Essays in Earnings Management

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A thesis submitted for the degree of

Doctor of Philosophy in Accounting and Finance

Essex Business School

University of Essex

October, 2016

ABSTRACT

This thesis examines three essays in earnings management using UK-based data samples. The first essay implements a first test of the debt covenant hypothesis for the UK. The results indicate that firms close to violation or in technical default of their interest coverage (debt to EBITDA) covenants engage in higher levels of RAM relative to firms far from violation. Mandatory IFRS adoption does not change the use of RAM for firms close to violation or in technical default of their interest coverage covenants. However, it increases the propensity for employing RAM for firm close to default of their debt to EBITDA covenants. The second essay examines the effect of seasoned equity offerings (SEOs) on the debt covenant hypothesis. It finds that the use of RAM to avoid the possibility of interest coverage covenant violations decreases from the pre-issue period to the post-issue period. The results also show that the decrease in the use of RAM in the post SEO period to avoid the likelihood of breaching interest coverage covenant is more pervasive among SEO firms with low market to book ratios or high financial leverage. The third and final essay investigates revenue reclassification as an earnings management tool. More specifically, it examines whether firms use revenue reclassification by shifting other revenues to core revenues. The results establish that firms engage in revenue reclassification to inflate core revenues. They indicate that the period following mandatory IFRS adoption is associated with an increase in this practice as IRFS offers more latitude for revenue reclassification. Further tests reveal that revenue reclassification is more pervasive among firms with high incentives for earnings management such as those conducting seasoned equity offerings, those in financial distