managers seek to manage earnings. The first is opportunistic behaviour that aims to increase the manager's utility either via bonus plans or stock options. Healy (1985) examines the relationship between various bonus contracts and earnings management. The aim of the study is to analyse the format of the bonus contracts to characterise the accounting incentives managers may have to manage earnings. The study allows for income increasing and decreasing activities; if managers believe that there is no possibility of receiving a bonus this year, they may take a bath to further reduce the profits, thereby increasing earnings in subsequent years, or if they are to receive the full bonus this year then they may reduce the profits so that they will still receive their full bonus but increase profits in subsequent years. Bergstresser and Philippon (2006) identify that managers are more likely to manage earnings in firms where the CEO’s compensation is linked to the value of options holdings and the value of the stock. In addition, CEOs exercise more options and insiders sell higher amounts of shares in the years that their firms report high amounts of accruals.

Second, managers may seek to manage earnings for fundraising purposes to meet either debt covenant requirements, or capital requirements such as stock options, or initial public offerings. When firms borrow from lenders, there is usually a contract agreement between the two that limits the firm from engaging in some activities to assure the protection of the lender’s interests, which are referred to as debt covenants. Examples of such activities are keeping working capital accruals above a certain level or restriction on excessive dividends payments. These covenants provide lenders with increased security, and when firms breach such covenants, costs are incurred. Managers will try to avoid such costs as they are not only payments but may also affect firms’ ability to borrow in the future. Therefore, managers are likely to engage in earnings management to avoid the violation of debt covenants. One of the first to investigate earnings management in a debt covenant context is Sweeney (1994). Her research finds that, when firms are approaching a default of debt covenant agreements, managers seek to increase earnings via earnings management; however, the response is dependent on the cost of the default and the availability of accounting flexibility. Managers may also seek to manage earnings for capital market requirements, such as meeting investors' or financial analysts' expectations, as firms that report earnings higher than expectations are likely to receive an increase in share price because of the perception of better future performance. On the other hand, firms that surprise the market with negative earnings, or earnings that are less than expected, suffer a reduction in share price, as earnings are seen by the market as a measure of the firm's current and future performance. This is documented by various researchers, for example Bartov et al. (2002), who find an increase in share return for firms that exceed analysts' forecasts and a decrease in return for firms that fail to reach the forecast. As a result, managers seek to keep their earnings close to the forecasts, as the market tends to penalise firms that do not meet the forecasted target. Another capital market incentive would be when managers plan to issue new shares to the public. There is more incentive to have higher earnings; hence, managers may manage earnings to increase the amount received from share issuance. Teoh et al. (1998a) document that firms have higher amounts of abnormal accruals around public offerings and relatively lower stock return performance in the three years after. This activity may not be in the best interests of the new investors; however, it is in the best interests of the firms and current investors.

Third, managers may engage in earnings management to avoid paying expenses such as tax or to obtain some relief from the government. An example of tax avoidance is shown by Guenther (1994), that in the year prior to corporate tax rate reductions, large firms report lower amounts of accruals so that they can report higher earnings when the tax rate is reduced. Jones (1991) documents that firms may manage earnings during an investigation to obtain an import relief; a further explanation of her paper will be given later on.

Some of this empirical evidence on motives can either be good or bad for the shareholders. In theory, the main argument for earnings management to be good for shareholders is based on the blocked communication concept. As part of their expertise, agents sometimes obtain special information. Communicating that information to the principal could be costly; hence the communication is blocked (Scott, 2015). Earnings management can be used as a tool to reduce the blockage of information between the principal and the agent, such as smoothing earnings that are reported in a current year because it is extraordinary and is unlikely to occur in the future as the manager will not want to report earnings that are 'too high' and cannot be sustained in the future. Empirically, the use of earnings management to avoid a debt covenant is considered as good for the shareholders, but not so good for other stakeholders. It is true that even the raising of capital is not necessarily in the best interest of future shareholders; however, it can be beneficial for existing shareholders. In addition, smoothing earnings via earnings management increases the ability to predict future earnings, which can be thought of as good earnings management (Tucker and Zarowin, 2006). Bad earnings management is earnings management that is not in the best interests of the shareholders and is more beneficial for the managers – opportunistic managerial behaviour – such as bonus incentives and stock option compensation.

2.2.3 Accruals vs real earnings management

The earnings figure consists of two components: a cash flow and an accruals component (Dechow et al., 2010). Therefore, there are two ways to manage earnings, either by altering the cash component of earnings (real earnings management), or by altering the non-cash component of earnings (accruals earnings management). Accruals are defined as revenue and expense recognition that do not affect cash flow (such as sales on credit or depreciation charges). Real earnings management occurs when managers purposefully reduce cash-related activities of the firm from what the firm would normally do, in order to affect the earnings figure (Roychowdhury, 2006).

The most studied aspect of earnings management is the level of abnormal accruals firms have. Accruals are the difference between earnings and cash flow from operations. Accruals are defined as revenue and expense recognition that do not affect cash flow, such as sales on credit, depreciation charges, deferred tax, inventory valuation assumptions, recognition of revenue and bad debt. Accruals-based earnings management uses the flexibility that accounting standards provide to manipulate the financial statements without any direct effect on the cash flows of the firm. Such activities include asset write-offs or the estimation of bad debt (Roychowdhury, 2006). The cash flow component is harder to manipulate compared to the accruals component; therefore, if managers are going to manipulate the earnings figure, it is likely to be via the accruals component (Schipper, 1989). Examples of flexible accounting choices include managers' estimation of the useful life or salvage value of an asset to calculate depreciation charges, the estimation of bad debts or deferred taxation. Choices in accounting methods include inventory valuation, depreciation policy such as straight line or declining balance, revenue recognition and receivable policies. Such estimations have a direct effect on the earnings figure and require managers' judgement and choices.

Real earnings management occurs when managers cut down on real activities in firms in ways that are considered as a departure from normal activities, such as reducing research and development, advertising costs, maintenance of equipment, the timing of selling and purchasing various assets, postponing some projects that have positive net present value and overproduction (Roychowdhury, 2006). Such activities could be regarded as costly to shareholders and affect the long-term running of the business. As shown in the survey research of Graham et al. (2005), many of the managers that respond prefer to conduct real earnings management compared to accruals earnings management, as it is less likely to be detected by outsiders, while accruals earnings management may lead to legal or reputational consequences of the firm's use of aggressive accounting.

However, such activities, despite their importance, are not necessarily related to accounting procedures but more to the strategic business choices that managers take and are likely to affect the firm in the long run. Therefore, this study focuses on measuring earnings management using abnormal accruals, as it is more related to accounting choices while real earnings management is more related to business choices. After the research by Graham et al. (2005), US-based studies shift to measuring real earnings management rather than accruals earnings management. However, UK-based studies do not shift; both activities are still being considered (Athanasakou et al., 2011; Osma and Young, 2009).

2.2.4 Research design in accruals earnings management studies

2.2.4.1 Two-stage regressions

Accrual-based earnings management studies try to identify earnings management in two stages. The first stage runs a regression to estimate non-discretionary accruals (normal accruals). The regressions are run per industry per year (although earlier measures perform time series analyses, such as Jones (1991) and Dechow et al. (1995)). The estimated normal accruals from the regressions are deducted from the actual total accruals figure, and the difference between the two is considered as discretionary accruals (abnormal accruals). In the second stage, researchers use the estimate of abnormal accruals in three ways. First, it is used as a dependent variable to capture earnings management, or to capture earnings quality if it is used as an absolute value. Researchers regress abnormal accruals, as a measure of earnings management, against their variables of interest and some control variables (Dechow et al., 2010). Second, abnormal accruals are used to calculate pre-managed earnings, which is the difference between earnings and abnormal accruals (e.g. Atieh and Hussain, 2012). Third, researchers use abnormal accruals as an independent explanatory variable (e.g. Al-Attar et al., 2008). Recent research in the area questions the need for the two-step approach and argues that using the two stage process potentially biases the coefficients of the second stage regression (Chen et al., 2018). However, the bias can be fixed. Chen et al. (2018) provides various solutions that include adding the first-stage variables in the second-stage regression to control for bias in the coefficients of the key experimental variables. Another solution suggests not using the two-stage approach at all and using a one-stage approach to estimate total accruals and include the experimental variables and all controls in a single stage. This is becoming the new approach in estimating accruals earnings management (Florou et al., 2020).

2.2.4.2 Normal vs abnormal accruals

Differentiating between normal and abnormal accruals is critical in earnings management studies. To distinguish between the two, researchers need to understand the reasons that lead to having high or low total accruals, compared to others in the same industry. Hence, various researchers seek to understand economic events that lead to having a higher or lower amounts of accruals. Initially, all total accruals are considered as abnormal (Healy, 1985). Later on, researchers theorise that there has to be a part of accruals that is normal, such as last year's total accruals, and any increase or decrease in this year compared to previous years is abnormal (DeAngelo, 1986; Friedlan, 1994). Others argue that the industry median should be a benchmark for normal accruals; anything below or above that is abnormal (Dechow and Sloan, 1991). These arguments are quite basic; later measures are developed to incorporate economic events in the estimation of total accruals, such as changes in sales, gross property, plant and equipment and return on assets.

2.2.4.3 Total accruals vs working capital accruals

Total accruals have two parts: short term from working capital accruals (accounts receivable, inventories and payables), and long term, for example, depreciation charges. Before the introduction of the cash flow statement, researchers in the early 90s measure total accruals as the change in working capital accruals before income tax payable less depreciation expense. After the introduction of the cash flow statement, accruals are measured as the difference between earnings before extraordinary items and the cash flow from operating activities (Dechow et al., 2010). Models of accruals have two types of dependent variables; they either use total accruals (e.g. Dechow et al., 1995; Jones, 1991; Owens et al., 2017) or working capital accruals (e.g. Collins et al., 2017; Dechow and Dichev, 2002; DeFond and Jiambalvo, 1994; Peasnell et al. 2000a). Measures that use working capital accruals argue that long-term accruals are more likely to be monitored by auditors and are harder to manipulate compared to working capital accruals (Collins et al., 2017; Dechow and Dichev, 2002; DeFond and Jiambalvo, 1994; Peasnell et al. 2000a).

2.2.4.4 Choice of deflator

To reduce heteroscedasticity problems, researchers usually deflate the variables in the regressions used to estimate normal accruals either by lagged total assets, or average total assets (current and lagged year). There is only one researcher that argues that total accruals should be deflated by sales and lagged sales (Friedlan, 1994). Whether the choice of the deflator affects the estimations or not is not very clear. Some studies find that the deflator chosen has no effect on the significance of a UK-based study (Akbar and Stark, 2003; Shah and Akbar, 2010), although in different contexts than earnings management studies. In this thesis, normal accruals are estimated using different deflators depending on the original author's perspective, as specified in the relevant paper. For example Larcker and Richardson (2004) use average total assets to scale the dependent and independent variables in their model of the accruals generating process. Dechow et al. (1995) use lagged total assets to scale the dependent and independent variables in their model of the accruals generating process.

2.2.4.5 Constant or no constant

In addition, in the regressions used to estimate normal accruals, whether to scale the constant or not is debated in research, resulting in three different ways in which the measures are estimated. First, early measures such as those used by Jones (1991) and Dechow et al. (1995) run the regression measure in estimating total accruals without a constant. Instead, both add the variable 1/lagged total assets as a scaled intercept. The reason for this is that it will allow the intercept to vary with the magnitude of the firm's size, measured as lagged or average total assets, to control for heteroscedasticity. Heteroscedasticity does not bias the coefficient estimates; however, it will affect the standard errors (Dechow et al., 2003). This approach is criticised later on in the literature.

Both Peasnell et al. (2000a) and Dechow et al. (2003) argue that adding the 1/lagged variable is in principle suppressing the constant. Suppressing the constant makes R-squared an unreliable measure of explanatory power, particularly if one would like to compare power between measures. In addition, Peasnell et al. (2000a) argue that there is no theoretical reason to believe that the intercept has to be 0, because it is not necessarily the case that total accruals are 0 when the independent variables such as changes in sales or gross property, plant and equipment are 0. Hence, the second way is to remove the variable 1/lagged total assets and including a constant instead. The third approach is to include both a constant and the 1/lagged total assets variable in the measure, which is what, for example, Kothari et al. (2005) and Collins et al. (2017) do. Kothari et al. (2005) argue that having both will lead to having the benefits in two ways; having a constant will allow the use of R-squared to compare measures, as well as allowing the constant to change with respect to the firm's size (deflator).

Since this research compares the estimated measures of abnormal accruals using different approaches, each of the measures is estimated using the same approach as the original authors specify in their papers. Some measures, such as those in Jones (1991) and Dechow et al. (1995), are estimated in all three ways; therefore in this research all three approaches are considered.

2.2.5 Earnings management research in the UK

Research in the UK includes understanding different relationships in the contexts in which managers could be managing earnings. For example, research tests where there is an association between the composition of a board in the period pre- and post- the Cadbury report (Peasnell et al., 2000b), managing earnings to meet the expectation of analysts (Athanasakou et al., 2009; Athanasakou et al., 2011), the relationship between dividend-paying firms earnings management (Atieh and Hussain, 2012), the effect of the type of institutional investor (Wang, 2014), the influence of female directors on the board on the level of earnings management (Arun et al., 2015; Harakeh et al., 2019), the regulatory environment and earnings management in IPO firms (Alhadab et al., 2016), the relationship between having forecasted earnings in the prospectuses of IPO firms and earnings management (Buchner et al., 2017), and the relationship between audit quality and earnings management in IPO firms (Alhadab and Clacher, 2018).

One of the earliest studies in the UK on earnings management is Young (1999). This paper evaluates five measures of estimating abnormal accruals, focusing on the empirical strengths of the measures available at that time. To my knowledge, there is no subsequent study evaluating the different measures of abnormal accruals as proxies for earnings management in the UK. In addition, Peasnell et al. (2000a) develop their own measure of normal accruals. Except for these two studies, Young (1999) and Peasnell et al. (2000a), there is no further evaluation of the reliability of abnormal accruals measures in which earnings management in the UK is considered. Research in the UK has focused on associating earnings management with different concepts and theories. Therefore, there is a lack of knowledge on the reliability of accruals-based measures as proxies for earnings management in the UK. The need is particularly strong now as recent US researchers doubt the effectiveness of previous methods of estimating abnormal accruals as proxies for earnings management (Ball, 2013; Christodoulou et al., 2018; Collins et al. 2017; McNichols and Stubben, 2018; Owens et al., 2017). Below is a table that shows research in the UK that has used measures of abnormal accruals as proxies for earnings management.

UK studies that use accrual-based earnings management

Paper	Journal	Title of the paper
Young (1998)	Accounting and Business Research	"The Determinants of Managerial Accounting Policy Choice: Further Evidence for the UK"
Young (1999)	Journal of Business Finance and Accounting	"Systematic Measurement Error in the Estimation of Discretionary Accruals: An Evaluation of Alternative Modelling Procedures"
Peasnell, Pope and Young (2000a)	Accounting and Business Research	"Detecting earnings management using cross-sectional abnormal accruals measures"
Peasnell, Pope and Young (2000b)	British Accounting Review	"Accrual management to meet earnings targets: UK evidence pre-and post-Cadbury"
Ferguson, Seow and Young (2004)	Contemporary Accounting Research	"Nonaudit Services and Earnings Management: UK Evidence"
Ball and Shivakumar (2005)	Journal of Accounting and Economics	"Earnings Quality in U.K. Private Firms"
Peasnell, Pope and Young (2005)	Journal of Business Finance and Accounting	"Board Monitoring and Earnings Management: Do Outside Directors Influence Abnormal Accruals?"
Wright, Shaw and Guan (2006)	Journal of international Accounting Research	"Corporate Governance and Investor Protection: Earnings Management in the U.K. and U.S."

Gore, Pope and Singh (2007)	Accounting and Business Research	"Earnings management and the distribution of earnings relative to targets: UK evidence"
Al-Attar et al (2008)	Accounting and Business Research	"Earnings quality, bankruptcy risk and future cash flows"
Ball and Shivakumar (2008)	Journal of Accounting and Economics	"Earnings quality at initial public offerings"
Osma (2008)	Corporate Governance: An International Review	"Board independence and real earnings management: the case of R&D expenditure"
Athanasakou, Strong & Walker (2009)	Accounting and Business Research	"Earnings management or forecast guidance to meet analyst expectations?"
García Lara, Osma, Neophytou (2009)	Accounting and Business Research	"Earnings quality in ex-post failed firms"
Iatridis & Kadorinis (2009)	International Review of Financial Analysis	"Earnings management and firm financial motives: A financial investigation of UK listed firm"
Iqbal, Espenlaub & Strong (2009)	The European Journal of Finance	"Earnings management around UK open offers"
Osma & Young (2009)	European Accounting Review	"R&D expenditure and earnings targets"
Sun, Salama, Hussainey, and Habbash (2010)	Managerial Auditing Journal	"Corporate Environmental Disclosure and Earnings Management: UK Evidence"

Iqbal and Stromh (2010)	International Journal of Managerial Finance	"The effect of corporate governance on earnings management around UK rights issues"
Athanasakou, Strong & Walker (2011)	Journal of Business Finance and Accounting	"The Market Reward for Achieving Analyst Earnings Expectations: Does Managing Expectations or Earnings Matter?"
Young and Yang (2011)	The Accounting Review	"Stock Repurchases and Executive Compensation Contract Design: The Role of Earnings per Share Performance Conditions"
Chahine, Arthurs, Filatotchev and Hoskisson (2012)	Journal of Corporate Finance	"The effects of venture capital syndicate diversity on earnings management and performance of IPOs in the US and UK: An institutional perspective"
Iatridis (2012)	The British Accounting Review	"Hedging and earnings management in the light of IFRS implementation: Evidence from the UK stock market"
Atieh & Hussain (2012)	Accounting and Business Research	"Do UK firms manage earnings to meet dividend thresholds?"
Alhadab, Clacher & Keasey (2015)	Accounting and Business Research	"Real and accrual earnings management and IPO failure risk"
Arun, Almahrog and Aribi (2015)	International Review of Financial Analysis Female	"Female directors and earnings management: Evidence from UK companies"

Alhadab, Clacher & Keasey (2016)	Journal of Business Finance & Accounting	"A Comparative Analysis of Real and Accrual Earnings Management around Initial Public Offerings under Different Regulatory Environments"
Buchner, Mohamed and Saadouni (2017)	Journal of International Financial Markets, Institutions and Money	"The association between earnings forecast in IPOs prospectuses and earnings management post listing: An empirical analysis"
Alhadab & Clacher (2018)	The British Accounting Review	"The impact of audit quality on real and accrual earnings management around IPOs"
Almahrog, Aribi and Arun (2018)	Journal of Financial Reporting and Accounting	"Earnings management and corporate social responsibility: UK evidence"
Harakeh, El-Gammal, and Matar (2019)	Research in International Business and Finance	"Female directors, earnings management, and CEO incentive compensation: UK evidence"
Florou, Morricone and Pope (2020)	The Accounting Review	"Proactive Financial Reporting Enforcement: Audit Fee and Financial Reporting Quality Effects"

2.2.6 Development of methods of estimating normal accruals

This section describes the historical development of empirical abnormal accruals measures in the literature, providing explanations for the firm-specific factors considered to be important in estimating the normal accruals of firms (where the difference between estimated and actual accruals is considered as abnormal accruals and a proxy for earnings management, as explained earlier in section 2.2.4), starting from the very first measure in 1985 to recent measures published in 2017.

This study identifies four main categories in the literature for accruals-based earnings management measures. The first category is "Early measures". These are simple methods that measure earnings management without involving the use of regressions, such as total accruals or the difference between last year's and this year's total accruals. The second is "Jones-type measures", which are based on the model first introduced in Jones (1991) to estimate normal accruals and developed by various researchers in the field. Hence, all Jones-type models have the original Jones approach nested in them, which involves the use of two main explanatory variables for accruals: the first one is change in sales, as a measure related to the need for working capital, and the second is property, plant and equipment, capturing the need for depreciation charges. Other researchers build their models of normal accruals based on Jones' argument. The third category, "Accruals quality measures", model accruals through current, future and past cash flow from operations (introduced by Dechow and Dichev, 2002). The fourth category is the "Asymmetric behaviour of accruals", which models accruals as both a function of last year's accruals and cash flow from operations. The four categories are explained in detail in the next section. Below is a diagram of the family tree of all the approaches identified in literature that are used to estimate the normal accruals of a firm.

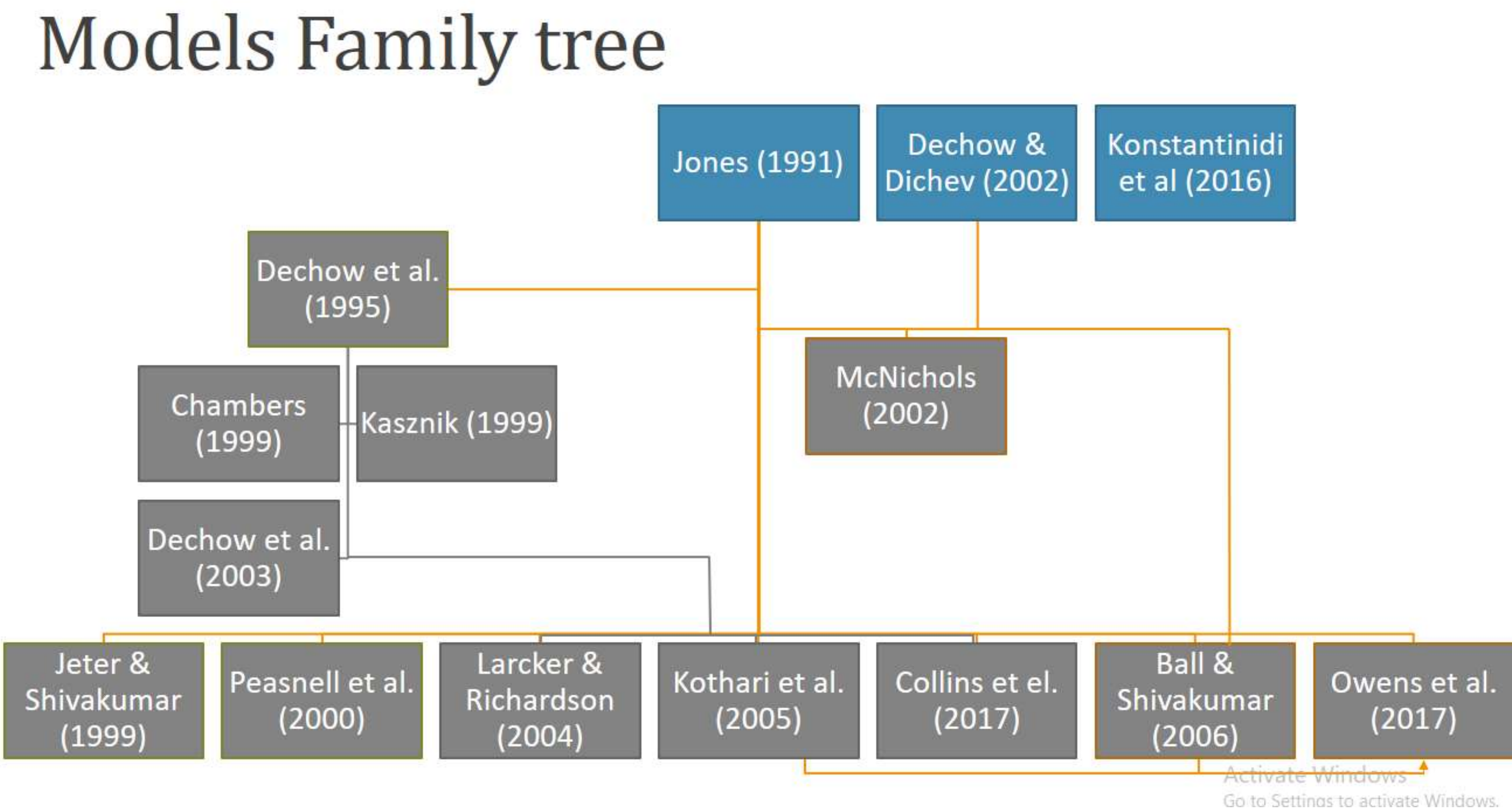

Figure 1 Accrual measures family tree

2.2.6.1 Early measures

2.3.6.1.1 The Healy measure

Healy (1985) is one of the earliest studies using accruals as a proxy for earnings management. The study by Healy (1985) aims to analyse the features of bonus contracts to characterise the accounting incentives managers may have to manage earnings. It allows for income increasing and decreasing earnings management. If managers believe that there is no possibility of receiving a bonus this year, they may take a bath to reduce profits further, shifting income into subsequent years, increasing their chance of receiving a bonus in those subsequent years. Similarly, if managers believe they are going to receive the maximum bonus this year, they may reduce the profits so that they still receive the maximum bonus this year, but also shift income into subsequent years, increasing their chance of receiving a bonus in those subsequent years. Healy estimates abnormal accruals, which is the proxy for earnings management, in a simple way; the assumption is that abnormal accruals are equal to total accruals deflated by lagged total assets, which is the most straightforward way of estimating abnormal accruals (Young, 1999). Therefore, the first measure of abnormal accruals is as follows:

$$AA_{i,t} = \frac{TAcc_{i,t}}{TA_{i,t-1}} \tag{1}$$

AA is abnormal accruals for firm i at time t. TAcc is total accruals for firm i for the period t (where total accruals is measured as the difference between earnings and cash flows from operations for the firm for the period t) and TA is total assets for firm i for at time t-1.

2.2.6.1.2 The DeAngelo measure

DeAngelo (1986) argues that part of accruals is normal, by assuming that normal accruals follow a random walk. Hence, a steady-state firm's normal accruals for the year t are theorised to be total accruals at year t-1. Thus, abnormal accruals are the difference between last year's and this year's accruals, scaled by lagged total assets. The second measure in estimating abnormal accruals is:

$$AA_{i,t} = \frac{(TAcc_{i,t} - TAcc_{i,t-1})}{TA_{i,t-1}} \qquad (2)$$

AA is abnormal accruals for firm i at time t. TAcc is total accruals for firm i for the period t (where total accruals is measured as the difference between earnings and cash flows from operations for the firm i for the period t) and t-1. TA is total assets for firm i for at time t-1.

2.2.6.1.3 Friedlan (1994)

Friedlan (1994) argues that total accruals are proportional to the firms' operational activities and suggests considering sales as a measure of activities and a better scalar for total accruals rather than lagged total assets. Therefore, the third measure for abnormal accruals is as follows:

$$AA_{i,t} = (\frac{TAcc_{i,t}}{Sales_{i,t}} - \frac{TAcc_{i,t-1}}{Sales_{i,t-1}}) \qquad (3)$$

AA is abnormal accruals for firm i at time t. TAcc is total accruals for firm i for the period t (where total accruals is measured as the difference between earnings before and cash flows from operations for the firm i for the period t) and t-1. Sales are total sales for firm i for period t and t-1.

Measures 1 to 3 estimate abnormal accruals directly relying on past information of the firm itself and past events, with no relationship to other firms in the same industry. Remaining measures use regressions to estimate normal accruals by comparing the firm to its peers in the same industry, and then use estimated normal accruals to calculate abnormal accruals (which are the difference between actual accruals and estimated accruals).

2.2.6.1.4 The industry measures

The first authors to link accruals to their peers in the same industry are Dechow and Sloan (1991). They assume that the variation in normal accruals of a firm should be similar to other firms in the same industry. They estimate normal accruals of a firm as a function of the median of the total accruals of the industry it operates in. Thus, the industry measure is:

$$TAcc_{i,t} = \beta_0 + \beta_1 \left(\frac{Median(TAcc_{i,t})}{TA_{i,t-1}} \right) \tag{4}$$

Median TAcc is the median total accruals for firms in the same industry scaled by lagged total assets for year t-1 (where total accruals is measured as the difference between earnings before and cash flows from operations for the firm i for the period t). This measure assumes that the changes in the median accruals of the industry are regular and any changes beyond that are abnormal accruals. Thus, the estimated total accruals from this regression is compared to the actual accruals of a firm, and any difference is considered as abnormal accruals.

2.2.6.2 Jones-type measures

This section explains the original Jones measure (Jones, 1991) and modified Jones measures found in the research literature. There have been various amendments to the original Jones method, and this section groups these amendments by the main assumptions which the authors theorise as their justification, though some measures overlap with other categories. The groupings are lagged accrual measures, cash flow from operations measures, working capital accruals measures, non-linear arguments and finally firm performance.

2.2.6.2.1 The Jones measure

Jones (1991) argues that changes in total accruals on its own, as done in previous studies, (DeAngelo, 1986; Healy, 1985) is not enough for her study. This paper highlights the importance of the effect of sales on accruals, particularly in the scenario of her study which is the effect of import relief on earnings, because if the sales of a firm in the industry are declining, it is expected for them to have import relief since they are not doing well from a sales point of view. Hence, sales affects the level of normal accruals; therefore, they should be accounted for when trying to estimate normal accruals, as this captures the effect of changes in the firm's economic circumstances. In addition, changes in working capital, such as accounts payables, inventories and accounts receivable, are part of total accruals, which depend on the changes in sales, but only to some extent as managers may postpone the shipment of goods to avoid them being recognised as sales. Jones also adds gross property, plant and equipment to incorporate the effect it will have on depreciation charges that are part of normal accruals.

The Jones' measure is estimated originally via a time series approach. However, it can be estimated via a cross-sectional regression as well. In this chapter, we estimate all measures, including the one based upon Jones (1991), cross-sectionally per industry for the following reasons. Firstly, the time series approach requires a substantial amount of observations for each firm. Secondly, this practice follows UK-based studies such as Atieh and Hussain (2012), Gore et al. (2007), Iatridis and Kadorinis (2009), Young (1998) and Young (1999), who use cross-sectional regressions.

$$TAcc_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \varepsilon \tag{5}$$

TAcc is total accruals measured as the difference between earnings and the cash flow from operating activities for firm i for the period t. Change in sales is measured as the difference in the sales figure for firm i between the period t and t-1. GPPE is the gross property, plant and equipment for firm i at year t. All variables are scaled by lagged total assets including the constant (1/lagged total assets), and all variables are winsorised at the 1% and 99% level.

The second way of running this method is to drop the variable 1/lagged total assets and run the regression with a constant (Peasnell et al. 2000a, Dechow et al. 2003).

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \varepsilon \qquad (6)$$

The third way of running the regression is having the 1/lagged total assets as a variable and including the constant as well (Collins et al., 2017; Kothari et al., 2005).

$$TAcc_{i,t} = \beta_0 + \beta_1 \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \beta_3 GPPE_{i,t} + \varepsilon \qquad (7)$$

The Jones measure is used as a basic approach in much earnings management research; although researchers modify the measure in various ways in attempts to increase its power and improve its specification. The way in which Jones' (1991) study is conducted is not aggregated to all firms and years; it is specific for certain firms facing a certain event. However, the Jones (1991) measure of abnormal accruals is later used in an aggregated way in the literature. The main reason for the extensive use of this measure is the availability of the data and the simplicity of the measure (Ball, 2013), with the assurance that the Jones method is a valid measure of earnings management for all firm-year observations (Dechow et al., 1995).

2.2.6.2.2 The modified Jones method

Dechow et al. (1995) modify Jones' (1991) approach by adjusting the change in sales to incorporate the change in accounts receivables. They argue that Jones (1991) assumes that sales are not manipulated, while Dechow et al. (1995) argue that sales on credit could be a result of earnings management. Therefore, when estimating normal accruals, only sales through cash should be considered. The reason for this assumption is that it is easier to manage credit sales relative to cash sales. In their simulation study, they also conclude that excluding credit sales makes the measure more powerful. The Dechow et al. (1995) measure is as follows:

$$TAcc_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \varepsilon \tag{8}$$

The variables in this measure are the same as in Jones (1991) (see explanation above). The change they include in the measure is the change in Rec, which is measured as the difference between account receivables between year t and t-1 for firm i. All variables are scaled by lagged total assets as well as the constant, and winsorised at the 1% and 99% level. Similar to the Jones (1991) measure, the Dechow et al. (1995) measure can be estimated in three ways. The first uses the original equation (8), and the second is with a constant and excludes the 1/lagged total assets, which is used in Dechow et al. (2003) as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \varepsilon \tag{9}$$

The third way is with both constant and 1/lagged total assets, as in Kothari et al. (2005) and Collins et al. (2017), as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_3 GPPE_{i,t} + \varepsilon \tag{10}$$

2.2.6.2.3 Lagged accrual measures

Dechow et al. (2003) amend the assumption in Dechow et al. (1995) that all credit sales are considered as earnings management. Instead, they argued that part of the receivables are expected due to the change in sales. Hence, this should be considered when calculating the change in sales minus the change in receivables. They estimate the following regression for each industry each year to capture the percentage of change in receivables that are expected per industry:

$$\Delta Rec = \alpha + k\Delta Sales + \varepsilon$$

The expected change in account receivables for the change in sales is captured by the slope coefficient (k). k is incorporated into the Dechow et al. (1995) modification; hence, the measure estimated for each industry year is:

$$TAcc_{i,t} = \alpha + \beta_1((1+k)\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \varepsilon \qquad (11)$$

All variables in this measure are as defined earlier (see explanation above); k is the coefficient of the previous measure and is restricted to values between 0 and 1. All the variables in Dechow et al. (2003) are scaled by average total assets at times t and t-1 and winsorised at the 1% and 99% level.

Dechow et al. (2003) also argue that there is a proportion of lagged total accruals that helps in the prediction of next year's total accruals, and hence lagged total accruals should be included in the measure. This argument is also made in Chambers (1999), where the paper argues that current accruals tend to reverse in the next period. Therefore, the measures should include lagged current accruals as a control for the reversal. Chambers' (1999) measure is an extension of the Dechow et al. (1995):

$$TAcc_{i,t} = \alpha \left(\frac{1}{TA_{i,t-1}}\right) + \beta_1\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + CA_{i,t-1} + \varepsilon \qquad (12)$$

All the measures are defined as earlier; the variable CA is current accruals, which is calculated as the change in working capital accruals. All variables in the Chambers (1999) measure are scaled by lagged total assets and winsorised at the 1% and 99% level, and regressions are estimated by industry year.

Following the argument of Chambers (1999), Dechow et al. (2003) include an additional variable in their regression, lagged total accruals, as they are less persistent than cash flows and are more likely to reverse over time. Therefore, Dechow et al. (2003) also extend the measures as follows:

$$TAcc_{i,t} = \alpha + \beta_1\left((1+k)\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + \beta_3 TAcc_{i,t-1} + \varepsilon \qquad (13)$$

All variables are as explained earlier and scaled by average total assets and winsorised at the 1% and 99% level.

Another addition by Dechow et al. (2003) includes the expected growth in sales. They argue that if firms are expecting a growth in future sales, then they are more likely to build up inventory, which will reflect the level of total accruals. Therefore, when estimating normal accruals, a measure of future growth in sales should be incorporated. For that reason, they include a variable that measures firms’ future sales growth as follows:

$$TAcc_{i,t} = \alpha + \beta_1\left((1+k)\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + \beta_3 TAcc_{i,t-1} + GR\_Sales_{i,t} + \varepsilon \qquad (14)$$

GR_Sales is the expected growth for firm i calculated as the difference between sales at time t and t+1 scaled by sales at time t. All other variables are as explained earlier, plus all variables are scaled by the average of total assets and winsorised at the 1% and 99% level.

2.2.6.2.4 Cash flow from operations measures

Several authors, such as Ball and Shivakumar (2006), Jeter and Shivakumar (1999), Kasznik (1999) and Larcker and Richardson (2004), argue for the need to include cash flow from operations when estimating normal accruals. The reason is the negative relationship between cash flows from operations and accruals (Dechow, 1994; Sloan, 1996). One of the first to test this relationship is Dechow (1994). The paper argues that both cash flow from operations and earnings are considered as measures of the firms' performance. This research tests the strength of the association of earnings versus cash flow from operations with stock returns, to measure the performance of a firm. The research concludes that cash flow from operations has a lower association with stock returns compared to earnings. Hence, earnings are better at measuring firms' performance. The paper also argues that accruals serve their purpose by increasing timing and matching, which is the problem that cash flow from operations suffers from. Dechow (1994) also highlights that cash flow from operations and accruals have a negative correlation and this may affect the way in which accruals are estimated.

For that reason, Jeter and Shivakumar (1999) test the power of the measure they develop that includes cash flow from operations, compared to Jones (1991) and Dechow et al. (1995) measures in a simulation study. Kasnik (1999) and Larcker and Richardson (2004) argue the need to include cash flow from operations in estimating normal accruals in studies that examine earnings management. However, they do not specify if this inclusion leads to an increase in the measure's power or specification in detecting earnings management.

Jeter and Shivakumar (1999) focuses on the methodological issues that arise in the estimation of abnormal accruals. They study the effectiveness of abnormal accruals measures in detecting earnings management in a cross-sectional study. Thus, their study focuses on developing methods in detecting earnings management for event-specific earnings management studies, which include seasonal equity offerings and initial public offerings, and exclude firm-specific earnings management studies, such as earnings management for managerial compensation purposes. Jeter and Shivakumar (1999) argue that, unlike Dechow et al. (1995), who rely on time series measures in their simulation study, their research focuses on cross-sectional measures for both quarterly and annual data. The paper use both mean squared predictions and simulation analysis to argue that the improvements they suggest to the measure make it more powerful than the Jones (1991) measure in detecting earnings management.

The measure Jeter and Shivakumar (1999) introduce is a modification of the Jones's (1991) approach, because it controls for the level of cash flow from operations. They argue that previous earnings management measures do not control for the negative relationship between cash flow from operations and total accruals. Since Dechow et al. (1995) comment that the Jones (1991) measure when used in time series form is not well specified for extreme cash flows, Jeter and Shivakumar (1999) argue that this is due to the lack of control for cash flows from operations. Hence, including dummy variables to capture the change in cash flow from operations and using quantile dummies provides a solution to this problem.

Jeter and Shivakumar (1999) compare their measures with Jones (1991) and conclude that the measures they introduce are more effective in detecting earnings management in a cross-sectional study compared to the Jones (1991) measure. Al Attar et al. (2008) is one of the papers that applies Jeter and Shivakumar's (1999) measure in the UK context as a measure of earnings management. The Jeter and Shivakumar (1999) measure is as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \sum_k \beta_{3,k} CFO\_DUM_{k,i,t} + \varepsilon \qquad (15)$$

Firms in each year are sorted into five quantiles based on cash flow from operations at time t scaled by lagged total assets. Thus, k takes the values of 1 to 4 in equation (15). Each quantile dummy takes the value of 1 if the firm belongs to that CFO (Cash flow from operating activities) quantile, and 0 otherwise. The remaining variables in this approach are similar in their explanation as for the Jones measure (1991) explained earlier. All variables are scaled by lagged total assets except the constant and winsorised at the 1% and 99% level.

Kasznik (1999) discusses the association between voluntary disclosure and earnings management. This paper investigates whether managers are more likely to manage earnings upwards to meet forecasting needs. The author examines 499 firm-year observations and splits them into two groups: 222 firms, or 44% of the sample, are firms that have overestimated earnings, and the second group are firms that have underestimated earnings. The author concludes that the first group has a significantly higher amount of abnormal accruals compared to the second.

Kasznik (1999) extends the Dechow et al. (1995) measure to include the change in cash flow from operations. Further explanation on the reason for, or power of, including this variable is not provided in the paper. The paper supports the need for this variable by referencing Dechow (1994), who argues that cash flow from operations is negatively correlated with total accruals and, hence, should be included when estimating normal accruals. Kasznik (1995) includes the change in cash flow from operations in a linear way; this measure is used in various papers, such as García Lara et al. (2009), a UK-based study.

$$TAcc_{i,t} = \beta_0 + \beta_1(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \beta_3 \Delta CFO_{i,t} + \varepsilon \tag{16}$$

The variables in this measure are similar in their explanation to the Dechow et al. (1995) measure, which is explained above. Change in CFO is the difference in the cash flow from operations for the period from t and t-1 for firm i. All variables are scaled by lagged total assets and winsorised at the 1% and 99% level.

The primary purpose of the paper by Larcker and Richardson (2004) is to examine the behaviour of accounting accruals, relating it to the choices of audit services and audit fees. The authors use an adapted version of Dechow et al. (1995) to measure earnings management. They include two additional variables, the first being cash flow from operations. Unlike Kasznik (1999) and Jeter and Shivakumar (1999), Larcker and Richardson (2004) do not include the change in cash flow from operations between the current and previous year, or use a quantile dummy. Larcker and Richardson (2004) choose to include current cash flows from operations, as a measure of current operating performance. The second variable is the book-to-market ratio, as a proxy for the expected growth of the firm's operations. They argue that larger accruals are expected for firms that are growing, as they are likely to be building up inventories. The authors state that their measure is more advanced and attempts to mitigate problems in the identification of normal and abnormal accruals, although they acknowledge that the measure still has limitations. Further explanation of the measure's power compared to others is not provided in the paper.

$$TAcc_{i,t} = \beta_0 + \beta_1(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \beta_3 \mathrm{BM}_{i,t} + \beta_4 \Delta CFO_{i,t} + \varepsilon \tag{17}$$

All variables are as explained earlier. BM is the book-to-market value ratio which is the book value of common equity divided by the market capitalisation for firm i at the end of the year t. CFO is current cash flow from operations for firm i at time t. All variables, except BM, are scaled by average total assets for the year t and t-1 and winsorised at the 1% and 99% level.

2.2.6.2.5 Working capital accrual measures

All the measures that are explained above consider total accruals, both long term and short term. DeFond and Jiambalvo (1994) are the first to the adjust Jones' (1991) measure to use working capital accruals rather than total accruals. They argue that working capital accruals are more likely to be managed than total accruals, and it is the part of accruals where auditors frequently detect errors. DeFond and Jiambalvo (1994) test whether debt covenant restrictions influence accounting choices resulting in earnings management in the year preceding the violation. They measure manipulation using the Jones (1991) model, using both total accruals and working capital accruals. For working capital accruals, they modify the Jones (1991) by excluding gross property, plant and equipment as an explanatory variable of accruals, as it is a proxy for depreciation, and depreciation is not included in working capital accruals as it is a long-term accrual. Some researchers focus on abnormal working capital accruals as a measure of earnings management rather than total accruals. Such studies include Peasnell et al. (2000a) and Collins et al. (2017).

The working capital accruals Jones measure is as follows:

$$\Delta WC_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1 \Delta Sales_{i,t} + \varepsilon \qquad (18)$$

Change in working capital accruals is measured as (change in current assets - change in current liabilities - change in cash + change in short-term loans). All variables are as described earlier and winsorised at the 1% and 99% level.

Peasnell et al. (2000a) is the only UK-developed measure, as far as the researcher knows, that uses a regression to measure abnormal accruals. Unlike Dechow et al. (1995), they focus on working capital accruals measures rather than total accruals. They conclude that when cash flow performance is extreme, the margin measure (the one they develop) is better at estimating abnormal accruals. The Jones (1991) and Dechow et al. (1995) measures are more potent in detecting bad debt and revenue manipulations, and the margin measure is better at detecting non-bad debt expense manipulation. Unlike DeFond and Jiambalvo (1994), Peasnell et al. (2000a) add a constant to the Jones (1991) measure and remove the variable (1/lagged total assets). Therefore, the following is the amendment they make to Jones (1991):

$$\Delta WC_{i,t} = \alpha + \beta_1 \Delta Sales_{i,t} + \varepsilon \tag{19}$$

They amend the Dechow et al. (1995) measure in the same way as follows:

$$\Delta WC_{i,t} = \alpha + \beta_1 \left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \varepsilon \tag{20}$$

Peasnell et al. (2000a) estimate normal accruals from the three main working capital accruals components: change in inventories, change in accounts payable and change in accounts receivable. Like Jones (1991), they argue that all three components are the consequences of sales and the collection of cash from customers of the period. Working capital accruals that are left unexplained by this year’s sales are classified as abnormal and are more likely to be manipulated. Hence, the margin measure is as follows:

$$\Delta WC_{i,t} = \alpha + \beta_1 Sales_{i,t} + \beta_2 \left(Sales_{i,t} - \Delta Rec_{i,t}\right) + \varepsilon \tag{21}$$

All measures are as explained earlier. In all of the three equations (19, 20 and 21), all variables are scaled by lagged total assets and winsorised at the 1% and 99% level.

2.2.6.2.6 Non-linear measures

With the exception of Jeter and Shivakumar (1999), all other measures assume that the explanatory independent variables have a linear relationship with the dependent variable. Ball and Shivakumar (2006) and Collins et al. (2017) argue that the variables used in explaining normal accruals have a non-linear relationship with accruals. Dummy variables can be included to solve this issue.

Ball and Shivakumar (2006) argue that the relationships between cash flows and accruals are not linear, which in turn challenges the previous assumptions in accruals-based measures of abnormal accruals. They make amendments to the Jones-type measures and the Dechow and Dichev (2002) measure (discussed later), arguing the need to incorporate systematic gain and loss recognition. They provide evidence that incorporating loss asymmetry in accruals-based measures results in improvements in the explanatory power of the measures. In their paper, they employ four different proxies to define fiscal year gains and losses. Three of these are book-based measures (based on financial reporting indicators) while the fourth is a market-based measure (based on stock market returns). The authors argue that all book value measures give the same results. Hence, this study will consider three of their amendments, a book-based measure, a market-based measure and a combination of both book- and market-based measures.

The first amendment by Ball and Shivakumar (2006) to the Jones (1991) approach uses the book measure of gain and loss asymmetry as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \varepsilon (22)$$

All variables are as explained earlier other than DCF is a dummy variable that takes the value of 1 if CFO < 0, and equals 0 otherwise. All variables are scaled by average total assets for the years t and t-1 and winsorised at the 1% and 99% level.

The second amendment by Ball and Shivakumar (2006) to the Jones (1991) approach uses a market measure of gain and loss asymmetry as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 ABNRET_{i,t} + \beta_4 DABNRET_{i,t} + \beta_5 ABNRET * DABNRET_{i,t} + \varepsilon \quad (23)$$

All variables are as explained earlier other than ABNRET is the firm i abnormal stock return for the year t (based on total return for the total UK market). DABNRET is a dummy variable that takes the value of 1 if ABNRET < 0, and equals 0 otherwise. All variables are scaled by the average of total assets for the year’s t and t-1. All variables are winsorised at the 1% and 99% level.

The third amendment by Ball and Shivakumar (2006) uses both book and market variables for gain and loss:

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \beta_6 ABNRET_{i,t} + \beta_7 DABNRET_{i,t} + \beta_8 ABNRET * DABNRET_{i,t} + \varepsilon \quad (24)$$

All measures are as explained earlier. All variables are scaled by the average of total assets for the year’s t and t-1. All variables are winsorised at the 1% and 99% level.

The argument by Collins et al. (2017) debates whether firms that are growing are likely to have more working capital accruals because of increased inventories. This growth is not adequately controlled for in Jones-type measures of abnormal accruals. They provide evidence that there is a possibility of the misspecification of earnings management when using Jones-type measures. They demonstrate how various variables used in the literature to test earnings management are correlated with firm growth measures, using a simulation study to test specification bias and type I errors for earnings management when firm growth is not controlled for properly. The published paper focuses on quarterly data but has a section for annual data. They find that accruals have a strong non-linear relationship to firm characteristics that are used in the literature as measures of growth. Such firm characteristics include the market-to-book ratio, the earnings-to-price ratio, market value, return on assets and sales growth.

This non-linear relationship can lead to falsely rejecting the null hypothesis of no earnings management. In their original working paper, they adjust both Jones and modified Jones approaches by including five of these firm characteristics explanatory variables for accruals via the use of quantile dummies(Collins et al., 2012), and three in the published paper (Collins et al., 2017). Adjustments to the Jones model in the published paper by Collins et al. (2017) exclude two firm characteristics - MV (market value of equity) and EP (earnings to price) characteristics-Jones model adjustments are as follows:

$$\Delta WC_{i,t} = \alpha + \beta_1 \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \sum_{\kappa} \beta_{3,\kappa} ROA\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{4,\kappa} SG\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{5,\kappa} MB\_DUM_{\kappa,i,t-1} + \varepsilon \qquad (25)$$

Modified Jones model adjustments in the published paper by Collins et al. (2017) are as follows:

$$\Delta WC_{i,t} = \alpha + \beta_1 \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \sum_{\kappa} \beta_{3,\kappa} ROA\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{4,\kappa} SG\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{6,\kappa} MB\_DUM_{\kappa,i,t-1} + \varepsilon \qquad (26)$$

The working paper by Collins et al. (2012) includes MV and EP; hence, the adjusted Jones model in their working paper are as follows:

$$\Delta WC_{i,t} = \alpha + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \sum_{\kappa} \beta_{3,\kappa} ROA\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{4,\kappa} SG\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{5,\kappa} MV\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{6,\kappa} MB\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{7,\kappa} EP\_DUM_{\kappa,i,t-1} + \varepsilon \qquad (27)$$

The same adjustments are made for the modified Jones model:

$$\Delta WC_{i,t} = \alpha + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \sum_{\kappa} \beta_{3,\kappa} ROA\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{4,\kappa} SG\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{5,\kappa} MV\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{6,\kappa} MB\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{7,\kappa} EP\_DUM_{\kappa,i,t-1} + \varepsilon \qquad (28)$$

All variables are as explained earlier. k in equations (25, 26, 27 and 28) takes the values 1-4. Each dummy takes the value of 1 if the corresponding firm characteristics are in that quantile, and 0 otherwise. ROA is the return on assets - net income divided by total asset for firm i for the year t-1. SG is sales growth which is the change in sales from year t-1 to t divided by sales for year t-1. MV is the market value of equity for firm i as of end of year t-1. EP is the ratio of earnings to price measured as net income for year t-1 divided by the stock price at the end of the year. MB is the market-to-book ratio for firm i at year end t-1. All variables are scaled by lagged total assets and winsorised at the 1% and 99% level.

2.2.6.2.7 Firm performance measures

Kothari et al. (2005) examine the specification and power of Jones and modified Jones approaches to producing measures of abnormal accruals. The objective of their research is to investigate whether matching firms based on performance leads to a more powerful and specific measure of abnormal accruals, arguing that accruals-based measures may be mis-specified when they are applied to firms with extreme performance. Like Dechow et al. (1995), Kothari et al. (2005) is a simulation study that tests for type I and type II errors when the null hypothesis is that there is no earnings management. They find that adjusting the residual of these measures to a similar industry, return on asset-matched, firm results in a more reasonable, well-specified, test of earnings management.

Therefore, Kothari et al. (2005) amend the Jones model by including return on assets as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \beta_3 GPPE_{i,t} + \beta_4 ROA_{i,t} + \varepsilon \qquad (29)$$

In addition, they amend the modified Jones model as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_3 GPPE_{i,t} + \beta_4 ROA_{i,t} + \varepsilon \quad (30)$$

Owens et al. (2017) argue that what is missing from accrual-based measures of abnormal accruals in the literature is a variable capturing the underlying economic circumstances that affect firms' performance. An example would be that two firms have the same level of growth in sales; however, one firm grew in sales due to the increase in demand while the other one grew due to having easier credit terms. This will result in firms having different levels of accruals, which is not due to manipulation, but current measures fail to capture this. These circumstances vary across time and firms, which will result in different levels of normal accruals. The two key assumptions when running the measures in the literature are: first, firms have accruals-generating processes that are reasonably stable; and the second is intra-industry homogeneity, which is when peers in the same industry have similar accruals-generating processes. Owens et al. (2017) question these two assumptions, as businesses in the same industry are not the same as each other. They compete, and one of the ways of competing is through the cash flow cycle. Owens et al. (2017) amend the Jones and Kothari et al.'s (2005) approaches by including a measure for "idiosyncratic shock"; this term refers to any event that alters the firm's underlying economics, either due to firm-specific factors or any other factors in the industry or economy. They argue that including this measure will reduce the intra-industry homogeneity assumption and relax the stationarity assumption (the assumption that the firm's accruals generating process is stable).

The "idiosyncratic shock" variable used in the accruals-based measures regressions is measured as the mean of squared residuals from the following equation by Chun et al. (2008):

$$r_{i,T} = \alpha_{i,T} + \beta_1 r_{j,T} + \beta_2 r_{m,T} + \varepsilon$$

The dependent variable r_i is the monthly stock return for firm i, r_j is firm i's industry, excluding firm i, value weighted monthly return; and r_m is the value weighted market return, T is an index for 24 months for the years t and t-1.

Owens et al. (2017) amend the following three Jones-type models:

Amendment to Jones (1991):

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 IdioShock_{i,t} + \varepsilon \qquad (31)$$

Amendment to Ball and Shivakumar (2006):

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \beta_6 ABNRET_{i,t} + \beta_7 DABNRET_{i,t} + \beta_8 ABNRET * DABNRET_{i,t} + \beta_9 IdioShock_{i,t} + \varepsilon \quad (32)$$

Amendment to Kothari et al. (2005):

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 IdioShock_{i,t} + \varepsilon \quad (33)$$

All variables are as explained earlier. Equations (31) and (33) are scaled by lagged total assets, while equation (32) is scaled by average total assets for the years t and t-1, following Owens et al. (2017). All variables are winsorised at the 1% and 99% level.

2.2.6.3 Accruals quality measures

Dechow and Dichev (2002) take a different perspective in terms of modelling working capital accruals. They argue that change in working capital accruals is the result of three variables: cash flow from operations for the current, lagged and lead years. The reason is that accruals are used as a tool to adjust and shift cash flows over time; therefore, accruals represent the collection and payment of future cash flows. Their initial paper is intended to provide a way to measure accruals quality, which is measured as the residuals' standard deviation. Hence, the Dechow and Dichev (2002) approach to modelling working capital accruals is as follows:

$$\Delta WC_{i,t} = \alpha + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \varepsilon \quad (34)$$

Following suggestions by McNichols (2002), Francis et al. (2005) modify the Dechow and Dichev model by merging it with the Jones (1991) model. One of the limitations of the Dechow and Dichev (2002) measure is that it only considers short-term accruals. Merging the approaches incorporates the effect of firms' performance through the sales variable and the measurement of long-term accruals through gross property, plant and equipment. In addition, combining the two measures results in an increase in the explanatory power of the model. Francis et al. (2005) demonstrate that adding the change in sales and PPE to the Dechow and Dichev (2002) equation results in an increase in the mean explanatory power from 39% to 50%.

Therefore, the Francis et al. (2005) measure is as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \beta_4 \Delta Sales_{i,t} + \beta_5 GPPE_{i,t} + \varepsilon \quad (35)$$

Ball and Shivakumar (2006) also amend the Dechow and Dichev (2002) approach to modelling working capital accruals to include a proxy for firms' gains and losses as follows:

$$\begin{aligned} \Delta WC_{i,t} = \beta_0 + \beta_1 CFO_{i,t-1} \\ + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \beta_6 ABNRET_{i,t} \\ + \beta_7 DABNRET_{i,t} + \beta_8 ABNRET * DABNRET_{i,t} + \varepsilon \quad (36) \end{aligned}$$

All variables are as explained earlier. All variables are scaled by lagged total assets and winsorised at the 1% and 99% levels.

2.2.6.4 Asymmetric behaviour of accruals

Konstantinidi et al. (2016) provide a different approach to estimating accruals. Their approach predicts one year-ahead accruals using this year's cash flows and accruals, and the interactions between them. This study suggests that current accruals are predicted by last year's accruals and cash flows as follows:

$$\begin{aligned} TAcc_{i,t} = \alpha + \beta_1 D_{t-1} + \beta_2 TAcc_{i,t-1} + \beta_3 CFO_{i,t-1} + \beta_4 TAcc_{i,t-1} * D_{t-1} + \beta_5 CFO_{i,t-1} * D_{t-1} \\ + \varepsilon \quad (37) \end{aligned}$$

All variables are as explained earlier, except that D is a dummy variable that takes the value of 1 for and economic loss and 0 otherwise, and economic loss is measured as either cash flows from operating at t-1 being negative or change in cash flow from operating year t and t-1 is negative. All variables are scaled by average total assets, for the years t and t-1, and winsorised at the 1% and 99% level.

[INSERT TABLE 2.1, 2.2 AND 2.3 HERE]

2.3 Discussion of previous studies

This section discusses previous research on accruals-based earnings management through three main phases, as well as a summary to identify any research gaps. The first phase relates to the development of assumptions used in measures of abnormal and normal accruals that cover the period from 1985 to 2006. Accruals research in this time period focuses on understanding how accruals behave and how proxies for earnings management can be estimated, and developing new measures. After 2006, some measures become established proxies and are used in various contexts and regions, such as the measures of Kothari et al. (2005) and Dechow et al. (1995). The second phase relates to comments questioning earnings management research by key authors in accounting research, and these comments came about in 2013. The main comments relate to the reliability of the measures used in the accounting research literature to capture earnings management. The third is related to re-examining current measures in earnings management research, suggesting alterations to the previously established proxies, and providing solutions to methodological issues, such as Chen et al. (2018); Collins et al. (2017) and Owens et al. (2017).

2.3.1 The establishment of abnormal accruals as a proxy for earnings management (1985-2006)

To understand how these measures became established, one needs to understand how and why they were developed. Research between the years 1985 and 2006 focuses on the development of the way in which abnormal accruals and associated earnings management proxies are estimated. This thesis identifies four main research streams in which normal and abnormal accruals measures are developed: the first is related to specific scenarios in which earnings management is expected to occur in a small sample of firms. The second is via simulation studies where earnings management occurs artificially. The third is related to studies that examine earnings management in different scenarios by using large samples with thousands of observations. The fourth is not related to earnings management; however, the papers in this stream provide an estimator for normal accruals, which is used in earning management studies such as Dechow and Dichev (2002).

2.3.1.1 Specific scenario case studies in earnings management (firm-specific events)

Earlier research in earnings management focuses on events in which earnings management are likely to occur (DeAngelo 1986, Dechow and Sloan 1991, Friedlan 1994, Healy 1985, Jones 1991). These studies use a small sample of observations (the largest is 211, and most are less than 100) to illustrate the effect of a certain event, such as import relief or bonus plans, on the abnormal accruals of the firm. These small sample earnings management case studies present strong arguments in the scenarios that have been examined. At their time, these studies made important contributions to the accruals-based earnings management literature. This thesis believes that the evidence presented in such studies is convincing as they are examined in a small setting of firms where incentives to manage earnings are strong. These are more reliable than large data sets of firm-year observations, as it is harder to establish causal events for earnings management when the measures are being generalised to all firms and all non-financial industries for a large number of years.

For example, Healy (1985) consider the effect of bonus schemes on the accruals policies in 94 firms. The paper compares three cases of different contract agreements and the effect they have on total accruals through earnings management. This research has finds that managers have a strong incentive to manage accruals in terms of choices in accounting procedures and decisions if their bonus scheme is linked to earnings. DeAngelo (1986) also examines a small case study sample (64 firms) in which the relationship between accounting decisions is related to firm buyouts and the impact of earnings management on accruals to understate the earnings to reduce stock prices and to purchase all publicly held shares. This research however does not find a relation between understating earnings and firm buyouts when using accruals in the periods prior to the buyout, where the difference between this year and last year's accruals is considered as a measure of earnings management.

Jones (1991) examines a specific scenario of a restricted sample of 23 firms; her study focuses on testing whether firms manage earnings to reduce the earnings figure during import relief investigation, as profitability is one of the factors that entitles firms to import relief. This paper uses time series measures in the estimation of normal accruals with the assumption that the ratio of normal accruals to total assets is persistent over time. Hence, her study focuses on whether, during an import relief investigation period, the abnormal accruals will be lower than when there is not an import relief investigation. The research assumes that the firm's normal accruals are measured in relation to the firm's previous years, considering the changes in sales, and property, plant and equipment. The research also assumes that the relationship between the normal accruals and the explanatory variables is stationary. Therefore, if, in the import relief year, abnormal accruals are less than in previous years and are positive in the years after the import relief period, as accruals tend to reverse, it is likely to be a result of earnings management.

The study uses a sample of 23 firms from five different industries that were involved in import relief investigations for the five-year period from 1980 to 1985 (Scott, 2015).

In addition, Friedlan (1994) considers the effect of the accruals managerial choices in the financial statements of 211 IPOs, particularly to increase earnings which, as a result, increases the issue price. The findings suggest that, prior to going public, managers manage earnings upwards using accruals to increase the issue price. Dechow and Sloan (1991) investigate whether CEOs in their final year of office will manage earnings upwards, particularly by using R&D (research and development). They use a sample of 58 firms in the manufacturing industries, as they have reasonably higher R&D activities, and they find that, during the last year of office, R&D is significantly reduced thus resulting in higher earnings. The authors also associate abnormal accruals to the changes in earnings and have found that they are not as significant as the changes in R&D. They argue that the lack of findings could be attributed to the sample, as it is non-random and is more biased towards CEOs who have more opportunity to manage R&D.

2.3.1.2 Simulation studies

Various researchers compare the specification and power of different abnormal accrual measures used in literature by their ability to identify earnings management and also to develop a “better” measure of earnings management (Dechow et al., 1995; Jeter and Shivakumar, 1999; Peasnell et al., 2000a; Dechow et al., 2003; Kothari et al., 2005). Such simulation studies artificially alter the accruals figure and test if abnormal accruals measures capture this alteration. This includes tests for type I and type II of errors when the null hypothesis is that there is no earnings management (Dechow et al., 1995; Kothari et al., 2005). However, in real-life situations, when the accruals are higher, it does not necessarily indicate that this is earnings management.

The increase in accruals could be a result of firm-specific characteristics, or strategies that lead to this higher figure, not manipulation. If such measures are able to capture earnings management in real life then they should be tested on cases that are known to have earnings management. However, when testing these measures on Enron, for example, they fail to capture earnings management (Jackson, 2018).

An example of a simulation study is Dechow et al. (1995). To my knowledge this study is the first earnings management study that uses simulation. Dechow et al. (1995) used a simulation study to evaluate various abnormal accrual measures for their ability to detect earnings management. They examine the measures used by DeAngelo (1986), Healy (1985), Jones (1991) and Dechow and Sloan (1991); in addition they develop their own measure which is a modification of the Jones (1991) approach, and is referred to in the research as the Modified Jones model. They test both the power and specifications of each measure, in their abilities to detect earnings management.

In their research, they used two samples. The first one is a randomly selected sample of 1000 firm-years, and the second uses 1000 firm-years that have extreme financial performance (non-random). Arguing that firms' performance is correlated with abnormal accruals identified by researchers before, they artificially manipulate a sample of data and test whether the measures are capable of detecting this manipulation as a measure of earnings management. To test the measure's specification, they tested the frequency in which type I errors are generated, in which the null hypothesis is rejected when in fact it is true, the null hypothesis being that there is no earnings management. To test the measure's power, they examine the frequency in which the measures generate a type II error, in which the null hypothesis is not rejected when in fact it is false; again the null hypothesis is that there is no earnings management. They conclude in their findings that when applying the measures to a random sample of firm-years, the measures are well specified while the power of the measures is low.

An example of a UK-based simulation study is Peasnell et al. (2000a). Their paper examines the power and specification of three abnormal accruals measures: the Jones (1991) measure, the Dechow et al. (1995) measure, and their own “margin measure”. They follow the same research design as Dechow et al. (1995) in testing the power and specification of the three measures in a simulation study. Unlike Dechow et al. (1995), they run the measures cross-sectionally rather than on a time-series basis. Consistent with previous US studies, they argue that the measures are well specified to be used in a UK setting and to be applied to a random sample of firm-years.

2.3.1.3 Large sample studies

Researchers find evidence of earnings management on small samples where there are more obvious incentives to manage earnings. After the simulation studies, researchers become more confident in using abnormal accruals measures on larger samples (Chambers, 1999). Some of these studies have compare different measures as well as develop their own measures of estimating earnings management (Chambers, 1999; Larcker and Richardson, 2004) and study, for example, the relation between earnings management and auditing and non-auditing services in more than 40 industries classifications (Larcker and Richardson, 2004), or the relation between investors’ investment choices and earnings management (Chambers, 1999).

An example of such studies is Chambers (1999); this study uses several measures of abnormal accruals, as well as developing its own measure, to estimate earnings management.

This study is one of the earliest implemented on a large number of firm observations. It provides evidence on whether earnings management leads to stock mispricing, which will then have an effect on investors as they will misallocate their investment capital. Using different measures to estimate earnings management, the results are consistent as the relationship between abnormal returns and a hedge portfolio formed using earnings management trading rules is found to be positively significant.

2.3.1.4 Studies that model accruals that are not related to earnings management

The previously discussed studies relate to earnings management use different research designs. There are, however, other studies that are more concerned with accruals, how they are modelled, and what affects them (Dechow and Dichev, 2002; Ball and Shivakumar, 2006) rather than earnings management. For example, they look at the quality of accruals (Dechow and Dichev, 2002) and the role of accruals in the asymmetrical timely recognitions of gain or loss (Ball and Shivakumar, 2006). These studies result in different assumptions used in the modelling of accruals, which are then used by other researchers to estimate abnormal accruals as a proxy for earnings management.

An example of such studies is Ball and Shivakumar (2006). They argue that losses are recognised in a more timely fashion than gains. The objective of their research is not to develop a better abnormal accruals measure but to improve the specifications from the non-linear measures by incorporating the role of asymmetrical timely loss recognitions, as the relationships between cash flows and accruals are not linear. The objective is achieved by investigating the implications of gain and loss recognition asymmetry on the modelling of accruals. They provide evidence that incorporating loss asymmetry in the modelling of accrual will result in improvements in the explanatory power of the models. On the other hand, Dechow and Dichev (2002) measure accruals quality, where accruals represent the collection and payment of future cash flows. The reason for that is that accruals are used as a tool to adjust and shift cash flows over time.

2.3.1.5 Conclusions

The time period studied is filled with studies that develop the modelling of accruals and, thereby, abnormal accruals. Research starts with the use of a small sample of firms exposed to certain well-defined events where earnings management is expected, and abnormal accruals are considered as a proxy for earnings management. Later on, measures of abnormal accruals developed are tested in simulation studies to investigate the power or ability of these measures in identifying earnings management (Dechow et al. 1995; Peasnell et al. 2000a; Kothari et al., 2005). This results in other researchers expanding the use of measures to large sample tests, and compares results as to whether they are robust or not. On the other hand, some of these measures are a result of researchers developing an understanding of how accruals are generated in general and not specifically related to earnings management activities. However, they are used in earnings management studies, such as the measure based on Dechow and Dichev (2002). After these developments, such abnormal accrual measures become established. Thus, researchers find no need to re-examine them, and they are used to estimate earnings management in various contexts and regions. The most used measure in literature after 2005 is the Kothari et al. (2005) measure, which is a variation of the Jones measure with ROA (Jackson, 2018). An example of such studies in the UK context is discussed in section 2.2.5.

2.3.2 The belief that accruals-based measures are not reliable measures of earnings management.

Despite the establishment of these measures of abnormal accruals in the accounting research literature, there is a stream of researchers that do not believe in the validity of these measures (McNichols, 2000), as there is a lack of knowledge in understanding how accruals behave. This results in miss-specified measures of abnormal accruals, which can lead to misleading inferences concerning earnings management (McNichols, 2000). Such arguments do not receive much attention as there are always limits to every study. However, measures became overused and studies on earnings management became extensive, leading to unrealistic findings of earnings management in every context and region.

Some important researchers identify earnings management as one of the problem areas in accounting research, and Ball (2013) chose to go against current research in earnings management as the author believes that it is scandalous. Even though the author has been a part of the development of this field, Ball (2013) acknowledges that some beliefs change over time, and the belief that the current research design of earnings management studies is reliable is not correct anymore. Ball (2013) asserts that earnings management cannot be as extensive as the research literature seems to imply. It is arrogant to assume that researchers are able to capture earnings management using cross-sectional comparisons, while others that are more in the field, such as financial analysts and auditors, are not able to capture this manipulation (Ball, 2013). This is largely based on the assumption that any amount of accruals that is not explained by the modelling approaches for accruals is a result of earnings management and/or a lack of quality in earnings (Gerakos, 2012). Likewise, research implies that accruals play a large role in determining the firms’ value and accounting quality when, in fact, at most it has a second order effect (Zimmerman, 2013). A lot of weight is given in research to the idea that abnormal accruals are opportunistic (Zimmerman, 2013). It can be true that earnings management is present in real life, but whether researchers are able to capture it is not even close to being established (Ball, 2013).

Consequently, current research in earnings management is flawed in various ways (Ball, 2013). If abnormal accruals measures are as capable of capturing earnings management as is implied by the research literature, then they should be able to capture it in firms that we know have manipulation, such as Enron. However, such measures fail to do so, suggesting they are not well specified and do not actually capture manipulation as is widely believed (Jackson, 2018). The lack of understanding of how accruals behave in the absence of manipulation, as well as researchers’ obliviousness to problems in measures relating to correlated omitted variables, has promoted a culture of inadequate research designs and more concern with the publication of false positives (Ball, 2013).

This leads researchers to imply various issues that are sceptical, for example that manipulation in the form of discretionary accruals represent the majority of the variation in accrual reaching 80% at times; however, as accountants most of what they do is accruals (depreciation, amortization, impairment etc.), which are harder to account for compared to cash; one does not need accounting knowledge to calculate cash (Ball, 2013). That manipulation occurs in such enormous amounts, even if disguised in literature by the expression "as a proportion of total assets. They occur every quarter of every year of every firm. Not only that but such manipulation goes by unnoticed by those that have greater information than researchers, even though they have great incentives to detect this manipulation (such as board members, auditors, press, regulators, financial analysts, whistle-blowers), more so than the researcher himself (Ball, 2013).

If researchers are confident in their findings of manipulation, then they should take this to the persons with control. Ball (2013) question if any of the researchers have taken a list of the cases with extreme earnings management to the auditors of the firm, board members or press. If such earnings management is occurring and researchers are reliably capable of detecting it, surely it is unethical for researchers to keep this information to themselves (Ball, 2013). It is only the fact that these measures are unable to detect earnings management in real-life situations that they do not report them as they would not have been able to capture the fact that Enron is in fact manipulating earnings (Jackson, 2018). The fact that researchers do not do so is great evidence that even researchers do not believe in the results they are reporting (Ball, 2013). Thus, a valid inference of earnings management in a scenario cannot be adequately captured by using the correlation between abnormal accruals and the hypothesised factor (McNichols and Stubben, 2018)

As explained earlier in section 2.2.2., earnings management research follows agency theory (the manager is the agent and the shareholders are principals). One aspect that Ball (2013) finds personally “galling” in earnings management research is that it does incorporate agency costs which are there to prevent managers from managing earnings. It is assumed that the cost to manage earnings is relatively low, while agency costs to protect shareholders are absent. It should be plausible to explain results with motives other than earnings management in such studies (Ball, 2013).

Building on the argument by Ball (2013), researchers started to re-examine the concepts used in earnings management studies and identified problems relating to the used of abnormal accruals as a proxy for earnings management. Both Chen et al. (2018) and Christodoulou et al. (2018) criticise the research design used in earnings management studies, particularly the use of two-stage regressions (as explained in section 2.2.4). They provide proof that the use of residuals from the first regression as an estimate of earnings management and framework for research is potentially biased. The problems are considered worse when the first stage is run per industry (Christodoulou et al., 2018), not necessarily due to the model's specification but, as a result of statistical reasons (Chen et al., 2018; Christodoulou et al., 2018), such as the correlation between first-stage model explanatory variables and the second-stage experimental variables (Chen et al., 2018).

Furthermore, Collins et al. (2017) state that firms that are expecting to grow are likely to spend more on working capital accruals by increasing inventories. This type of growth is not adequately controlled for in Jones-type measures of abnormal accruals. They demonstrate how various firm factors used in the literature to estimate normal accruals in earnings management studies are correlated with firm growth measures.

Moreover, in earnings management research, abnormal accruals measures are generally estimated using a cross-sectional regression per industry per year (see section 2.2.4 for research design). It is argued that, in doing so, one is assuming that normal accruals of the firm should depend on the average industry model, which implies an assumption of intra-industry homogeneity, i.e. peers in the same industry having similar accrual-generating processes (Jackson, 2018; Owens et al., 2017). However, peers in the same industry do not operate in the same way; they compete, and one of the ways of competing is through the cash flow cycle (Owens et al., 2017). Thus, the average accruals generating processes of firms in the same industry are not necessarily a good benchmark (Jackson, 2018; Owens et al., 2017). Such research design (using peers in the same industry as benchmark) is considered as an adequate design if the difference between accruals of the same industry, whether it is desirable or not, is part of the research question being asked (Jackson, 2018) or if it is properly controlled for (Owens et al., 2017).

To conclude, it can be observed that the comments by Ball (2013) have led to a stream of research that questions the ability of abnormal accruals in capturing earnings management in the currently used research design. There have been some suggestions for improvements that will be discussed in the next part.

2.3.3 Measures redevelopment

The concerns expressed about the reliability of the use of abnormal accruals as an indicator of earnings management can mainly be related to two parts. The first is the power of the measures of abnormal accruals. The second is related to the main research design of earnings management studies which involves two-stage regressions. Thus, this thesis splits the development into two parts: the first is related to the development of the estimation of normal accruals, and the second is related to the research design of earnings management studies.

2.3.3.1 Development of accrual-based measures

This thesis identifies three additional measures in estimating accruals after the comments by Ball (2013) which are Collins et al. (2017), Konstantinidi et al. (2016) and Owens et al. (2017). We will discuss briefly the finding and theory for the development of these measures, and the model specification as explained earlier in section 2.2.

1. Konstantinidi et al. (2016) re-examine the accrual anomaly. This paper is not related to earnings management studies, though; it provides an approach to estimating accruals. They investigate whether the asymmetric persistence of accruals is reflected on the stock price of the firm. They find that in general investors expect accruals to be persistent. Konstantinidi et al. (2016) provide a different approach to estimating accruals. Their measure predicts future accruals measured by this year's cash flows and accruals, and the interactions between them.
2. Collins et al. (2017) provide evidence that there is a possibility of mis-specification of abnormal accruals as a proxy for earnings management in Jones-type measures. They demonstrate how variables used in the literature to test for earnings management are correlated with firm growth measures, using a simulation study to test for specification bias and type I errors, in earnings management when firm growth is not controlled for properly. They find that accruals have a strong non-linear relationship to firm characteristics that are used in the literature as a measure of growth. Such firm characteristics include the market-to-book ratio, the earnings-to-price ratio, market value, return on assets and sales growth. They amend the Jones-type measures to include quantile dummies for a firm's growth.
3. Owens et al. (2017) argue that accrual-based measure in literature miss a control for the underlying economic circumstances that affect firms' performance. They argue, as an example, that two firms have the same level of growth in sales; however, one firm grew its sales due to an increase in demand while the other grew its sales due to having easier

credit terms. This will result in firms having different levels of abnormal accruals, which is not due to manipulation, but conventional measures of abnormal accruals fail to capture this. These circumstances vary across time and firms, which will result in different levels of expected normal accruals. Owens et al. (2017) amend Jones and Kothari et al.'s (2005) measures by including a measure for "idiosyncratic shock"; this term referring to any event that alters the firm's underlying economics, either due to firm-specific factors or any other factors in the industry or economy. They argue that including this measure will reduce the intra-industry homogeneity assumption and differs from the firm's stationary assumption.

2.3.3.2 Development of research design

There have been suggestions to develop the research design of current earnings management studies. The typical research design in earnings management studies uses two-stage regressions. Chen et al. (2018) show that using the error term as a dependent variable can bias the coefficients on explanatory variables of interest, resulting in incorrect inferences. They also show that this is largely due to the correlation between the independent variables used in the first regression with the independent variables studied in the second regression. Because of this problem, they recommend some solutions. The simplest one is to use a single-stage regression instead of two stages, which is also recommended by Christodoulou et al. (2018), as the power of such approaches is higher when done in a single stage rather than two (Christodoulou et al., 2018).

2.3.4 Summary and research gaps in literature

From the concerns explained earlier, current earnings management research is particularly concerned with increasing the validity of earnings management studies by redeveloping measurements and further advancing the research design of earnings management studies. It can be observed that currently the stream of research is moving towards questioning the use of abnormal accruals as a proxy for earning management, and some researchers have gone completely against the field (Ball, 2013). Thus, this thesis attempts to fill in the gap by investigating the use of abnormal accruals as a proxy for earnings management in the UK. In terms of understanding the reliability of such measures in estimating earnings management in the UK, as well as the research design of earnings management studies in the UK context, this research identifies various gaps that still need exploring relating to earnings management studies.

First, I study the correlation of abnormal accruals generated from different approaches to the actual accruals of the firm. If these measures suffer from problems with correlated omitted variables, as suggested by Ball (2013), then a high correlation to actual accruals is expected; moreover the degree of correlation should be reduced when the latest developments in modelling accruals, as they should improve the older measures used. There is no research that compares the measures of abnormal accruals to understand in what way the results generated from different accrual-based measures are correlated. The correlation between abnormal accruals and the actual accruals of the firm, total accruals or working capital accruals, has not been examined before. This is because the assumptions used by the authors whether to choose total accruals or working capital accruals might have an effect on the estimation of abnormal accruals and thus the degree of correlation. It is expected that the latest measures will give different results from the older measures, as allegedly they should have fixed problems in the earlier measures (e.g. Collins et al., 2017; Owens et al., 2017).

Second, understanding whether abnormal accruals are persistent. As one of the key assumptions of earnings management studies is that earnings management is a onetime manipulation and thus should reverse completely over time. Consequently, if abnormal accruals accurately estimate earnings management, then abnormal accruals should not be persistent and should reverse completely over time. Therefore, having persistent abnormal accruals is not an indication of earnings management, which has not been previously examined. There is a gap of knowledge on understanding the persistence of abnormal accruals, and this thesis is unaware of a study that has considered this factor. Ball (2013) suggests that these measures suffer from a problem with correlated omitted variables. Thus, this thesis will test the persistence of various abnormal accruals over a period of five years to identify whether they reverse or if they are persistent. It will also compare older measures to newer ones to show if they are less persistent and, by inference, have fewer problems with correlated omitted variables.

Third, accrual-based measures are argued to be of low power (Dechow et al., 1995; Ball, 2013). However, it is not clear how low this power is, or how much the firm factors used to model normal accruals underlying these measures are able to explain the variation accruals. It is not clear if the power differs per measure or per industry, if different measures of accruals have higher power in explaining the variance of accruals in some industries compared to others, and likewise if newer measures are more powerful in explaining the variance in accruals than the older measures.

Fourth, this research also identifies a gap in understanding the outcomes of using different measures in estimating earnings management, and the effect it will have on the findings of a study. This research seeks to add to knowledge in understanding if the results of a study differ when the latest measures are compared to older ones. It seeks to understand whether changing the research design (one stage/two stage) has an effect on the outcome of a study. Ball (2013) suggests that researchers should explore the possibility of results where agency costs are present, meaning auditors do their jobs. Thus, this research will try and provide an explanation for the results of these studies that is logical and might have no relation to earnings management.

Fifth, this research will fill in the gap of understanding the limitations of such measures in UK-based studies as the UK has different institutional settings than the US. Almost all of these measures are initially generated using US data. However, they are used in UK-based studies to explain earnings management (see section 2.2.5 for a summary of UK-based studies). The last comparison of power of such measures is performed by Peasnell et al. (2000a), which is more than 20 years ago, and a lot has changed, as demonstrated earlier. Thus, it is worth re-examining these concepts again to understand how reliable they are in capturing earnings management.

2.4 Hypothesis development

The previous sections discuss the main phases identified in relevant literature. They include the establishment of accruals-based earnings management measures, scepticism about the reliability of current research designs and measures used in estimating earnings management, as well as the suggested development of current research design and measures. This discussion forms the basis of the research hypotheses of this thesis, which are discussed below.

Agency theory predicts that managers may engage in opportunistic behaviour to manage earnings for various reasons, such as bonus plans (Healy, 1985). This management is often done through the use of the flexibility in measuring accruals, as a large body of researchers provide evidence that accruals are relatively easy to manipulate compared to cash (Walker, 2013). The concept of accruals-based earning management is that it reverses and it is not persistent (Dechow et al., 2012). Thus, persistent abnormal accruals are an indication that the measures are not capturing earnings management, and there is still a part of accruals that is not being explained by the factors used to model accruals. Accruals-based research is often done by the use of an approach to estimate normal accruals of a firm using a model of accruals involving some firm factors in relation to the firms' peers in the same industry (Dechow et al., 2010; Walker, 2013). The use of factors is not consistent, and various researchers assume different factors are needed to model accruals. Such factors include the change in sales and gross property plant and equipment (Jones, 1991), changes in cash sales (Dechow et al. 1995), cash flows from operating activities (Ball and Shivakumar, 2006; Dechow and Dichev, 2002; Jeter and Shivakumar, 1999; Kasznik, 1999; Larcker and Richardson, 2004), firm performance (Kothari et al., 2005) and growth in sales (Dechow et al., 2003). Moreover, researchers either use total accruals or working capital accruals in the estimation of normal accruals (Dechow et al., 2010; Walker, 2013). After the estimation of normal accruals, abnormal accruals are estimated (the difference between actual and estimated accruals) and used in a second analysis related to the study as an explanation for earnings management.

More recently, there has been scepticism concerning the adequacies of model specifications for accruals, and the research design of accruals-based earnings management studies (Ball, 2013), and it is suggested that such research designs do not capture manipulation in cases that are known to have earnings management (Jackson, 2018). Further, the results of using the two-stage resgression design can be biased (Chen et al., 2018; Christodoulou et al., 2018).

Thus, researchers suggest solutions to eliminate these problems. These include, for example, the inclusion of a factor in the estimation of normal accruals that controls for idiosyncratic shocks (Owens et al., 2017), the inclusion of quantile dummies to control for the nonlinear relationship between accruals and growth measures in models of accruals (Collins et al., 2017), and the use of one-stage regression designs instead of using two stages (Chen et al., 2018; Christodoulou et al., 2018), or modified two stage regression designs.

All accruals-based measures of abnormal earnings (except one) analysed in this study are developed in a US setting yet are used to proxy for earnings management in the UK (such as Atieh and Hussain, 2012; Alhadab et al., 2015; Arun et al., 2015; Alhadab et al., 2016; Buchner et al., 2017; Alhadab and Clacher, 2018; Almahrog et al., 2018; Harakehet al., 2019). Such measures need to be examined in the UK setting to understand how reliable they are. The last piece of research that compares different accruals-based measures in a simulation study is by Peasnell et al. (2000a). This is more than 20 years ago and a lot of developments in modelling accruals and developing measures of abnormal accruals have occurred since then. As a consequence, it is worth comprehensively re-examining the reliability of such measures in capturing earnings management. Further, there are differences in institutional and capital market characteristics across countries which can influence financial reporting practices (Leuz et al., 2003; Pope and Rees, 1992; Pope and Walker, 1999). The UK, for example, is characterised as having lower political involvement in accounting compared to the US, and lower issuance of public debt and litigation costs (Ball et al., 2000).

Overall, the following hypotheses are formed to test the reliability of the measures of earnings management in the UK. Therefore, this chapter will discuss the following hypotheses:

Hypothesis 1: there is a strong positive significant relationship between abnormal accruals generated from total accruals measures and actual total accruals.

Hypothesis 2: there is a strong positive significant relationship between abnormal accruals generated from working capital accruals measures and actual working capital accruals.

Hypothesis 3: measures of abnormal accruals generated from total accruals have a strong significant positive relationship with abnormal accruals generated from other total accruals-based measures.

Hypothesis 4: measures of abnormal accruals generated from working capital accruals have a strong significant positive relationship with abnormal accruals generated from other working capital accruals-based measures.

Hypothesis 5: models for estimating total accruals have low adjusted R squared.

Hypothesis 6: models for estimating working capital accruals have low adjusted R-squared

Hypothesis 7: there is a relationship between industry classification and the ability of models to explain accruals, whether total or working capital.

Hypothesis 8: abnormal accruals generated from models of total accruals are persistent for a period of five years.

Hypothesis 9: abnormal accruals generated from models of working capital accruals are persistent for a period of five years.

After the general investigation of the reliability of abnormal accruals generated from different models of the accruals generating process, this thesis aims to test the reliability of abnormal accruals measures when applied in different scenarios in the UK. This is achieved by observing the consistency of findings of a study, meaning whether the significance and sign of the coefficients of the experimental variables are consistent when different measures of abnormal accruals are used. Reliability is also tested with the use of placebo tests, where a relation between earnings management and the experimental variables is not expected, such as the use of lead and lag abnormal accruals as a proxy for earnings management. If the relationship is found to be significant then it's a signal that the measures are not reliable. Moreover, the thesis investigates the effect of altering the research design of some of the studies, and the effect that this has on the findings.

This thesis will investigate the reliability of accruals-based earnings management proxies on UK-based scenarios. Scenarios include the relationship between earnings management and: dividend-paying firms (Atieh and Hussain, 2012), forecasts in IPO firms (Buchner et al., 2017), audit quality in IPO firms (Alhadab and Clacher, 2018), regulatory environment in IPO firms (Alhadab et al., 2016) and female board members (Arun et al., 2015). Each scenario is investigated in a separate chapter (chapters 3-6), except for the audit quality and the regulatory environment in IPO firms scenarios, which is investigated in one chapter (chapter 5).

Hypothesis 10: Ceteris paribus, there is a significant positive relationship between firms that pay dividend when the firms' pre-managed earnings are lower than expected dividends and upwards earnings management (Atieh and Hussain, 2012).

Hypothesis 11: Ceteris paribus, there is a significant negative relationship between IPO firms having a forecast in their prospectus and upwards earnings management, relative to firms that do not have forecasts in their prospectus, post IPO (Buchner et al., 2017).

Hypothesis 12: Ceteris paribus, there is a significant negative relationship between IPO firms that are audited by Big N audit firms and upwards earnings management, relative to IPO firms that are not audited by Big N audit firms (Alhadab and Clacher, 2018).

Hypothesis 13: Ceteris paribus, there is a significant positive relationship between IPO firms that are listed on AIM and upwards earnings management, relative to IPO firms that are listed on the Main Market (Alhadab et al., 2016).

Hypothesis 14: Ceteris paribus, there is a significant positive relationship between firms that have a large number of female and independent female directors and upwards earnings management, relative to firms that do not have female board members (Arun et al., 2015).

2.5 Research design

In answering the first nine hypotheses identified above, this study uses the following research design:

- Step one: All approachess from equations (1-37) above are used to estimate normal accruals per year per ICB industry classification using a common sample. Normal accruals are deducted from actual accruals to estimate abnormal accruals measures, defined as AA1-AA37; numbering is according to table 2.2, which shows the measure number and the reference for the measure.
- Step two: All AA measures are pooled into one dataset.
- Step three: Using the pooled dataset, correlation tests are performed between abnormal accruals generated from different methods AA1-AA37 as well as with total accruals (hypotheses 1, 2, 3 and 4).

- Step four: Adjusted R-squared for approaches to modelling accruals underlying measures AA1-AA37 per industry are gathered, descriptive statistics of adjusted R-squared are generated, and ANOVA tests comparing mean adjusted R-squared per industry are performed (hypotheses 5, 6 and 7).
- Step five: lagged values of AA1-AA37 at t-1, t-2, t-3, t-4 and t-5 are generated.
- Step six: using AA1-AA37 and their lagged values, persistence tests are performed (Pearson correlation, Spearman correlation and regression over time). In addition, dummy variables are generated for AA1-AA37, and all lagged AA1-AA37. The dummy takes the value of 1 if AA1-AA37 > 0, and 0 otherwise. Chi-square tests are then performed to measure persistence (Hypothesis 8 and 9).

2.6 Sample distribution

This study uses all UK firms listed on the London Stock Exchange including, both Main Market and AIM, but excludes all firms that are classified as financial or utilities since they have different accruals-generating processes. In addition, it excludes all firms with reported accounts that are not in the pounds sterling, or that are not listed in London using the code EXNAME from Datastream, as well as excluding all firms with irregular fiscal year length (fiscal year length over 372 days or below 358 days, 7 days + or - normal year length of 365 days).

All 37 measures identified earlier are estimated using the same sample for comparative reasons. Therefore, all industries with less than 30 average year observations are excluded, as measures 25 and 26 have 22 independent variables, resulting in nine industry classifications within the sample. Table 2.4 shows the average number of observations per year for the period from 1998 to 2015. The final sample size is 12,850 firm-year observations. All variables used in the measures are extracted from Datastream. Stata is used to run all regressions and tests.

[INSERT TABLE 2.4 HERE]

2.7 Results

The previous sections discuss the hypotheses, research design and sample used. This section explains the results with the aim of testing the reliability of accruals-based earnings management measures. To test hypotheses 1, 2, 3, and 4, the results include testing the correlation between abnormal accruals generated from different approaches to modelling accruals, as well as the correlation between measures of abnormal accruals, total accruals and working capital accruals. To test hypotheses 5, 6 and 7, descriptive statistics are shown for the adjusted R-squared of all identified measures of normal accruals. An ANOVA test for the effects of industry classification is performed. To test hypotheses 8 and 9, Spearman correlation, Pearson correlation, Chi-square tests and regressions over time are performed. The results of these tests are presented in this section.

When discussing the findings, the abnormal accruals measures are grouped into two groups based on the dependent variable used in the estimation of the normal accruals, “total accruals measures”, which use total accruals as the dependent variables, and “working capital accruals measures”, which use working capital accruals as the dependent variable. Total accrual measures include (AA4 to AA17, AA22 to AA24, AA29 to AA33, AA35 and AA37), and these are presented in the first two parts of table 2.5. Working capital accruals measures are (AA18 to AA21, AA25 to AA28, AA31, AA32 and AA36), and these are presented and compared to actual working capital accruals in the third part of table 2.5. Tables 2.1 and 2.2 show the classification of the measures in more detail.

2.7.1 Correlation of abnormal accruals

[INSERT TABLE 2.5 HERE]

Table 2.5 shows the correlation matrix of abnormal accruals generated from different measures. All correlations are significant at the 1% level. According to table 2.2, AA2 and AA3 are based on the difference between last year and this year's total accruals (they do not use a regression to estimate normal accruals). When comparing these two with the remaining measures that use an estimate of normal accruals (AA4-AA377), the correlation's magnitude is relatively low. The correlations for AA3 are even lower than for AA2; the main difference between the two (AA2 and AA3) is the denominator: AA2 is scaled using lagged total assets (most normal accrual models use lagged or average total assets), while AA3 is scaled by sales and lagged sales which could be the reason for the low correlation of AA3 with remaining abnormal accruals. Both AA2 and AA3 have their highest correlation with AA37 (Konstantinidi et al., 2016) at 0.559 and 0.200 respectively; this could be due to these measures containing lagged total accruals in the estimation of normal accruals, while the lowest correlation is at 0.391 with AA35 (Francis et al., 2005) and 0.130 with AA29 (Kothari et al., 2005).

The results for AA2 and AA3 are explained separately as they do not use a regression to estimate normal accruals; they only take the difference between last year and this year's total accruals as an estimator of abnormal accruals or earnings management. It is shown then that the correlation is not very high with the remaining abnormal accruals measures, especially when the scalar is different. The remaining sections look at the correlations between abnormal accruals measures grouped by the dependent variable used in deriving them (total accruals or working capital accruals) and also between the measures and total accruals/working capital accruals. The correlations between abnormal accruals generated from different measures are presented depending on the group they belong to.

2.7.1.1 Correlation with total accruals

Table 2.5 also shows that there is a strong positive correlation between total accruals measures of abnormal accruals and total accruals, AA1. The highest correlation with total accruals measures is with abnormal accruals generated from the industry measure, which is AA4 at 0.947, while the lowest correlation between total accruals and the measures by Kothari et al. (2005) is AA30 at 0.706. Thus, it can be concluded that there is not much difference between total accruals and abnormal accruals generated from the different abnormal accruals measures. Even the development by Owens et al., (2017) in estimating normal accruals, from which abnormal accruals are estimated, still gives high correlations to total accruals at the rates of 0.923 for AA31, 0.769 for AA32 and 0.781 for AA33. This may indicate that the explanatory variables in total accruals models do not explain much of the variation in accruals. Thus, the findings of the correlation analysis are consistent with hypothesis 1. There is a strong positive relationship between abnormal accruals generated from total accruals-based measures and actual total accruals, meaning that estimated abnormal accruals are not that different from actual total accruals. Thus, measures that estimate normal accruals might not be reliable as they provide little explanation to normal accruals.

2.7.1.2 Correlation with working capital accruals

The third part of table 2.5 shows the correlation between actual working capital accruals and abnormal accruals generated from working capital accrual measures. Working capital accruals measures have an even higher correlations between measures of abnormal accruals and actual working capital accruals than for the total accruals measures. The highest correlation is between the modified Jones measure, AA20, at a correlation of 0.958 while the lowest is with the latest measure, by Collins et al. (2017), AA26, at 0.759. The correlations are high, meaning that the approaches to estimating normal accruals are not especially powerful as the abnormal accruals measures are highly correlated with working capital accruals. Even the correlations from the measures based on Collins et al. (2017), AA25, 0.847, AA26, 0.759, AA27, 0.794 and AA28, 0.797 are highly correlated to working capital accruals, meaning that they could still be suffering from a problem with correlated omitted variables. Thus, the findings of the correlations are consistent with hypothesis 2. There is a strong positive relationship between abnormal accruals generated from working capital accruals measures and actual working capital accruals. This means that the various measures of abnormal accruals are not that different from actual working capital accruals.

2.7.1.3 Correlations between abnormal accruals from different measures

When estimating normal accruals, researchers have argued for the need to include various firm characteristics. This thesis argues that the measures might not be reliable and, whichever characteristics are used, the regression models still do not reliably model accruals. Thus, hypotheses 3 and 4 assume that the correlations of abnormal accruals measures generated from the relevant group are expected to be high and positive. When observing table 2.5, it is clear that the correlations between abnormal accruals generated from different approaches are high and significant.

When considering total accruals measures, the correlation reaches a high of 0.993, between AA5 and AA8, which are the Jones (1991) and modified Jones measures (Dechow et al., 1995). The lowest correlation is at 0.587, between AA30 and AA32, which are the Kothari et al. (2005) and the Owens et al. (2017) measures. The mean of the correlations between abnormal accruals measures generated from total accruals across all measures is 0.848. The mean of the correlations between Owens et al. (2017) measures (AA31, AA32 and AA33) and the remaining total accruals measures is 0.835. Thus, the findings are consistent with hypothesis 3 that abnormal accruals measures generated from total accruals have strong positive correlations between them. It indicates that the different models of the accruals generating process, using different firm characteristics that are assumed to explain normal accruals, are not particularly different when estimating abnormal accruals.

When considering working capital accruals measures, the mean of the correlations between the abnormal accruals measures is 0.831, while the highest correlation is 0.990, between AA19 and AA20, and these two measures are the Jones (1991) and the Dechow et al. (1995) measures, where the main difference between the two is that one considers changes in all sales while the other considers change in cash sales only as an indicator to explain working capital accruals. The lowest correlation is 0.676, between AA26 and AA36, which are the measures from Collins et al. (2017) and the amendment by Ball and Shivakumar (2006) to the Dechow and Dichev (2002) measure. The mean correlation of the Collins et al. (2017) measure to other abnormal accruals measures is 0.792, meaning that the abnormal accruals generated from a recently developed measure is still highly correlated with the remaining abnormal accruals measures generated from other estimated accruals generation processes. Thus, the findings are consistent with hypothesis 4, that abnormal accruals measures generated from working capital accruals have a strong positive correlation between them. This means that the different firm factors that are assumed to explain working capital accruals do not result in abnormal accruals measures that are enormoyusly different from each other.

2.7.2 The power of models of accruals

From the correlation tests performed earlier, results suggest that there is relatively little difference between abnormal accruals measures and the dependent variables in the models from which from which they are derived (total accruals and working capital accruals). As abnormal accruals represent the error term of accruals generating process model, this indicates that the models of accruals have low power and that the firm factors do not explain much, resulting in error terms highly correlated with the dependent variable. Consequently, the adjusted R-squared of these measures is expected to be low. This section discusses hypotheses 5, 6 and 7, related to the power of models of accruals. The results of step four in the research design are demonstrated in table 2.6 and 2.7.

[INSERT TABLE 2.6 AND 2.7 HERE]

The adjusted R-squared for models of accruals without a constant are not included in these tests (see table 2.1's list of measures), as the adjusted R-squared is not comparable and does not give an explanation of the model's explanatory power (Dechow et al., 2003; Kothari et al., 2005; and Peasnell et al., 2000a). Therefore, only measures that have a constant according to table 2.1 are considered.

Table 2.6 provides the average adjusted R-squared of each model per industry. It can be observed that the models vary in explanatory power. When comparing adjusted R-squared across all models, the lowest is a total accruals-based measure of a 5.07% adjusted R-squared, which is for the model from Dechow et al. (2003). It means that the firm factors identified in this measure explain only 5% of the variation of total accruals, while the average R-squared across all models for total and working capital accruals and all industries is 15.9%, meaning that, on average across all industries and models, the firm factors explain 15.9% of the variation in accruals. The largest average R-squared across all models and industries explains 36.82% of total accruals, meaning that the model with the highest explanatory power across industries is the model of Kothari et al. (2005). This explains just 36.82% of the variation in the dependent variable, meaning there is still more that 60% of the variation of total accruals that is not explained by this model.

The highest and lowest R-squared across all measures are both total accruals measures (models 11 and 30), and the mean R-squared of total accruals measures is 16.54%. Thus, this thesis finds evidence in support of hypothesis 5 that total accruals models have low explanatory power. Even the R-squared from the model of Owens et al. (2017) has low power on average, but varies across industries. Owens et al.’s (2017) models are numbers 31, 32 and 33, and across all industries the mean R-squared of 31 is 6.62%, 32 is 24.69% and 33 is 32.72%. Thus, on average across all industries, the power is still relatively low.

The highest mean R-squared across all industries for working capital accruals models is 23.78% which is model number 36. This is the measure that is from Ball and Shivakumar (2006), based on an amendment to the model in Dechow and Dichev (2002). The lowest mean R-squared across all industries of working capital accruals models is at 6.49% for model number 19, which is the working capital accruals version of the Jones (1991) model. The mean R-squared across all industries of working capital accruals measures is 14.4%, which means that, on average across all industries, the firm characteristics identified have low power in explaining the variation of working capital accruals, where more than 85% of the variation is not explained. Thus, this thesis finds evidence in support of hypothesis 6 that working capital accruals models have low explanatory power. Even in models developed by Collins et al. (2017), models numbers 25, 26, 27 and 28 have means of 13.29% for 25, 13.6% for 26, 13.31% for 27 and 13.03% for 28 across all industries. These are even lower than the mean for all models of working capital accruals.

It can be observed that the R-squared varies per industry, therefore, mean adjusted R-squared for each model per industry are tested and presented in table 2.7. The adjusted R-squared of these models is low; the highest industry is personal and household goods at an average of 28.66% while the lowest adjusted R-squared is for the health care industry at 9.57%. An ANOVA test is conducted to compare the effects of industry classification on mean R-squared, which is significant at the $p < 0.01$ level, meaning the average power of the models differs significantly per industry. These findings are aligned with hypothesis 7, that the power of the models varies significantly across industry classifications.

Thus, from the evidence provided above for hypotheses 5, 6 and 7, it can be argued that the models could still suffer from problems with correlated omitted variables. This is true for the the more recent modelling developments by Collins et al. (2017) and Owens et al. (2017), as they still have low explanatory power and, therefore, are still potentially unreliable.

2.7.3 Persistence of abnormal accruals

This section provides the results of tests of the persistence of abnormal accruals. If abnormal accruals measures capture manipulation reliably then they should reverse in future years. However, if they are persistent then it is likely that they are not reliable measures of earnings management. This section discusses the test results of step six in testing the persistence of measures of abnormal accruals presented in tables 2.8 and 2.9.

For the results of persistence, all conclusions from different tests give the same results (Pearson correlation, Spearman correlation, Chi-square tests and regression over time). Results for abnormal accruals measures 2 and 3, which use the difference between total accruals at year t and t-1 as proxies for earnings management, show that one has a negative relation in the first year and no relation in the remaining four years, while the other has a negative relation for up to five years.

Looking at the results in tables 2.8 and 2.9, the first table relates to total accruals-based measures and the second relates to working capital accruals-based measures. The tables show that abnormal accruals generated from total accruals-based measures have positive persistence in all five years. The magnitude of this persistence is not high, but what is more important is that it is significant and positive. For example, for the Pearson correlations, the highest first year correlation is measure AA17 from Larcker and Richardson (2004), at 0.197, and the remaining years are positive and less than 0.1. This persistence is similar to that for total accruals (AA1) of 0.154 in the first year and around 0.1 in the remaining years, meaning that abnormal accruals measures generated from total accrual follow the same line of persistence as the actual total accruals for a period of five years. Therefore, these findings are consistent with hypothesis 8 that abnormal accruals measures based on total accruals are persistent for a period of five years, which means they might not be reliable measures of earnings management.

Results also show that abnormal accruals measures generated from working capital accruals have a slight negative persistence of less than 0.1 in the first year and no correlation in the years after. Though this is not persistent, it might not indicate earnings management, as earnings management should reverse in subsequent years. This is similar to the persistence of actual working capital accruals, which in nature should reverse in subsequent years if they are higher than usual, even if accruals are not being managed. This finding is not consistent with hypothesis 9 that abnormal accruals measures generated from working capital accruals are persistent. Tables 2.8 and 2.9 have Pearson correlation and Spearman correlation results for all measures while results for Chi-square tests and regressions over time are left untabulated.

[INSERT TABLES 2.8 AND 2.9]

2.8 Summary of the chapter

When testing the reliability of abnormal accruals as a proxy for earnings management, the findings of this chapter provide evidence that the measures of abnormal earnings used in the literature to capture earnings management might not be reliable as they do not significantly differ from total accruals or working capital accruals. Measures lack power and abnormal accruals generated from total accruals models are persistent for a period of five years, which seems inconsistent with earnings management. The evidence that abnormal accruals seem similar to the dependent variable (total accruals and working capital accruals) in terms of correlation and persistence could be a signal that models for estimating normal accruals are not reliable as they provide little explanation of the dependent variable, resulting in error terms that are highly correlated with the dependent variable.

Results also show that there is little difference between the models used in the accounting research literature in estimating normal accruals from which abnormal accruals are extracted and used as a proxy for earnings management. All measures used in the study give highly correlated results, from Healy (1985) to the latest Owen et al. (2017) model. The models have low explanatory power, with over 70% of the variation in accruals not being captured by the models of accruals. Hence, the estimated measures of abnormal accruals of a firm are highly correlated with the actual accruals. Thus, the measures could still suffer from problems with correlated omitted variables.

Abnormal accruals measures generated from total accrual are positively related to future abnormal accruals for up to five years. This could be caused by firm-specific characteristics not being captured by the models, rather than earnings management. Abnormal accruals measures generated from working capital accruals have only a slight negative persistence in the first year and no relation in the years after, however. The reason for the difference between the methods that use total accruals and methods that use working capital accruals as dependent variables is likely that total accruals have a long-term component (depreciation, amortisation and impairment) that is likely to be persistent, whereas working capital accruals have only short-term components and are more likely to reverse in subsequent years.

This chapter enhances the understanding of the potential consequences of using different models in estimating normal accruals and using abnormal accruals as a proxy for earnings management. In addition, it provides evidence supporting Ball's (2013) argument that these measures still have low explanatory power and potential problems with correlated omitted variables. Thus, the findings conclude that there is a high possibility that any measure of abnormal accruals used in an implementation study will result in the same conclusions. In addition, abnormal accruals measures are highly correlated with the variable from which they are derived (total accruals or working capital accruals), and they follow the same persistence in terms of sign, which suggests that, in a study in which total accruals and working capital accruals are used as a measure of earnings management, the conclusions are likely to be similar to the conclusions drawn from the use of abnormal accruals measures.

Therefore, the remaining chapters of this thesis will investigate the reliability of abnormal accruals measures in capturing earnings management in various scenarios. The next chapter, Chapter 3, will consider specifically the relationship between firms that pay dividends and earnings management in the UK, investigating whether the findings of this chapter will have an impact on inferences about this relationship.

Tables

Table 2.1 Accrual-based earnings management measures

Number	Reference	Family	Dependent Variable	Constant	1/lag-Avg TA
1	Healy (1985)	Early Measures TAcc	TAcc	-	-
2	DeAngelo (1986)	Early Measures-Difference	TAcc	-	-
3	Friedlan (1994)	Early Measures-Difference	TAcc	-	-
4	Dechow and Sloan (1991)	Early Measures-Industry Median	TAcc	Y	N
5	Jones (1991)	Jones	TAcc	N	Y
6	Dechow et al. (2003)	Jones	TAcc	Y	N
7	Kothari et al. (2005)	Jones	TAcc	Y	Y
8	Dechow et al. (1995)	Modified-Jones	TAcc	N	Y
9	Dechow et al. (2003)	Modified-Jones	TAcc	Y	N
10	Kothari et al. (2005)	Modified-Jones	TAcc	Y	Y
11	Dechow et al. (2003)	Modified-Jones	TAcc	Y	N
12	Chambers (1999)	Modified-Jones	TAcc	N	Y
13	Dechow et al. (2003) – Lag TAcc	Modified-Jones	TAcc	Y	N

Number	Reference	Family	Dependent Variable	Constant	1/lag-Avg. TA
14	Dechow et al. (2003) – Lag TAcc and sale growth	Modified-Jones	TAcc	Y	N
15	Jeter and Shivakumar (1999)	Jones	TAcc	Y	N
16	Kasznik (1999)	Modified-Jones	TAcc	Y	N
17	Larcker and Richardson (2004)	Modified-Jones	TAcc	Y	N
18	DeFond and Jiambalvo (1994)	Jones	WC	N	Y
19	Peasnell et al. (2000a)	Jones	WC	Y	Y
20	Peasnell et al. (2000a)	Modified-Jones	WC	Y	N
21	Peasnell et al. (2000a)	Peasnell et al. (2000a)	WC	Y	N
22	Ball and Shivakumar (2006) – Book	Jones	TAcc	Y	N
23	Ball and Shivakumar (2006) – Market	Jones	TAcc	Y	N
24	Ball and Shivakumar (2006) – Book and Market	Jones	TAcc	Y	N
25	Collins et al. (2017)	Jones	WC	Y	Y
26	Collins et al. (2017)	Modified-Jones	WC	Y	Y

Number	Reference	Family	Dependent Variable	Constant	1/lag-Avg. TA
27	Working paper Collins et al. (2017)	Jones	WC	Y	Y
28	Working paper Collins et al. (2017)	Modified-Jones	WC	Y	Y
29	Kothari et al. (2005)	Jones	TAcc	Y	Y
30	Kothari et al. (2005)	Modified-Jones	TAcc	Y	Y
31	Owens et al. (2017)	Jones	TAcc	Y	N
32	Owens et al. (2017)	Ball and Shivakumar (2006)	TAcc	Y	N
33	Owens et al. (2017)	Kothari et al. (2005)	TAcc	Y	N
34	Dechow and Dichev (2002)	Accrual Quality	WC	Y	N
35	Francis et al. (2005)	Mix (Dechow and Dichev 2002, Jones 1991)	TAcc	Y	N
36	Dechow and Dichev – Ball and Shivakumar 2006	Mix (Dechow and Dichev 2002, Ball and Shivakumar 2006)	WC	Y	N
37	Konstantinidi et al. (2016)	Asymmetric behaviour	TAcc	Y	N

Table 2.2 Accrual-based measures

Number	Reference	Measure
1	Healy (1985)	$AA_{i,t} = \frac{TAcc_{i,t}}{TA_{i,t-1}}$
2	DeAngelo (1986)	$AA_{i,t} = \frac{(TAcc_{i,t} - TAcc_{i,t-1})}{TA_{i,t-1}}$
3	Friedlan (1994)	$AA_{i,t} = (\frac{TAcc_{i,t}}{Sales_{i,t}} - \frac{TAcc_{i,t-1}}{Sales_{i,t-1}})$
4	Dechow and Sloan (1991)	$TAcc_{i,t} = \beta_0 + \beta_1(\frac{Median(TAcc_{i,t})}{TA_{i,t-1}})$
5	Jones (1991)	$TAcc_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \varepsilon$
6	Dechow et al. (2003)	$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \varepsilon$
7	Kothari et al. (2005)	$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \beta_3 GPPE_{i,t} + \varepsilon$
8	Dechow et al. (1995)	$TAcc_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \varepsilon$
9	Dechow et al. (2003)	$TAcc_{i,t} = \beta_0 + \beta_1(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \varepsilon$
10	Kothari et al. (2005)	$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_3 GPPE_{i,t} + \varepsilon$
11	Dechow et al. (2003)	$TAcc_{i,t} = \alpha + \beta_1((1+\kappa)\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \beta_2 GPPE_{i,t} + \varepsilon$
12	Chambers (1999)	$TAcc_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + CA_{i,t-1} + \varepsilon$

Number	Reference	Measure
13	Dechow et al. (2003) – Lag TAcc	$$TAcc_{i,t} = \alpha + \beta_1\left((1+\kappa)\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + \beta_3 TAcc_{i,t-1} + \varepsilon$$
14	Dechow et al. (2003) – Lag TAcc and Sale growth	$$TAcc_{i,t} = \alpha + \beta_1\left((1+\kappa)\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + \beta_3 TAcc_{i,t-1} + GR_{Sales_{i,t}} + \varepsilon$$
15	Jeter and Shivakumar (1999)	$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \sum_{\kappa} \beta_{3,\kappa} CFO\_DUM_{\kappa,i,t} + \varepsilon$$
16	Kasznik (1999)	$$TAcc_{i,t} = \beta_0 + \beta_1\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + \beta_3 \Delta CFO_{i,t} + \varepsilon$$
17	Larcker and Richardson (2004)	$$TAcc_{i,t} = \beta_0 + \beta_1\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_2 GPPE_{i,t} + \beta_3 \mathrm{BM}_{i,t} + \beta_4 \Delta CFO_{i,t} + \varepsilon$$
18	DeFond and Jiambalvo (1994)	$$\Delta WC_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1 \Delta Sales_{i,t} + \varepsilon$$
19	Peasnell et al. (2000a)	$$\Delta WC_{i,t} = \alpha + \beta_1 \Delta Sales_{i,t} + \varepsilon$$
20	Peasnell et al. (2000a)	$$\Delta WC_{i,t} = \alpha + \beta_1\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \varepsilon$$
21	Peasnell et al. (2000a)	$$\Delta WC_{i,t} = \alpha + \beta_1 Sales_{i,t} + \beta_2\left(Sales_{i,t} - \Delta Rec_{i,t}\right) + \varepsilon$$

Number	Reference	Measure
22	Ball and Shivakumar (2006) – Book	$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \varepsilon$$
23	Ball and Shivakumar (2006) – Market	$$Acc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 ABNRET_{i,t} + \beta_4 DABNRET_{i,t} + \beta_5 ABNRET * DABNRET_{i,t} + \varepsilon$$
24	Ball and Shivakumar (2006) – Book and Market	$$Acc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 ABNRET_{i,t} + \beta_4 DABNRET_{i,t} + \beta_5 ABNRET * DABNRET_{i,t} + \varepsilon$$
25	Collins et al. (2017)	$$\Delta WC_{i,t} = \alpha + \beta_1 \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \sum_{\kappa} \beta_{3,\kappa} ROA\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{4,\kappa} SG\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{5,\kappa} MB\_DUM_{\kappa,i,t-1} + \varepsilon$$
26	Collins et al. (2017)	$$\Delta WC_{i,t} = \alpha + \beta_1 \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \sum_{\kappa} \beta_{3,\kappa} ROA\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{4,\kappa} SG\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{6,\kappa} MB\_DUM_{\kappa,i,t-1} + \varepsilon$$
27	Working paper Collins et al. (2017)	$$\Delta WC_{i,t} = \alpha + \beta_1 \left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \sum_{\kappa} \beta_{3,\kappa} ROA_{DUM_{\kappa,i,t-1}} + \sum_{\kappa} \beta_{4,\kappa} SG_{DUM_{\kappa,i,t-1}} + \sum_{\kappa} \beta_{5,\kappa} MV_{DUM_{\kappa,i,t-1}} + \sum_{\kappa} \beta_{6,\kappa} MB_{DUM_{\kappa,i,t-1}} + \sum_{\kappa} \beta_{7,\kappa} EP_{DUM_{\kappa,i,t-1}} + \varepsilon$$

Number	Reference	Measure
28	Working paper Collins et al. (2017)	$\Delta WC_{i,t} = \alpha + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \sum_{\kappa} \beta_{3,\kappa} ROA\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{4,\kappa} SG\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{5,\kappa} MV\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{6,\kappa} MB\_DUM_{\kappa,i,t-1} + \sum_{\kappa} \beta_{7,\kappa} EP\_DUM_{\kappa,i,t-1} + \varepsilon$
29	Kothari et al. (2005)	$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2 \Delta Sales_{i,t} + \beta_3 GPPE_{i,t} + \beta_4 ROA_{i,t} + \varepsilon$
30	Kothari et al. (2005)	$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{TA_{i,t-1}}\right) + \beta_2\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \beta_3 GPPE_{i,t} + \beta_4 ROA_{i,t} + \varepsilon$
31	Owens et al. (2017)	$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 IdioShock_{i,t} + \varepsilon$
32	Owens et al. (2017)	$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \beta_6 ABNRET_{i,t} + \beta_7 DABNRET_{i,t} + \beta_8 ABNRET * DABNRET_{i,t} + \beta_9 IdioShock_{i,t} + \varepsilon$
33	Owens et al. (2017)	$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 ROA_{i,t} + \beta_4 IdioShock_{i,t} + \varepsilon$
34	Dechow and Dichev (2002)	$\Delta WC_{i,t} = \alpha + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \varepsilon$

Number	Reference	Measure
35	Francis et al. (2005)	$TAcc_{i,t} = \beta_0 + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \beta_4 \Delta Sales_{i,t} + \beta_5 GPPE_{i,t} + \varepsilon$
36	Dechow and Dichev – Ball and Shivakumar (2006)	$\Delta WC_{i,t} = \beta_0 + \beta_1 CFO_{i,t-1} + \beta_2 CFO_{i,t} + \beta_3 CFO_{i,t+1} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \beta_6 ABNRET_{i,t} + \beta_7 DABNRET_{i,t} + \beta_8 ABNRET * DABNRET_{i,t} + \varepsilon$
37	Konstantinidi et al. (2016)	$Acc_{i,t} = \alpha + \beta_1 D_{t-1} + \beta_2 TAcc_{i,t-1} + \beta_3 CFO_{i,t-1} + \beta_4 TAcc_{i,t-1} * D_{t-1} + \beta_5 CFO_{i,t-1} * D_{t-1} + \varepsilon$

Variables as explained in table 2.3

Table 2.3 Variable explanation

Variable Name	Variable Explanation
$TAcc_{i,t-1}$	Lagged total accruals (Total accruals = earnings – cash flows from operating activities)
$TAcc_{i,t}-TAcc_{i,t-1}$	Change in total accruals
$Median(TAcc_{i,t})$	Industry median of total accruals
$\Delta Sales_{i,t}$	Change in sales from t-1 to t
$GPPE_{i,t}$	Gross property, plant and equipment
$\Delta Sales_{i,t}-\Delta Rec_{i,t}$	Change in cash sales
$CA_{i,t-1}$	Lagged current accruals
$\Delta Sales_{i,t,t+1}$	Expected growth in sales
$CFO\_DUM_{\kappa,i,t}$	Cash flow from quantile operations dummy
$\Delta CFO_{i,t}$	Change in cash flow from operations
$BM_{i,t}$	Book-to-market value
$CFO_{i,t}$	Cash flow from operations at t
$CFO_{i,t-1}$	Cash flow from operations at t-1
$CFO_{i,t+1}$	Cash flow from operations at t+1
$DCF_{i,t}$	Dummy CFO +/-
$CFO*DCF_{i,t}$	Interaction between dummy CFO and CFO
$ABNRET_{i,t}$	Abnormal stock return for the year t (based on total return for the total UK market)
$DABNRET_{i,t}$	A dummy variable that takes the value of 1 if ABNRET <0, and equals 0 otherwise
$ABNRET*DABNRET_{i,t}$	Interaction between dummy abnormal stock return and abnormal stock return
$ROA_{i,t}$	Is the return on assets measures as net income divided by total asset for firm i for the year t
$ROA\_DUM_{\kappa,i,t-1}$	ROA at t-1 quantile dummy
$SG\_DUM_{\kappa,i,t-1}$	Sales growth at t-1 Quantile dummy
$MB\_DUM_{\kappa,i,t-1}$	Market-to-book ratio at t-1 Quantile dummy
$MV\_DUM_{\kappa,i,t-1}$	The market value of equity at t-1 Quantile dummy
$EP\_DUM_{\kappa,i,t-1}$	Earnings-to-price ratio at t-1 Quantile dummy
$IdioShock_{i,t}$	Mean of squared residuals of the regressions monthly stock return of firm i for the period of 24 months on firm's i industry weighted return excluding i and weighted monthly return of the market
D_{t-1}	D is a dummy variable that takes the value of 1 if cash flows from operations at time t-1 or change in cash flow from year t and t-1 is negative
$TAcc_{i,t-1}*D_{t-1}$	Interaction between lagged total accruals and Dt-1
$CFO_{i,t-1}*D_{t-1}$	Interaction between cash flows from operations and Dt-1

Table 2.4 Number of average observations per year in each industry classification

	ICB sector	ICB code	Average number of observations per year
1	Oil and Gas	0500	43
2	Basic Resources	1700	32
3	Industrial Goods and Services	2700	221
4	Personal and Household Goods	3700	56
5	Health Care	4500	62
6	Retail	5300	57
7	Media	5500	62
8	Travel and Leisure	5700	65
9	Technology	9500	117
	Total		714

Table 2.5 Correlation matrix between measures winsorised data (1998-2015)

	AA1	AA2	AA3	AA4	AA5	AA6	AA7	AA8	AA9	AA10	AA11	AA12	AA13	AA14
AA2	0.533													
AA3	0.173	0.279												
AA4	0.947	0.531	0.172											
AA5	0.898	0.513	0.176	0.924										
AA6	0.929	0.511	0.174	0.925	0.937									
AA7	0.902	0.507	0.172	0.947	0.964	0.973								
AA8	0.903	0.510	0.176	0.928	0.993	0.931	0.957							
AA9	0.932	0.509	0.175	0.928	0.932	0.992	0.966	0.939						
AA10	0.906	0.505	0.174	0.950	0.959	0.967	0.993	0.965	0.973					
AA11	0.879	0.476	0.178	0.883	0.890	0.937	0.915	0.894	0.941	0.919				
AA12	0.781	0.427	0.165	0.806	0.874	0.810	0.834	0.878	0.814	0.838	0.792			
AA13	0.875	0.480	0.179	0.880	0.887	0.933	0.912	0.890	0.938	0.915	0.995	0.788		
AA14	0.855	0.469	0.170	0.864	0.870	0.914	0.895	0.872	0.918	0.898	0.975	0.774	0.980	
AA15	0.879	0.481	0.174	0.874	0.885	0.944	0.920	0.880	0.937	0.914	0.892	0.774	0.889	0.870
AA16	0.867	0.429	0.162	0.870	0.873	0.923	0.904	0.878	0.930	0.910	0.890	0.784	0.887	0.868
AA17	0.837	0.447	0.177	0.845	0.854	0.893	0.878	0.859	0.899	0.883	0.951	0.769	0.946	0.930
AA22	0.807	0.444	0.178	0.818	0.832	0.867	0.856	0.827	0.862	0.850	0.921	0.748	0.916	0.902
AA23	0.851	0.480	0.179	0.894	0.914	0.914	0.937	0.908	0.909	0.930	0.957	0.808	0.954	0.937
AA24	0.775	0.434	0.171	0.816	0.834	0.831	0.854	0.829	0.828	0.849	0.882	0.756	0.880	0.866
AA29	0.757	0.461	0.130	0.792	0.809	0.816	0.839	0.804	0.810	0.833	0.714	0.668	0.712	0.699
AA30	0.755	0.456	0.131	0.790	0.799	0.804	0.826	0.805	0.811	0.833	0.709	0.671	0.707	0.694
AA31	0.923	0.508	0.171	0.920	0.931	0.994	0.968	0.925	0.986	0.961	0.931	0.805	0.927	0.909
AA32	0.769	0.432	0.169	0.810	0.828	0.825	0.848	0.823	0.821	0.843	0.875	0.751	0.873	0.861
AA33	0.781	0.487	0.140	0.798	0.825	0.842	0.844	0.818	0.836	0.838	0.741	0.687	0.739	0.723
AA35	0.774	0.391	0.170	0.791	0.804	0.833	0.827	0.799	0.829	0.822	0.887	0.743	0.882	0.869
AA37	0.831	0.559	0.200	0.848	0.822	0.842	0.836	0.826	0.847	0.841	0.888	0.731	0.885	0.868

Measure numbers are as defined in tables 2.1 and 2 2

	AA15	AA16	AA17	AA22	AA23	AA24	AA29	AA30	AA31	AA32	AA33	AA35
AA16	0.894											
AA17	0.889	0.867										
AA22	0.900	0.843	0.935									
AA23	0.871	0.866	0.921	0.904								
AA24	0.864	0.822	0.900	0.956	0.919							
AA29	0.719	0.711	0.653	0.620	0.737	0.603						
AA30	0.706	0.710	0.648	0.608	0.725	0.591	0.992					
AA31	0.938	0.918	0.887	0.862	0.909	0.827	0.813	0.801				
AA32	0.858	0.815	0.892	0.949	0.912	0.992	0.599	0.587	0.831			
AA33	0.746	0.740	0.680	0.651	0.755	0.629	0.961	0.952	0.847	0.631		
AA35	0.831	0.885	0.895	0.887	0.879	0.867	0.599	0.589	0.827	0.860	0.629	
AA37	0.822	0.816	0.869	0.862	0.874	0.836	0.672	0.670	0.838	0.832	0.702	0.833

Only working capital accrual measures

	WC	WC_AVG	AA18	AA19	AA20	AA21	AA25	AA26	AA27	AA28	AA34
WC_AVG	0.954										
AA18	0.932	0.905									
AA19	0.951	0.921	0.970								
AA20	0.958	0.927	0.963	0.990							
AA21	0.920	0.889	0.908	0.930	0.920						
AA25	0.847	0.825	0.908	0.891	0.884	0.838					
AA26	0.759	0.732	0.775	0.761	0.769	0.723	0.812				
AA27	0.794	0.774	0.851	0.836	0.830	0.790	0.937	0.749			
AA28	0.797	0.776	0.842	0.826	0.832	0.783	0.923	0.757	0.985		
AA34	0.861	0.894	0.843	0.849	0.860	0.830	0.784	0.690	0.739	0.742	
AA36	0.817	0.846	0.818	0.806	0.817	0.790	0.770	0.676	0.729	0.732	0.945

Measure numbers are as defined in tables 2.1 and 2.2, WC is working capital accruals measured as change in current assets - change current liabilities - change in cash + change in short-term loans scaled by lagged total assets. While WC_AVG is working capital accruals scaled by average total assets.

Table 2.6 Average adjusted $\boldsymbol{R^2}$ by industry and measure

Measure Number		(4)	(6)	(7)	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)	(19)	(20)	(21)	(22)
Independent Variables		1	2	3	2	3	2	3	4	6	3	4	2	2	2	5
	500	6.4%	4.2%	10.9%	6.0%	12.4%	4.9%	14.5%	16.1%	4.7%	10.5%	12.1%	3.5%	12.8%	19.1%	13.8%
	1700	7.7%	6.0%	13.9%	5.5%	13.0%	5.0%	9.8%	11.4%	5.2%	17.2%	14.6%	7.0%	20.0%	19.1%	13.1%
	2700	2.3%	6.7%	9.5%	5.4%	8.1%	3.4%	7.2%	8.2%	12.0%	17.8%	5.8%	5.3%	8.1%	12.1%	12.2%
	3700	11.0%	17.2%	23.5%	15.1%	21.4%	18.3%	27.0%	32.8%	38.4%	37.9%	33.6%	12.5%	18.1%	15.7%	46.7%
Industry	**4500**	5.3%	3.5%	6.8%	3.1%	6.4%	1.3%	6.4%	7.7%	3.6%	14.2%	4.2%	7.1%	11.5%	21.5%	6.0%
	5300	7.6%	5.0%	11.2%	4.9%	10.9%	5.7%	12.7%	16.2%	15.7%	24.0%	15.6%	3.8%	9.6%	12.2%	23.6%
	5500	4.5%	4.0%	6.6%	3.2%	6.2%	-0.2%	6.0%	10.5%	11.0%	11.6%	9.6%	6.5%	10.4%	13.1%	15.1%
	5700	8.3%	7.7%	13.2%	7.7%	13.1%	5.4%	15.6%	17.5%	19.8%	20.5%	17.9%	7.8%	12.9%	13.8%	27.0%
	9500	3.9%	4.0%	7.1%	2.5%	5.4%	1.8%	6.1%	7.2%	6.7%	13.0%	5.0%	4.9%	5.8%	13.7%	10.2%
Measures		(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)
Independent Variables		5	8	14	14	22	22	4	4	3	9	4	3	5	8	4
	500	8.7%	21.2%	10.3%	17.6%	11.7%	16.1%	43.4%	45.7%	3.9%	20.9%	38.8%	18.5%	19.8%	24.5%	12.2%
	1700	11.8%	23.9%	17.6%	17.3%	14.9%	12.5%	59.1%	58.6%	7.2%	26.6%	52.0%	26.1%	25.9%	32.8%	15.1%
	2700	8.1%	15.3%	9.4%	8.3%	10.9%	9.9%	34.0%	33.9%	7.0%	15.6%	32.2%	11.1%	19.9%	14.7%	11.6%
	3700	24.2%	54.7%	25.6%	22.6%	29.2%	26.3%	32.2%	31.1%	17.4%	54.4%	27.9%	28.2%	50.8%	37.5%	28.6%
Industry	**4500**	5.8%	8.3%	9.0%	5.7%	5.4%	1.7%	26.4%	26.9%	3.4%	8.1%	24.0%	15.0%	12.6%	19.4%	6.7%
	5300	13.7%	32.9%	13.2%	13.0%	15.7%	15.4%	36.1%	36.0%	5.1%	33.0%	30.5%	16.3%	31.4%	21.8%	18.6%
	5500	2.2%	15.0%	12.1%	13.0%	9.7%	10.4%	35.3%	35.5%	3.9%	14.9%	32.6%	19.0%	16.7%	22.4%	11.6%
	5700	11.3%	34.9%	16.1%	18.1%	16.1%	18.1%	34.2%	34.1%	7.9%	35.2%	29.9%	18.6%	24.8%	25.3%	25.8%
	9500	7.0%	13.8%	6.3%	6.8%	6.2%	6.9%	29.6%	29.6%	3.8%	13.5%	26.6%	13.0%	17.6%	15.6%	8.4%

Industry classification is as defined in table 2.1. Measure numbers are as defined in tables 2.1 and 2.2 above

Table 2.7 Average adjusted $\boldsymbol{R^2}$ per industry

ICB Code	Mean	Std Dev	Max	Min
500	15.51%	10.85%	45.7%	3.5%
1700	18.99%	14.60%	59.1%	5.0%
2700	12.19%	8.23%	34.0%	2.3%
3700	28.66%	11.79%	54.7%	11.0%
4500	9.57%	7.27%	26.9%	1.3%
5300	17.05%	9.79%	36.1%	3.8%
5500	12.41%	9.06%	35.5%	-0.2%
5700	18.62%	8.93%	35.2%	5.4%
9500	10.07%	7.48%	29.6%	1.8%

Industry classification is as defined in table 2.1

Table 2.8 Pearson Correlation matrix abnormal accruals and lagged abnormal accruals winsorised data for the period from 1998 to 2015: **total accruals measures**

	AA1	AA2	AA3	AA4	AA5
AA (t-1)	0.154***	-0.305***	-0.332***	0.132***	0.146***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.118***	-0.00719	-0.0651***	0.102***	0.104***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.086***	-0.0129	-0.0280**	0.0757***	0.0741***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.066***	0.00404	0.0665***	0.0611***	0.0588***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.078***	-0.00722	-0.0353***	0.0733***	0.0678***
Obs	5,832	5,832	5,832	5,832	5,832

	AA6	AA7	AA8	AA9	AA10
AA (t-1)	0.124***	0.117***	0.150***	0.129***	0.122***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.0903***	0.0857***	0.102***	0.0926***	0.0872***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.0638***	0.0587***	0.0703***	0.0644***	0.0596***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.0480***	0.0428***	0.0541***	0.0445***	0.0408***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.0662***	0.0607***	0.0624***	0.0619***	0.0601***
Obs	5,832	5,832	5,832	5,832	5,832

	AA11	AA12	AA13	AA14	AA15
AA (t-1)	0.135***	0.169***	0.127***	0.123***	0.125***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.0946***	0.123***	0.0935***	0.0892***	0.0843***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.0602***	0.0952***	0.0574***	0.0575***	0.0555***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.0547***	0.0566***	0.0547***	0.0563***	0.0391***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.0632***	0.0664***	0.0588***	0.0631***	0.0476***
Obs	5,832	5,832	5,832	5,832	5,832

** $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Measure numbers are as defined in tables 2.1 and 2.2*

Pearson correlation matrix abnormal accruals and lagged abnormal accruals winsorised data for the period from 1998 to 2015: **total accruals measures**

	AA16	AA17	AA22	AA23	AA24
AA (t-1)	0.197***	0.155***	0.136***	0.119***	0.139***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.0915***	0.0953***	0.0846***	0.0820***	0.0825***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.0657***	0.0626***	0.0523***	0.0503***	0.0473***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.0484***	0.0478***	0.0575***	0.0526***	0.0490***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.0747***	0.0517***	0.0573***	0.0564***	0.0508***
Obs	5,832	5,832	5,832	5,832	5,832

	AA29	AA30	AA31	AA32	AA33
AA (t-1)	0.173***	0.180***	0.124***	0.137***	0.165***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.167***	0.171***	0.0852***	0.0781***	0.153***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.140***	0.143***	0.0634***	0.0460***	0.136***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.122***	0.122***	0.0467***	0.0475***	0.112***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.116***	0.119***	0.0617***	0.0513***	0.108***
Obs	5,832	5,832	5,832	5,832	5,832

	AA35	AA37
AA (t-1)	0.192***	-0.0117
Obs	11,056	11,056
AA (t-2)	0.0942***	0.0490***
Obs	9,513	9,513
AA (t-3)	0.0600***	0.0346***
Obs	8,140	8,140
AA (t-4)	0.0654***	0.0420***
Obs	6,913	6,913
AA (t-5)	0.0675***	0.0486***
Obs	5,832	5,832

** $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Measure numbers are as defined in tables 2.1 and 2.2*

Pearson correlation matrix abnormal accruals and lagged abnormal accruals winsorised data for the period from 1998 to 2015: **working capital accrual measures**

	AA18	AA19	AA20	AA21	AA25
AA (t-1)	-0.174***	-0.189***	-0.177***	-0.182***	-0.165***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.0191*	0.0204**	0.0164	0.0244**	0.0155
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	-0.00333	-0.00522	-0.00474	0.00326	-0.00443
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	-0.00709	-0.0106	-0.0119	-0.0157	-0.0117
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.0154	0.00747	-0.177***	0.00535	0.00672
Obs	5,832	5,832	5,832	5,832	5,832

	AA26	AA27	AA28	AA34	AA36
AA (t-1)	-0.134***	-0.153***	-0.147***	-0.143***	-0.137***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.0194*	0.0136	0.0169*	0.0208**	0.0222**
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.00477	0.000649	0.00274	-0.0175	-0.0162
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	-0.0116	-0.0161	-0.0159	-0.0295**	-0.0238**
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	-0.00408	0.0152	0.00700	0.00549	0.00321
Obs	5,832	5,832	5,832	5,832	5,832

** $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Measure numbers are as defined in tables 2.1 and 2.2*

Table 2.9 Spearman correlation matrix abnormal accruals and lagged abnormal accruals winsorised data for the period from 1998 to 2015: **total accruals measures**

	AA1	AA2	AA3	AA4	AA5
AA (t-1)	0.246***	-0.355***	-0.337***	0.212***	0.213***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.182***	-0.00404	-0.00719	0.162***	0.166***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.155***	-0.0115	-0.00842	0.140***	0.137***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.148***	-0.00203	-0.00975	0.140***	0.131***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.152***	-0.0166	0.00396	0.132***	0.125***
Obs	5,832	5,832	5,832	5,832	5,832

	AA6	AA7	AA8	AA9	AA10
AA (t-1)	0.168***	0.168***	0.213***	0.172***	0.173***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.133***	0.128***	0.163***	0.134***	0.128***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.104***	0.104***	0.132***	0.104***	0.103***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.109***	0.109***	0.121***	0.103***	0.103***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.0990***	0.0935***	0.117***	0.0933***	0.0894***
Obs	5,832	5,832	5,832	5,832	5,832

	AA11	AA12	AA13	AA14	AA15
AA (t-1)	0.175***	0.231***	0.168***	0.166***	0.167***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.136***	0.183***	0.134***	0.125***	0.113***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.101***	0.157***	0.0971***	0.102***	0.0871***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.101***	0.132***	0.0982***	0.0995***	0.0817***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.103***	0.138***	0.0973***	0.0993***	0.0663***
Obs	5,832	5,832	5,832	5,832	5,832

** $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Measure numbers are as defined in tables2.1 and 2.2*

Spearman correlation matrix abnormal accruals and lagged abnormal accruals winsorised data for the period from 1998 to 2015: **total accruals measures**

	AA16	AA17	AA22	AA23	AA24
AA (t-1)	0.265***	0.190***	0.202***	0.164***	0.204***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.145***	0.127***	0.129***	0.127***	0.133***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.119***	0.0906***	0.0994***	0.105***	0.0989***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.107***	0.0803***	0.0953***	0.104***	0.0931***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.0947***	0.0782***	0.0952***	0.0974***	0.0801***
Obs	5,832	5,832	5,832	5,832	5,832

	AA29	AA30	AA31	AA32	AA33
AA (t-1)	0.232***	0.239***	0.161***	0.198***	0.217***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.209***	0.211***	0.124***	0.123***	0.201***
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.187***	0.188***	0.0994***	0.0934***	0.177***
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.184***	0.184***	0.103***	0.0892***	0.170***
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.165***	0.169***	0.0903***	0.0787***	0.160***
Obs	5,832	5,832	5,832	5,832	5,832

	AA35	AA37
AA (t-1)	0.285***	0.0467***
Obs	11,056	11,056
AA (t-2)	0.151***	0.0870***
Obs	9,513	9,513
AA (t-3)	0.114***	0.0597***
Obs	8,140	8,140
AA (t-4)	0.123***	0.0783***
Obs	6,913	6,913
AA (t-5)	0.116***	0.0777***
Obs	5,832	5,832

** $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Measure numbers are as defined in tables 2.1 and 2.2*

Spearman correlation matrix abnormal accruals and lagged abnormal accruals winsorised data for the period from 1998 to 2015: **working capital accrual measures**

	AA18	AA19	AA20	AA21	AA25
AA (t-1)	-0.0936***	-0.103***	-0.0991***	-0.0915***	-0.0871***
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.0225**	0.0174*	0.0190*	0.0283***	0.0120
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	-0.00541	-0.00103	-0.00698	0.0109	-0.00145
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	0.00425	0.00419	0.00485	-0.00575	0.00413
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.0126	0.00915	0.0213	0.00686	0.00799
Obs	5,832	5,832	5,832	5,832	5,832

	AA26	AA27	AA28	AA34	AA36
AA (t-1)	-0.0720***	-0.0785***	-0.0763***	-0.0201**	-0.0215**
Obs	11,056	11,056	11,056	11,056	11,056
AA (t-2)	0.00316	0.00866	0.00390	0.0233**	0.0218**
Obs	9,513	9,513	9,513	9,513	9,513
AA (t-3)	0.0106	0.00315	0.00667	0.00116	0.00447
Obs	8,140	8,140	8,140	8,140	8,140
AA (t-4)	-0.00128	0.00917	0.00211	-0.0125	-0.00349
Obs	6,913	6,913	6,913	6,913	6,913
AA (t-5)	0.00424	0.00925	0.00804	0.0122	0.00984
Obs	5,832	5,832	5,832	5,832	5,832

** $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Measure numbers are as defined in tables 2.1 and 2.2*

Chapter 3

Dividend-Paying Firms and Earnings Management

3.1 Introduction

The previous chapter discusses the reliability of using measures of abnormal accruals to proxy for earnings management, in terms of comparing different measures of abnormal accruals as well as the persistence of those measures. It is concluded that abnormal accruals are not reliable measures of earnings management and do not differ a lot from total accruals or working capital accruals.

To further investigate the reliability of measures of abnormal accruals as proxies for earnings management, this thesis investigates the relationship between earnings management and various scenarios in the UK. This is done via replicating studies that use measures of abnormal accruals as proxies for earnings management, then altering how abnormal accruals are estimated. Because of the persistence of some measures of abnormal accruals, placebo tests are also used to examine the reliability of using measures of abnormal accruals as proxies for earnings management.

This chapter discusses the first scenario which involves a replication of Atieh and Hussain (2012). This paper deals with the relationship between dividend-paying firms and earnings management, specifically when pre-managed earnings are less than the expected level of dividends (referred to as 'deficit' by the authors). The reasons for choosing Atieh and Hussain (2012) to replicate are as follows. First, the paper uses the UK data and uses measures of abnormal accruals as the proxy for earnings management in the UK. Second, the databases required are available at Nottingham University. Third, the paper uses abnormal accruals as the dependent variable of the second stage analysis, not as an independent variable. Finally, it is published in a high-ranked journal and is relatively recent.

3.1.1 Motives, aims, and objectives

Atieh and Hussain (2012) study the relationship between dividend-paying firms and earnings management, specifically when pre-managed earnings are less than the expected level of dividends. The main motive of this study is related to dividend restrictions as a common covenant in debt contracts, and to identify whether expected dividend levels are considered as an important threshold for managers to manage earnings to meet and beat. Thus, this study aims to understand the relationship between firms that pay dividends and earnings management. Also, earnings management by non-dividend paying firms that manage earnings to avoid reporting a loss is considered. To achieve this aim, the study sets an objective in which it tests whether dividend-paying firms are likely to manage earnings when pre-managed earnings are less than the expected divided payment.

3.1.2 Theory

The study being replicated is based on two main theoretical concepts. The first is managers' reluctance to cut dividend payments to investors as it sends a negative signal that the firm is not performing well, as dividends are one of the main concerns of investors (DeAngelo and DeAngelo, 2006). The second theoretical concept relates to earnings management and the flexibility in accounting standards allowing managers to manage earnings so that dividend thresholds in debt covenants are met. One of the incentives for earnings management is the existence of specific dividends restrictions in debt covenants, thus, managers will seek to manage earnings to keep paying such dividends and meeting this threshold (Daniel et al., 2008). This follows the earnings management literature as explained earlier in chapter 2, in particular motives to manage earnings in section 2.2.2, where managers have an incentive to manage earnings to achieve dividend thresholds.

3.1.3 Methodology

To achieve this objective, Atieh and Hussain (2012) examine all UK firms listed on the Main Market and AIM of the London Stock Exchange, both active and non-active, for the period from 1994 to 2004. The methodology used by Atieh and Hussain (2012) involves a two-stage regression, the first of which estimates abnormal accruals as a proxy for earnings management. They then estimate pre-managed earnings, calculated as the difference between earnings and abnormal accruals. The second stage involves a logit regression that studies the effect that having a 'deficit' will have on the earnings management of a firm (the main experimental variable), where 'deficit' is the difference between pre-managed earnings and expected dividends (a 'deficit' occurs when pre-managed earnings are less than expected levels of dividends). For a non-dividend-paying firm, the 'deficit' indicates whether a firm's pre-managed earnings are less than zero, indicating the firm will make a loss in the absence of earnings management. Hence, Atieh and Hussain (2012) also study whether non-dividend paying, 'deficit', firms manage earnings to avoid declaring a loss by including an interaction term between deficit and a dummy variable capturing whether the firm is a non-dividend payer. This is explained in more detail in the methodology section.

3.1.4 Main findings

The original researchers find that firms that pay dividends are more likely to manage earnings upwards when pre-managed earnings show a deficit. However, firms that do not pay dividends are also more likely to manage earnings to avoid reporting a loss than firms that pay dividends and manage earnings when their pre-managed earnings are less than expected dividends. They also point out that abnormal accruals measures based upon working capital accruals are more capable of revealing earnings management than abnormal accruals measures based upon total accruals.

3.1.5 Replication

Studies in the UK with regard to dividend payments suggest the following. First, payment of dividends is relatively prevalent amongst UK firms, and such payments are sticky once they are introduced by the firm. Second, when dividend-paying firms' performance is poor, they are motivated to manage earnings to meet the existing dividend coverage ratio (defined as earnings divided by the dividend payment). Third, having debt contracts from banks may lead to threats of restrictions on dividend payment (Atieh and Hussain, 2012).

Therefore, following the findings by Daniel et al. (2008) in the US and Atieh and Hussain (2012) in the UK, this chapter tests hypothesis 10 in section 2.4 above by examining if there is a significant positive relationship between firms that pay dividends and upwards earnings management when the firms' pre-managed earnings are lower than the expected dividend. This is done using different measures of abnormal accruals to proxy for earnings management, and also uses placebo tests, to examine the reliability of abnormal accruals measures, by seeing whether the results of the paper are robust to changing definitions of abnormal accruals, and other methodological changes.

This thesis chooses to replicate this study as it is from a high-ranking journal, uses UK data, and uses abnormal accruals to proxy for earnings management, and access to data is available. First, this study is replicated using the same measures as the paper in estimating normal accruals. The time period used by Atieh and Hussain (2012 is from 1994 to 2004. This thesis uses data from 1998 to 2015. Because conclusions in terms of the findings concerning the experimental variables are the same, in terms of their significance and sign, as in Atieh and Hussain (2012), the sample period is considered as sufficient for the replication and, therefore, the sample is not increased to include older years. In addition, placebo tests are performed to measure the reliability of the methods used to estimate abnormal accruals.

This replication finds the same results, in terms of significance and sign of the key experimental variables, when the same research design and methods in estimating normal accruals as the original paper are used. In addition, when using the 37 different methods to estimate abnormal accruals identified in chapter 2, the significance and sign of the coefficients of the key experimental variables do not change.

To further examine the reliability of the abnormal accruals measures in capturing earnings management, placebo tests are performed. Placebo tests include the use of lagged and lead abnormal accruals as the measure of earnings management, where, in theory, they should not be related to the experimental variables. Almost all lagged and lead abnormal accrual results derived from total accruals-based measures give similar results in terms of the significance and sign of the experimental variables of the study, while all lagged and lead abnormal accruals measures from working capital accruals-based abnormal earnings measures give different results in terms of significance and sign. In addition, when using total accruals and accrual working capitals as the measure of manipulation, the results do not significantly change from the original paper's findings.

3.1.6 Contribution

This chapter contributes first in terms of the methods used in estimating earnings management, whereby the methods used to estimate abnormal accruals do not have an effect on the overall conclusions of the study. This can be explained in at least two ways, one of which is that all of the methods used estimate earnings management equally well, another being that they are all similarly bad at estimating earnings management. Nonetheless, in this replication it does not make a difference which abnormal accruals measure is used, whether they are older or more recently developed measures, or whether total accruals or working capital accruals are used; the results are robust to the choice of measure.

This chapter also contributes by responding to the suggestion by Ball (2013) to find different reasons for the results that have nothing to do with earnings management, as it is a good practice for researchers to assume that there are agency costs, and managers are not free to manage earnings entirely as they please (Ball, 2013). Given that the use of total accruals to proxy for earnings management gives the same results as using abnormal accruals measures, another explanation could be that the results are caused by something other than earnings management. When calculating pre-managed earnings using total accruals, the calculation is earnings minus total accruals, which is equal to cash flow from operations. Hence, one could interpret the results as follows: if a firm that pays dividends has cash flows lower than those dividends yet still goes ahead and pays them, it does so because profits exceed dividends (and, hence, total accruals are positive) which could be interpreted as firms having earnings exceeding their dividends. This is an explanation that has nothing to do with earnings management.

3.1.7 Chapter structure

This chapter is organised as follows: section 3.2 discusses the literature on the relationship between dividend paying firms and earnings management; section 3.3 the methodology; section 3.4 the replication design; section 3.5 the data used; section 3.6 the results of Atieh and Hussain (2012) compared to the replication results and placebo tests; and section 3.7 the summary of the chapter.

3.2 Related literature

The literature related to the relationship between earnings management and firms that pay dividends is built on two main theoretical underpinnings. The first is managers' unwillingness to cut dividend payments as it sends a negative signal about the firm, and dividends are one of the main concerns of investors (DeAngelo and DeAngelo, 2006). The second is the flexibility in accounting standards that allows managers to manage earnings so that any dividend restriction in debt covenants is met. This relationship is examined by Daniel et al. (2008) in the US and Atieh and Hussain (2012) in the UK. Thus, the main motive of these studies is related to dividend restrictions as a common covenant in debt contracts. Such covenants usually determine the ceiling for the amount that can be paid as dividend in relation to the level of reported earnings of the firm. Thus, managers have an incentive to manage earnings to meet this threshold.

Since Lintner (1956), it is evident that managers of dividend-paying firms are usually reluctant to cut their dividend payments. Managers may go to extreme lengths to avoid doing so. For example, the survey study by Brav et al. (2005) suggests that CFOs (chief financial officers) are willing to provide cash to pay dividends regardless of whether this means that they have to lay off some employees, sell assets or even borrow funds. Such behaviour is consistent with the findings in DeAngelo and DeAngelo (2006) that dividends are the single most important thing to investors. In the US, there are restrictions on dividends payments in debt contract, this restriction being determined based on the firm's level of earnings. For that reason, managers may consider managing earnings when pre-managed earnings are less than the expected dividend payment. This is because firms feel pressured to maintain dividend payments even at a time when earnings are weak. In particular managers are pressured to maintain the dividend coverage ratio. Also, firms that do not pay dividends are incentivised to manage earnings to avoid reporting a loss (Daniel et al., 2008).

As explained earlier in chapter 2.2.2, managers have various motives to manage earnings. Such motives include meeting analysts' earnings forecasts (DeGeorge et al., 1999) or avoiding reporting a loss (Burgstahler and Dichev, 1997). Daniel et al. (2008) and Atieh and Hussain (2012) add to this literature by examining dividends as one of the important thresholds that motivate managers to manage earnings. It is argued that one of the motives of managers to manage earnings is to avoid broaching covenants in debt contracts and dividend payment restrictions are one of the most common covenants in debt contracts. Therefore, managers are likely to manage earnings to meet this threshold.

Historically, dividend payments are more prevalent in UK firms than they are in the US, and the reason for that is that the UK has more favourable tax treatments on dividends, and it is also due to the preference of institutional investors in the UK (Ferris et al., 2006). Trojanowski and Renneboog (2005)show that four out of five firms in the UK pay dividends compared to one in four firms in the US during the 90's. Studies in the UK report that once a firm starts paying dividends to their shareholders, the dividends exhibit what is referred to as 'nominal stickiness' (Atieh and Hussain, 2012). Firms like to maintain the dividend payments to shareholders, which in turn may require firms to manage earnings if dividend thresholds are not met. The study by Atieh and Hussain (2012) examines the relationship between firms that pay dividends and earnings management in the UK, where they argue that if a firm pays dividends then they are likely to manage earnings to meet the dividend threshold, particularly when pre-managed earnings (which are measured as earnings minus abnormal accruals) are less than the expected dividend payment (measured as last year's dividend payment). These assumptions follow a US-based study by Daniel et al. (2008).

3.3 Methodology

Atieh and Hussain (2012) examine all FTSE UK firms listed on the London Stock Exchange, excluding financial and utilities firms, for the period from 1994 to 2004. Almost all of the data is obtained from Datastream. They use three methods to estimate normal accruals, from which abnormal accruals are then identified; these are the Jones (1991) measure (measure number 5 in tables 2.1 and 2.2 in chapter 2), the Dechow et al. (1995) measure (measure number 8 in tables 2.1 and 2.2 in chapter 2), and the working capital accruals Jones measure (measure number 20 in tables 2.1 and 2.2 in chapter 2). The measures are estimated using a cross-sectional approach per industry per year, where abnormal accruals are the residual of the regression. All the data is trimmed at the 1st and 99th percentile, consistent with Daniel et al. (2008).

Following Daniel et al. (2008), pre-managed earnings (PME) are defined as the difference between earnings and abnormal accruals. Expected dividends are measured as last year's dividend payment (EDIV). Using these two variables, the original authors calculate the deficit as the difference between expected dividends and pre-managed earnings, with a minimum value of 0. Therefore, the deficit will equal 0 if the pre-managed earnings are higher than expected dividends; however, when expected dividends are higher than pre-managed earnings, the deficit is positive.

DEFICIT=Max [0, {EDIV – PME}]

The authors amend the original paper by Daniel et al. (2008) by including a measure for financial distress as a possible determinant for managers to manage earnings (Butler et al., 2004). Financial distress is measured as the probability of bankruptcy, which is calculated as follows:

$$\ln\left(\frac{PB}{1-PB}\right) = 12.38F1 - 20.96F2 - 3.01F3 - 7.17$$

This method is derived from Charitou et al. (2004), who study UK non-financial firms, where PB is the probability of bankruptcy one year ahead, F1 is total liabilities/total assets, F2 is earnings before interest and tax/total liabilities, and F3 is cash flows from operations/total liabilities.

The main logit analysis of the study by Atieh and Hussain (2012) is as follows:

$$\text{PosAcc} = \alpha + \beta_1 Deficit_{i,t} + \beta_2 (Deficit * Nonpayer)_{i,t} + \beta_3 Nonpayer_{i,t} + \sum_{j=1}^{6} \beta_6 . C_j$$

PosAcc takes the value of 1 if abnormal accruals (generated from the three accrual methods) are positive, and 0 otherwise. The deficit is the difference between the expected dividend (lagged dividend) and pre-managed earnings. If the deficit is negative, it is replaced with 0. Nonpayer is a dummy variable that takes the value of 1 if firms do not pay a dividend; and 0 otherwise. Control variables in this study are firm size (the natural logarithm of the lagged market value of equity); book-to-market value (measured as the lagged book value of equity-to-market ratio); gearing (measured as the lagged ratio of debt to total assets); retained earnings (measured as lagged retained earnings to total assets) and finally earnings (measured as lagged reported earnings to total assets).

3.4 Replication design

Below are the steps of the replication performed of the study performed by Atieh and Hussain (2012):

- Step one: Use all measures from equations 1-37 (chapter 2) to estimate normal accruals per year per ICB industry classification. Normal accrual estimates are deducted from actual accruals to estimate abnormal accruals defined as AA1-AA37; numbering is according to the measures in table 2.2 in chapter 2, which shows the measure number and the reference for the measure.
- Step two: Pool all abnormal accruals from cross-sectional regressions into one dataset, creating a pooled dataset.
- Step three: Follow the methodology described earlier using the same methods of estimating normal accruals and obtain abnormal accruals using the same methods indicated in Atieh and Hussain (2012).

- Step four: Use the abnormal accruals measures generated from the different measures identified in chapter 2 in the second-stage regression; then compare results with Atieh and Hussain's (2012) results for experimental variables in terms of significance and sign.
- Step five: rerun the second stage of the replicated study using total accruals and working capital accruals instead of the abnormal accruals measures as proxies for earnings management. Compare the results with those in Atieh and Hussain (2012) and for the other abnormal accruals measures for the coefficients of the key experimental variables in terms of their significance and sign.
- Step six: For a placebo test, use lead and lagged abnormal accruals as measures of earnings management. Compare the results with those in Atieh and Hussain (2012) for the experimental variables, in terms of the significance and sign of their coefficients.

3.5 Data

This study follows the data collection processes explained by Atieh and Hussain (2012) with the exception of one of the control variables, executive cash compensation (salary including bonus), which takes the value of 1 if the firm has one of the highest values for executive cash compensation for UK to 20 firms in the year 2004 and 0 otherwise. This variable is not available from Datastream. The variable is obtained from *The Guardian* newspaper's website in the year 2007 by the original authors, where they identify the top 35 salaries of executives in UK firms in 2004. They identify 20 firms where executives were highly rewarded. Obtaining this information is not possible after more than ten years. Therefore, the replication is performed excluding this variable.

This replication is performed using the same data sources as Atieh and Hussain (2012) - Datastream; it uses a different time period, however, as the original paper's sample period is from 1994 to 2004 while the time period of the replication is from 1998 to 2015. Because the conclusions in terms of the findings of the main logit analysis for the experimental variables, deficit and the interaction with the dummy non payers, are the same, in terms of the significance and sign of the coefficients, as in Atieh and Hussain (2012), the sample period is considered as suitable for the replication and, therefore, the sample is not increased to include older years. Initially, the replication is performed using the same methods described by the authors, using all FTSE firms for the period from 1998 to 2015, with trimming at the 1% and 99% levels. Then, the replication is performed using all available UK data for the same time period. Finally, the analysis is replicated using a single sample for estimating abnormal accruals for all the 37 measures identified in chapter 2. The reason for this approach is to use a common sample in order to focus solely on the effects of changing measures of abnormal accruals on the results of the analysis. Hence, all 37 measures identified earlier in chapter 2 are used to estimate abnormal accruals are extracted from the same sample. Consequently, as described in the previous chapter, all industries with less than 30 average year observations are excluded. Consequently, nine industry classifications are used. Table 3.1 shows the average number of observations per year for the period from 1998 to 2015, and the final sample size is 12,850 firm-year observations.

[INSERT TABLE 3.1]

3.6 Results

The main logit analysis concerns the probability of a firm reporting positive abnormal accruals in relation to pre-managed earnings, firms that have a deficit (pre-managed earnings less than expected earnings), as defined earlier in the chapter, firms that do not pay dividends, and the interaction between deficit and firms that do not pay dividends. The authors find that the probability of a firm having positive abnormal accruals (earnings management) increases when the deficit is higher; while the probability of a firm having abnormal accruals (earnings management) decreases with the level of the pre-managed earnings and if the firm is a nonpayer (the significance and sign of the interaction between deficit and nonpayer is not consistent across all second stage regressions of Atieh and Hussain (2012) - for example, when bankruptcy is included as a control variable, the interaction is not significant, see table 3.2). Table 3.2 below is extracted from two tables (table 5 on page 86 and table 6 on page 88 of Atieh and Hussain (2012)) and provides, for comparison, the results taken from Atieh and Hussain (2012).

When using the same methods of estimating abnormal accruals as Atieh and Hussain (2012), and other methods of estimating abnormal accruals (identified in chapter 2), all conclusions in terms of the significance and sign of the coefficients for the main experimental variable of interest, deficit, are materially the same. When trimming or winsorising the sample, the conclusions in terms of significance and sign of the coefficients of the experimental variables do not differ. Findings are robust when the full data and when one sample is used (one sample in the estimation of all measures, meaning that a matching sample size is used to estimate accrual-based measures to reduce the possibility of a sampling effect on the results when all abnormal accruals measures are used). When total accruals or working capital accruals are used as measures of manipulation, the significance and sign of the experimental variables do not differ from the findings in Atieh and Hussain (2012). Table 3.3 shows the results when using the same methods as Atieh and Hussain (2012), and table 3.4 shows the results of the main experimental variable, which is deficit, when using different measures for abnormal accruals (the 37 measures identified in chapter 2 where each measure of abnormal accruals is estimated according to methods described in tables 2.2).

[INSERT TABLES 3.2, 3.3 AND 3.4]

The findings support the hypothesis of a significant positive relationship between firms that pay dividends and upwards earnings management when the firms' pre-managed earnings are in lower than the expected dividend. The results are consistent and robust to the use of different measures of abnormal accruals, as well as using total accruals and working capital accruals as the measures of earnings manipulation. Thus, the method used in estimating abnormal accruals has no effect on the significance and sign of the experimental variables of the study - the findings are robust to any method of estimating earnings manipulation. Even when total accruals and working capital accruals are used, the results do not differ in terms of the significance and sign of coefficients of the experimental variables. Overall, the methods used to estimate abnormal accruals do not make a difference to the relationship being examined.

Finally, when using placebo tests - lagged and lead abnormal accruals, as proxies for earnings management, it is not expected that any relationship with the main experimental variable, deficit, should be found. Using this placebo test, pre-managed earnings is calculated as the difference between earnings and lead/lagged abnormal accruals as a proxy for earnings management. In the second logit regression, that tests for the effect of having a ‘deficit’ on the earnings management of a firm, the results of the placebo tests are mixed. For lead abnormal accruals, all measures gave different results from Atieh and Hussain (2012) except for the measures from Healy (1985), Jones (1991), Dechow et al. (1995) (without a constant), Kasznik (1999), Kothari et al. (2005)-type measures and McNichols (2002). These measures gave similar results in terms of significance and sign of the experimental variables, deficit, and the interaction between deficit and nonpayers. For lagged abnormal accruals, all total accruals-based measures gave similar results in terms of the significance and sign of the coefficients of the key experimental variables, except for the change in total accruals from t and t-1, and the measure from Konstantinidi et al. (2016). However, all working capital accrual measures gave different results in either significance or sign. Tables 3.5 and 3.6 show the significance and sign of the main experimental variable deficit, when using lagged and lead abnormal accruals generated from the 37 measures in table 2.2.

The method used to estimate normal accruals does not make any difference to the conclusions drawn, even when using total accruals or working capital accruals. Ball (2013) suggests that researchers should aim to explain the findings without resort to earnings management stories. Thus, another theory for the significance of the findings could be that when total accruals are used to proxy for earnings management, pre-managed earnings equal cash flows from operations. Hence, one could interpret the results as follows: if a firm that pays dividends has cash flows lower than those dividends yet still goes ahead and pays them, it does so because profits exceed dividends (and, hence, total accruals are positive) which could be interpreted as firms having cover over earnings exceeding their dividends and, therefore, this has nothing to do with earnings management.

[INSERT TABLES 3.5 AND 3.6]

3.7 Summary of the chapter

This chapter looks at the relationship between firms that pay dividends in the UK and earnings management, specifically, when the pre-managed earnings are less than the expected level of dividends. The replication of Atieh and Hussain (2012) finds results similar to the authors in terms of the significance and sign of the coefficients of the key experimental variables. The results are also robust to using other measures of abnormal accruals and to using total accruals or working capital accruals as measures of earnings management.

When considering the reliability of the measures to proxy earnings management, in this replication the method used in estimating abnormal accruals do not make a difference to the overall conclusions of the study, even when using total accruals as the measure upon which the dependent variable in the logit analysis is based. The latter may suggest another explanation for the results that has nothing to do with earnings management. It could be concluded that dividend-paying firms still pay dividends, even when they have lower cash flows from operations than expected dividends, because earnings still exceed expected dividends, implying total accruals must be positive. This is particularly clear when total accruals are used as a measure of earnings management, as pre-managed earnings are equal to earnings minus earnings management; and, when using total accruals as the measure of earnings management, pre-managed earnings are equal to earnings minus total accruals, which is cash flow from operations.

Hence, deficit is equal to expected dividends minus cash flow from operations. Therefore, the relationship between deficit and total accruals is positive.

When using placebo tests to examine the reliability of the abnormal accruals measures some results are found. If abnormal accruals reliably measure earnings management, then a relationship between lead and lagged abnormal accruals and the deficit of pre-managed earnings relative to expected dividends should not be found. This casts doubts on the reliability of the abnormal accruals measures, especially those derived from total accruals. Thus, one may conclude that the reliability of accruals-based measures in capturing earnings management is low.

However, one needs to further investigate the reliability of the measures in capturing earnings management, as replicating one study is not enough. Thus, the remaining chapters will consider other scenarios in which measures of abnormal accruals are used as a proxy for earnings management in the UK. Chapter 4 will now consider the relationship between having forecasts in the prospectuses of IPO firms and earnings management in the UK.

Tables

Table 3.1 – All UK average sample size data for the period from 1998 to 2015

	ICB sector	ICB code	The average number of observations in a year
1	Oil and Gas	0500	43
2	Basic Resources	1700	32
3	Industrial Goods and Services	2700	221
4	Personal and Household Goods	3700	56
5	Health Care	4500	62
6	Retail	5300	57
7	Media	5500	62
8	Travel and Leisure	5700	65
9	Technology	9500	117

Table 3.2 – Atieh and Hussain's (2012) results extracted from table 5 on page 86 and 6 on page 88. They follows Dechow et al. (1995) in modelling total accruals to estimate abnormal accruals for the period from 1994 to 2004.

Logit regression: Binary variable that takes the value of 1 if abnormal accruals are above 0 and 0 otherwise.					
Deficit	-0.147	3.436**			5.356 **
Nonpayer	4.137***	-0.175	-0.886 ***	-.817**	0.106
Nonpayer x Deficit	-3.813***	- 3.129 **			-1.328
Size		0.020		0.043	0.006
Book-to-market value		0.123**		0.104**	0.103***
Gearing		0.015		-0.044**	0.020
Retained earnings		005		0.041	0.000
Earnings		-0.037		-0.001	-0.021
Cash compensation		-0.090		-0.232	
Pre-managed earnings			-9.826**	-9.447**	
Expected dividends			11.578 **	14.839**	
Bankruptcy					-0.976 ***
Constant	-0.039	- 0.861**	0.301 **	-0.686*	0.649*
Number of observations	3778	3778	3778	3778	3778

Deficit is maximum [0, expected dividends – pre-managed earnings] where expected dividends are lagged dividends and pre-managed earnings are the difference between earnings and abnormal accruals estimated using Dechow et al. (1995). Nonpayer is a dummy variable that takes the value of 1 if a firm does not pay dividends and 0 otherwise. Size is measured as the ln of lagged market value of equity. Book-to-market value is lagged book-to-market value ratio. Gearing is measured as the ratio of lagged debt to lagged total assets. Retained earnings are measured as lagged earnings retained. Earnings are lagged reported earnings of the firm. Cash compensation is a dummy variable that takes the value of 1 if the firm is one of the UK's top 20 firms in cash compensation in 2004. Pre-managed earnings are the difference between earnings and abnormal accruals estimated using Dechow et al. (1995). Expected dividends are lagged dividends. Bankruptcy is a dummy variable that takes the value of 1 if the firm has a probability of bankruptcy that is over 50%. Total abnormal accruals, working capital abnormal accruals, pre-

managed earnings, expected dividends, retained earnings and earnings are all deflated by lagged total assets.
Statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.3 – Replication of Atieh and Hussain (2012) using the same methods in modelling abnormal accruals as the authors
Dechow et al.'s (1995) total accrual (number 8 in tables 2.1 and 2.2. chapter 2), and Peasnell et al. (2000) working capital accruals (number 20 in tables 2.1 and 2.2 chapter 2) for the period from 1998 to 2015 using one sample

Logit regression: Binary variable that takes the value of 1 if abnormal accruals are above 0 and 0 other otherwise.						
	Dechow et al. (1995) Total accrual			Peasnell et al. (2000) Working capital		
Deficit	2.547***	3.210***	5.429***	4.182***	4.551***	6.120***
Nonpayer	-0.173***	-0.0474	0.233***	-0.0901**	0.00998	0.192***
Nonpayer x deficit	-2.632***	-2.166***	-3.713***	-3.223***	-2.923***	-4.028***
Size		0.0398***	0.0365***		0.0130	0.0105
Book-to-market value (t-1)		0.0809***	0.0547***		-0.0420**	-0.0603***
Gearing		-0.103	0.252**		-0.263***	-0.0324
Retained earnings		-0.0169	-0.0130		-0.0139	-0.0116
Earnings		1.062***	0.840***		0.877***	0.737***
Bankruptcy			-1.052***			-0.694***
Constant	0.295***	-0.00649	0.137**	-0.0959***	-0.134**	-0.0508
Number of observations	12841	12821	12821	12841	12821	12821

Deficit is maximum [0, expected dividends – pre-managed earnings] where expected dividends are lagged dividends and pre-managed earnings are the difference between earnings and abnormal accruals estimated using Dechow et al. (1995) and Peasnell et al. (2000a). Nonpayer is a dummy variable that takes the value of 1 if a firm does not pay dividends and 0 otherwise. Size is measured as the ln of lagged market value of equity. Book-to-market value is lagged book-to-market value ratio. Gearing is measured as the ratio of lagged debt to lagged total assets. Retained earnings are measured as lagged earnings retained. Earnings are lagged reported earnings of the firm. Cash compensation is a dummy variable that takes the value of 1 if the firm is one of the UK's top 20 firms in cash compensation in 2004. Bankruptcy is a dummy variable that takes the value of 1 if the firm has a probability of bankruptcy that is over 50%. Total abnormal accruals, working capital abnormal accruals, pre-managed earnings, expected dividends, retained earnings and earnings are all deflated by lagged total assets.
Statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3.4 – Coefficient of the experimental variable “Deficit” when using alternative methods to estimate abnormal accruals using one sample for the period from 1998-2015

Measure Number	Measure reference	Coefficient and sign of the experimental variable “Deficit”	Measure type	Dependent variable of the measure
Original paper	Dechow et al. (1995)	5.356**	Jones	TAcc
Using the same method of modelling abnormal accruals as the authors	Dechow et al. (1995)	5.429***	Jones	TAcc
1	Healy (1985)	4.343***	Early Measures TAcc	TAcc
2	DeAngelo (1986)	10.26***	Early Measures-Difference TAcc	TAcc
3	Friedlan (1994)	6.200***	Early Measures-Difference TAcc	TAcc
4	Dechow and Sloan (1991)	6.836***	Early Measures-Industry Median	TAcc
5	Jones (1991)	5.654***	Jones	TAcc
6	Dechow et al. (2003)	6.060***	Jones	TAcc

7	Kothari et al. (2005)	6.454***	Jones	TAcc
8	Dechow et al. (1995)	5.429***	Modified-Jones	TAcc
9	Dechow et al. (2003)	5.839***	Modified-Jones	TAcc
10	Kothari et al. 2005	4.039***	Modified-Jones	TAcc
11	Dechow et al. (2003)	1.129***	Modified-Jones	TAcc
12	Chambers (1999)	3.026***	Modified-Jones	TAcc
13	Dechow et al. (2003) – Lag TAcc	6.167***	Modified-Jones	TAcc
14	Dechow et al. (2003) – Lag TAcc and Sale growth	6.341***	Modified- Jones	TAcc
15	Jeter and Shivakumar (1999)	3.590***	Jones	Tacc

16	Kasznik (1999)	3.530***	Modified-Jones	TAcc
17	Larcker and Richardson (2004)	5.551***	Modified-Jones	Tacc
18	DeFond and Jiambalvo (1994)	5.353***	Jones	WC
19	Peasnell et al. (2000a)	5.896***	Jones	WC
20	Peasnell et al. (2000a)	6.120***	Modified-Jones	WC
21	Peasnell et al. (2000a)	5.715***	Peasnell et al. (2000a)	WC
22	Ball and Shivakumar (2006) – Book	4.123***	Jones	Tacc
23	Ball and Shivakumar (2006) – Market	6.919***	Jones	Tacc

24	Ball and Shivakumar (2006) – Book and Market	3.044***	Jones	Tacc
25	Collins et al. (2017)	6.022***	Jones	WC
26	Collins et al. (2017)	5.610***	Modified- Jones	WC
27	Working paper – Collins et al. (2017)	6.167***	Jones	WC
28	Working paper – Collins et al. (2017)	6.494***	Modified-Jones	WC
29	Kothari et al. (2005)	3.864***	Jones	Tacc
30	Kothari et al. (2005)	3.589***	Modified-Jones	Tacc
31	Owens et al. (2017)	6.125***	Jones	Tacc

32	Owens et al. (2017)	3.410***	Jones	Tacc
33	Owens et al. (2017)	4.275***	Jones	Tacc
34	Dechow and Dichev (2002)	3.806***	Cash flow measure	WC
35	Francis et al. (2005)	4.544***	Mix (Cash flow measure and Jones)	Tacc
36	Dechow and Dichev – Ball and Shivakumar (2006)	3.705***	Mix (Cash flow measure and Jones)	WC
37	Konstantinidi et al. (2016)	3.661***	Asymmetric behaviour	Tacc

All measures as explained in tables 2.1 and 2.2 in chapter 2

Table 3.5 – Coefficient of the experimental variable deficit when using placebo test **lagged** abnormal accruals to estimate earnings management using one sample for the period from 1998-2015

Measure Number	Measure reference	Coefficient and sign of the experimental variable "Deficit"	Measure type	Dependent variable of the measure
1	Healy (1985)	**2.003*****	**Early Measures**	**TAcc**
2	DeAngelo (1986)	-2.401***	Early Measures-Difference	TAcc
3	Friedlan (1994)	-1.059***	Early Measures-Difference	TAcc
4	Dechow and Sloan (1991)	**2.714*****	**Early Measures-Industry Median**	**TAcc**
5	Jones (1991)	**1.993*****	**Jones**	**TAcc**
6	Dechow et al. (2003)	**1.738*****	**Jones**	**TAcc**
7	Kothari et al. (2005)	**2.535*****	**Jones**	**TAcc**
8	Dechow et al. (1995)	**1.891*****	**Modified-Jones**	**TAcc**
9	Dechow et al. (2003)	**1.787*****	**Modified-Jones**	**TAcc**
10	Kothari et al. 2005	**1.774*****	**Modified-Jones**	**TAcc**
11	Dechow et al. (2003)	**1.433*****	**Modified-Jones**	**TAcc**
12	Chambers (1999)	**1.285*****	**Modified-Jones**	**TAcc**

13	Dechow et al. (2003) – Lag TAcc	**1.820*** **	**Modified-Jones**	**TAcc**
14	Dechow et al. (2003) – Lag TAcc and Sale growth	**1.890*** **	**Modified-Jones**	**TAcc**
15	Jeter and Shivakumar (1999)	**1.293*** **	**Jones**	**Tacc**
16	Kasznik (1999)	**3.266*** **	**Modified-Jones**	**TAcc**
17	Larcker and Richardson (2004)	**1.154*** **	**Modified-Jones**	**Tacc**
18	DeFond and Jiambalvo (1994)	-0.0946	Jones	WC
19	Peasnell et al. (2000a)	-0.162	Jones	WC
20	Peasnell et al. (2000a)	-0.223	Modified-Jones	WC
21	Peasnell et al. (2000a)	-0.217	Peasnell et al. (2000a)	WC
22	Ball and Shivakumar (2006) – Book	**1.126*** **	**Jones**	**Tacc**
23	Ball and Shivakumar (2006) – Market	**1.788*** **	**Jones**	**Tacc**
24	Ball and Shivakumar (2006) – Book and Market	**1.236*** **	**Jones**	**Tacc**
25	Collins et al. (2017)	-0.138	Jones	WC
26	Collins et al. (2017)	-0.0211	Modified- Jones	WC

27	Working paper – Collins et al. (2017)	0.0603	Jones	WC
28	Working paper – Collins et al. (2017)	0.00612	Modified-Jones	WC
29	Kothari et al. (2005)	**1.745*** **	**Jones**	**Tacc**
30	Kothari et al. (2005)	**1.665*** **	**Modified-Jones**	**Tacc**
31	Owens et al. (2017)	**1.680*** **	**Jones**	**Tacc**
32	Owens et al. (2017)	**1.253*** **	**Jones**	**Tacc**
33	Owens et al. (2017)	**1.773*** **	**Jones**	**Tacc**
34	Dechow and Dichev (2002)	0.134	Cash flow measure	WC
35	Francis et al. (2005)	**4.096*** **	**Mix (Cash flow measure and Jones)**	**Tacc**
36	Dechow and Dichev – Ball and Shivakumar (2006)	0.0448	Mix (Cash flow measure and Jones)	WC
37	Konstantinidi et al. (2016)	-0.377	Asymmetric behaviour	Tacc

All measures as explained in tables 2.1 and 2.2 of chapter 2

Table 3.6 – Coefficient of the experimental variable deficit when using placebo test **lead** abnormal accruals to estimate earnings management using one sample for the period from 1998-2015

Measure Number	Measure reference	Coefficient and sign of the experimental variable "Deficit"	Measure type	Dependent variable of the measure
1	Healy (1985)	**1.144*****	**Early Measures**	**TAcc**
2	DeAngelo (1986)	-1.327***	Early Measures-Difference	TAcc
3	Friedlan (1994)	-0.196**	Early Measures-Difference	TAcc
4	Dechow and Sloan (1991)	**0.938*****	**Early Measures-Industry Median**	**TAcc**
5	Jones (1991)	0.177	Jones	TAcc
6	Dechow et al. (2003)	0.419	Jones	TAcc
7	Kothari et al. (2005)	**1.012*****	**Jones**	**TAcc**
8	Dechow et al. (1995)	0.0415	Modified-Jones	TAcc
9	Dechow et al. (2003)	0.402	Modified-Jones	TAcc
10	Kothari et al. 2005	-0.0324	Modified-Jones	TAcc
11	Dechow et al. (2003)	0.0636	Modified-Jones	TAcc
12	Chambers (1999)	0.361	Modified-Jones	TAcc
13	Dechow et al. (2003) – Lag TAcc	0.110	Modified-Jones	TAcc

14	Dechow et al. (2003) – Lag TAcc and Sale growth	0.234	Modified- Jones	TAcc
15	Jeter and Shivakumar (1999)	0.0252	Jones	Tacc
16	Kasznik (1999)	**0.824*****	**Modified-Jones**	**TAcc**
17	Larcker and Richardson (2004)	0.00180	Modified-Jones	Tacc
18	DeFond and Jiambalvo (1994)	-0.729***	Jones	WC
19	Peasnell et al. (2000a)	-0.652***	Jones	WC
20	Peasnell et al. (2000a)	-0.698***	Modified-Jones	WC
21	Peasnell et al. (2000a)	-0.660***	Peasnell et al. (2000a)	WC
22	Ball and Shivakumar (2006) – Book	-0.105	Jones	Tacc
23	Ball and Shivakumar (2006) – Market	**0.448***	**Jones**	**Tacc**
24	Ball and Shivakumar (2006) – Book and Market	0.0822	Jones	Tacc
25	Collins et al. (2017)	-0.435**	Jones	WC
26	Collins et al. (2017)	-0.574***	Modified- Jones	WC
27	Working paper – Collins et al. (2017)	-0.379*	Jones	WC

28	Working paper – Collins et al. (2017)	-0.497**	Modified-Jones	WC
29	Kothari et al. (2005)	**0.645*** **	**Jones**	**Tacc**
30	Kothari et al. (2005)	**0.614** **	**Modified-Jones**	**Tacc**
31	Owens et al. (2017)	0.152	Jones	Tacc
32	Owens et al. (2017)	0.0963	Jones	Tacc
33	Owens et al. (2017)	**0.687*** **	**Jones**	**Tacc**
34	Dechow and Dichev (2002)	-0.496**	Cash flow measure	WC
35	Francis et al. (2005)	**1.187*** **	**Mix (Cash flow measure and Jones)**	**Tacc**
36	Dechow and Dichev – Ball and Shivakumar (2006)	-0.553**	Mix (Cash flow measure and Jones)	WC
37	Konstantinidi et al. (2016)	-0.704***	Asymmetric behaviour	Tacc

All measures as explained in tables 2.1 and 2.2 of chapter 2

Chapter 4

Forecasts in IPO Firms' Prospectuses and Earnings Management

4.1 Introduction:

The previous two chapters (2 and 3) examine the reliability of measures of abnormal accruals as proxies for earnings management, and provide evidence consistent with the idea that accruals-based measures of earnings management are not reliable. Chapter 2 finds that abnormal accruals estimates are highly correlated when the same dependent variable is used in the estimation (total accruals/working capital accruals). They are also highly correlated with total accruals and working capital accruals. Chapter 3 replicates Atieh and Hussain (2012) and finds that, when replacing the method used in estimating abnormal accruals in the paper with different measures or with actual total accruals and working capital accruals, it does not have an impact on the overall conclusion of the study; the findings staying consistent in terms of the significance and sign of the key experimental variable.

To draw additional conclusions on the reliability of abnormal accruals as a proxy for earnings management, this thesis examines more than one scenario. This chapter discusses a scenario related to the relationship between large IPO firms that provide investors with earnings forecasts during listing and earnings management, in the year after the IPO, as investigated by Buchner, Mohamed, and Saadouni (2017) (BMS hereafter). BMS is chosen for replication for the following reasons. First, the paper uses UK data as the research investigates the use of a measure of abnormal accruals as a proxy for earnings management in the UK. Second, the data is available at Nottingham University. Third, the measure of abnormal accruals is used as the dependent variable of the regression, not as an independent variable. Finally, the paper is published recently in a highly ranked journal.

4.1.1 Motives, aims and objectives

The main motive of BMS is to understand if investors value earnings forecasts during the initial public offerings of large IPO firms. Thus, the aim of BMS is to understand the relationship between large IPO firms that decide to provide investors with earnings forecast when listing and earnings management, in the year after the IPO, the motive for providing this earnings forecast, and the value it adds to investors. To achieve this aim, BMS set the following objective: to investigate whether the voluntary disclosure of earnings forecasts in large IPO firms results in less earnings management in the year after the IPO, relative to large firms that do not disclose earnings forecasts in their initial offer.

4.1.2 Theory

BMS build on the theoretical assumption that providing earnings forecasts during the IPO are seen as a signal of higher quality, and thus, such firms are less likely to engage in earnings management, in the year after the IPO (Buchner et al., 2017). In instances where managers provide forecasts to their investors, it is seen as a promise and, as a result, managers are unlikely to overestimate earnings in the future (Chong and Ho, 2007). Also, providing an optimistic forecast may lead to the loss of reputation, as well as significant litigation costs. In the UK, providing earnings forecasts at the time of listing is optional (Chong and Ho, 2007). In the US, firms are not allowed to provide forecasts when listing. The reason for this is the risk associated with providing a forecast and the legal repercussions in cases where the forecasts do not meet investors' expectations (Teoh et al., 1998a). If a firm provides earnings forecasts in the prospectus, then it could be interpreted as a promise from the firm to investors. Thus, for this reason it is expected that large IPO firms that provide earnings forecasts in their prospectuses will outperform firms that do not offer earnings forecasts in the long run, so this earnings forecast is valuable to investors and conveys higher quality.

4.1.3 Methodology

BMS examine the level of earnings management, in the year after the IPO, for IPO firms listed on the Main Market of the London Stock Exchange. Using IPO firms listed on the UK Main Market for the period from 1985 to 2012, they compare the level of earnings management, in the year after the IPO, in UK IPO firms that report earnings forecasts in the prospectus and those that do not report earnings forecasts. BMS use a two-stage regression research design, where the first regression is used to estimate abnormal accruals as a proxy for earnings management. In the second regression, they compare IPO firms without earnings forecast to the IPO firms having earnings forecast in the prospectus.

4.1.4 Main findings

BMS find supporting evidence for their theory that the level of earnings management, in the year after the IPO, is lower in firms that report earnings forecasts compared to firms that do not report earnings forecasts. The results of the paper show that IPO firms listed on the Main Market that provide earnings forecasts in their prospectuses are less likely to engage in earnings management, in the year after the IPO, compared to IPO firms that do not report a forecast. This indicates that forecasts provide useful information to investors during the listing period as a measure of the firm's financial reporting quality.

4.1.5 Replication

Studies in the UK suggest that when large firms seek a public offering and provide earnings forecasts in their prospectors, it is an indication that such firms are higher quality. This will be associated with the future performance of the firm and will result in lower earnings management, in the year after the IPO, relative to larger firms that do not provide earnings forecasts in their prospectus (Buchner et al., 2017). Therefore, following the findings by BMS, this chapter will seek to test hypothesis 11 in section 2.4 by examining if there is a significant negative relationship between larger IPO firms that have earnings forecasts in their prospectuses and earnings management, in the year after the IPO, relative to large IPO firms that do not have earnings forecasts in their prospectuses. This is done using different measures of abnormal accruals to proxy for earnings management and different research designs to examine the reliability of the measures.

This study is chosen for replication as it uses abnormal accruals to proxy for earnings management, uses UK data, access is available to this data, is recent and is in a high- ranking journal. The first replication is performed using the same research design as the authors; however, it is for a shorter period. Due to data availability, this replication is performed using a sample from 1998 to 2015. Because conclusions in terms of the findings of the experimental variable. 'Forecasting'. In BMS are similar in terms of significance and sign as in BMS, the sample period is considered sufficient for the replication and, therefore, the sample is not increased to include older years.

The replication is then performed using the alternative methods of estimating abnormal accruals, as identified in chapter 2, tables 2.1 and 2.2, to understand the effect of changing the proxy for earnings management on the results of a study. Then, the replication is performed using total accruals and working capital accruals as proxies for earnings management. In addition, the research design is changed at the second stage by including controls for the variables used in the first stage, following the suggestions of Chen et al. (2018).

When replicating the study using the same methods in estimating abnormal accruals as in BMS, the experimental variable 'Forecasting' is found to be significant and negatively related to abnormal accruals, as BMS find. When using other methods for estimating abnormal accruals, the results are mixed. Almost all of the accrual methods that use total accruals as a dependent variable give the same conclusion in terms of significance and sign of the coefficient of 'Forecasting' as an explanatory variable to those BMS find. Not all working capital accruals-based methods give the same significance and sign of the experimental variable as in BMS, however. When using total accruals as a proxy for earnings management, the significance and sign of the experimental variable 'Forecasting' are also significant and negative as in BMS, whereas when using working capital accruals as a proxy, the results are not significant.

In an attempt to follow the suggestion of Ball (2013 - providing an alternative explanation to the findings of earnings management studies other than earning management - this chapter investigates the possible reason for the results which might be due to the long-term component of accruals. This is because the results of the replication are consistent with BMS when using total accruals and abnormal accruals generated from total accruals, while no results are found when working capital accruals is used or when using abnormal accruals measures based on working capital accruals. Thus, this may suggest that what is influencing the conclusions is the long-term component of total accruals rather than the short-term component, which is confirmed when tested for. This may indicate a relationship between the types of firms that provide earnings forecasts and the industry classification of such firms. It is found that there is a relationship between the industry classifications and having earnings forecast during IPO, where the basic resources industry has a high probability of reporting earnings forecast compared to other industries. The basic resources industry is mainly manufacturing-type companies, and such companies tend to have more equipment and more depreciation charges compared to other industries such as service-providing firms; hence, they have more long-term accruals. Thus, they could be influencing the results between having earnings forecasts and total accruals or long-term accruals, as opposed to an explanation based on earnings management. Changing the research design based upon the critique of Chen et al. (2018) does not affect the conclusions of the study.

4.1.6 Contribution

The findings of this chapter contribute to the literature by extending prior research that suggests that accruals-based earnings management measures are not reliable (Ball, 2013), as well as highlighting the relationship between IPOs and earnings management, if there is one. Clear differences between results generated using abnormal accruals generated from total accruals and abnormal accruals generated from working capital accruals are found. In addition, the relationship between IPO firms providing earnings forecasts is related to the total accruals of a firm, not just abnormal accruals. Since both total accruals and abnormal accruals based upon total accruals give the same findings, unless one assumes all total accruals are all due to earnings management, another reason for the relationship is investigated. One possible reason is industry classification. This chapter provides evidence that IPO firms listed in two industries: Basic

Resources and Industrial Goods and Services have a higher probability of reporting earnings forecasts in their prospectus. Both industries are manufacturing industries that have relatively high amounts of fixed assets and, hence, higher depreciation charges (i.e., long-term accruals). Thus, these findings contribute to the literature by providing evidence that what the issuance of earnings forecasts does not necessarily influence subsequent earnings management behaviour because the issuance is a signal of quality (Ball, 2013).

4.1.7 Chapter structure

This chapter is organised as follows: section 4.2 discusses the literature with regard to the relationship between having earnings forecast in the prospectus and earnings management, section 4.3 discusses the methodology, section 4.4 discusses the replication design, section 4.5 describes the data used, section 4.6 provides the results of BMS compared to the replication results, and section 4.7 provides a summary of the chapter.

4.2 Related literature

This study is built on the theoretical assumption that large IPO firms in the UK will only report forecasts when they are confident that they can meet them, and will choose to report the forecasts because they are valued by investors. For these reasons, after the offer, it is expected that large IPO firms that report forecasts during the offer will exhibit less earnings management, compared to those that do not report forecasts in their offer. Thus, the main literature related to this topic covers three main strands: the motivation for IPO firms to report forecasts, earnings management in IPOs, and forecasting decisions.

Having a forecast in the prospectus during the initial public offering in the UK is optional. Small IPO firms that report forecasts are found to manage earnings to meet such forecasts (Cormier and Martinez, 2006). IPO firms go to the market to raise additional funds and they cannot afford the loss of their reputation by reporting inaccurate forecasts (Clarkson et al., 1992). For that reason, IPO firms will only seek to report a forecast when they consider the benefit higher than the cost of the forecast (Dye, 1985). Plus, they will only disclose information voluntarily when the information is considered credible, to avoid any possible penalties due to false information (Teoh et al., 1998a). By contrast, firms that are not confident and lack reliable information will choose not to disclose earnings forecasts, as it might be damaging rather than valuable. Following this argument, if a large firm chooses to report forecasts during an initial public offering, then this is a signal of credibility and is valued by investors, as the firm is confident in sharing its private information to investors (Hartnett, 2010).

The incentives to manage earnings in large firms are weak as large firms are typically known by investors. BMS theorise that having earnings forecasts in the prospectus provides valuable information to potential investors, due to the limited information that an IPO firm has available prior to the listing. However, there is a risk of losing the trust of investors when there is a forecasting error in which there is a difference between actual and forecasted earnings. BMS point out that there are costs due to errors in the forecast, involving the loss of reputation, and reputation is a key factor for IPO firms as they seek to raise additional funds. Therefore, IPO firms will only voluntarily disclose credible information to avoid legal costs and loss of reputation, while firms that do not have such information will not disclose earnings forecasts. Therefore, providing forecasts at the time of the listing is considered a credible signal for IPO firms listed in the Main Market.

Previous studies suggest that managers have an incentive to manage earnings during and post IPO. Small IPO firms that provide forecasts have more incentive to manage earnings to achieve this forecast, however, research has not explored the reason for large IPO firms to provide forecasts, as well as the long term implications of providing the forecast (Cormier and Martinez, 2006; Cormier et al., 2014). The choice of underwriter for an IPO has an effect on earnings management (Darrough and Rangan, 2005). BMS are the first to examine the relationship of subsequent earnings management, in the year after the IPO by large UK IPOs which provide forecasts at the time of listing. They theorise that firms that have earnings forecasts in the prospectus have less subsequent earnings management, in the year after the IPO, than firms that do not have an earnings forecast.

Using a sample of 368 IPO firms for the period from 1985 to 2012 that are listed on the Main Market of the London Stock Exchange, BMS find supporting evidence to this theory that the level of earnings management, in the year after the IPO, is lower in firms that report earnings forecasts compared to firms that do not report earnings forecasts. This indicates that forecasts provide useful information to investors during the listing period as a measure of the firm's quality.

4.3 Methodology

BMS follow the research design of Alhadab et al. (2015) and use different proxies for real and accruals earnings management. They use a two-stage regression, first to estimate abnormal accruals as a proxy for earnings management, and the second regression tests the association between having forecasts in the prospectus and the level of abnormal accruals of the firm, after including some controls. BMS also follow Alhadab et al. (2015) in estimating abnormal accruals. Alhadab et al. (2015) measure accruals earnings management using the approach in Kothari et al. (2005) to estimate normal accruals. They use the method used by Kothari et al. (2005) (Measure 29 – table 2.1 and 2.2 chapter 2); however, they use average total assets as a deflator instead of lagged total assets, arguing that lagged total assets are smaller for IPO firms because at the end of the year IPO firms tend to use proceeds to invest in assets. They estimate normal accruals using the following measure estimated on a cross-sectional basis per industry for all non-IPO firms:

$$TAcc_{i,t} = \beta_0 + \beta_1 \left(\frac{1}{Avg.TA_i}\right) + \beta_2 \Delta Sales_{i,t} + \beta_3 GPPE_{i,t} + \beta_4 ROA_{i,t} + \varepsilon \qquad (39)$$

TAcc is total accruals, the result of the difference between earnings and the cash flow from operating activities for firm i for the period t scaled by average total assets. Change in sales is measured as the difference in the sales figure for firm i between the period t and t-1 scaled by average total assets. GPPE is gross property, plant and equipment for firm i at year t scaled by average total assets. ROA is the return on assets measured as operating income for firm i for the year t scaled by average total assets.

After obtaining the coefficient estimates from the above regression, they estimate normal accruals as follows (Measure 30 – table 2.1 chapter 2) for the IPO firms:

$$NA_{i,t} = \widehat{\beta_0} + \widehat{\beta_1}\left(\frac{1}{TA_{i,t-1}}\right) + \widehat{\beta_2}\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \widehat{\beta_3} GPPE_{i,t} + \widehat{\beta_4} ROA_{i,t}$$

where NA is normal accruals for the firm if, for the period t, change in Rec is measured as the difference between account sreceivable figure for firm i between period t and t-1. All variables are deflated by average total assets. All other variables are as explained earlier (receivables are included in estimating NA but not in estimating the coefficients used).

$$AA_{i,t} = \left(\frac{TAcc_{i,t}}{Avg.TA_i}\right) - NA_{i,t}$$

They then obtain abnormal accruals as the difference between actual total accruals and estimated normal accruals. This is used as a proxy for earnings management in the second-stage regression.

They control for endogeneity and sample selection, by arguing that if IPO firms provide a forecast, they are likely to manage earnings to meet the forecasted figures. Hence, if both earnings forecasts and earnings management are co-determined, this should be addressed in the following way. First, they estimate step one, which is the probability of providing a profit forecast, using the following equation:

Step 1:

$$Profit\ Forecast = \beta_0 + \beta_1 Retained\ Ownership + \beta_2 Size + \beta_3 Age + \beta_4 Leverage + \varepsilon$$

The predicted value from the above equation is then converted into the inverse Mills ratio. The inverse Mills ratio then is added to the second step of regression.

Step 2:

$$\begin{aligned} Abnormal\ Accruals & \\ &= \beta_0 + \beta_1 Forecasting + \beta_2 Retained\ Ownership + B_3 Ln\ Age + \beta_4 ROA \\ &+ \beta_5 \text{Log Absolute } CFO + \beta_6 Underpricing + \beta_7 Underwriter + \beta_8 Big\ N \\ &+ \beta_9 Inverse\ Mills + Year + Industry + \varepsilon \end{aligned}$$

where the variables for steps 1 and 2 are as follows: Retained Ownership is the percentage of retained ownership by insiders (family members, directors, group holders) at the IPO date; Size is measured as the logarithm of the total value of assets for the IPO year. Age is the age of the IPO firm calculated as the period between the date of establishing the firm and the IPO date measured in years; Leverage is the ratio of total debt to total assets during the IPO year; Abnormal Accruals are measured for the year t+1, where year t is the year of the IPO. Forecasting is a dummy that takes the value of 1 if the IPO reported earnings forecast in the IPO during listing and 0 otherwise; Ln Age is the logarithm of age; ROA is operating income divided by the total assets of the firm in the IPO year; Log Absolute CFO is the logarithm of the absolute value of cash flows from operations for the IPO year; Underpricing is measured as the difference between the market price on the first day of offer and the offer price, divided by the offer price; Underwriter is a dummy variable that takes the value of 1 if the firm has a prestigious underwriter according to Derrien and Kecskes (2007), and 0 otherwise; and Big N is a dummy variable that takes the value of 1 if a firm has a Big N auditor, and 0 otherwise (i.e. PWC, Deloitte, Ernst and Young and KPMG).

4.4 Replication design

Below are the steps of the replication:

- Step one: Use all measures from equations 1-37 (chapter 2) to estimate normal accruals per year per ICB industry classification. Normal accrual estimates are deducted from actual accruals to estimate abnormal accruals defined as AA1-AA37; numbering is according to the measures table 2.2 in chapter 2, which shows the measure number and the reference for the measure.
- Step two: Pool all abnormal accruals from cross-sectional regressions into one dataset making a pooled dataset.

- Step three: Follow the BMS method of estimating normal accruals and obtain abnormal accruals using the same approach.
- Step four: Run the second-stage regression, as in BMS, using abnormal accruals as a proxy for earnings management, experiment variable and control variables.
- Step five: Use abnormal accruals generated from the different measures identified in chapter 2 as measures of earnings management in the second-stage regression; compare results with the results in BMS for the experimental variable in terms of the significance and sign of its coefficient.
- Step six: Rerun the second stage of the replicated study using total accruals and working capital accruals instead of abnormal accruals as a proxy for earnings management. Compare the results with those in BMS and with the abnormal accrual measures' results for the experimental variable, in terms of the significance and sign of its coefficient.
- Step seven: Add additional control variables from the first stage regressions, as suggested by Chen et al. (2018), to the second stage regression. Compare results with the results in BMS and with other abnormal accrual measures' results for the experimental variable, in terms of the significance and sign of its coefficient.

4.5 Data

BMS use a sample of IPO firms listed on the Main Market of the London Stock Exchange, excluding IPO firms listed on AIM and those that are incorporated abroad. The sample also excludes firms that are in the financial and utility industries as they do not have the same accruals-generating process as other firms (Chang et al., 2010; Chen et al., 2005; Lee and Masulis, 2011; Teoh et al., 1998a,b and Wongsunwai, 2012). This leads to a sample of 417 firms, out of which 368 firms have full accounting data and prospectuses for the period from 1985 until 2012. For the non-IPO control firms, which are used to estimate normal accruals, the authors include firms that have at least six observations for each industry group per year, which follows Athanasakou et al. (2011), Iqbal et al. (2009) and Rosner (2003). All of the accounting data is obtained from Datastream, while other information such as issue price, date of the IPO, and other non-accounting information is manually collected from the prospectuses.

Based on previous data availability, the time period chosen for this replication is from 1998 to 2015, with the results of following their methodology matching those in BMS. This suggests that the time period used in the current study is sufficient for the replication. This study follows the same criteria for excluding firms by excluding financial and utility industries, as well as IPO firms listed on AIM and incorporated abroad. This results in 209 firm-year observations that have accounting data and prospectuses. Like in BMS, the accounting data is downloaded from Datastream, while remaining variables are manually collected from the prospectuses of the IPOs, which are obtained from Thomson One. Table 4.1 shows the sample population per industry.

[INSERT TABLE 4.1 HERE]

4.6 Results

4.6.1 Descriptive statistics

Table 4.2 shows the descriptive statistics of some of the main variables used in BMS in comparison to my dataset. The BMS time period is from 1985 to 2012 while my dataset is from

1998 to 2015. The variables are abnormal accruals measured using the approach in Kothari et al. (2005), as described in the methodology section. Forecasting is a dummy that takes the value of 1 if the IPO reports earnings forecast in the IPO during listing, and 0 otherwise. Total assets are the lagged value of the total assets reported in £1,000. Leverage is the debt-to-total-assets ratio. ROA is measured as the reported income to total assets. Cash flow from operations is reported in thousands for the IPO period. Age is the difference between the date of incorporation and the IPO date measured in years. Underpricing is measured as the difference between the first day market price of the share and the offer price, scaled by the offer price. Retained ownership is the percentage of ownership retained by directors and major shareholders after the issue. Underwriter is a dummy variable that takes the value of 1 if the firm has a prestigious underwriter, according to Derrien and Kecskes (2007), and 0 otherwise. Big N is a dummy variable that takes the value of 1 if a firm is audited by one of the Big Four auditors, which are PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG, and 0 otherwise. Placing is a dummy variable that takes the value of 1 if the type of offer is a placing, and 0 otherwise. The firms I have are relatively young in age compared to the firms in BMS; in addition, they have many more Big N auditors compared to the sample in BMS. This could be due to the paper's sample including older firms from the year 1985, whilst my sample starts from 1998.

[INSERT TABLE 4.2 HERE]

4.6.2 Results of the replication

The variable of interest is the dummy variable, Forecasting, where BMS find a negative and significant relationship between Forecasting and earnings management in the year after the IPO.

This means that a firm that has earnings forecast in their prospectus have less earnings management (less abnormal accruals) in the following year, compared to firms that do not have earnings forecast in their prospectus. Table 4.3 shows the results in BMS and my replication using their method for estimating abnormal accruals. When the dependent variable is abnormal accruals as a proxy for earnings management, both the results show that the dummy variable, Forecasting, is significant and negatively related to abnormal accruals. This means that, if a firm has earnings forecast in its IPO prospectus, then the firm has a lower level of abnormal accruals compared to firms that do not have earnings forecast in their prospectus. Results are also robust when the research design of the paper is changed by including the first-stage regressors in the second stage as controls, as suggested by Chen et al. (2018). Thus, in this replication, this recommended methodological addition does not affect the findings of the study.

[INSERT TABLES 4.3 AND 4.4 HERE]

When using other methods in estimating abnormal accruals as proxies for earning management, I keep all the controls as they are shown in table 4.3 and just change how abnormal accruals are estimated. The results show that methods that use total accruals as the dependent variable in generating abnormal accruals give the same conclusion in terms of significance and sign of the coefficient of the dummy variable, forecasting, as in BMS. However, results differ when a working capital accruals-based method is used in the estimation of normal accruals from which abnormal accruals are extracted. Table 4.4 shows the differences in the coefficient of the experimental variable (Forecasting) when using alternative methods of estimating abnormal accruals, as well as reporting the significance and sign of the coefficients. Therefore, in this replication, the findings of the paper are not robust to alternative methods of estimating accruals-based earnings management; they are only robust when a total accruals-based measure is used. Thus, evidence for hypothesis 11 is not consistent and this replication finds that there is only a significant negative relationship between larger IPO firms that have earnings forecast in their prospectus and earnings management in the year following the IPOrelative to large IPO firms that do not have earnings forecast in their prospectus, in the cases when abnormal accrual are generated from total accrual measures, not working capital accruals.. To investigate the relationship further, the analysis is performed again using total accruals and working capital accruals as a proxy for earnings management.

[INSERT TABLE 4.5 HERE]

When running the regressions using total accruals as a measure of earnings management, the significance and sign of the coefficient of the experimental variable is negative and significant. Hence, when using total accruals, or when using most of the abnormal accruals measures that are generated from total accruals, the conclusions are the same in terms of the experimental variable's significance and sign. When using working capital accruals, instead of abnormal accruals generated from working capital accruals, the relationship between earnings management IPO Forecasting is not significant. This could suggest that what is influencing the relationship is the long-term component of total accruals, whereby having earnings forecast is negatively related to the long-term accruals of the firm. To test this theory, a new variable is included, which is the long-term component of accruals, estimated as the difference between total accruals and working capital accruals. Results show that the long-term component of accruals is negatively related to having earnings forecast. Table 4.6 shows the relationship between having earnings forecast in the prospectus and total accruals, working capital accruals and the long-term component of accruals.

Since the long-term component of accruals seems to be the key influence on the results, the reason for the relationship between the various abnormal accruals measures based on total accruals and having earnings forecast could have nothing to do with earnings management, in the year after the IPO, and instead could be due to the types of firms that are more likely to provide earnings forecast. To test this idea, I run a regression of the probability of a firm providing earnings forecast in the prospectus in relation to its industry classification. Table 4.7 shows that firms that are the most likely to report earnings forecasts fall under two industry classifications: Basic Resources and Industrial Goods and Services. Both industries are manufacturing industries that have relatively high amounts of fixed assets and, hence, higher depreciation charges (i.e., long-term accruals).

[INSERT TABLE 4.6 AND 4.7 HERE]

In untabulated regressions, I also find no relation between lead abnormal accruals estimated from all measures of accruals-based earnings management and having earnings forecast in the prospectus of the IPO year.

4.7 Summary of the chapter

This chapter replicates BMS which examines the relationship between having firms having an earnings forecast in their IPO prospectus and earnings management in the year following the IPO. When using total accruals-based, abnormal accruals measures, the results are the same as in BMS in terms of the significance and sign of the coefficient of the experimental variable. However, results differ when abnormal accruals measures based upon working capital accruals are used.

This means the findings of the paper by BMS are robust only to the use of total accruals-based measures of abnormal accruals. This suggests the importance of the long-term component of accruals to the findings of the study.

After further investigation into the reason for this relationship, it is suggested that what is driving the results is the long-term component of accruals. This is confirmed when only long-term accruals are considered significant to having an earnings forecast in the prospectus. Following Ball's (2013) suggestion of considering alternative reasons for the results in the absence of earnings management, this chapter investigates the effect of industry classification on reporting earnings forecasts. The level of long-term accruals could be due to the industry affiliation of the sample population, which has nothing to do with earnings management. It is confirmed that the industry 'basic resources' has the highest probability of reporting earnings forecast compared to other industries, the second being 'industrial goods and services'. This could explain the relationship between having an earnings forecast and long-term accruals, as they are manufacturing companies that have higher amounts of long-term accruals such as depreciation, and hence earnings management is probably not what is driving the results.

This chapter contributes by extending prior research of the relationship between IPO firms and earnings management, as well as extending the literature related to the reliability of accruals as a proxy for earnings management. Also, it follows chapters 2 and 3 in finding evidence of the lack of reliability of abnormal accruals measures as proxies for earnings management. This chapter differs from chapter 3 in that the results are not consistent across all types of measures and differ between total accruals and accrual working capital. To draw firmer conclusions on the reliability of accruals as a proxy for earnings management, further replications are performed which will be discussed in the remaining chapters.

Tables

Table 4.1 – IPO firms' listed on the Main Market of London Stock Exchange for the period from 1998 to 2015

	ICB Sector	ICB Code	Total Number of Observations	Observations with Earnings Forecast	Observations without Earnings Forecast
1	Oil and Gas	0500	16	3	13
2	Basic Resources	1700	10	4	6
3	Industrial Goods and Services	2700	36	12	24
4	Personal and Household Goods	3700	6	1	5
5	Health Care	4500	24	1	23
6	Retail	5300	26	6	20
7	Media	5500	16	1	15
8	Travel and Leisure	5700	19	1	18
9	Technology	9500	56	9	47
	Total		209	38	171

Table 4.2 Descriptive statistics comparison

	My Descriptive Results					Buchner et al. (2017)				
Variable	**Mean**	**Median**	**Standard Deviation**	**Minimum**	**Maximum**	**Mean**	**Median**	**Standard Deviation**	**Minimum**	**Maximum**
Abnormal accruals	0.0071	0.0010	0.1429	-0.7223	0.5935	0.0426	0.0403	0.2055	-0.4339	0.6421
Forecasting	0.1818	0	0.3866	0	1	0.2744	0	0.4368	0	1
Total Assets Lagged	384,227	61,192	899,899	250	5,015,800	254,262	43,248	730,131	2,365	5,197,800
Leverage	0.3465	0.1639	0.5985	0	6.2399	0.4175	0.3758	0.2901	0.0092	0.8704
ROA	-0.0015	0.0344	0.2061	-1.6643	0.3913	0.0404	0.0657	0.14	-0.4334	0.3838
Cash Flows from Operations	32,905	7,511	84,654	-41,200	537,428	11,845	1,646	38,206	-30916.00	270,000
Age	4.2128	2.1315	6.2653	0.0575	31.2712	8.8813	6.96	8.2817	3.5	37.012
Underpricing	0.0772	0.0500	0.1487	-0.2808	0.5421	0.0728	0.1071	2.9137	-0.0826	0.2957
Retained Ownership	0.5757	0.5985	0.1814	0.1025	0.9050	0.563	0.61	0.2117	0.05	0.75
Underwriter	0.5550	1	0.4982	0	1	0.1786	0	0.3835	0	1
Big N	0.8612	1	0.3465	0	1	0.398	0	0.4114	0	1
Placing	0.7273	1	0.4464	0	1	0.5163	1	0.5002	0	1
N	**209**					**368**				

Abnormal accruals are measured using Kothari et al. (2005) as described in the methodology section. Forecasting is a dummy that takes the value of 1 if the IPO reported a forecast in the IPO during listing and 0 otherwise. Total assets are the lagged value of the total assets reported in £1,000. Leverage is the debt-to-total-assets ratio. ROA is measured as the reported income to total assets. Cash flow from operations is reported in thousands for the IPO period. Age is the difference between the date of incorporation and the IPO date measured in years. Underpricing is measured as the difference between the first day market price of the share and the offer price scaled by the offer price. Retained ownership is the percentage of ownership retained by directors and major shareholders after the issue. Underwriter is a dummy variable that takes the value of 1 if the firm has a prestigious underwriter according to Derrien and Kecskes (2007) and 0 otherwise. Big N is a dummy variable that takes the value of 1 if a firm is audited by one of the Big Four auditors, which are PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG, and 0 otherwise. Placing is a dummy variable that takes the value of 1 if the type of offer is placing and 0 otherwise.

Table 4.3 Buchner et al.'s (2017) replication using the same method as the original paper as a measure of abnormal accruals 1998-2015

	My Results 1998-2015 1998-2015 Abnormal Accruals	Original Paper 1985-2012 Abnormal Accruals
Retained Ownership	-0.0219	-0.0372*
	(-0.41)	(0.053)
Ln Age	-0.0175	-0.0167
	(-1.56)	(0.175)
Forecasting	-0.0699***	-0.1733**
	(-2.76)	(0.029)
Underpricing	0.0119	0.0067
	(0.18)	(0.981)
ROA	-0.114**	-0.1442***
	(-2.42)	(0.000)
Log Absolute CFO	-0.0207***	0.0019
	(-2.95)	(0.489)
Underwriter	-0.00241	-0.1533**
	(-0.13)	(0.036)
Big N	-0.00706	-0.0328
	(-0.24)	(0.248)
Inverse Mills Ratio	-0.615*	0.2077***
	(-1.70)	(0.000)
Constant	0.392***	-0.3197***
	(3.15)	(0.001)
Industry and Year	Yes	Yes
N	207	368

Abnormal accruals are measured using the method in Kothari et al. (2005). Retained ownership is the percentage of ownership retained by directors and major shareholders after the issue. Ln Age is the natural logarithm of the age of the company measured as the difference between the date of incorporation and the IPO date measured in years. Forecasting is a dummy that takes the value of 1 if the IPO reported a forecast in the IPO during listing and 0 otherwise. Underpricing is measured as the difference between the first day market price of the share and the offer price scaled by the offer price. ROA is measured as the reported income to total assets. Cash flow from operations is reported in thousands for the IPO period. Log Absolute CFO is the logarithm of absolute value of cash flows from operations in the IPO year. Underwriter is a dummy variable that takes the value of 1 if the firm has a prestigious underwriter according to Derrien and Kecskes (2007), and 0 otherwise. Big N is a dummy variable that takes the value of 1 if a firm is audited by one of the Big Four auditors, which are PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG, and 0 otherwise.

t statistics in parentheses * *$p < 0.10$,* ** *$p < 0.05$,* *** *$p < 0.01$*

Table 4.4 Buchner et al.'s (2017) replication using the same method as the original paper as a measure of abnormal accruals 1998-2015 adding controls from the first stage as suggested by Chen et al. (2018)

	Abnormal Accruals 1998-2015
Retained Ownership	-0.0220
	(-0.41)
Ln Age	-0.0176
	(-1.56)
Forecasting	-0.0689***
	(-2.68)
Underpricing	0.0139
	(0.21)
ROA	-0.113**
	(-2.36)
Log Absolute CFO	-0.0207***
	(-2.93)
Underwriter	-0.00221
	(-0.12)
Big N	-0.00777
	(-0.27)
Inverse Mills Ratio	-0.618*
	(-1.70)
Change in Revenue	-0.00533
	(-0.22)
Gross PPE	-0.00779
	(-0.25)
Constant	0.401***
	(3.12)
Industry and Year	Yes
N	207

Abnormal accruals are measured using Kothari et al. (2005). Retained ownership is the percentage of ownership retained by directors and major shareholders after the issue. Ln Age is the natural logarithm of the age of the company measured as the difference between the date of incorporation and the IPO date measured in years. Forecasting is a dummy that takes the value of 1 if the IPO reported a forecast in the IPO during listing and 0 otherwise. Underpricing is measured as the difference between the first day market price of the share and the offer price scaled by the offer price. ROA is measured as the reported income to total assets. Cash flow from operations is reported in thousands for the IPO period. Log Absolute CFO is the logarithm of absolute value of cash flows from operations in the IPO year. Big N is a dummy variable that takes the value of 1 if a firm is audited by one of the Big Four auditors, which are PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG, and 0 otherwise.Change in Revenue is the change between last year and this year's revenue scaled by average total assets. Gross PPE is gross property, plant and equipment scaled by average total *assets. t statistics in parentheses.* * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.5 Coefficient of the experimental variable forecast when using alternative methods to estimate abnormal accruals

Measure Number	Measure reference	Coefficient and sign of the experimental variable "forecasting"	Measure type	Dependent variable of the measure
Original paper	Kothari et al. (2005)	**-0.1733****	**Jones**	**TAcc**
Replicated way	Kothari et al. (2005)	**-0.0699*****	**Jones**	**TAcc**
1	Healy (1985)	**-0.187***	**Early Measures TAcc**	**TAcc**
2	DeAngelo (1986)	-0.112	Early Measures-Difference TAcc	TAcc
3	Friedlan (1994)	-0.167	Early Measures-Difference TAcc	TAcc
4	Dechow and Sloan (1991)	**-0.179****	**Early Measures-Industry Median**	**TAcc**
5	Jones (1991)	**-0.161****	**Jones**	**TAcc**
6	Dechow et al. (2003)	**-0.159****	**Jones**	**TAcc**
7	Kothari et al. (2005)	**-0.169****	**Jones**	**TAcc**
8	Dechow et al. (1995)	**-0.156****	**Modified-Jones**	**TAcc**
9	Dechow et al. (2003)	**-0.164****	**Modified-Jones**	**TAcc**

10	Kothari et al. 2005	**-0.167****	**Modified-Jones**	**TAcc**
11	Dechow et al. (2003)	**-0.0743*****	**Modified-Jones**	**TAcc**
12	Chambers (1999)	-0.101	Modified-Jones	TAcc
13	Dechow et al. (2003) –Lag TAcc	**-0.0626****	**Modified-Jones**	**TAcc**
14	Dechow et al. (2003) – Lag TAcc and Sale growth	**-0.0458***	**Modified- Jones**	**TAcc**
15	Jeter and Shivakumar (1999)	**-0.173****	**Jones**	**Tacc**
16	Kasznik (1999)	-0.0596	Modified-Jones	TAcc
17	Larcker and Richardson (2004)	**-0.0838*****	**Modified-Jones**	**Tacc**
18	DeFond and Jiambalvo (1994)	0.0338	Jones	WC
19	Peasnell et al. (2000a)	0.0407	Jones	WC
20	Peasnell et al. (2000a)	0.0422	Modified-Jones	WC
21	Peasnell et al. (2000a)	0.0539	Peasnell et al. (2000a)	WC
22	Ball and Shivakumar (2006) – Book	**-0.0791*****	**Jones**	**Tacc**
23	Ball and Shivakumar (2006) – Market	**-0.106*****	**Jones**	**Tacc**

24	Ball and Shivakumar (2006) – Book and Market	**-0.109*****	**Jones**	**Tacc**
25	Collins et al. (2017)	NA	Jones	WC
26	Collins et al. (2017)	NA	Modified- Jones	WC
27	Working paper – Collins et al. (2017)	NA	Jones	WC
28	Working paper – Collins et al. (2017)	NA	Modified-Jones	WC
29	Kothari et al. (2005)	**-0.167****	**Jones**	**Tacc**
30	Kothari et al. (2005)	**-0.159****	**Modified-Jones**	**Tacc**
31	Owens et al. (2017)	**-0.200*****	**Jones**	**Tacc**
32	Owens et al. (2017)	**-0.0910****	**Jones**	**Tacc**
33	Owens et al. (2017)	**-0.190*****	**Jones**	**Tacc**
34	Dechow and Dichev (2002)	0.00708	Cash flow measure	WC
35	Francis et al. (2005)	**-0.0829*****	**Mix (Cash flow measure and Jones)**	**Tacc**
36	Dechow and Dichev – Ball and Shivakumar (2006)	0.0131	Mix (Cash flow measure and Jones)	WC
37	Konstantinidi et al. (2016)	**-0.0675****	**Asymmetric behaviour**	**Tacc**

All measures as explained in tables 2.1 and 2.2 of chapter 2

Table 4.6 Buchner et al. (2017) replication using working capital accruals and long-term accruals 1998-2015

	Total Accruals	Working Capital Accruals	Long-Term Accruals
	1998-2015	1998-2015	1998-2015
Retained Ownership	-0.201	-0.0779	0.0391
	(-1.00)	(-0.23)	(0.71)
Ln Age	-0.0406	-0.0813	-0.0180*
	(-0.97)	(-1.25)	(-1.69)
Forecasting	-0.187*	0.108	-0.0654***
	(-1.97)	(0.72)	(-2.69)
Underpricing	-0.695***	-0.934**	-0.0181
	(-2.79)	(-2.30)	(-0.27)
ROA	0.628***	0.260	0.136***
	(3.55)	(0.90)	(2.89)
Log Absolute CFO	-0.101***	-0.144***	-0.00708
	(-3.84)	(-3.52)	(-1.06)
Underwriter	-0.0380	0.160	-0.000547
	(-0.54)	(1.42)	(-0.03)
Big N	-0.00382	-0.0300	-0.00452
	(-0.04)	(-0.17)	(-0.15)
Inverse Mills Ratio	-7.029***	-15.62***	0.0918
	(-5.20)	(-6.72)	(0.24)
Constant	2.416***	4.327***	0.0425
	(5.19)	(5.57)	(0.34)
Industry and Year	Yes	Yes	Yes
N	207	181	181

Total accruals are measured as the difference between earnings and cash flows from operations. Working capital accruals is measured as (change current assets - change current liabilities - change in cash+ change in short-term loans). Long-term accruals are the difference between total accruals and accrual working capital. Total accruals, accrual working capital and long-term accruals are all scaled by average total assets. Retained ownership is the percentage of ownership retained by directors and major shareholders after the issue. Ln Age is the natural logarithm of the age of the company measured as the difference between the date of incorporation and the IPO date measured in years. Forecasting is a dummy that takes the value of 1 if the IPO reported a forecast in the IPO during listing and 0 otherwise. Underpricing is measured as the difference between the first day market price of the share and the offer price scaled by the offer price. ROA is measured as the reported income to total assets. Cash flow from operations is reported in thousands for the IPO period. Log Absolute CFO is the logarithm of absolute value of cash flows from operations in the IPO year. Underwriter is a dummy variable that takes the value of 1 if the firm has a prestigious underwriter according to Derrien and Kecskes (2007), and 0 otherwise. Big N is a dummy variable that takes the value of 1 if a firm is audited by one of the Big Four auditors, which are PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG, and 0 otherwise. . t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4.7 Probability of reporting a forecast in the prospectus of an IPO by industry

ICB Sector	ICB Code	Forecasting
Oil and Gas	INDC500	0.188**
		(1.98)
Basic Resources	IND1700	0.400***
		(3.34)
Industrial Goods and Services	IND2700	0.333***
		(5.28)
Personal and Household Goods	IND3700	0.167
		(1.08)
Health Care	IND4500	0.0417
		(0.54)
Retail	IND5300	0.231***
		(3.11)
Media	IND5500	0.0625
		(0.66)
Travel and Leisure	IND5700	0.0526
		(0.61)
Technology	IND9500	0.161***
		(3.18)
N		209

Where the dependent variable is forecasting that takes the value of 1 if a firm has a forecast in the prospectus and 0 otherwise. The independent variables take the value of 1 if a firm is in the identified industry classification and 0 otherwise. .

t statistics in parentheses. * *p* < 0.10, ** *p* < 0.05, *** *p* < 0.01

Chapter 5

Audit Quality, Regulatory Environment and Earnings Management in IPO Firms

5.1 Introduction

The previous chapters examine the reliability of measures of abnormal accruals as proxies for earnings management, and provide evidence that accruals-based measures of earnings management are not reliable. Chapter 2 examines abnormal accruals estimates generated from different approaches, their correlations with each other, their ability to be distinguished from total accruals or working capital accruals, and their persistence, and it concludes that the measures lack power and reliability. Chapters 3 and 4 examine the differing effects of assumptions used in the estimation of abnormal accruals in different scenarios. In studying the relationship between paying dividends and earnings management, studied in the UK by Atieh and Hussain (2012), the replication in Chapter 3 finds that, when replacing the method used in estimating abnormal accruals in the original paper with different abnormal accruals measures or with total accruals and working capital accruals, there is no impact on the empirical results of the study. When replicating a study on the relationship between the provision of forecasts in IPO prospectuses and earnings management, however, chapter 4 reports that the choice between abnormal accruals measures based on total accruals or working capital accruals has impacts upon the empirical regularities reported. In both chapters, alternative explanations are presented for the empirical regularities that do not involve earnings management. To draw additional conclusions on the reliability of abnormal accruals as a proxy for earnings management, this chapter presents the results of examining two further scenarios related to the relationship between earnings management in IPO firms, during the IPO year, in relation to the regulatory environment (Alhadab, Clacher and Keasey, 2016 (ACK subsequently)) and audit quality (Alhadab and Clacher, 2018 (AC subsequently)).

These two papers are chosen for replication as both papers are UK based, they use measures of abnormal accruals as proxies for earnings management, access to data is available, they are from high-ranked journals, and are relatively recent. The two studies in this chapter are interesting as they both use the same basic research design, time period and dataset. However, they differ in the proxies for earnings management, the number of observations, and control variables used. Interestingly, measures of audit quality and regulatory environment are employed as explanatory variables for earnings management in both papers (either as the main experimental variable or as a control variable). For both these variables, however, the relationship with earnings management is only reported to be significant when the variable is the experimental variable of the study and not when the variable is added as a control variable. The conflicting results suggested in the relationship between the key experimental variables and abnormal accruals as a proxy for earnings management make it interesting to replicate as the results are not even robust between the two studies (despite the overlap in author teams and the fact the two papers are derived from the PhD thesis of the first author for both papers). For these reasons, these two scenarios are studied in this chapter.

5.1.1 Motives, aims and objectives

The research motive of both studies is to understand the impact of different mechanisms, both external (regulatory environment) or internal (audit quality), on earnings management. The aim of ACK is to understand whether the burdens imposed by the regulatory environment place more/less restrictions on earnings management around IPOs. Therefore, the primary objective of ACK is to examine if the regulatory environment has an effect on earnings management, as there are more restrictions imposed on IPO firms that seek to list on the Main Market vs AIM in the UK. For AC, the aim of the paper is to understand whether having higher-quality auditing will restrict earnings management compared to lower-quality audit. Thus, the primary objective of AC is to examine if IPO firms that have Big Four auditors, as an indicator of higher audit quality, will have less earnings management than firms that do not have Big Four auditors.

5.1.2 Theory

The two studies are based on two theoretical concepts, agency theory and corporate governance, to explain earnings management. As discussed earlier in section 2.2.2 of chapter 2, agency theory suggests that, in the relationship between different individuals where one is the principal and the other is the agent, the latter ought to act in the best interests of the principal, otherwise a conflict of interest may arise (Jensen and Meckling, 1976). Thus, managers (agents) may have an incentive to manage earnings that is not necessarily in line with the best interests of the principal (stakeholders). Thus, to attempt to align the interests of managers and stakeholders, there should be some monitoring mechanisms to mitigate the problem. Such mechanisms include the installation of corporate governance mechanisms (Shleifer and Vishny, 1986). Thus, having good governance is seen as potentially restricting opportunistic behaviour by managers (Rezaee, 2004). Following this argument, having tougher regulations is seen as better governance and should restrict earnings management. Thus, firms seeking to list on the Main Market should have lower earnings management compared to firms seeking to list on the AIM market (ACK). Further, auditors play a role as a monitoring mechanism, as they have a responsibility to give assurance that firms can keep operating in the future, and that financial statements are true and fair. In this context, having a high-quality auditor gives a signal to potential investors in IPO firms that the financial statements are prepared to a high quality (Brau and Fawcett, 2006). Therefore, IPO firms with higher-quality auditors should have less earnings management compared to IPO firms that have low-quality auditors (AC).

5.1.3 Methodology

Both papers use data for IPO firms listed on both the AIM and Main Market of the London Stock Exchange for the period from 1998 to 2008; however, the sample sizes differs. ACK has 570 observations while AC has 498 observations. In relation to accruals earnings management measures, both papers use the two-stage regression process. First, abnormal accruals are estimated. ACK model normal accruals based on Kothari et al. (2005) (measure number 29, tables 2.1, and 2.2, chapter 2), from which abnormal accruals are estimated as the difference between actual accruals and estimated normal accruals, during the IPO year. AC models normal accruals based on Ball and Shivakumar (2006) (measure number 22, tables 2.1, and 2.2, chapter 2), from which abnormal accruals are estimated as the difference between actual accruals and estimated normal accruals, during the IPO year. Second, whether 'Market listing' and/or 'Audit quality' is significantly related to earnings management in IPO firms is investigated. The papers differ in the measures of abnormal accruals used, and the control variables used in the second stage. Both papers, however, have 'Market listing' and 'Audit quality' either as a main experimental variable or as a control variable in the second stage regression.

5.1.4 Main findings

In relation to accruals earnings management, ACK find that the level of earnings management is affected by the market listing. They report that IPO firms listing on the Main Market have less accruals earnings management compared to firms listing on AIM, arguing that this difference is due to the impact of the light regulations that AIM imposes on IPO firms. In AC, when the market listing is included as a control variable, however, it is not significantly related to abnormal accruals as a proxy for earnings management in IPO firms. In contrast, AC find that the quality of the audit restricts earnings management as they report that firms that have Big N auditors have lower levels of accruals earnings management while, in ACK, when Big N auditors are included as a control variable, it is not significantly related to accruals earnings management.

5.1.5 Replication

Following the main aim of this thesis, which is to understand the reliability of abnormal accruals as a proxy for earning management, these two papers are chosen for replication to explore the possibility that the method used in estimating abnormal accruals, given it is different in the two papers, leads to changes in the significance and sign of the coefficients of the two variables (Audit quality and Market listing). These two papers are chosen for replication as both papers are UK based, they use abnormal accruals as a proxy for earnings management, access to data is available, they are from high-ranked journals, and are relatively recent. The conflicting results reported in the relationship between the experimental variables and abnormal accruals as a proxy for earnings management make it interesting to replicate to understand the reliability of the used as the results are not robust between the two papers.

Unlike in chapters 3 and 4, in which the time period for the sample data is different relative to the replicated studies, in this chapter, pure replication of the two papers is performed by replicating the studies using the same research design, population and sample period. In addition, this study replicates the two papers using other methods in the literature to estimate abnormal accruals (as per tables 2.1 and 2.2 of chapter 2), uses placebo tests, performs robustness checks by extending the research time period to include additional years and, finally, uses the absolute value of abnormal accruals, as this is used by the first author of the two papers in his thesis as a measure of earnings quality.

One of the basic requirements for scientific research to progress is the ability to replicate studies (Burman et al., 2010). The findings of a study are more robust when they are replicated, and this is of great importance in providing reassurance that causal inference can be drawn (e.g. Moonesinghe et al., 2007). However, replicating a study and getting the same findings is almost impossible (Burman et al., 2010). Hence, the person doing the replication should be transparent in the way in which data is collected and analysed to provide assurance that the differences in results are not due to errors and to guide future researchers in conducting their research.

Unfortunately, when attempting to replicate the two studies using the same methods and time periods as the original authors, this research does not find any significant results for the experimental variables, market listing and audit quality, as reported by AC and ACK. When using extended time periods, or other methods for estimating abnormal accruals, the results of the experimental variables still are not significant. Finally, when using the absolute value of abnormal accruals, instead of positive and negative abnormal accruals, some relationships are reported. This, however, is not what the authors report that they do in the original papers. Thus, in terms of the relationship between audit quality, regulatory environment and earnings management in

IPO firms in the UK, this research finds there is no relationship between the two, which is in line with the findings of the AC and ACK when they are used as control variables, rather than experimental variables, in second stage regressions.

This chapter shows the detailed steps taken to replicate the studies, in addition to the struggles that researchers may face when replicating a published paper or when trying to build on the research of a published paper. Because the findings of the replicated studies do not match the reported findings by AC and ACK, this chapter explains in detail the data collection process and the variables used in the study, and includes a comparison of the summary statistics of AC and ACK with the dataset of this study, in order to remain as transparent as possible.

5.1.6 Contribution

This chapter contributes to the knowledge in the following ways. First, in terms of the relationship between earning management in IPO firms and the regulatory environment and audit quality, prior research presents conflicting results in terms of these relationships (AC versus ACK). The results reported in this chapter finds no such relationship when using any measure of abnormal accruals in estimating earnings management. This means that the relationship between accruals earnings management and audit quality or regulatory environment is not robust. This is in line with the findings of AC and ACK when the variables focussed upon are considered as control variables, as a relationship is not found in these circumstances. Since the results differ, if only in part, from what is described in AC and ACK, this chapter contributes to the understanding of the struggles a researcher may be presented with when building on another study or understanding a published study, which, to the best of my knowledge. is the first to be presented in market-based accounting research. This is achieved by providing detailed explanations of the replication process as well as data collection, highlighting the difficulties researchers face when building on other research or when aiming to obtain robust, consistent, results relative to published papers.

5.1.7 Chapter structure

This chapter is organised as follows: section 5.2 discusses the literature in relation to the relationship between audit quality, regulatory environment and accruals earnings management; section 5.3 discusses the methodology of AC and ACK, section 5.4 discusses the replication design; section 5.5 describes the data collection process and provides a detailed explanation of the variables uses in this study; section 5.6 provides the results of AC and ACK results compared to the replication results and placebo tests; and section 5.7 provides a summary of the chapter.

5.2 Related literature

This section discusses literature related to the main scenarios of this chapter, in relation to the two papers by ACK and AC. Both papers examine IPO firms in the UK and earnings management. ACK look at the theoretical concept that different regulatory environments lead to different managerial abilities to mislead potential investors, while AC consider the theoretical concept that audit quality is a defence mechanism in that it restricts the implementation of such managerial motives. These two papers use established measures and theoretical constructs in the earnings management literature that build on previous research in the area. Thus, related literature includes earnings management around IPOs, the different regulatory environment, and audit quality.

5.2.1 Earnings management around IPO offerings

It is shown in literature that managers seek to provide a positive signal to investors through earnings (Brau and Fawcett, 2006). Researchers provide evidence that, around IPOs, managers seek to use accruals earnings management to increase earnings figures, as it is a crucial part of the firm's life cycle (Friedlan, 1994; Gramlich and Sorensen, 2004; Morsfield and Tan, 2006; Teoh et al., 1998a). Managers have various incentives to manage earnings around IPOs in order to maintain a high stock price (Teoh et al., 1998a). There are various reasons why the stock price needs to stay high, such as the high litigation risk facing such firms that gives managers an incentive to manage earnings pre and post the IPO so that earnings do not decline and affect the stock price (Teoh et al., 1998a), and the negative impact a stock price decline will have on the entrepreneur's investments, given that they are restricted by a lock-up period and thus cannot sell their shares (Darrough and Rangan, 2005). Another reason to manage earnings is to attain any forecasted figures to avoid possible reputation damage arising from not meeting the forecast in the prospectus, which may influence the relationship with investors, analysts, as well as underwriters (Buchner et al., 2017).

Other authors have questioned the presence of upwards accruals earnings management during IPOs. Cecchini et al. (2012) report evidence that IPO firms manage earnings downwards by reporting larger amounts of bad debt expense. Likewise, using 171 UK IPOs, Ball and Shivakumar (2008) find that reporting quality is high and more conservative, contrary to the argument that managers manage earnings upwards around IPOs (Ball and Shivakumar, 2008).

5.2.2 The regulatory environment (AIM vs Main market)

ACK examines the relationship between the regulatory environment and earnings management in IPO firms in the UK. The UK is an excellent setting as the London Stock Exchange has two regulatory environments, Main and AIM. The UK Listing Authority (UKLA) regulates and monitors IPO firms on the Main Market, while AIM is regulated by Nominated Advisers (Nomads). Nomads are private companies that regulate and advise IPO firms. ACK argues that IPO firms looking to list on the AIM market have lower regulatory requirements. For example, they do not need to comply with the UK Corporate Governance Code, unlike firms listed on the Main Market.

There are major differences between AIM and the Main Market (Jenkinson and Ramadorai, 2010). Vitally, the regulatory environment, in terms of flexibility, differs, with AIM being more flexible while the Main Market is more restrictive. Given that the Main Market is a more developed market and such developed markets are more restrictive, AIM is characterised as having lighter and more flexible regulations. The purpose of the AIM market contributes to the reasons for this difference. Since it was established in 1995, the AIM market has provided the opportunity to raise capital for small and medium businesses from the public. Thus, the cost to comply and list on this market is lower compared the Main Market.

An example of some of the differences between AIM and the Main Market is the firm's previous financial record, as listing on AIM does not require IPO firms to provide such information. IPO firms seeking to list on the Main Market are required to have financial records for a minimum of the last three years, and a minimum float of 25% should be made available to the public. Due to this flexibility, firms seeking to list on AIM can go public faster than those seeking to list on the Main Market (ACK).

Therefore, ACK theorise that the regulatory environment is related to earnings management, arguing that the Main Market of the London Stock Exchange is heavily regulated while the Alternative Investment Market (AIM) is more lightly regulated. The strength of the regulatory environment therefore contributes to the level of earnings management. Hence, the authors seek to answer the question of whether a light vs controlled regulatory environment will have an impact on real and accruals earnings management.

5.2.3 Audit quality

AC examines the relationship between audit quality and earnings quality in IPO firms in the UK. There has been extensive research on the relationship between earnings management and audit quality. There are several proxies of audit quality that are associated with earnings management. DeAngelo (1981) is one of the earliest studies and uses the size of the audit as a proxy and indicator of higher-quality auditors. Becker et al. (1998) uses having one of the Big 6 as an auditor for a firm as a proxy for higher-quality auditors, reducing accruals earnings management relative to firms that do not have Big 6 auditors. There are other proxies as well, such as the fees of audit and non-audit services provided by auditors (Frankel et al., 2002; Antle et al., 2006), the industrial experience of the auditor (Krishnan, 2003), the level of conservatism in the audit report (Francis and Krishnan, 1999), and the audit efforts measured by the hours spent on the audit (Caramanis and Lennox, 2008).

Researchers find that the higher the quality of the audit, the lower the level of earnings management. For example, Frankel et al. (2002) find that there is a negative relationship between firms that pay higher audit fees and accruals earnings management. As higher audit fees are considered as better audit quality, the more firms pay to auditors, the less earnings management there is in accruals. Furthermore, in relation to non-audit fees they find a positive relationship with accruals earnings management, as non-audit fees compromise the independence of the auditors. Francis and Krishnan (1999) find that, in the cases in which firms have higher accruals earnings management, the audit opinion in the report is more likely to be a modified audit opinion. Caramanis and Lennox (2008) measure audit quality in terms of the hours spent on the audit, and find that firms with higher audit hours have less accruals earnings management.

According to AC, it is the first to examine the relationship between having Big N auditors as an indicator of audit quality and earnings management around IPOs in the UK. The authors propose that, by having Big N auditors, the firm has higher audit quality and is likely to reduce material misstatements which, as a result, will reduce earnings management compared to firms that do not have such high audit quality. The authors use two proxies for earnings management, both real and accruals.

5.3 Methodology

ACK and AC are very similar in terms of research design. Both use two-stage regressions and the same sample population. Both use IPO firms listed on the London Stock Exchange for the period from 1998 to 2008. However, they differ in the method used to estimate accruals-based earnings management, the number of control variables, and the number of observations. In the first stage regression, one uses earnings management measures based upon Ball and Shivakumar (2008) while the other uses measures based upon Kothari et al. (2005). This section explains both methods.

5.3.1 ACK’s method

In the paper by ACK, the authors measure normal accruals first by using the approach of Kothari et al. (2005) (measure number 29, tables 2.1, and 2.2, chapter 2) to obtain the coefficients of the explanatory variables. They adjust the methods by using average total assets as a deflator instead of lagged total assets, arguing that lagged total assets are smaller for IPO firms because, at the end of the year of the IPO, firms tend to use the proceeds to invest in assets. Hence, they estimate the following equation, during the IPO year cross-sectionally per industry for all non-IPO firms:

$$TAcc_{i,t} = \beta_0 + \beta_1\left(\frac{1}{Avg.TA_i}\right) + \beta_2\Delta Sales_{i,t} + \beta_3 GPPE_{i,t} + \beta_4 ROA_{i,t} + \varepsilon \quad (29)$$

After obtaining the beta estimates from the above regressions, they estimate normal accruals as follows (measure number 30 – table 2.1 and 2.2 chapter 2) for the IPO firms (receivables are included in estimating NA but not in estimating the coefficients used).

$$NA_{i,t} = \widehat{\beta_0} + \widehat{\beta_1}\left(\frac{1}{Avg.TA_i}\right) + \widehat{\beta_2}\left(\Delta Sales_{i,t} - \Delta Rec_{i,t}\right) + \widehat{\beta_3} GPPE_{i,t} + \widehat{\beta_4} ROA_{i,t} \quad (30)$$

where NA is normal accruals for the firm if, for the period t, all other variables are as explained in table 2.3.

$$AA_{i,t} = \left(\frac{TAcc_{i,t}}{Avg.TA_i}\right) - NA_{i,t}$$

They then obtain abnormal accruals as the difference between actual total accruals and estimated normal accruals. Abnormal accruals are then regressed in the second-stage regression where (Market.Listing) takes the value of 1 if the IPO firm is listed on AIM and 0 if it is listed on the Main Market, in addition to some control variables.

$$AA_{i,t} = \beta_0 + \beta_1 Market.Listing + Controls$$

Controls are ln size or ln market, which is the natural logarithm of the market value of the firm at year t. Retained ownership is the percentage of ownership retained by insiders (directors and major shareholders that hold more than 3%). Loss is a dummy variable that takes the value of 1 if the firm reports a loss in the IPO year time period and 0 otherwise. The leverage ratio is measured as total debt at year t divided by total assets at t-1. The book-to-market ratio is calculated as the book value of equity divided by the market value. Venture capitalist is a dummy variable that takes the value of 1 if the IPO firm is backed by a venture capitalist, as classified by British Venture Capitalist Association, where they own more than 3% of the IPO firm's shares and 0 otherwise. Underwriter is a dummy variable that equals 1 if the IPO firm has a prestigious underwriter (as classified by Derrien and Kecskes (2007), explained in more detail in the data collection process below). Outside directors are the percentage of non-executive directors relative to the size of the board. Board size is the number of directors on the board. CEO/Chairman takes the value of 1 if both the CEO and Chairman are the same person and 0 otherwise, and finally Big N is a dummy variable in this paper that takes the value of 1 if a firm auditor is considered as one of the Big Four auditors, PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG, and 0 otherwise.

5.3.2 AC's method

AC estimate normal accruals using the same method used by Ball and Shivakumar (2006) (measure number 22, tables 2.1, and 2.2, chapter 2), by running a cross-sectional regression for each year for all the non-IPO firms for each 2-digit SIC industry classification as follows:

$$TAcc_{i,t} = \beta_0 + \beta_1 \Delta Sales_{i,t} + \beta_2 GPPE_{i,t} + \beta_3 CFO_{i,t} + \beta_4 DCF_{i,t} + \beta_5 CFO * DCF_{i,t} + \varepsilon \quad (22)$$

TAcc is total accruals for firm i for the year t measured as the difference between earnings before extraordinary items and cash flows from operating activities. Change in sales is measured as the difference in the sales figure for firm i between the years t and t-1. GPPE is the gross property, plant and equipment for firm i for year t. CFO is cash flows from operating activities for firm i for the year t. DCF is a dummy variable that takes the value of 1 if CFO < 0 and equals 0 otherwise. All variables are scaled by average total assets for the years t and t-1 and winsorised at the 1% and 99% level. Abnormal accruals are calculated as the difference between actual accruals and estimated normal accruals.

They estimate normal accruals from the estimated betas of the above regressions as follows:

$$NA_{i,t} = \widehat{\beta_0} + \hat{\beta}_1 \Delta Sales_{i,t} + \widehat{\beta_2} GPPE_{i,t} + \hat{\beta}_3 CFO_{i,t} + \widehat{\beta_4} DCF_{i,t} + \widehat{\beta_5} CFO * DCF_{i,t}$$

Where NA is the normal accruals for the firm i, for the period t, all other variables are as explained in table 2.3:

$$AA_{i,t} = \left(\frac{TAcc_{i,t}}{Avg.TA_i}\right) - NA_{i,t}$$

They then estimate abnormal accruals, which are used in the second-stage regression as the dependent variable as a proxy for earnings management. Abnormal accruals are regressed on Big N, which is a dummy variable that takes the value of 1 if a firm has an auditor that is one of the Big Four audit firms – PWC, Deloitte, KPMG and EY – or zero otherwise, as pointed out in footnote 3 on page 444 of the paper.

$$AA_{i,t} = \beta_0 + \ \beta_1 Big.N + Controls$$

All the second-stage independent variables in ACK are in the second stage regression of AC, with the addition of four more independent control variables in AC. They are ln(1+age), which is the natural logarithm of 1 plus the age of the IPO firm, where age is measured as the difference between the founding date of the firm and the IPO year, measured in years. ROA is the return on assets, measured as earnings before extraordinary items divided by total assets in the year prior to the IPO. SEO is a dummy variable that takes the value of 1 if a firm issues a seasonal equity offering during the IPO year, and 0 otherwise. Capital expenditure growth is measured as the difference between capital expenditure during the IPO year and capital expenditure in the year before scaled by total assets in the year prior to the IPO. The reason for the inclusion of the control variables in both papers is not clear, as other papers do not give adequate explanation of the reason for these controls and the choices of variable. Finally, market listing is a control variable in this paper and experimental variable in ACK, which is a dummy variable that takes the value of 1 if the IPO firm is listed on AIM and 0 if the IPO firm is listed on the Main Market of the London Stock Exchange.

5.4 Replication design

As researchers, we generate hypotheses, collect data, and statistically test the data to find out whether it is consistent with our hypotheses; as scientists it is our job to try to understand the truth about the world (Simmons et al., 2011). In any econometric study, there are multiple decisions in building the bridge from data to results that a researcher makes. If another researcher seeks to replicate the results, they will face great difficulty understanding such decisions, particularly without the dataset and the codes used by the original researcher. It is of great importance for researchers, therefore, to publish data and codes used to allow other authors to replicate the original study with confidence and to assure them that they correctly understood the original study (Duvendack et al., 2015). Unfortunately, this is not the case with many papers in many journals.

According to Hamermesh (2007), there are three ways to replicate a study. The first is pure replication, which is replicating the data using the same sample, the same measures and the same estimation methods. The second type is statistical replication, which is using a different sample but identical measures, estimation, and underlying population. The third type is scientific replication, which is using a different sample relative to the original study, and a different population, while the measures employed can be similar but not identical, using a different theoretical or conceptual approach.

In this research, all three types of replications are performed. The first approach is pure replication carried out by replicating the papers by AC and ACL using the same research design, sample period (1998-2008), data sources, and the same way of estimating abnormal accruals. The second type is increasing the sample size to incorporate a larger time period (1998-2015). The third type is using different measures to estimate abnormal accruals and the impact this has on the results, as well as observing the significance and sign of the coefficients of the experimental variables when using the total accruals or working capital accruals. Finally, placebo tests are used in health science, which involve replacing the drug that is being tested for its effect with sugar pills. In social science, placebo tests are performed by repeating the analysis using an outcome that should not be related to the variable of interest. In this research, lead abnormal accruals are used as a measure of earnings management as a placebo test.

Below are the steps of the replications:

- Step one: Use all measures from equations 1-37 (chapter 2) to estimate normal accruals per year per ICB industry classification. Normal accruals estimates are deducted from actual accruals to estimate abnormal accruals defined as AA1-AA37; numbering is according to the measures table 2.2 in chapter 2, which shows the measure number and the reference for the measure.
- Step two: Pool all abnormal accruals from cross-sectional regressions into one dataset making a pooled dataset.

- Step three: Follow ACK and AC in estimating normal accruals and obtain abnormal accruals using the same way as indicated in the papers.
- Step four: Run the second-stage regressions as in ACK and AC using abnormal accruals as a proxy for earnings management, experiment variables and control variables.
- Step five: Use abnormal accruals generated from the different measures identified as measures of earnings management in the second-stage regression; compare the results with those in ACK and AC for the experimental variables in terms of the significance and sign of their coefficients.
- Step six: Rerun the second stage of the replicated studies using total accruals and working capital accruals instead of abnormal accruals as a proxy for earnings management. Compare the results with the results by ACK and AC and with other abnormal accruals measures' results for the experimental variables in terms of the significance and sign of their coefficients.
- Step seven: Perform Placebo-tests using lead abnormal accruals as measures of earnings management. Compare the results with those in ACK and AC and with other abnormal accruals measures' results for the experimental variables in terms of the significance and sign and significance of their coefficients.
- Step eight: Use a different two stage research design, consistent with that suggested by Chen et al. (2018). Compare the results with those in ACK and AC and with other abnormal accruals measures' results for the experimental variable in terms of the significance and sign of their coefficients.

- Step nine: Run regression diagnostics by removing one outlier observation at a time, aiming to obtain the same results of the significance and sign of coefficients of the experimental variables as in ACK and AC.
- Step ten: Use the absolute value of abnormal accruals (as performed in the PhD thesis of the A in AC and ACK). Compare results with those in ACK and AC and with other abnormal accruals measures' results for the experimental variables in terms of the significance and sign of their coefficients.

5.5 Data

The data collection process in both papers seems similar; the authors describe the data collection process in ACK (p.857) as follows:

"We collect data using the following sources: (1) IPO firms are identified using the list of IPOs on the London Stock Exchange website for UK firms that were admitted to the AIM and Main markets during the period 1998–2008. This list provides information about IPOs such as, issue price, the date of an IPO, market capitalisation, etc.; (2) the ICC Plum and Lexis-Nexis databases were used to obtain information about the company identifier for IPO firms, such as the Worldscope and ISIN codes; (3) financial data for the IPO firms and for our control sample of all UK non-IPO firms were obtained from the Worldscope database; (4) Worldscope, however, does not provide all the required financial data for our sample of IPO firms; therefore, IPO prospectuses were downloaded from the Thomson One Banker database and all missing financial data were manually collected from IPO prospectuses."

In AC (p.452), it is as follows:

"Our data is collected from a range of sources. Our list of IPO firms are taken from the IPO list of the LSE website, which covers all firms listed on both the Main and AIM markets between 1998 and 2008. This gives us key information about the IPO including the IPO date, market capitalisation, and issue price etc. To obtain company identifier information for our sample firms we use Lexis-Nexis and ICC Plum and collect ISIN and Worldscope codes. Worldscope is used to collect financials for both our IPO firms and our control sample of non-IPO companies. Stock prices for both IPO firms and control firms are taken from Datastream. FAME is used to identify the auditor of both our IPO and control samples. Finally, we use the IPO prospectus to collect manually all missing data."

Despite both explanations of data collection being the same, the number of observations in the two papers drops by over 12% from 570 to 498 firm-year observations. I tried contacting the primary author to obtain the ISIN numbers for both samples to be sure that I have the same sample for both replications and to understand the criteria which led to the observations dropping. However, I did not receive any reply from the author after contacting him by email twice. Hence, I perform data collection based on the explanations provided in the two published papers, in addition to the PhD thesis of the primary author upon which these two papers are based.

To obtain the data, I first obtain the list of new issues on the London Stock Exchange from the London Stock Exchange website; the file name is "new issue". There are different types of issue (for example, an introduction from AIM/Main/SFM/USM, new company placing, reverse takeover, transfer); there are over 50 classifications of different types of issue. These types are classified by the LSE into two groups: IPO and not IPO. Therefore, the data collection process starts by taking the list of all non-financial firms classified as IPO firms for the period from 1998 to 2015, regardless of the issue type.

Firms that are listed after April 2014 have a section for the ticker code, while it is missing for firms listed prior to that. To obtain the ticker/ISIN code of the firms, the LexisNexis database is used. The company name is searched for in the company profiles section; within these documents the ticker and ISIN are provided. After obtaining this information, it is matched to the dataset of all UK-listed firms in the Main Market and AIM that is downloaded from the Worldscope database (Datastream). In some cases, where a firm gets delisted, one cannot use the ticker to obtain information from Datastream as they stop using the ticker and they assign a code to the firm instead. In such cases the ISIN and company name are matched.

Some of the variables used in the original papers are obtained from FAME, such as the names of auditors. However, FAME only provides data for a firm for the last 10 years; some of this data is not available for the time periods being examined and has to be obtained manually from the prospectuses. Prospectus documents are obtained from Thomson One, where the filing information is collected. The final sample with full data I obtain is 584 firm-year observations for the period from 1998 to 2008 compared to 570 and 498 in ACK and AC. The reasons for having more observations than in both papers are not clear. It could be due to some data that is not available to the original authors at the time of collection, such as missing prospectuses on Thomson One, or data that was not available on Datastream. I tried contacting the authors twice, first to understand the criteria according to which the sample was selected, and I then asked for the list of ISIN numbers of the firms in both papers to replicate the study using the same sample of firms. Unfortunately, I did not get a reply from the main contact author. The sample distribution per year compared to the authors' papers is provided in table 5.1.

[INSERT TABLES 5.1 and 5.2 HERE]

5.5.1 Variable measurement

Real and accruals proxies for earnings management are used in both papers. Normal accruals are estimated using measures based on those from Kothari et al. (2005) in ACK and from Ball and Shivakumar (2006) in AC, from which abnormal accruals are estimated. The primary independent variable of interest in ACK is the listing variable, which is whether the IPO is listed on the Main Market or AIM. In addition, the primary variable of interest in AC is a proxy for audit quality, which is Big N auditors, and takes the value of 1 if the IPO firm has a Big N auditor and 0 otherwise. The remaining control variables of ACK are all used in AC, along with a few more, as explained in the table below. In both papers, in order to avoid the influence of outliers, the financial data is winsorised at the top 1% and bottom 99%.

The following steps are taken for a pure replication of the studies, using the available information. First, a comparison of the explanation of the variables used in the regressions between the two papers is performed, and in the cases when the explanation is not clear, it is compared to the PhD thesis of the main author. Second, a comparison is made of the summary statistics of the variables between the two replicated papers and any other paper published by the same author, even ones that are not related to earnings management, where the same sample is used. Tables 5.3 and 5.4 provide a comparison of the summary statistics of all published papers by the author as well as the PhD thesis summary of the same sample of IPO firms in the

UK 1998-2008. There are some inconsistences in the sample means between the PhD thesis and the published papers of the authors. For example, one of the main differences is capital expenditure growth; the figure I obtain is closer to the PhD thesis mean.

Variable Name and Description – ACK	Variable Name and Description – AC
Market.Listing *A dummy variable that equals 1 if the IPO firm is listed on AIM and 0 if the IPO firm is listed on the Main Market*	***AIM*** *A dummy variable equalling if the firm is listed on the Alternative Investment Market (AIM) and 0 otherwise*
LnSize *The natural logarithm of market value*	***Ln(MK)*** *The natural logarithm of market value*
Retained Ownership *Measured as the percentage of retained ownership by insiders*	***Retained Ownership*** *Measured as the percentage of retained ownership by insiders*
Loss *Equals 1 if the firm reported a loss during the IPO year and 0 otherwise*	***Loss*** *A dummy variable equalling 1 if the firm reported a loss during the IPO year and 0 otherwise*
Lev *A leverage ratio that is measured as total debt i,t/total assetsi,t−1*	***LEV*** *Leverage ratio calculated as total debt divided by total assets in the year prior to the IPO*
BM *The book-to-market ratio calculated as the book value of equity divided by the market value of equity*	***BM*** *The book-to-market ratio calculated as the book value of equity divided by the market value of equity*
VC *Equals 1 if the firm is backed by a venture capitalist and 0 otherwise*	***VC*** *A dummy variable equalling 1 if the firm is backed by a venture capitalist and 0 otherwise*
Underwriter *Equals 1 if the IPO is underwritten by a prestigious underwriter and 0 otherwise*	***Underwriter*** *A dummy variable equalling 1 if the firm is underwritten by a prestigious underwriter and 0 otherwise*
Big N *Equals 1 if the firm is audited by a Big N auditor and 0 otherwise*	***Big N*** *A dummy variable equalling 1 if the firm is audited by a Big N audit firm and 0 otherwise*
OutDirectors *The percentage of outside directors on the board*	***OutDirectors*** *Measured as the percentage of outside directors on the board*
BrdSize *The number of directors on the board*	***BrdSize*** *The number of directors on the board*
Chrm/CEO *A dummy variable that equals 1 if the Chairman and the CEO is the same director and 0 otherwise*	***Chrm/CEO*** *A dummy variable equalling 1 if the chairman of the board and the CEO is the same individual and 0 otherwise*
	Ln(1+age) *The natural logarithm of 1+IPO firm age where the IPO firm's age is calculated as the difference between the founding date of the IPO firm and the date of its IPO*

ROA *Return on assets measured as earnings before extraordinary items divided by total assets in the year prior to the IPO*

Capex growth *Capital expenditure growth which is computed as capital expenditure for the IPO year minus the previous year scaled by total assets in the year prior*

SEO *A dummy variable equalling 1 if the firms issued a seasoned equity offering during the IPO year and 0 otherwise*

Some explanations are unclear and require further investigation. For example, **retained ownership** as explained by the authors is the percentage of ownership that is retained by “insiders”. However, who are classified as insiders is not clear. Are they directors, family shareholders or all significant shareholders? In the prospectus under the additional information section, companies are required to list the names of directors of interest and the percentage of ownership. Under these sections, the percentage of ownership pre and post the listing is provided. At the start, the assumption made is that retained ownership by “insiders” is the percentage of retained ownership by directors of the firm. However, the variable mean does not match the variable mean of the two papers and the PhD thesis; it is much lower. For that reason, I alter the definition of insiders to include all significant shareholders, not just directors. In the prospectuses, firms are also required to disclose the significant shareholders that own 3% or more of the firm shares. Consequently, I combine the percentage of retained ownership of directors with the percentage of retained ownership by all other significant shareholders, which include family members, venture capitalists and other firms. The variable mean percentage is closer to the one in both papers and the PhD. Therefore, this is the one that is used for the second-stage regression.

Loss is a variable that takes the value of 1 if a firm reports a loss during the year and 0 otherwise. However, which variable is used to obtain the dummy is not clear; one can use net income or earnings. This dummy is calculated using both to get to the one that is closer to the mean of the two papers published and the PhD thesis.

Leverage is explained clearly in ACK; the numerators' and denominators' time periods are clear. However, it is not evident in AC: "leverage ratio calculated as total debt divided by total assets in the year prior to the IPO". From this statement one can assume that both the numerator and denominator are at the year prior to the IPO. I have chosen to use the explanation in ACK, assuming it is the same variable in AC.

The variable **VC** takes the value of 1 if the IPO firm is backed by a venture capitalist and 0 otherwise. However, which shareholders are classified as venture capitalists is unclear in ACK. In AC, this information is provided in a footnote; hence, it is considered as the measure in both papers, assuming that this is what they is meant in ACK too. *"Venture capitalists are those investors who hold more than 3% of a firm's shares and appear in the list of venture capitalists provided by British Venture Capitalist Association. Specifically, we collect data about all the shareholders who hold more than 3% from the prospectuses and then we match the shareholder's name with a list of venture capitalists, which is obtained from the British Venture Capitalist Association."* (p.453, AC)

In the prospectus of a firm, there is a list of the names of significant shareholders of the firm (firms or people). These are the shareholders that hold 3% or higher from the share capital prior and post IPO. The names of these shareholders are then cross-checked with the list of venture capitalists provided by the British Venture Capitalist Association, as the original authors do. One of the drawbacks in this part of the data collection is that this list is updated, meaning that this is the list as at the year 2019. This may or may not be similar to the list of venture capitalists at the time the original authors collected the data (assumed to be between the years 2009 and 2012). This may have an impact on the classifications between my dataset and the original authors' datasets. Classifications of a firm being a venture capitalist are not restricted to lists provided by the British Venture Capital Association. There are others, including the European Venture Capitalist Association [or 'European Private Equity & Venture Capital Association'] or National Venture Capitalist [or 'Capital'] Association, as well as classifications listed in the database of Venture Economics Inc (Coakley et al., 2009).

Underwriter takes the value of 1 if the firm is backed by a prestigious underwriter; however, how an underwriter is classified as prestigious is unclear. There is no mention of what is classified as a prestigious underwriter in ACK. However, it is mentioned in a footnote in AC (p.453): *"Underwriters are those global investment banks as defined by Derrien and Kecskes (2007)"*. Following Derrien and Kecskes (2007), the authors classify an underwriter as "prestigious" if it is a global investment bank. Derrien and Kecskes (2007) argue that if a prestigious firm is not "obvious" they rely on the Thomson's Extel survey conducted in the period 1997-2003. The footnote in Derrien and Kecskes (2007) (p.460) says this: *"We only consider brokers in our sample of introductions, offerings, and IPOs. The global investment banks are ABN AMRO (incl. Hoare Govett), CazenoveandCo., Credit Lyonnais Securities, Dresdner Kleinwort Wasserstein, HSBC Securities (incl. James Capel), ING Financial Markets (incl. Charterhouse Securities), Investec Henderson Crosthwaite Securities, KBC Securities (incl. Peel Hunt), Lazard,* *Lehman Brothers, Nomura International, Schroder Salomon Smith Barney, SG Securities, UBS, and WestLB (incl. Panmure Gordon)."* Hence, the assumption that is made for the two replications is that, if a firm's underwriter is one of these banks, then the variable takes the value of 1 being "prestigious", and 0 otherwise.

Big N is classified as one of the Big Four audit firms, and they are PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG. This is clearly stated in both papers in the footnotes. Regarding the percentage of **outside directors**, the use of the term outside is not precise. Does it mean all non-executive directors or just independent non-executive directors? One also has to speculate here. The assumption that is made in this replication is that it is all non-executive directors.

With regard to **SEO**, how the data from a seasoned equity offering is obtained is not clear in the original papers. One has to speculate where this information is obtained from and on what basis it is considered. Since the LSE provides a list for all further issues across AIM and the Main Market, I assume that this is the data source for this information, as it is not available in Datastream. In this list of "further issues", there are over 60 different types of further issues. Some of these classifications are Placing for Cash, Placing, Exercise of Options, Exercise of Warrants, the Issue for Cash, Further Issue, etc. To obtain this variable, that firms offered seasonal equity, at first, I search for the firm's name in the year of the IPO to detect if they have any further issue. If the name of the firm does not show up on the list, it is considered that the firm had no seasoned equity offering in the IPO year; therefore, it takes the value of 0 for this dummy. If the name of the firm is on the list, then I consider what the type of issue is; again, here I speculate as it -is unclear in the original papers. At first, I consider any placing, further issue and issue for cash as a seasoned equity offering. This leads to a much higher percentage than the one in the original paper, at 5%. So, I then include only further issues as seasoned equity offerings, which results in a percentage of 4.3%.

Capital expenditure growth is calculated as described by the original authors since I am not able to obtain a mean figure close to the one reported in the original paper. Further investigation of the variable explanation in the thesis is performed; however, the explanation is the same as in the original papers. Nonetheless, I find that the mean in the thesis differs from the one in the original paper and is closer to the mean I arrive at. The reason for this difference might be an error, or it may have to do with the exclusion of some firms, which leads to this increase in the mean; the paper does state that they winsorise financial data at the 1% and 99% levels. However, since the median is much lower than the mean, one might assume that there are some outliers that are affecting the mean. Finally, the variable **ROA** is described as *"return on assets measured as earnings before extraordinary items divided by total assets in the year prior to the IPO"*. One can interpret this in two ways, the first being that both the nominator and denominator are at the year prior to the IPO while the other is that the numerator is for IPO year and the denominator is at the year prior to the IPO. Since it is only a control variable in AC, I can only compare it to the description in the PhD thesis, in which the explanation is the same. The variable is calculated twice using both methods, and the one which is closer to the mean of the paper is used, which is earnings before extraordinary items for the IPO year divided by total assets of the year prior to the IPO.

5.6 Results

5.6.1 Descriptive statistics

This part shows a comparison of the descriptive statistics of my dataset with the two replicated papers and the PhD thesis of Alhadab (2012). There are no descriptive statistics for the control variables in ACK. The variable with the biggest difference between the PhD thesis and the published papers is the growth in capital expenditure. The figure I obtain is the one closest to that found in the PhD thesis. In addition, the mean of abnormal accruals used in the papers is slightly higher than the one I arrive at. Therefore, the two datasets are not identical, which could be a reason for any difference in results between the published papers and the results I obtain. The descriptive statistics are for the period from 1998 to 2008, the same time period for the replicated papers.

[INSERT TABLES 5.3 and 5.4 HERE]

5.6.2 Results

This section will discuss the findings on the relationship between accruals earnings management in IPO firms in the UK and both audit quality and regulatory environment, where measures of abnormal accruals are the proxies for accruals earnings management and the main two experimental variables are 'Market listing' and 'Big N'. The relationship is tested when using the same time period and methods as AC and ACK, for an extended time period, the authors' methods in estimating abnormal accruals, any measure of the 37 measures identified in chapter 2 to estimate abnormal accruals, total accruals, working capital accruals, using placebo tests, or an expanded two stage research design. I am unable to draw similar conclusions in terms of the significance and sign of the coefficients of the experimental variables as in ACK and AC. Some results are found when absolute abnormal accruals are used, instead of positive and negative abnormal accruals.

Results of the findings in ACK suggest that IPO firms listed on AIM are likely to have higher earnings management compared to IPO firms listed on the Main Market; the authors argue that this is due to the regulatory environment and associated requirements. ACK report a positive relationship between market listing and abnormal accruals, at the 5% significance level. Market listing is not significantly related with abnormal accruals in AC, however, where it is added as a control variable. The pure replication, when using the same methods and the same time period as ACK, in terms of the significance and sign of the coefficient of the variable market listing, finds no significant results. When extending the time period, significant coefficients are still not found. Hence, my findings are consistent with AC, but not ACK, in that there is no significant relationship between market listing and abnormal accruals. Tables 5.6 and 5.7 show the results of ACK and

AC compared to my results. The tables show no relationship between the control variable AIM, which is a dummy variable that takes the value of 1 if the IPO firm is listed on AIM and 0 if it is listed on the Main Market.

The paper by AC argues that IPO firms that have Big N auditors are likely to have lower abnormal accruals and, as a consequence, less earnings management and better earnings quality than IPO firms that do not have Big N auditors. AC report a significant (at the 5% level) negative relationship between having a Big N auditor and abnormal accruals. However, in ACK the control variable Big N is not significantly related to abnormal accruals. Although it is just a control variable in ACK, it is the experimental variable in AC. Hence, the relationship between having Big N auditors and earnings management, where abnormal accruals are the proxy for earnings management, in IPO firms in the UK is not significant in both my replications and ACK, contrary to AC.

[INSERT TABLES 5.5 and 5.6 HERE]

Neither of variables, market listing and Big N, are significant in the pure replication I perform, using the same time period as the original authors or the extended time period. In untabulated regressions, I find that, when using the 37 different measures in estimating abnormal accruals identified in chapter 2, the findings of the papers ACK and AC are not repeated in terms of the significance or sign of the coefficients of the key experimental variables (Big N and Market listing). The reason for this is not clear; one possible reason could be that the sample size I have is larger and the extra observations could be influencing the results.

For both regressions by ACK and AC, I run regression diagnostics (rerunning the second-stage regressions for a number of times excluding one observation at a time, to eliminate possible outliers); results do not change when one observation at a time is eliminated. Trying to force the results to know how many observations need to be removed to reach the desired findings, and since the result I am looking for is negative for the relationship between Big N and abnormal accruals, I try eliminating one observation at a time to find which set of eliminations gives the highest negative beta for the experimental variable. After dropping nine observations, I get results of negative significance at the 5% level. I do the same for the second regression in ACK and I try running regressions diagnostics (rerunning the second-stage regressions a number of times excluding one observation at a time, to eliminate possible outliers). The results do not materially change when one observation is eliminated. Since the result I am looking for is a positive relation between market listing and abnormal accruals, I try eliminating one observation at a time sequentially to find a set of eliminations that gives the highest positive coefficient for the experimental variable, and after dropping eight observations I get a positive coefficient which is significant at the 5% level. Thus, removing eight or nine 'outlier' observations can force the findings.

In untabulated regressions replications using total accruals and working capital accruals as measures of earnings management, I find no significant relationships for the key experimental variables. This is consistent with the results found when using any of the measures identified in table 2.1 and 2.1 in chapter 2. When using lead abnormal accruals as a placebo test, no significant relationships for the key experimental variables are found.

In the PhD thesis by Alhadab (2012), the author finds a relationship between auditor quality and earnings quality. In the PhD thesis, the author uses absolute abnormal accruals as a measure of earnings quality in relation to Big N as a proxy for audit quality, thus, focusing on the magnitude of abnormal accruals rather than the sign. The sample size is slightly changed from 515 in the PhD thesis to 498 in AC. All other variables have the same explanation as AC. I try using absolute abnormal accruals instead, despite of the mean of abnormal accruals being negative in AC (as shown in table 5.3), indicating that it is not absolute. I am then able to find some statistically significant relationships.

When using absolute abnormal accruals as the dependent variable for the replications of ACK and AC, I find some results that are consistent with the papers, in terms of the significance and sign of the coefficients of the experimental variables, Big N and Market Listing. For the replication of AC, I find a significant negative relation between Big N and absolute abnormal accruals at the 10% level when the same measure in estimating abnormal accruals as the paper is used (AA22) (table 5.7). In untabulated findings, I find some results when using some of the total accruals measures, at the 10% level (AA1, AA11, AA35 and AA37), and at the 5% level (AA13, AA14 and AA17) that report a negative significant relation between absolute abnormal accruals and Big N. I do not find any results when working capital accruals measures are used or when actual working capital accruals is used.

When using absolute abnormal accruals for the replication of ACK, In untabulated findings, I find a significant positive relation between Market Listing and absolute abnormal accruals when using working capital accruals measures, that are significant at the 10% level, (AA18, AA19, AA20, AA21 and AA34), I also find results when actual absolute working capital accruals and actual absolute total accruals are used to proxy earnings management, that are also significant at the 10% level. I, however, do not find any results when the same method as the authors is used in estimating abnormal accruals or when using any of the total accruals-based measures of abnormal accruals. However, AC and ACK do not state that they use absolute abnormal accruals, and this is confirmed by the mean of -0.176 for abnormal accruals in the paper by AC (Table 5.3). Below is an extract from the table from the PhD thesis by Alhadab (2012), with the results on the replication when using absolute abnormal accruals.

[INSERT TABLE 5.7 HERE]

Accordingly, evidence is not found to support hypotheses 12 or 13 of a negative relationship between IPO firms that are audited by Big N audit firms and earnings management, relative to IPO firms that are not audited by Big N audit firms, or a positive relationship between IPO firms that are listed on AIM and earnings management, relative to IPO firms that are listed on the Main Market. The findings are consistent with Ball and Shivakumar (2008) who find that IPO firms in the UK are of high quality and highly monitored by different mechanisms such as auditors, analysts, press, regulators and board members. The findings of this chapter show that the regulatory environment as well as audit quality are not related to accruals earnings management. This finding is also consistent with the two replicated papers when the experimental variables in one are used as control variables in the other.

5.7 Summary of the chapter

This chapter highlights the differences in the relationship between audit quality and market listing to earnings management in IPO firms in the UK between the two replicated papers, AC and ACK. Interestingly, the experimental variable used in ACK is not significantly related to accruals-based earnings management when added as a control variable in AC, and vice versa. The change in significance can be attributed to many reasons, possibly the change in sample size, the change in control variables, or the change in the methods used in the estimation of abnormal accruals.

For that reason, these two papers are replicated in one chapter. This chapter provides no evidence of a relationship between audit quality and market listing and earnings management in IPO firms in the UK, using any of the 37 accruals measures identified in chapter 2 to estimate abnormal accruals. There is a relationship between absolute abnormal accruals as a measure of earnings quality when IPO firms have Big N auditors; however, this is not what the original authors state they analyse.

Repeating the steps of a previous study can be difficult. What makes it even more difficult is collecting the same data as the authors without the codes used to download from the exact source is originally obtained from plus, with manually collected data, there is room for human error. It is a time-consuming task that takes a lot of effort so, when the results of the original study are not obtained, it is unsatisfying for the researcher building on this study. Since the original studies are already published, researchers in general could believe that the published results are valid and that the replication is performed incorrectly. These replications do not seek to distrust the original results of the papers by ACK and AC; however, they encourage thinking about the limits of the findings of published papers. Possible limits to the findings of the papers could be the number of observations, as there is are gaps between the two replicated papers' numbers of observations, from 570 to 498, which also differ from the number of observations I use (576), so there might be some exclusions that are not clearly presented in the original papers. In addition, the number of my observations is higher than in ACK and AC. I tried contacting the corresponding author of both papers to obtain the ISIN codes to compare samples; however, I received no reply. Without such information, there is no way to know the exact firms that are in the original studies. Another possible limit to the findings is the different sets of control variables added in the second-stage regression, since there are no clear guidelines or consistencies in what needs to be controlled for in accruals earnings management research, which could explain the conflicting results for the experimental variables in the two papers. My replications do not find any impact of the method used in estimating abnormal accruals on the findings of the study, as the use of none of the different measures used in estimating normal accruals from which abnormal accruals are estimated suggests a relationship between earnings management proxies and market listing or audit quality for IPO firms.

This chapter also highlights the difficulties in replicating published studies and shows the various elements that may lead to conclusions differing from the original findings. Hence, this study encourages journal editors to ensure that papers are published with sufficient detail and information to enable replication to take place.

Tables

Table 5.1 Comparing sample to Alhadab et al. (2016) and Alhadab and Clacher (2018)

	Alhadab and Clacher (2018) Pooled Sample		Alhadab et al. (2016) Pooled Sample		My Sample Pooled Sample	
Year	Freq	%	Freq	%	Freq	%
1998	33	6.63	35	6.13	43	7.47%
1999	26	5.22	29	5.08	21	3.65%
2000	94	18.88	103	18.04	96	16.67%
2001	40	8.03	43	7.53	43	7.47%
2002	27	5.42	35	6.13	32	5.56%
2003	19	3.82	23	4.03	23	3.99%
2004	80	16.06	97	16.99	99	17.19%
2005	87	17.47	94	16.46	93	16.15%
2006	62	12.45	70	12.26	70	12.15%
2007	29	5.82	40	7.01	45	7.81%
2008	1	0.2	2	0.35	11	1.91%
Total	498	100	571	100	576	100%

	Alhadab and Clacher (2018) Big N clients		My Sample Big N clients		Alhadab and Clacher (2018) Non-Big N clients		My Sample Non-Big N clients	
Year	Freq	%	Freq	%	Freq	%	Freq	%
1998	24	10.34	27	9.82%	9	3.38	16	5.32%
1999	10	4.31	11	4.00%	16	6.02	10	3.32%
2000	59	25.43	62	22.55%	35	13.16	34	11.30%
2001	17	7.33	17	6.18%	23	8.65	26	8.64%
2002	14	6.03	19	6.91%	13	4.89	13	4.32%
2003	8	3.45	11	4.00%	11	4.14	12	3.99%
2004	37	15.95	43	15.64%	43	16.17	56	18.60%
2005	30	12.93	35	12.73%	57	21.43	58	19.27%
2006	20	8.62	26	9.45%	42	15.79	44	14.62%
2007	12	5.17	20	7.27%	17	6.39	25	8.31%
2008	1	0.43	4	1.45%	-	-	7	2.33%
Total	232	100	275	100%	266	100	301	100%

	Alhadab et al. (2016) Aim Market		My Sample Aim Market		Alhadab et al. (2016) Main Market		My Sample Main Market	
Year	Freq	%	Freq	%	Freq	%	Freq	%
1998	14	3.32	19	4.40%	21	15.22	24	16.67%
1999	16	3.70	12	2.78%	13	9.42	9	6.25%
2000	59	13.63	52	12.04%	44	31.88	44	30.56%
2001	39	9.01	40	9.26%	4	2.9	3	2.08%
2002	24	5.54	20	4.63%	11	7.97	12	8.33%
2003	19	4.39	19	4.40%	4	2.9	4	2.78%
2004	84	19.40	88	20.37%	13	9.42	11	7.64%
2005	85	19.63	82	18.98%	9	6.52	11	7.64%
2006	61	14.09	57	13.19%	9	6.52	13	9.03%
2007	30	6.93	33	7.64%	10	7.25	12	8.33%
2008	2	0.46	10	2.31%	-	-	1	0.69%
Total	433	100	432	100%	138	100	144	100%

Table 5.2 Sample size

Year	Total IPOs – With Data	Excluded Industry	Currency NOT POUND	Alhadab and Clacher (2018) Obs	Alhadab et al. (2016) Obs	My Observations for Alhadab and Clacher (2018)	My Observations for Alhadab et al. (2016)
2015	41	3	4	-	-	33	33
2014	84	11	8	-	-	61	61
2013	49	6	5	-	-	34	34
2012	29	2	9	-	-	15	15
2011	30	1	7	-	-	10	10
2010	34	2	8	-	-	18	18
2009	4	0	2	-	-	1	1
2008	20	1	7	1	2	11	10
2007	84	4	35	29	40	45	45
2006	128	7	49	62	70	70	69
2005	145	11	35	87	94	94	94
2004	140	7	25	80	97	102	102
2003	33	1	5	19	23	24	24
2002	45	2	10	27	35	32	32
2001	51	2	3	40	43	43	43
2000	101	2	4	94	102	96	96
1999	33	4	4	26	29	24	24
1998	47	1	2	33	35	43	43
Total	827	42	179	498	570	756	754

Table 5.3 Descriptive statistics – AC and ACK

	My Variables Description					Alhadab and Clacher (2018)			Alhadab PhD p177 and p231		
	Mean	Median	Std Dev	Min	Max	Mean	Median	Std Dev	Mean	Median	Std Dev
Big N	0.477	-	0.500	0	1	0.466	-	0.499	0.466	-	0.499
Ln(MK)	3.532	3.334	1.468	0.372	7.591	3.407	3.269	1.404	3.431	3.268	1.446
BM	0.289	0.243	0.301	-0.373	1.748	0.170	0.150	0.276			
Ln(1+Age)	1.115	0.986	0.891	-0.453	3.600	1.076	0.852	0.883	1.074	0.836	0.885
Leverage	0.441	0.092	1.070	0.00	8.530	0.353	0.106	0.66	0.359	0.11	0.662
Loss	0.515	-	0.500	0	1	0.492	-	0.5	0.499	-	0.5
ROA	-1.035	-0.018	3.035	-19.377	0.835	-0.879	0.005	2.721	-0.922	0.001	2.809
Capital Expenditure Growth	0.183	0.021	0.594	-0.329	4.390	*3.034*	*0.233*	*9.377*	0.162	0.019	0.747
SEO	0.043	-	0.204	0	1	0.050	-	0.219	0.050	-	0.219
AIM	0.750	-	0.433	0	1	0.755	-	0.431	0.753	-	0.431
VC	0.260	-	0.439	0	1	0.233	-	0.423	0.227	-	0.419
Underwriter	0.248	-	0.432	0	1	0.191	-	0.393	0.186	-	0.39
Retained Ownership	0.607	0.628	0.185	0.102	0.931	0.659	0.701	0.208			
Out Directors	0.465	0.500	0.147	0.000	0.846	0.447	0.444	0.162	0.452	0.5	
Board Size	5.922	6	1.713	2	16	5.715	6	1.689	5.708	6	
Chairman CEO	0.087	-	0.282	0	1	0.078	-	0.269	0.082	0.082	
Observations	576	576	576	576	576	498	498	498			
Abnormal accruals using Kothari et al. (2005) (Alhadab et. al., 2016)	0.009	0.007	0.189	-0.656	0.604	0.022	0.018	-	0.022	0.018	
Abnormal accruals using Ball and Shivakumar (2006) (Alhadab and Clacher, 2018)	0.018	0.023	0.221	-0.880	0.560	-0.176	0.002	0.509			

Big N is a dummy variable in this paper that takes the value of 1 if a firm auditor is considered as one of the Big Four auditors –

PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG – and 0 otherwise. Ln(MK) is the natural logarithm of the market value of the firm at year t. BM is book-to-market ratio calculated as the book value of the equity divided by the market value. Ln(1+age) is the natural logarithm of 1 plus the age of the IPO where age is measured as the difference between the founding date of the firms and the IPO year measured in years. Leverage ratio is measured as total debt at year t divided by total assets at t-1. Loss is a dummy variable that takes the value of 1 if the firm has reported a loss in the IPO year time period and 0 otherwise. ROA is the return on assets measured as return of the IPO year divided by total assets of the year prior to the IPO. Capital expenditure growth is measured as the difference between capital expenditure for the periods t and t-1 of the IPO year scaled by total assets in the year prior to the IPO. SEO is a dummy variable that takes the value of 1 if a firm has issued a seasonal equity offering during the IPO year and 0 otherwise. AIM takes the value of 1 if a firm is listed on AIM and 0 if the firm is listed on the Main Market of the London Stock Exchange. VC is venture capitalist, which is a dummy variable that takes the value of 1 if the IPO firm is backed by a venture capitalist as classified by British Venture Capitalist Association where they own more than 3% of the IPO firm's shares and 0 otherwise. Underwriter is a dummy variable that equals 1 if the IPO firm has a prestigious underwriter (as classified in the paper by Derrien and Kecskes (2007)). Retained ownership is the percentage of retained ownership by insiders (directors and major shareholders that hold more than 3%).

Outside directors is the percentage of non-executive directors relative to the size of the board. Board size is the number of directors on the board. CEO/Chairman takes the value of 1 if the CEO and Chairman are the same person and 0 otherwise.

Table 5.4 Descriptive statistics – Alhadab papers IPO

	Alhadab et al. (2018)			Alhadab PhD p177/p.231			Alhadab (2015) – Audit fee			Alhadab et al. (2015) – IPO failure risk	
	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median	Std Dev	Mean	Median
Big N	0.466	-	0.499	**0.466**	**-**	**0.499**	0.47	-	0.5	0.468	-
Ln(MK)	3.407	3.269	1.404	**3.431**	**3.268**	**1.446**	3.41	3.25	1.47	*113.93*	*25.11*
BM	0.170	0.150	0.276				0.23	0.15	1.58		
Ln(1+Age)	1.076	0.852	0.883	**1.074**	**0.836**	**0.885**	1.06	0.08	0.89	1.047	0.763
Leverage	0.353	0.106	0.66	**0.359**	**0.11**	**0.662**	0.36	0.11	0.65	0.353	0.108
Loss	0.492	-	0.5	**0.499**	**-**	**0.5**	0.5	-	0.5		
ROA	-0.879	0.005	2.721	**-0.922**	**0.001**	**2.809**	-1.05	-0.01	4.24		
Capital Expenditure Growth	*3.034*	*0.233*	*9.377*	**0.162**	**0.019**	**0.747**	*3.93*	*0.24*	*12.78*		
SEO	0.050	-	0.219	**0.050**	**-**	**0.219**	0.05	-	0.21		
AIM	0.755	-	0.431	**0.753**	**-**	**0.431**	0.75	-	0.43	0.757	-
VC	0.233	-	0.423	**0.227**	**-**	**0.419**	0.22	-	0.41	0.221	-
Underwriter	0.191	-	0.393	**0.186**	**-**	**0.39**	0.19	-	0.39	0.187	-
Retained Ownership	0.659	0.701	0.208								
Out Directors	0.447	0.444	0.162	0.452	0.5		*2.6*	*2*	*1.29*	0.452	0.5
Board Size	5.715	6	1.689	5.708	6		5.73	6	1.75	5.708	-
Chairman CEO	0.078	-	0.269	0.082	0.082		0.08		0.28	0.082	-
Observations	498	498	498	**515**-570	515-570	515-570	548	548	548	570	570

Big N is a dummy variable in this paper that takes the value of 1 if a firm auditor is considered as one of the Big Four auditors – PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG – and 0 otherwise. Ln(MK) is the natural logarithm of the market *value of the firm at year t. BM is book-to-market ratio calculated as the book value of the equity divided by the market value. Ln(1+age) is the natural logarithm of 1 plus the age of the IPO where age is measured as the difference between the founding date of the firms and the IPO year measured in years. Leverage ratio is measured as total debt at year t divided by total assets at t-1. Loss is a dummy variable that takes the value of 1 if the firm has reported a loss in the IPO year time period and 0 otherwise. ROA is the return on assets measured as return of the IPO year divided by total assets of the year prior to the IPO. Capital expenditure growth is measured as the difference between capital expenditure for the periods t and t-1 of the IPO year scaled by total assets in the year prior to the IPO. SEO is a dummy variable that takes the value of 1 if a firm has issued a seasonal equity offering during the IPO year and 0 otherwise. AIM takes the value of 1 if a firm is listed on AIM and 0 if the firm is listed on the Main Market of the London Stock Exchange. VC is venture capitalist, which is a dummy variable that takes the value of 1 if the IPO firm is backed by a venture capitalist as classified by the British Venture Capitalist Association where they own more than 3% of the IPO firm's shares and 0 otherwise. Underwriter is a dummy variable that equals 1 if the IPO firm has a prestigious underwriter (as classified in the paper by Derrien and Kecskes (2007)). Retained ownership is the percentage of retained ownership by insiders (directors and major shareholders that hold more than 3%). Outside directors is the percentage of non-executive directors relative to the size of the board. Board size is the number of directors on the board. CEO/Chairman takes the value of 1 if for the firm both the CEO and Chairman are the same person and 0 otherwise.*

Table 5.5 Alhadab et al. (2016) replication using the same method as the paper as a measure of abnormal accruals 1998-2015

	My results 1998-2008	My results 1998-2015	Alhadab et. al. (2016) 1998-2008
Market Listing	0.00244	0.00932	*0.097***
	(0.09)	(0.38)	*(2.203)*
LnSize	0.00233	0.00754	*0.182****
	(0.26)	(0.99)	*(2.749)*
Retained Ownership	-0.0556	-0.0106	*-0.015*
	(-1.24)	(-0.27)	*(-0.333)*
Loss	0.0225	0.00454	*0.133****
	(1.26)	(0.29)	*(4.531)*
Leverage	0.00276	-0.000751	*0.076**
	(0.37)	(-0.09)	*(1.779)*
BM	0.0250	0.0572**	*0.149****
	(0.91)	(2.38)	*(3.238)*
VC	0.00356	0.00720	*-0.024*
	(0.19)	(0.44)	*(-0.753)*
Underwriter	-0.0242	-0.0182	*0.004*
	(-1.16)	(-1.01)	*(0.107)*
Big N	-0.00236	0.00155	*-0.026*
	(-0.12)	(0.09)	*(-0.763)*
Outside Directors	-0.0990*	0.00000384	*-0.014*
	(-1.67)	(0.87)	*(-0.309)*
Board Size	0.00234	0.00186	*-0.048*
	(0.41)	(0.38)	*(-1.032)*
Chairman/CEO	-0.00940	-0.0183	*0.005*
	(-0.32)	(-0.68)	*(0.108)*
Constant	0.0186	-0.0905	*0.055*
	(0.24)	(-1.37)	*(0.393)*
Year and Industry Dummies	Yes	Yes	*Yes*
Adj. R-squared	0.0128	0.0154	*0.091*
N	584	752	*570*

Market listing takes the value of 1 if a firm is listed on AIM and 0 if the firm is listed on the Main Market of the London Stock Exchange. LnSize is the natural logarithm of the market value of the firm at year t. Retained ownership is the percentage of retained ownership by insiders (directors and major shareholders that hold more than 3%). Loss is a dummy variable that takes the value of 1 if the firm has reported a loss in the IPO year time period and 0 otherwise. Leverage ratio is measured as total debt at year t divided by total assets at t-1. BM is book-to-market ratio calculated as the book value of the equity divided by the market value. VC is venture capitalist, which is a dummy variable that takes the value of 1 if the IPO firm is backed by a venture capitalist as classified by the British Venture Capitalist Association where they own more than 3% of the IPO firm's shares and 0 otherwise. Underwriter is a dummy variable that equals 1 if the IPO firm *has a prestigious underwriter (as classified in the paper by Derrien and Kecskes (2007)). Outside directors is the percentage of non-executive directors relative to the size of the board. Board size is the number of directors on the board. CEO/Chairman takes the value of 1 if for the firm both the CEO and Chairman are the same person and 0 otherwise, and finally Big N is a dummy variable in this paper that takes the value of 1 if a firm auditor is considered as one of the Big Four auditors – PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG – and 0 otherwise.*

t- statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.6 Alhadab and Clacher (2018) replication using the same method as the original paper as a measure of abnormal accruals 1998-2015

	My results 1998-2008	My results 1998-2015	Alhadab and Clacher (2018)
Big N	-0.0117	-0.000397	*-0.099***
	(-0.58)	(-0.02)	*(-2.381)*
Ln (MK)	-0.00923	-0.00257	*0.057***
	(-0.93)	(-0.31)	*(2.533)*
BM	0.0636**	0.0850***	*0.325****
	(2.05)	(3.19)	*(4.543)*
Ln (1+age)	-0.00590	-0.00538	*0.029**
	(-0.58)	(-0.62)	*(1.805)*
Leverage	-0.00389	-0.00390	*0.020*
	(-0.40)	(-0.37)	*(0.569)*
Loss	-0.0778***	-0.0854***	*-0.395****
	(-3.61)	(-4.80)	*(-12.643)*
ROA	0.0152***	0.0122***	0.088***
	(4.16)	(5.28)	(6.779)
Capital Expenditure Growth	0.0390**	0.0254**	-0.001
	(2.05)	(2.43)	(-0.378)
SEO	0.0979**	0.0920**	-0.003
	(2.18)	(2.27)	(-0.069)
AIM	-0.0431	-0.0264	-0.042
	(-1.34)	(-0.98)	(-0.730)
VC	0.00670	0.0137	0.014
	(0.31)	(0.75)	(0.387)
Underwriter	-0.0347	-0.0300	-0.031
	(-1.48)	(-1.53)	(-0.808)
Retained Ownership	-0.0631	-0.0317	-0.214***
	(-1.26)	(-0.74)	(-2.918)
Outside Directors	-0.0753	0.000	-0.156
	(-1.14)	(0.04)	(-1.448)
Board Size	-0.00349	-0.00291	-0.017
	(-0.58)	(-0.56)	(-1.402)
Chairman/CEO	-0.0405	-0.0430	-0.058
	(-1.24)	(-1.45)	(-1.090)
Constant	0.202**	0.100	*0.318***
	(2.28)	(1.36)	*(2.091)*
Year and Industry Dummies	Yes	Yes	Yes
Adjusted R-squared	0.0981	0.1165	0.577
N	584	750	498

Big N is a dummy variable in this paper that takes the value of 1 if a firm auditor is considered as one of the Big Four auditors – PricewaterhouseCoopers, Ernst and Young, Deloitte Touche

Tohmatsu and KPMG – and 0 otherwise. Ln(MK) is the natural logarithm of the market value of the firm at year t. BM is book-to-market ratio calculated as the book value of the equity divided by the market value. Ln(1+age) is the natural logarithm of 1 plus the age of the IPO where age is measured as the difference between the founding date of the firms and the IPO year measured in years. Leverage ratio is measured as total debt at year t divided by total assets at t-1. Loss is a dummy variable that takes the value of 1 if the firm has reported a loss in the IPO year time period and 0 otherwise. ROA is the return on assets measured as return of the IPO year divided by total assets of the year prior to the IPO. Capital expenditure growth is measured as the difference between capital expenditure for the periods t and t-1 of the IPO year scaled by total assets in the year prior to the IPO. SEO is a dummy variable that takes the value of 1 if a firm has issued a seasonal equity offering during the IPO year and 0 otherwise. AIM takes the value of 1 if a firm is listed on AIM and 0 if the firm is listed on the Main Market of the London Stock Exchange. VC is venture capitalist, which is a dummy variable that takes the value of 1 if the IPO firm is backed by a venture capitalist as classified by British Venture Capitalist Association where they own more than 3% of the IPO firm's shares and 0 otherwise. Underwriter is a dummy variable that equals 1 if the IPO firm has a prestigious underwriter (as classified in the paper by Derrien and Kecskes (2007)). Retained ownership is the percentage of retained ownership by insiders (directors and major shareholders that hold more than 3%).
Outside directors is the percentage of non-executive directors relative to the size of the board. Board size is the number of directors on the board. CEO/Chairman takes the value of 1 if for the firm both the CEO and Chairman are the same person and 0 otherwise.
t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5.7 Alhadab and Clacher (2018) replication using PhD measure of absolute abnormal accruals 1998-2015

	Absolute Abnormal Accruals 1998-2008	Absolute Abnormal Accruals 1998-2015	Alhadab PhD p.183, (2012) 1998-2008
Big N	-0.0261*	-0.0251*	*-0.093*
	(-1.71)	(-1.83)	*(-2.379)***
Ln (MK)	-0.0190***	-0.0181***	*-0.076*
	(-2.65)	(-2.90)	*(-3.931)****
BM	-0.124***	-0.118***	*0.001*
	(-5.46)	(-5.88)	*(1.325)*
Ln (1+age)	-0.000108	-0.000510	*-0.034*
	(-0.01)	(-0.08)	*(-1.900)**
Leverage	-0.00514	-0.00415	*-0.013*
	(-0.60)	(-0.52)	*(-0.406)*
Loss	0.0374**	0.0361***	*0.036*
	(2.46)	(2.70)	*(0.900)*
ROA	-0.00875***	-0.00969***	-0.039
	(-4.54)	(-5.61)	(-2.879)***
Capital Expenditure Growth	-0.0175*	-0.0144*	-0.062
	(-1.70)	(-1.84)	(-0.818)
SEO	0.0459	0.0516*	-0.128
	(1.39)	(1.70)	(-1.895)*
AIM	-0.00506	0.0000774	-0.113
	(-0.22)	(0.00)	(-2.179)**
VC	-0.0390**	-0.0363***	-0.094
	(-2.51)	(-2.66)	(-2.475)**
Underwriter	-0.0149	-0.0156	-0.049
	(-0.87)	(-1.06)	(-1.461)
Constant	0.226***	0.244***	*0.660*
	(3.63)	(4.40)	*(4.854)****
N	584	750	515

Big N is a dummy variable in this paper that takes the value of 1 if a firm auditor is considered as one of the Big Four auditors – PricewaterhouseCoopers, Ernst and Young, Deloitte Touche Tohmatsu and KPMG – and 0 otherwise. Ln(MK) is the natural logarithm of the market value of the firm at year t. BM is book-to-market ratio calculated as the book value of the equity divided by the market value. Ln(1+age) is the natural logarithm of 1 plus the age of the IPO where age is measured as the difference between the founding date of the firms and the IPO year measured in years. Leverage ratio is measured as total debt at year t divided by total assets at t-1. Loss is a dummy variable that takes the value of 1 if the firm has reported a loss in the IPO year time period and 0 otherwise. ROA is the return on assets measured as return of the IPO year divided by total assets of the year prior to the IPO. Capital expenditure growth is measured as the difference between capital expenditure for the periods t and t-1 of the IPO year scaled by total assets in the *year prior to the IPO. SEO is a dummy variable that takes the value of 1 if a firm has issued a seasonal equity offering during the IPO year and 0 otherwise. AIM takes the value of 1 if a firm is listed on AIM and 0 if the firm is listed on the Main Market of the London Stock Exchange. VC is venture capitalist, which is a dummy variable that takes the value of 1 if the IPO firm is backed by a venture capitalist as classified by British Venture Capitalist Association where they own more than 3% of the IPO firm's shares and 0 otherwise. Underwriter is a dummy variable that equals 1 if the IPO firm has a prestigious underwriter (as classified in the paper by Derrien and Kecskes (2007)).* t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Chapter 6

Female Board Members and Earnings Management

6.1 Introduction

Previous chapters discuss the reliability of using accruals as a proxy for earnings management. Chapter 2 compares the power of different measures of abnormal accruals as well as the persistence of, and correlation between, different measures of abnormal accruals. Chapters 3 to 5 study different scenarios in which measures of abnormal accruals are used as a proxy for earnings management. Consistent results are found for the empirical relationship between abnormal accruals and dividend-paying firms across all measures of accruals in chapter 3. The hypothesised empirical relationship between earnings management and a UK IPO firm having a forecast in its prospectus, studied in chapter 4, only occurs when total accruals-based measures of abnormal accruals are used. The inability to find any relationship between accruals, regulatory environment and audit quality, whatever the measure of abnormal accruals, is covered in chapter 5.

Previous chapters' findings suggest that measures of abnormal accruals as proxies for earnings management are not reliable. This chapter will discuss the fifth and final scenario in this thesis to assess the reliability of using measures of using abnormal accruals as proxies for earnings management in the UK. This chapter studies having female board members and earnings management in the UK (Arun, Almahrog and Aribi, 2015) (AAA hereafter). This paper is chosen for replication as it is a relatively new paper and is published in a high-ranked journal. Furthermore, it uses UK data and uses abnormal accruals as a proxy for earnings management.

Also, this paper is highly cited, as they provide evidence of the relationship between earnings management and board diversity.

The topic of the relationship between having a gender diverse board and earnings management is widely debated in the literature. Policymakers and researchers are interested in the role and impact of having women in an organisation, and they argue that women are underrepresented on boards (Mensi-Klabrach, 2014). This paper is chosen for replication as it is a relatively new paper and is published in a high-ranked journal. Furthermore, it uses UK data and uses abnormal accruals as a proxy for earnings management. The topic of this paper is of great policy importance. Finally, this paper is highly cited. AAA examine the influence of female board members on earnings management in the UK using abnormal accruals to proxy for earnings management. Thus, this chapter seeks to understand how robust are the results of the study to using different ways of estimating accruals-based earnings management in understanding this relationship.

6.1.1 Motives, aims and objectives

The research motive of the study replicated is to provide knowledge of the relationship between board gender diversity and financial reporting. Research in management in general, and in accounting in particular, attempts to understand the relationship between female board representation and the effectiveness of the board with regard to financial reporting quality (Barua et al., 2010; Sun et al., 2011; Thiruvadi and Huang, 2011). Particular consideration is given to the role of female members on the audit committee (Sun et al., 2011; Thiruvadi and Huang, 2011), and in key positions in the firm, such as examining the effect of having a female as Chief Financial Officer (CFO) on earnings quality (Barua et al., 2010). On the contrary, some researchers argue that females on the board have no impact on earnings quality or earnings management, such as the study by Ye et al. (2010) in China on the relationship between board gender representation and earnings quality. Findings about the relationship between having female board representation and financial reporting outcomes are inconclusive (Kyaw et al., 2015). Accordingly, the aim of research reported on in the study to be replicated is to provide answers to the contradictory arguments on the relationship between gender diversification on the board and earnings management. To achieve this aim, the study sets the following objectives. The first is to examine the relationship between having female board members, whether independent or executive, and earnings management in the UK. The second is to examine the relationship between having independent female board members and earnings management in the UK. The third is to examine the relationship between having a female CFO and the level of earnings management in the UK.

6.1.2 Theory

The main theoretical argument underpinning this research is based on the role of gender, particularly females, in restraining the practices of earnings management. Arguing that the gender of board members can influence the firm's behaviour, where researchers argue that women are more ethical and more likely to follow regulations compared to men, researchers find a relationship between having more female representation on the board and an increase in the quality of the earnings (Arun et al., 2015; Barua et al., 2010; Gull et al., 2018; Ittonen et al., 2013; Krishnan and Parsons, 2008; Srinidhi et al., 2011; Thiruvadi and Huang, 2011), as female directors are not risk-takers compared to male directors (Watson and McNaughton, 2007).

6.1.3 Methodology

Using a sample of UK FTSE 350 firms for the period from 2005 to 2011, the financial data is downloaded from FAME, while data related to the gender of the directors is manually collected. The study to be replicated uses a two-stage regression methodology, where the first stage is a regression to estimate abnormal accruals. Then, abnormal accruals are used in the second stage regression as a proxy for earnings management, which is then regressed on the number of female directors on the board, the number of independent female members and whether the CFO is female, together with control variables, in a second stage regression.

AAA shows some weaknesses in terms of the explanation of their methodology. The authors state that they use working capital accruals to estimate the normal accruals of a firm. However, they state that they measure working capital accruals as the difference between earnings before extraordinary items and cash flows from operations, which is a measure of total accruals not working capital accruals (Dechow et al. 2010). In addition, when estimating the normal level of accruals, they exclude property, plant and equipment as an explanatory variable, which is appropriate if the dependent variable is working capital accruals (Peasnell et al., 2000). However, using earnings minus cash flow from operations still includes depreciation charges, which gross property, plant and equipment is a control for.

6.1.4 Main findings

AAA find that having female board members leads to a significantly higher level of abnormal accruals, and they argue that this means that having female members leads to more conservative earnings as it increases the level of accruals, which they interpreted as restrained earnings management practices. AAA argue that having female members on the board should increase earnings quality and reduce earnings management. Earnings quality is measured as the absolute value of abnormal accruals. If one theorises that having female members leads to higher earnings quality, the relationship should be the more female members on the board, the lower the level of absolute abnormal accruals, a negative relationship (Barua et al., 2010; Gavious et al., 2012; Ittonen et al., 2013). Similarly, if one theorises that having female members reduces levels of earnings management, then one would expect that the higher the number of female members on board, the lower the abnormal accruals. Therefore, there should be a negative relationship between the two (Peni and Vähämaa, 2010). However, the authors find a positive relationship between abnormal accruals and female members on the board, and they interpret this result as reduced earnings management and improved earnings quality, which is not supported by the literature (see Dechow et al., 2010). Also, conservatism is a different construct and is not explicitly analysed in this paper (see Basu, 1997; Ball and Shivkumar, 2006).

6.1.5 Replication

Pure replication is performed on this paper using the same sample of FTSE 350 firms for the same time period of the paper 2005-2011. A replication is also performed by extending the time period to include data from 1999-2015, using the same research design as AAA.

Regardless of the inaccuracy in the description of the methodology mentioned above, , as explained earlier, the replication is first performed using the same methods as specified by the authors in the paper, in addition to using alternative methods of estimating abnormal accruals in the literature (chapter 2 tables 2.1 and 2.2). Regardless of the points explained in the findings section, this replication seeks to first find a significant positive relationship between abnormal accruals and female members on the board, as presented in AAA using the same methods explained in it.

One difference between AAA and this replication is in the data source for female board membership. I obtain the data from BoardEx, so it is downloaded rather than manually collected, and the financial information is obtained from Datastream rather than FAME, as FAME is restricted to the past 10 years' information only, which no longer covers the timeframe of the study.

Using AAA's methods and the other methods of estimating abnormal accruals, the analysis described below is not able to find results similar to the original authors in terms of the significance and sign of the coefficients of the experimental variables (number and percentage of female members on the board, number and percentage of female independent members on the board and having a female CFO on the board). Results are mixed, where no relationship or a negative relationship is found when using the same sample period as well as an extended time period. The difference in results could be attributed to the type of data collection used or the data source; despite manual collection of information being harder and taking longer to perform, using a database makes it more precise. Therefore, the conclusion drawn is that the relationship between accruals-based earnings management and having female board members is not robust to how abnormal accruals are estimated.

6.1.6 Contribution

This chapter contributes to knowledge in many theoretical as well as empirical aspects. First it contributes in terms whether the gender diversity of board members has an impact on earnings management. As researchers have previously presented conflicting results, where some papers report that there is no relationship between earnings management and gender diversity on the board, while others have found some results, this chapter finds mixed results using alternative measures of abnormal accruals, which means that the relationship between accruals earnings management and board gender diversity is not robust to different ways of capturing earnings management. This chapter also contributes by highlighting the inconsistencies of some of accruals earnings management research designs.

6.1.7 Chapter structure

This remainder of the chapter is organised as follows: section 6.2 discusses the literature on the relationship between female board members and accruals earnings management activities, section 6.3 describes methodology used, section 6.4 describes the design of the replication, section 6.5 describes the data collection process, 6.6 provides the results of AAA compared to the replication study results, and 6.7 provides a summary of the chapter.

6.2 Related literature

This section discusses the literature related to the main scenario in this chapter, which is the effect of board members' gender on firms' reporting activities, in particular, the effect of having female board members and the effect this has on reported earnings.

The underlying theory is built on arguments that women are more ethical in the workplace than men and, because of that, women are less likely to engage in unethical behaviour (Betz et al., 1989; Khazanchi, 1995) as women are less aggressive and more cautious than men when making a decision (Byrnes et al., 1999), and they are more risk averse in comparison to men (Powell and Ansic, 1997). Consequently, having female board members (Gul et al., 2009), female directors on the audit committee (Thiruvadi and Huang, 2011) and a female CEO of a firm (Gavious et al., 2012) will reduce the earnings management of a firm, which increases the quality of the financial statements (Krishnan and Parsons, 2008; Srinidhi et al. 2011). However, empirical findings on the relationship between earnings management and female directors are not consistent in the literature as some authors find no relationship between having female representation on the board or on the audit committee and the level of earnings management (Abdullah and Ismail, 2016; Hili and Affes, 2012; Sun et al., 2011).

One of the strongest roles in the company, particularly in terms of the financial reporting, is held by the CFO, and for that reason it is believed they have great influence on the final reported earnings and, thus, any earnings management (Jiang et al., 2010). For example, it has been found that there is a relationship between the extent of accruals in relation to beating analysts' forecasts and the incentives of CFOs and Chief Executive Officers (CEOs), where it is more sensitive to the CFO's incentives rather than the CEO's (Jiang et al., 2010). Evidence on the relationship between the diversity of board members, in terms of gender, and earnings management is limited (Arun et al., 2015). An example of such studies is Barua et al. (2010), who investigate the relationship between the gender of the CFO and earnings management, and they find that, when the CFO is female, discretionary accruals are lower compared to when the CFO is male. Likewise, Peni and Vähämaa (2010) consider the relationship between the gender of the CEO and CFO and earnings management. They find that, when the CFO is female, the amount of discretionary accruals is lower. On the other hand, they do not find a relationship between CEO gender and earnings management. Gavious et al. (2012) finds that the level of earnings management is lower when the CEO or CFO are female. However, some authors find no relation between the gender of board members and the level of earnings management in countries such as France, the US (Hili and Affes, 2012) or China (Ye et al., 2010), suggesting that there is no difference in the ethical values between men and women.

As a consequence of inconsistencies in the literature on the relationship between having female members on the board and earnings quality, AAA investigate the influence of having female members on the board, both executive and independent, as well as the influence of having a female CFO, on earnings management in the UK.

6.3 Methodology

AAA use a two-step earnings management research design where, in the first step, they estimate abnormal accruals using a modified Jones-type approach. They look at a sample of UK FTSE 350 index firms, excluding those classified as financial and mining, for the period from 2005 to 2011.

AAA state that they use current accruals as the basis for estimating abnormal accruals, instead of total accruals, as the short-term component of accruals is easier to manipulate compared to the long-term accruals component. However, AAA state that they measure current accruals as the difference between net income before extraordinary items and cash flows from operating activities, which equals total accruals, not current accruals. The correct way to use measures based on current accruals (or working capital accruals) is by calculating current accruals using the balance sheet approach as change in current assets – change in current liabilities – change in cash + change in short-term loans, in a similar way to measures 19 and 20 in chapter 2. However, AAA appear to calculate current accruals as total accruals but only use the current accruals-based independent variables in the Jones-type methods (i.e., exclude gross property, plant and equipment as an explanatory variable). Despite the method explained in the paper appearing to be inaccurate, the replication is performed in the same way as stated by the authors. Hence the way in which the authors first estimate normal accruals is as follows:

$$TAcc_{i,t} = \alpha\left(\frac{1}{TA_{i,t-1}}\right) + \beta_1(\Delta Sales_{i,t} - \Delta Rec_{i,t}) + \varepsilon \quad (40)$$

where TAcc is measured as the difference between earnings and cash flows from operating activities for firm i for the period t. $\Delta Sales_{i,t}$ is the changes in sales from period t-1 to t for firm i. $\Delta Rec_{i,t}$ is the change in accounts receivable from period t-1 to t for firm i. All variables are scaled by lagged total assets. Abnormal accruals are the residual from the equation, where abnormal accruals are used in the second stage regression, provided below as the dependent variable and as the measure of earnings management.

$$\begin{aligned} Abnormal\ Accruals_{i,t} \\ &= \beta_0 + \beta_1 Number\ of\ female\ directors_{i,t} \\ &+ \beta_2 Number\ of\ independent\ female\ directors_{i,t} + \beta_3 CFO_{i,t} + \beta_4 Size_{i,t} \\ &+ \beta_5 Operating\ cash\ flow_{i,t} + \beta_6 ROA_{i,t} + \beta_7 Leverage_{i,t} \\ &+ \beta_8 Growth\ in\ sales_{i,t} + \beta_9 Market\ to\ Book_{i,t} + \beta_{10} Loss_{i,t} + Year \\ &+ Industry + \varepsilon \end{aligned}$$

The number of female directors is the number of these on the board of directors. The number of independent female directors is the number of independent female board members. CFO is a dummy that takes the value of 1 if the CFO of the firms is female and 0 otherwise. Size is measured as the natural logarithm of total assets of the firm in year t. Operating cash flow is operating cash flow scaled by total assets for the year t. ROA is a measure of the firm's performance calculated as net revenue scaled by total assets for the year t. Leverage is measured as the total liabilities to total assets ratio for the year t. The growth in sales is measured as the difference between sales at t and t-1 divided by sales at t-1 for year t. The market-to-book ratio is the market value of the firm divided by the book value of equity for the year t. Loss is a dummy variable that takes the value of 1 if a firm reported a net loss and 0 otherwise.

AAA also use another measure for female representation on the board, which is the proportion of female members relative to total members of the board, and the proportion of independent female members on the board. All variables are as explained earlier:

$$
\begin{aligned}
Abnormal\ Accruals_{i,t} & \\
&= \beta_0 + \beta_1 Proportion\ of\ female\ directors_{i,t} \\
&+ \beta_2 Proportion\ of\ independent\ female\ director_{i,t} + \beta_3 CFO_{i,t} + \beta_4 Size_{i,t} \\
&+ \beta_5 Operating\ cash\ flow_{i,t} + \beta_6 ROA_{i,t} + \beta_7 Leverage_{i,t} \\
&+ \beta_8 Growth\ in\ sales_{i,t} + \beta_9 Market\ to\ Book_{i,t} + \beta_{10} Loss_{i,t} + Year \\
&+ Industry + \varepsilon
\end{aligned}
$$

6.4 Replication design

To examine the reliability of abnormal accruals as a proxy for earnings management, this study replicates AAA in the three ways classified by Hamermesh (2007). The first is a pure replication, which involves replicating the data by attempting to use the same sample, the same measure and the same estimation methods. The second type is statistical replication, which involves using a different sample but using identical measures. This is done by increasing the sample size to incorporate other time periods (from 1999-2015). The third type is scientific replication, which involves using a different sample, while the measures of abnormal returns employed can be similar but not identical. This is done by estimating abnormal accruals using different measures and examining the impact this has on the results, as well as observing the significance and sign of the coefficients of the key experimental variables when using the total accruals or working capital accruals.

Below are the steps of the replications:

- Step one: Use all measures from equations 1-37 (chapter 2) to estimate normal accruals per year per ICB industry classification. Normal accruals estimates are deducted from actual accruals to estimate abnormal accruals defined as AA1-AA37; numbering is according to the measures described in table 2.2 in chapter 2, which shows the measure number and the reference for the measure.
- Step two: Pool all abnormal accruals from cross-sectional regressions into one dataset making a pooled dataset.
- Step three: Follow AAA in estimating normal accruals and obtain abnormal accruals using the same way as indicated in the paper.
- Step four: Run the second-stage regression as in AAA, using abnormal accruals as a proxy for earnings management, experiment variables and control variables.
- Step five: Use abnormal accruals generated from the different measures identified in chapter 2 as measures of earnings management in the second-stage regression; compare results with the results by AAA in terms of the significance and sign of the coefficients of the experimental variables.

- Step six: Rerun the second stage of the replicated study using total accruals and working capital accruals instead of abnormal accruals as a proxy for earnings management. Compare these results with the results in AAA and with other abnormal accruals measures' results in terms of the significance and sign of the coefficients of the key experimental variables.

6.5 Data

AAA obtain most of their data from FAME but they manually obtain information regarding directors and gender from Thomson One Banker annual reports of the firm. I obtain data from Datastream as FAME only has data for the past 10 years and therefore does not cover the time period under investigation. In addition, the data regarding gender of the directors is obtained from BoardEx, where information regarding gender of the board members and position is downloaded. The initial sample of the paper is taken from UK FTSE 350 index for the period from 2005 to 2011, excluding financial utilities and mining, as well as removing any industry that has less than six observations. The final sample used in AAA is 1,217 firm-year observations. The replication is performed first using the same time period and industry classifications as the authors. The results are robust when the mining industry is included and when increasing the time period to 1999 to 2015. Table 6.1 shows the sample distribution of firms per industry of the original paper compared to my sample.

[INSERT TABLE 6.1 HERE]

6.6 Results

6.6.1 Descriptive statistics

Table 6.2 shows the descriptive statistics of the experimental variables used in the original paper compared to my dataset. The descriptive statistics are provided for the same time period as the original paper.

[INSERT TABLE 6.2 HERE]

6.6.2 Results

AAA find a positive relationship between having female members on the board and abnormal accruals. When performing a pure replication using the same methods as the authors and the same time period, I am not able to find any results that are the same as in AAA in terms of the significance and sign of the coefficients of the experimental variables. Tables 6.3 and 6.4 provide the results in AAA. The results show that the coefficients of the number of female directors and the proportion of female directors on the board are positive and significantly related to abnormal accruals. In addition, the number and proportion of independent female members on the board are significantly positively related to abnormal accruals, while the authors find no relationship between having a female CFO and abnormal accruals of a firm.

[INSERT TABLES 6.3 AND 6.4 HERE]

The pure replication shows a significant negative relationship between having a female CFO and abnormal accruals, meaning that when the firm has a CFO that is female, it leads to having lower amounts of abnormal accruals, hence lower earnings management. However, the number or proportion of female board members and female independent board members is not found to be significantly related to abnormal accruals of a firm. Increasing the sample size by incorporating other time periods from 1999 to 2015 has no effect on the significance and sign of the coefficients of the key experimental variables. Tables 6.5 and 6.6 show the replication using the same method in estimating abnormal accruals as in AAA.

[INSERT TABLES 6.5 AND 6.6 HERE]

When replicating the study using alternative methods of estimating abnormal accruals, the results are mixed in terms of the significance and sign of the experimental variables. The relationship between having a female CFO and abnormal accruals is not consistent across the different methods. Some of the results showed a negative relationship, while others showed a positive relationship, and some show no relationship. However, the results for the relationship between the number and proportion of female members on the board and earnings management are either not significant or negative; none of the methods of estimating abnormal accruals used show a positive relationship, as found in AAA. Table 6.7 shows the coefficients of the experimental variables and their significance when alternative methods are used to estimate abnormal accruals.

[INSTER TABLE 6.7 HERE]

6.7 Summary of the chapter

The influence of having female members on the board on earnings management is considered controversial in the literature. Some authors find a positive influence of having female members on the board (Arun et al., 2015; Barua et al., 2010; Gull et al., 2018; Ittonen et al., 2013; Krishnan and Parsons, 2008; Srinidhi et al., 2011; Thiruvadi and Huang, 2011) while others, such as Ye et al. (2010), do not find significant results with regard to the relationship. Consistent with other research in the area, the results in this chapter suggest inconsistent results with respect to the relationship between having female members on the board and earnings management with respect to the different methods in estimating abnormal accruals. The proportion and number of female board members, both independent and not independent, are shown to either have no relationship to earnings management or are negatively related, depending on the method used to estimate abnormal accruals. This could indicate that having more female members on the board reduces earnings management, which is consistent with some literature (Barua et al., 2010; Gavious et al., 2012; Ittonen et al., 2013; Peni, and Vähämaa, 2010), although the result is not robust to alternative methods of measuring abnormal accruals. Also, the relationship between having a female CFO and earnings management is mixed (i.e., some methods of estimating abnormal accruals suggest that the relationship is positive whilst others suggest it is negative).

Consistent with the finding of the previous chapters, this chapter highlights the unreliability of using abnormal accruals as a proxy for earnings management in the UK. This chapter presents evidence of the lack of reliability in using a common approach to research design in earnings management studies in the UK.

Tables

Table 6.1 Total number of observations per industry

	ICB Sector	ICB Code	AAA Observations 2005-2011	My Observations 2005-2011	My Observations 1999-2015
1	Oil and Gas	0500	97	81	143
2	Basic Resources	1700	-	68	122
3	Industrial Goods and Services	2700	390	310	708
4	Food and Beverage	3500	77	61	138
5	Personal and Household Goods	3700	86	88	219
6	Health Care	4500	56	43	123
7	Retail	5300	162	127	287
8	Media	5500	61	67	186
9	Travel and Leisure	5700	148	129	309
10	Telecommunications	6500	42	21	54
11	Technology	9500	101	91	224
	Total		1220	1,086	2,513

Table 6.2 Descriptive statistics comparison

	My Descriptive Results for the Period from 2005 to 2011					Arun et al. (2015) for the Period from 2005 to 2011				
Variable	**Mean**	**Median**	**Standard Deviation**	**Minimum**	**Maximum**	**Mean**	**Median**	**Standard Deviation**	**Minimum**	**Maximum**
Abnormal Accruals	-0.020	-0.019	0.062	-.470	0.192	-0.020	-0.018	0.076	-0.788	0.805
Number of Female Directors	0.792	1	0.871	0	4	0.813	1	0.932	0	4
Number of Independent Female Directors	0.501	0	0.626	0	3	0.392	0	0.632	0	3
CFO	0.001	0	0.030	0	1	0.028	0	0.165	0	1
Size (ln (Total Assets))	14.266	14.116	1.367	11.366	17.816	3.109	3.047	0.673	1.318	5.341
Operating Cash Flow	0.115	0.101	0.076	-0.068	0.352	0.12	0.103	0.108	-0.347	1.461
ROA	0.069	0.060	0.069	-0.250	0.287	0.097	0.081	0.125	-0.544	1.341
Leverage	0.601	0.613	0.219	0.095	1.344	0.592	0.599	0.211	-0.100	1.319
Growth in Sales	0.125	0.081	0.251	-0.441	1.446	0.212	0.102	0.569	-0.774	8.341
Market to Book	2.754	2.325	9.105	-47.480	42.070	3.504	2.657	3.233	-0.387	25.055
Loss	0.089	0	0.286	0	1.000	0.092	0	0.289	0	1
N	**1,086**					**1,220**				

Abnormal accruals are calculated using Dechow et al.'s (1995) Jones measure; number of female directors is the number of female directors on the board. Number of independent female directors is the number of independent female board directors on the board. CFO is a dummy that takes the value of 1 if the CFO of the firm is female and 0 otherwise. Size is measured as the natural logarithm of total assets of the firm in year t. Operating cash flow is operating cash flow scaled by total assets for the year t. ROA is a measure of the firm's performance calculated as net revenue scaled by total assets for the year t of the firm. Leverage is measured as the total liability to total assets ratio for the year t of firm i. Growth in sales is measured as the difference between sales at t and t-1 divided by sales at t-1. Market-to-book ratio is the market value of the firm divided by the book value of equity for the year t for firm i. Loss is a dummy variable that takes the value of 1 if a firm reported a net loss and 0 otherwise.

Table 6.3 Arun et al.'s (2015) original paper's results extracted from the paper page 141 (2005-2011) – Number of female directors on the board

	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals
Number of Female Directors		0.006** (2.329)			0.007** (2.419)
Number of Independent Female Directors			0.004* (1.833)		0.004* (1.887)
CFO				0.004 (0.510)	-0.007 (-0.861)
Size (ln (Total Assets))	-0.024*** (-11.287)	-0.024*** (-11.388)	-0.025*** (-11.307)	-0.024*** (-11.278)	-0.025*** (-11.418)
Operating Cash Flow	-0.267*** (-12.757)	-0.269*** (-13.107)	-0.269*** (-12.858)	-0.267*** (-12.743)	-0.271*** (-13.236)
ROA	0.097*** (4.897)	0.095*** (4.863)	0.098*** (4.931)	0.097*** (4.899)	0.095*** (4.885)
Leverage	-0.033*** (-4.411)	-0.033*** (-4.492)	-0.033*** (-4.425)	-0.033*** (-4.382)	-0.034*** (-4.554)
Growth in Sales	-0.004 (-1.354)	-0.004 (-1.424)	-0.003 (-1.319)	-0.004 (-1.383)	-0.004 (-1.355)
Market to book	0.001 (0.044)	0.001 (0.164)	0.001 (0.084)	0.001 (0.035)	0.001 (0.245)
Loss	-0.035*** (-6.001)	-0.035*** (-6.094)	-0.035*** (-5.980)	-0.035*** (-6.006)	-0.035*** (-6.071)
Constant	0.093*** (9.566)	0.093*** (9.594)	0.095*** (9.630)	0.093*** (9.563)	0.095*** (9.661)
Year and Industry Dummy	Yes	Yes	Yes	Yes	Yes
N	1217	1217	1217	1217	1217

Abnormal accruals are calculated using Dechow et al.'s (1995) Jones measure; number of female directors is the number of female directors on the board. Number of independent female directors is the number of independent female board directors on the board. CFO is a dummy that takes *the value of 1 if the CFO of the firm is female and 0 otherwise. Size is measured as the natural logarithm of total assets of the firm in year t. Operating cash flow is operating cash flow scaled by total assets for the year t. ROA is a measure of the firm's performance calculated as net revenue scaled by total assets for the year t of the firm. Leverage is measured as the total liability to total assets ratio for the year t of firm i. Growth in sales is measured as the difference between sales at t and t-1 divided by sales at t-1. Market-to-book ratio is the market value of the firm divided by the book value of equity for the year t for firm i. Loss is a dummy variable that takes the value of 1 if a firm reported a net loss and 0 otherwise.*

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.4 Arun et al.'s (2015) original paper's results extracted from the paper page 141 (2005-2011) – Proportion of female directors on the board

	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals
Proportion of Female Directors		0.058** (2.219)			0.070** (2.335)
Proportion of Independent Female Directors			0.038* (1.933)		0.039* (2.004)
CFO				0.004 (0.510)	-0.007 (-0.936)
Size (ln (Total Assets))	-0.024*** (-11.287)	-0.024*** (-11.196)	-0.025*** (-11.396)	-0.024*** (-11.278)	-0.025*** (-11.312)
Operating Cash Flow	-0.267*** (-12.757)	-0.268*** (-13.015)	-0.269*** (-12.882)	-0.267*** (-12.743)	-0.270*** (-13.157)
ROA t	0.097*** (4.897)	0.095*** (4.868)	0.098*** (4.947)	0.097*** (4.899)	0.096*** (4.907)
Leverage	-0.033*** (-4.411)	-0.034*** (-4.503)	-0.033*** (-4.437)	-0.033*** (-4.382)	-0.034*** (-4.585)
Growth in Sales	-0.004 (-1.354)	-0.004 (-1.407)	-0.003 (-1.298)	-0.004 (-1.383)	-0.003 (-1.310)
Market to Book	0.001 (0.044)	0.001 (0.152)	0.001 (0.125)	0.001 (0.035)	0.001 (0.278)
Loss	-0.035*** (-6.001)	-0.035*** (-6.082)	-0.035*** (-5.990)	-0.035*** (-6.006)	-0.035*** (-6.068)
Constant	0.093*** (9.566)	0.092*** (9.519)	0.094*** (9.678)	0.093*** (9.563)	0.094*** (9.627)
Year and Industry Dummy	Yes	Yes	Yes	Yes	Yes
N	1217	1217	1217	1217	1217

Abnormal accruals are calculated using Dechow et al.'s (1995) Jones measure; proportion of female directors is the proportion of female directors compared to total directors on the board.

Proportion of independent female directors is the proportion of independent female directors compared to total directors on the board. CFO is a dummy that takes the value of 1 if the CFO of the firm is female and 0 otherwise. Size is measured as the natural logarithm of total assets of the firm in year t. Operating cash flow is operating cash flow scaled by total assets for the year t. ROA is a measure of the firm's performance calculated as net revenue scaled by total assets for the year t of the firm. Leverage is measured as the total liability to total assets ratio for the year t of firm i. Growth in sales is measured as the difference between sales at t and t-1 divided by sales at t-1. Market-to-book ratio is the market value of the firm divided by the book value of equity for the year t for firm i. Loss is a dummy variable that takes the value of 1 if a firm reported a net loss and 0 otherwise.

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.5 Arun et al.'s (2015) replication using the same method in estimating abnormal accruals as the original paper (1999-2015) – Number of female directors on the board

	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals
Number of Female Directors		0.000356 (0.34)			0.00166 (1.17)
Number of Independent Female Directors			-0.000296 (-0.22)		-0.00199 (-1.09)
CFO				-0.0645*** (-3.26)	-0.0685*** (-3.42)
Size (ln (Total Assets))	-0.0124*** (-19.25)	-0.0124*** (-17.99)	-0.0123*** (-18.60)	-0.0124*** (-19.29)	-0.0125*** (-18.14)
Operating Cash Flow	-0.780*** (-56.71)	-0.781*** (-56.48)	-0.780*** (-56.68)	-0.780*** (-56.81)	-0.782*** (-56.58)
ROA t	0.767*** (54.45)	0.767*** (54.44)	0.767*** (54.44)	0.767*** (54.53)	0.767*** (54.53)
Leverage	-0.00849** (-2.11)	-0.00853** (-2.12)	-0.00846** (-2.10)	-0.00861** (-2.14)	-0.00862** (-2.15)
Growth in Sales	0.0146*** (4.43)	0.0146*** (4.44)	0.0146*** (4.42)	0.0146*** (4.43)	0.0145*** (4.42)
Market to Book	0.000295*** (3.22)	0.000293*** (3.19)	0.000295*** (3.22)	0.000296*** (3.24)	0.000290*** (3.17)
Loss	0.00360 (1.30)	0.00357 (1.28)	0.00363 (1.30)	0.00376 (1.36)	0.00376 (1.35)
Constant	0.194*** (18.31)	0.216*** (19.41)	0.215*** (19.70)	0.195*** (18.38)	0.218*** (19.51)
Year and Industry Dummy	Yes	Yes	Yes	Yes	Yes
N	2513	2513	2513	2513	2513

Abnormal Accruals are calculated using Dechow et al.’s (1995) Jones measure; number of female directors is the number of female directors on the board. Number of independent female directors is the number of independent female directors on the board. CFO is a dummy that takes the value *of 1 if the CFO of the firm is female and 0 otherwise. Size is measured as the natural logarithm of total assets of the firm in year t. Operating cash flow is operating cash flow scaled by total assets for the year t. ROA is a measure of the firm's performance calculated as net revenue scaled by total assets for the year t of the firm. Leverage is measured as the total liability to total assets ratio for the year t of firm i. Growth in sales is measured as the difference between sales at t and t-1 divided by sales at t-1. Market-to-book ratio is the market value of the firm divided by the book value of equity for the year t for firm i. Loss is a dummy variable that takes the value of 1 if a firm reported a net loss and 0 otherwise.*

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.6 Arun et al.'s (2015) replication using the same method in estimating abnormal accruals as the original paper (1999-2015) – Proportion of female directors on the board

	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals	Abnormal Accruals
Proportion of Female Directors		-0.00794 (-0.80)			0.00220 (0.16)
Proportion of Independent Female Directors			-0.00936 (-0.77)		-0.0135 (-0.79)
CFO				-0.0645*** (-3.26)	-0.0660*** (-3.29)
Size (ln (Total Assets))	-0.0124*** (-19.25)	-0.0122*** (-18.52)	-0.0123*** (-19.01)	-0.0124*** (-19.29)	-0.0123*** (-18.62)
Operating Cash Flow	-0.780*** (-56.71)	-0.780*** (-56.48)	-0.780*** (-56.70)	-0.780*** (-56.81)	-0.781*** (-56.50)
ROA t	0.767*** (54.45)	0.767*** (54.43)	0.767*** (54.45)	0.767*** (54.53)	0.767*** (54.51)
Leverage	-0.00849** (-2.11)	-0.00840** (-2.09)	-0.00839** (-2.09)	-0.00861** (-2.14)	-0.00850** (-2.12)
Growth in Sales	0.0146*** (4.43)	0.0145*** (4.39)	0.0145*** (4.39)	0.0146*** (4.43)	0.0144*** (4.38)
Market to Book	0.000295*** (3.22)	0.000299*** (3.26)	0.000296*** (3.23)	0.000296*** (3.24)	0.000297*** (3.24)
Loss	0.00360 (1.30)	0.00365 (1.31)	0.00365 (1.31)	0.00376 (1.36)	0.00382 (1.38)
Constant	0.194*** (18.31)	0.193*** (17.80)	0.194*** (18.13)	0.195*** (18.38)	0.194*** (17.93)
Year and Industry Dummy	Yes	Yes	Yes	Yes	Yes
N	2513	2513	2513	2513	2513

Abnormal accruals are calculated using Dechow et al.'s (1995) Jones measure; proportion of female directors is the proportion of female directors compared to total directors on the board. Proportion of independent female directors is the proportion of independent female directors *compared to total directors on the board. CFO is a dummy that takes the value of 1 if the CFO of the firm is female and 0 otherwise. Size is measured as the natural logarithm of total assets of the firm in year t. Operating cash flow is operating cash flow scaled by total assets for the year t. ROA is a measure of the firm's performance calculated as net revenue scaled by total assets for the year t of the firm. Leverage is measured as the total liability to total assets ratio for the year t of firm i. Growth in sales is measured as the difference between sales at t and t-1 divided by sales at t-1. Market-to-book ratio is the market value of the firm divided by the book value of equity for the year t for firm i. Loss is a dummy variable that takes the value of 1 if a firm reported a net loss and 0 otherwise.*

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6.7 Coefficient and significance of the experimental variables when using alternative methods to estimate abnormal accruals

Measure number	Measure type	Number of female directors on the board	Number of independent female directors on the board	Dummy variable equals 1 if the CFO of the firm is female	Proportion of female directors on the board	Proportion of independent female directors on the board
Original paper	Total accruals Modified Jones/ without PPE	0.006**	0.004*	0.004	0.058**	0.038**
Replicated way	Total accruals Modified Jones/ without PPE	NOT SIG	NOT SIG	-0.0645***	NOT SIG	NOT SIG
1	Healy (1985)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
2	DeAngelo (1986)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
3	Friedlan (1994)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
4	Dechow and Sloan (1991)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
5	Jones (1991)	-0.00227**	-0.00348**	-0.191***	-0.0317***	-0.0414***
6	Dechow et al. (2003)	NOT SIG	NOT SIG	0.214***	-0.0190*	NOT SIG
7	Kothari et al. (2005)	NOT SIG	NOT SIG	-0.0876**	-0.0247**	-0.0270**
8	Dechow et al. (1995)	NOT SIG	-0.00346**	-0.186***	-0.0264**	-0.0416***
9	Dechow et al. (2003)	NOT SIG	NOT SIG	0.205***	NOT SIG	NOT SIG
10	Kothari et al. 2005	NOT SIG	NOT SIG	NOT SIG	-0.0198*	-0.0271**
11	Dechow et al. (2003)	NOT SIG	NOT SIG	0.0598*	-0.0182*	-0.0196*
12	Chambers (1999)	-0.00202*	-0.00454***	-0.150***	-0.0341***	-0.0534***
13	Dechow et al. (2003) – Lag TAcc	NOT SIG	NOT SIG	-0.132***	-0.0156*	-0.0225*
14	Dechow et al. (2003) – Lag TAcc and Sale growth	NOT SIG	NOT SIG	-0.127***	NOT SIG	NOT SIG
15	Jeter and Shivakumar (1999)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
16	Kasznik (1999)	NOT SIG	NOT SIG	0.181***	-0.0230**	NOT SIG
17	Larcker and Richardson (2004)	NOT SIG	NOT SIG	0.180***	NOT SIG	NOT SIG
18	DeFond and Jiambalvo (1994)	NOT SIG	NOT SIG	0.101*	NOT SIG	NOT SIG

Measure number	Measure type	Number of female directors on the board	Number of independent female directors on the board	Dummy variable equals 1 if the CFO of the firm is female	Proportion of female directors on the board	Proportion of independent female directors on the board
19	Peasnell et al. (2000a)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
20	Peasnell et al. (2000a)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
21	Peasnell et al. (2000a)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
22	Ball and Shivakumar (2006) – Book	NOT SIG	NOT SIG	0.181***	NOT SIG	-0.0215**
23	Ball and Shivakumar (2006) -Market	NOT SIG	NOT SIG	-0.140***	-0.0208**	NOT SIG
24	Ball and Shivakumar (2006) – Book and Market	-0.00156*	NOT SIG	NOT SIG	-0.0210***	-0.0204**
25	Collins et al. (2017)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
26	Collins et al. (2017	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
27	Working paper – Collins et al. (2017)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
28	Working paper – Collins et al. (2017)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
29	Kothari et al. (2005)	NOT SIG	NOT SIG	-0.131***	NOT SIG	NOT SIG
30	Kothari et al. (2005)	NOT SIG	NOT SIG	-0.0983***	NOT SIG	NOT SIG
31	Owens et al. (2017)	NOT SIG	NOT SIG	0.189***	-0.0192*	NOT SIG
32	Owens et al. (2017)	NOT SIG	NOT SIG	NOT SIG	-0.0179**	-0.0207**
33	Owens et al. (2017)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
34	Dechow and Dichev (2002)	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
35	Francis et al. (2005)	NOT SIG	NOT SIG	NOT SIG	-0.0180**	-0.0213**
36	Dechow and Dichev – Ball and Shivakumar 2006	NOT SIG	NOT SIG	NOT SIG	NOT SIG	NOT SIG
37	Konstantinidi et al. (2016)	NOT SIG	NOT SIG	-0.135***	NOT SIG	NOT SIG

All measures as explained in tables 2.1 and 2.2 of chapter 2

Chapter 7

Conclusion

In this chapter, the conclusion of the thesis is presented. This thesis presents an analysis of the accruals earnings management measures in terms of their reliability in capturing earnings management. The reliability of accruals as proxies for earnings management is first examined in chapter 2 in which accruals measures are compared in terms of power (by which is meant, the extent to which measures of the abnormal accruals component of total accruals or working capital accruals are different from total accruals or working capital accruals; and the extent to which models of the accruals generating process for total accruals or working capital accruals explain total accruals or working capital accruals by industry), correlation (the extent to which different measures of abnormal accruals are correlated with each other) and persistence (the extent to which measures of abnormal accruals persist over time). In this chapter, a review of earnings management literature is also presented, including discussions of the definition, theoretical background, research designs, and measures of abnormal accruals. The chapter identifies the research gap and hypotheses questioning the reliability of abnormal accruals as a proxy for earnings management.

The remaining chapters (chapters 3-6) assess the reliability of abnormal accruals as a proxy for earnings management in the UK through the replication of five UK-based studies. Each study investigates a different scenario, and the analyses in these chapters aims to understand the impact of the use of alternative accruals-based measures on the findings in each scenario. These chapters also demonstrate under which scenarios findings in earnings management studies are robust to different abnormal accruals measures, and whether these findings are necessarily related to earnings management or whether other explanations are possible.

The remainder of this chapter is organised as follows. Section 7.1 provides a summary of the thesis. Section 7.2 provides a review of the key findings of the thesis. Section 7.3 discusses the thesis contribution. Section 7.4 discusses the implication of findings. Section 7.5 discusses how the research objectives of the thesis are met. Section 7.6 considers the thesis' limitations. Finally, section 7.7 suggests areas for future research.

7.1 Summary of the thesis

This thesis investigates the use of accruals-based measures as proxies for earnings management in the UK, with the aim of understanding how reliable accruals-based measures are in acting as proxies for earnings management in the UK. This thesis builds on the arguments by Ball (2013), Jackson (2018) and McNichols and Stubben (2018) about whether accruals-based measures are informative about earnings management. Research in this area is concerned with the ability of accruals-based measures to capture earnings management, particularly with the typical current research design that uses aggregated accruals-based measures (Ball, 2013; McNichols and Stubben, 2018). Such measures sometimes fail to capture earnings management when it occurs in real life, such as in the case of Enron (Jackson, 2018). Furthermore, current research in this area is reconsidering previously established measures of abnormal accruals, pointing out the limitations of these measures and providing solutions (Collins et al., 2017; Owens et al., 2017). This thesis explores the impact of using different measures of abnormal accruals on the outcome in UK-based earnings management scenarios.

The thesis starts with an overview of the earnings management literature in terms of motives, theoretical underpinnings, and types of earnings management, as well as the development of accruals-based measures of earnings management. A discussion of the literature and an outline of the fundamental underlying issues are presented in chapter 2, particularly in relation to evaluating the reliability of measures of abnormal accruals as proxies for earnings management; where the correlation, power and persistence (as defined above) of accruals-based measures are investigated. This thesis examines the impact of using alternative measures of abnormal accruals in capturing earnings management in different UK-based scenarios, where the relationships between earnings management, in relation to, dividend-paying firms, having a forecast in the IPO prospectus, audit quality for IPO firms, the regulatory environment for IPO firms, and the gender diversity of board members are examined. The consistency of findings when alternative measures of accruals are used is tested. This thesis also uses placebo tests to examine the reliability of the findings, and, where appropriate, provides alternative explanations for the results that do not involve earnings management.

7.2 Key findings

7.2.1 Measure-related findings - chapter 2

7.2.1.1 Correlation between abnormal accruals from different measures and actual accruals

The first findings are related to the correlation between abnormal accruals measures generated from different approaches, as well as the correlation with the actual accruals of the firm. This is to understand the association between abnormal accruals generated from different measures, and also with the actual accruals of the firm. Similarly, these analyses help understand whether abnormal accruals measures generated from more recently developed approaches are less correlated to abnormal accruals generated from older measures, and less correlated with the actual accruals of the firm. These findings are presented in chapter 2. The results show that correlations are high and significant between abnormal accruals measures based on total accruals, as well as highly correlated with the total accruals itself. Abnormal accruals generated from working capital accruals measures are highly correlated with other abnormal accruals measures that are generated from working capital accruals, as well as being highly correlated with actual working capital accruals. Thus, recent approaches to estimating normal accruals do not produce results that are much different from older approaches, and estimated measures of abnormal accruals do not generally differ much from total accruals or working capital accruals.

7.2.1.2 Power of accruals-based measures of abnormal accruals

This thesis tests the power of models that estimate normal accruals, from which abnormal accruals are estimated, in chapter 2. The power of these models is assessed via the adjusted R square of the industry regressions. The findings show that the power of these measures is frequently very low, with over 70% of the variance in accruals not explained by the variables. The power varies according to industry: models of the accruals generating process for some industries have very low power, with an average of 10% explanatory power, meaning 90% of the variance in accruals in these industries is not explained using these models. Low explanatory power is found for the healthcare and technology industries; while the personal and household goods industries have the highest power. The variation in power across industries could be attributed to differences in the nature of accruals in these industries. This low power will affect the estimate of abnormal accruals, which is estimated as the difference between actual accruals, and the estimated normal accruals from this regression, resulting in abnormal accruals being similar to actual accruals.

7.2.1.3 Persistence of measures of abnormal accruals

In theory, earnings management is not a continuous practice; it is a one-time manipulation in accruals that should reverse over time. Thus, if abnormal accruals represent earnings management, they should not be persistent. The findings show that measures of abnormal accruals generated from total accruals are positively persistent for a period of five years. This persistence follows the persistence of the actual total accruals of the firm, which is an indicator that these measures of abnormal accruals might not be particularly good at representing earnings management. Abnormal accruals generated from working capital accruals reverse slightly in the first year and have no relation to the abnormal accruals in the years beyond that. These findings are similar to the persistence of actual working capital accruals. The difference between the persistence of total accruals and working capital accruals is related to the long-term component of accruals, such as depreciation. Nonetheless, the findings showed that measures of abnormal accruals follow the actual accruals they are derived from in term of persistence; they do not appear to completely reverse and abnormal accruals generated from total accruals are positively persistent for up to five years, which suggests that they might not be a good indication of earnings management. Moreover, there is no difference in terms of persistence of results between older and newer measures (e.g. Jones 1995 and Owens et al., 2017), meaning that the more recently developed measures could still suffer from correlated omitted variables problems, as isuggested by Ball (2013).

7.2.2 Replication findings - chapter 3-6

7.2.2.1 Dividend-paying firms and earnings management

In the replicated study, Atieh and Hussain (2012) find that firms that pay dividends are more likely to manage earnings upwards when pre-managed earnings are lower than pre-managed earnings. However, firms that do not pay dividends are also more likely to manage earnings to avoid reporting a loss than firms that pay dividends, and manage earnings when their pre-managed earnings are less than zero.

The findings in chapter 3 suggest that there is significant positive relationship between UK firms that pay dividends when the firms' pre-managed earnings are lower compared to the expected dividend and upwards earnings management. These findings are robust when using any of the 37 measures of abnormal accruals identified in chapter 2, and the findings are also consistent with the findings of the replicated study by Atieh and Hussain (2012). Therefore, in this replication, the measure used in proxying earning management does not make a difference to the overall findings of the study. When using placebo tests, lagged and lead abnormal accruals, instead of abnormal accruals, some similar results are found, particularly when abnormal accruals based on total accruals are used. When actual accruals are considered as a proxy for earnings management, the findings are also the same. Ball (2013) suggests that researchers need to offer explanations for findings that do not involve earnings management. Since the use of actual accruals of a firm gives the same findings, then an alternative explanation can be offered: Firms with operating cash flows (pre-managed earnings if total accruals are considered as earnings management) lower than expected dividends are likely to have profits exceeding dividends and, hence, total accruals are likely to be positive.

7.2.2.2 Forecasts in IPO and earning management activities

In the replicated study, Buchner et al. (2017) find that the level of earnings management, post IPO (in the year after the IPO), is lower in firms that report earnings forecasts in their prospectuses compared to firms that do not report earnings forecasts. This indicates that forecasts provide useful information to investors during the listing period as a measure of the firm's financial reporting quality.

The findings in chapter 4 show that the relationship between large IPO firms providing forecasts at the time of listing and earnings management, post IPO, is robust only when a total accruals-based measures of earnings management are used in the tests. However, when using abnormal accruals measures that are derived from working capital accruals, the findings in the original study are not found. Altering the research design, in one of the ways suggested by Chen et al. (2018), does not alter the findings in the chapter. The results are also robust when actual total accruals are used as the measure of earnings management, but not when working capital accruals are used, which may indicate that there is another explanation for the relationship. Since the main influence for finding the theorised relationship is the long-term component of accruals, further exploration of the types of IPO firms that tend to have a forecast in their prospectus reveals that there is a higher probability that firms in the 'basic resource' and 'industrial goods and services' industries report forecasts compared to other industries. Such industries have large amounts of fixed assets, which results in higher figures for long-term accruals such as high depreciation charges. Therefore, the main driver may be the industry classification rather earnings management.

7.2.2.3 Audit quality, regulatory environment and earnings management

In the replicated studies, Alhadab et al. (2016) find that IPO firms listed on the AIM market have more earnings management compared to firms listed on the Main Market of the London Stock Exchange. In Alhadab and Clacher (2018), when market listing is included as a control variable, it has no relation to accruals earnings management. Likewise, Alhadab and Clacher (2018) find a negative relationship between IPO firms that use Big N auditors and earnings management, while using a Big N auditor does not have a relationship with accruals earnings management when it is included as a control variable in Alhadab et al. (2016). Put another way, the two studies provide contradictory results.

The findings in chapter 5 do not show any relationship between the regulatory environment, audit quality and earnings management using any of the abnormal accruals measures identified in chapter 2. Placebo tests using lead and actual accruals also reveal no relationship. The results found in this chapter are consistent with Ball and Shivakumar (2008) - that IPO firms in the UK are of high quality and highly monitored by different mechanisms such as auditors, analysts, press, regulators and board members.

7.2.2.4 Female board members and earnings management

This study replicates Arun et al. (2015) who find a negative relationship between having female board members and earnings management. Arun et al. (2015) argues that women are more ethical in the workplace than men and, thus, less likely to engage in unethical behaviour (Betz et al., 1989; Khazanchi, 1995). Arun et al. (2015). The findings in chapter 6 do not suggest any relationship between measures of gender diversity on corporate boards and earnings management when using the Arun et al. (2015) abnormal accruals measure, or when using any of the 37 measures identified in chapter 2. Placebo tests, as might be expected, also reveal no relationship. These findings can be seen as consistent with previous literature, as findings on the relationship between gender diversity of the board and earnings management are seen to be inconclusive (Kyaw et al., 2015). The difference in results also could be attributed to the difference in data collection methods, as Arun et al. (2015) collect the data on board membership manually, whilst BoardEx is used to obtain the data for this thesis.

7.2.3 Hypotheses summary

Table 7.1 shows the hypotheses from section 2.4 with the main findings supported or not.

Table 7.1 Hypothesis findings

Hypothesis number	Hypothesis	Findings
1	There is a strong positive significant relationship between abnormal accruals measures generated from total accruals and total accruals.	Supported
2	There is a strong positive significant relationship between abnormal accruals measures generated from working capital accruals and actual working capital accruals.	Supported
3	Abnormal accruals measures generated from total accruals have a strong significant positive relationship	Supported

	with other abnormal accruals measures generated from total accruals.	
4	Abnormal accruals measures generated from working capital accruals have a strong significant positive relationship to other abnormal accruals measures generated from working capital accruals.	Supported
5	Models for estimating total accruals have low adjusted R squared	Supported
6	Models for estimating working capital accruals have low adjusted R-squared	Supported
7	There is a relationship between industry classification and the power of accruals-based measures of abnormal accruals.	Supported
8	Abnormal accruals generated from total accruals measures are persistent for a period of five years.	Supported
9	Abnormal accruals generated from working capital accruals are persistent for a period of five years.	Not supported
10	Ceteris paribus, there is a significant positive relationship between firms that pay dividends when the	Supported

	firms' pre-managed earnings are lower than expected dividends and upwards earnings management	
11	Ceteris paribus, there is a significant negative relationship between IPO firms having a forecast in their prospectus and upwards earnings management, relative to firms that do not have forecasts in their prospectus, post IPO.	Mixed - Supported when using total accruals-based measures of abnormal accruals - not supported when using working capital accruals measures.
12	Ceteris paribus, there is a significant negative relationship between IPO firms that are audited by Big N audit firms and upwards earnings management, relative to IPO firms that are not audited by Big N audit firms.	Not supported
13	Ceteris paribus, there is a significant positive relationship between IPO firms that are listed on AIM and upwards earnings management, relative to IPO firms that are listed on the Main Market.	Not supported.
14	Ceteris paribus, there is a significant positive relationship between firms that have a larger number of	Not supported.

female and independent female directors and upwards earnings management, relative to firms that do not have female board members.	

7.3 Contribution

This thesis contributes to earnings management research by building on the arguments in Ball (2013), Collins et al. (2017), Jackson (2018), McNichols and Stubben (2018) and Owens et al. (2017). This thesis makes a methodological contribution to the earnings management literature by providing evidence questioning the reliability of current measures of abnormal accruals and research designs used in the literature. It provides a guide to the specifications of abnormal accruals measures and empirically tests these measures' validity.

This thesis contributes to research by providing a thorough examination of the measures available in the literature for estimating accruals earnings management. It identifies 37 different ways used in the literature to estimate accruals-based earnings management. It shows how correlated abnormal accruals are to the dependent variable used to estimate them - total accruals or working capital accruals – as a way of investigating the power of these measures. It shows that more recently developed measures of abnormal accruals (e.g. Collins et al., 2017; Owens et al., 2017) do not provide correlation results much different from the older measures.

This research shows that abnormal accruals measures are persistent, if they are based upon total accruals. In theory, abnormal accruals result from a one time manipulation and should reverse in subsequent years. This thesis tests the persistence of various abnormal accruals measures over a period of five years and identifies that they do not completely reverse in the subsequent years, with total accruals measures positively persistent for a period of five years. Comparing older to more recently developed measures suggests that the newer measures are no less persistent that older measures and, thus, they still potentially suffer from problems with correlated omitted variables.

This thesis contributes to earnings management studies as it shows that the abnormal accruals measures have low power, and the power differs per measure or per industry. Further, more recently developed measures are not much different in explaining the variance in accruals from the older measures.

This thesis demonstrates that different earnings management measures provide similar outcomes, at least in the contexts in which they are applied in this study. It provides evidence that suggests that the latest suggested improvements in measuring abnormal accruals by Collins et al., (2017) and Owens et al. (2017) do not differ much from older measures in terms of outcomes in the scenarios studied. Further, in the scenarios studied, the use of the actual accruals of a firm, whether total accruals or working capital accruals, gives the same results as the use of abnormal accruals measures based upon them.

This thesis contributes to literature as it explores other possible reasons for the empirical findings in UK-based studies, particularly when actual accruals are used, that could explain the results in a way not involving earnings management. For example, firms with operating cash flows (pre-managed earnings if total accruals are considered as earnings management) lower than expected dividends are likely to have profits exceeding dividends and, hence, total accruals are likely to be positive, rather than dividend-paying firms managing earnings to pay dividends (Atieh and Husain, 2012). Having a forecast in the prospectus is not necessarily related to earnings management (as suggested by Buchner et al., 2017), but could be related to the type of industry the firm operates in, as this study provides evidence that there is a significant relationship between firms that report forecasts in their prospectus and industry classification. Firms that have higher fixed assets, meaning higher long-term accruals, are more likely to report forecasts in their prospectuses. In the case of other scenarios, the thesis shows inconsistency in findings with replicated studies, signifying the potential lack of robustness in accruals-based earnings management research, in particular, the lack of robustness in the relationships identified between the regulatory environment and audit quality on accruals earnings management in IPO firms (Alhadab et al., 2016; Alhadab and Clacher, 2018). A lack of robustness in the relationship between gender diversity and accruals earnings management (Arun et al., 2015) is also identified, as this study finds mixed results, thus a relationship is not established here that having female members has an impact on the abnormal accruals of the firm.

These contributions extend the sceptical comments of Ball (2013), Jackson (2018) and McNichols and Stubben (2018) about the reliability of current measures in capturing earnings management. It demonstrates that different accruals-based measures provide similar outcomes as actual accruals in several UK based studies. Whether abnormal accruals are reliable in capturing earnings management is still problematic. Thus, these findings may imply that the concerns presented by Ball (2013) about the low power of these measures are justified, likewise, that newly developed measures could still suffer from problems with correlated omitted variables.

7.4 Implications

The findings of this thesis have various implications for investors, regulators, accounting standard setters, financial analysts, policy makers and researchers. First, the findings of this thesis suggest that, though earnings management using accruals is known to occur, researchers still cannot present a reliable accruals-based measure which regulators or investors could use to assess the manipulations by managers. Similar to the findings by Ball and Shivakumar (2008), this thesis does not find any evidence of the impact of the regulatory environment or audit quality on the level of earnings management of the firm. When abnormal accruals are found to be significantly higher in IPO firms that have a forecast in their prospectus compared to those that do not, the findings suggest that this could be due to the industry classification of such IPO firms as such firms have higher amounts of fixed assets resulting in higher long-term accruals, rather than earnings management.

This thesis could have an impact on researchers who consider using abnormal accruals as a proxy for earnings management in general and in UK. This is because it finds that aggregated accrual-based measures are still problematic and should not be considered as strong evidence of earnings management on their own. As suggested by Ball (2013), these measures still suffer from problems and they cannot be considered as indicative of earnings management which one can use to report to authorities.

7.5 Achieving research objectives and answering research questions

The aim of this thesis is to examine and investigate the reliability of accruals-based measures in capturing earnings management in the UK in different scenarios, where the main research question is "*How reliable are accruals-based measures in assessing earnings management in the UK?"* To achieve this aim, the following objectives and sub-questions were set:

Objective: to examine the association between abnormal accruals generated from different approaches in the literature and the extent to which they differ from the actual accruals of a firm.

Sub-question: What is the association between accrual-based earnings management estimates generated from different approaches in the literature? To what extent are these estimates associated with the actual accruals of the firm?

The thesis achieves this objective. Findings show that there is a high association between abnormal accruals generated from different approaches, particularly when the same dependent variable – total accruals or working capital accruals - is used to generate abnormal accruals measures. This is shown in chapter 2, from the high correlation between total accruals-based abnormal accruals measures and between working capital accruals-based abnormal accruals measures. Abnormal accruals are also highly correlated with the actual accruals of a firm, which could be taken as an indication that the estimate of 'abnormal accruals' is not very informative about earnings management measure as it does not significantly differ from the actual accruals of the firm.

Objective: to examine the persistence of abnormal accruals measures generated from different approaches - if abnormal accruals capture manipulation reliably, they should reverse in the years after manipulation.

Sub-question: What is the relationship between current period earnings management estimates and subsequent periods' estimates?

This objective is met, as chapter 2 provides evidence that abnormal accruals measures generated from models of total accruals are positively persistent for a period of five years. If abnormal accruals are an accurate representation of earnings management, then they should reverse in the years after and, thus, they should not be positively persistent. Abnormal accruals generated from models of working capital accruals do not appear to fully reverse in subsequent years as well, indicating that these measures are also not reliable estimates of earnings management. It is worth pointing out that abnormal accruals persistence follows the persistence of total accruals and working capital accruals, again indicating that abnormal accruals measures are not much different from the actual accruals of the firm.

Objective: to examine the power of accrual-based measures, testing the ability of models of the accruals generating process in modelling the accruals of the firm, from which abnormal accruals are then estimated.

Sub-question: how capable are the models of the accruals generating process in estimating the accruals of a firm? Does industry classification affect the ability of these models to explain accruals?

When examining the power of accrual-based measures in chapter 2, it shows that the measures have low power as a large part of the variation in accruals is not explained. This is consistent with the high correlation between abnormal accruals estimates and the accruals. This lack of explanatory power is consistent with a lack of reliability of abnormal accruals measures as proxies for earnings management. This finding is consistent with the comments by Ball (2013) suggesting that models used in the estimation of normal accruals have low explanatory power.

Objective: to examine the dependability of accruals-based measures of abnormal accruals in capturing earnings management in different scenarios.

Sub-question: what is the effect of using different measures of abnormal accruals in UK-based studies of earnings management? How do the conclusions of a study change if a different measure is used?

The dependability of accruals as proxies for earnings management is examined in various scenarios in chapters 3-6, by replicating earnings management studies using alternative measures, as well as altering the research design, and usingplacebo tests. The results of the replications differ, but the main message from these replications, regardless of whether previous results are replicated or not, is that when using abnormal accruals generated from total accruals measures, the results do not differ from using total accruals and, when using abnormal accruals generated from working capital measures, the results do not differ from using working capital accruals. In these scenarios, some relationships are found to be robust to the use of different measures of abnormal accruals; and, alternative explanations for the results not related to earnings management are also presented. In other scenarios, results are not replicated, indicating the limits of earnings management studies and that the relationship between the tested scenario and abnormal accruals is not strong as the results are not robust. Finally, changes in research design, as suggested by Chen et al. (2018), do not have an impact on the findings of the study.

The above achieved objectives answer the main research question on the reliability of measures of abnormal accruals as a proxy for earnings management. The findings show that the current accruals-based measures of abnormal earnings are problematic for identifying earnings management in the UK, and that accruals-based measures could still potentially suffer from problems with correlated omitted variables, although, these findings should be interpreted with caution with regards to the limitations that are discussed in the following section.

7.6 Limitations

This these has several limitations. First in term of sample size, the sample for estimating measures of abnormal accruals is restricted to industries that have more than 30 observations. Most UK studies restrict the sample to industries that have more than five observations, but because one of the abnormal accruals measures (Collins et al., 2017) uses 22 independent variables in modelling the accruals generating process, the sample has to be restricted to industries with over 30 observations to be able to estimate this measure. When using abnormal accruals for IPO firms, the Collins et al. (2017) measure could not be estimated as most IPO firms have less than 30 observations in their industry.

The second limitation is in terms of context, as this thesis chooses the UK as the research context, using a sample of UK non-financial firms for the period from 1998-2015. Most of the abnormal accruals measures are developed in the US, although they are used in UK settings. There are differences in institutional and capital market characteristics across countries that can influence financial reporting practices (Leuz et al., 2003; Pope and Rees, 1992; Pope and Walker, 1999). The UK, for example, has been characterised as having lower political involvement in accounting compared to the US, and lower issuance of public debt and litigation costs (Ball et al., 2000). In addition, UK GAAP (generally accepted accounting principles) provides greater discretion in reporting extraordinary items compared to US GAAP (Pope and Walker, 1999).

Earnings before extraordinary items for UK firms are less sensitive to negative news compared to US firms, due to the US having higher regulatory and litigation costs (Pope and Walker, 1999).

Third the findings of the study are inconsistent with three of the replicated papers Alhadab et al. (2016), Alhadab and Clacher (2018) and Arun et al. (2015) when using the methods described in the original papers, and this might be caused by a lack of knowledge concerning the sample of firms used in these papers. Obtaining the exact sample might lead to different findings, despite the same sample period and population being employed.

7.7 Future research

This thesis acts as a guideline to future research in the field as it will help researchers understand the range of models of the accruals generating process underlying the estimation of normal accruals and how they differ, correlate and the limitations of these measures when using them, particularly in a UK setting. This study recommends future research to focus on understanding how normal accruals should be estimated, as abnormal accruals measures still suffer from significant problems, particularly as they do not differ much from the actual accruals of a firm.

One proposition may be to move away from using aggregated accrual-based measures and focus on using specific accruals models instead (McNichols and Stubben, 2018; Zha Giedt, 2018). Future research should contemplate the use of specific accruals such as allowance for bad debt, deferred revenue or tax expense, instead of aggregated accruals. It would be interesting if researchers could compare the two approaches, abnormal aggregated accruals as well as specific accruals, particularly to support findings of earnings management. Moreover, when the measures are used in future research, the limitations of these measures should be recognised and alternative explanations of findings not involving earnings management should be provided.

There is a lack of integration of other possible approaches to research in earnings management, as current research is concentrated on the use of archival data, where the focus is on inputs and outputs. Brennan (2021) has called for research using surveys, or a more qualitative approaches through interviews, that could aid in the development of theoretical foundations around accounting choices.

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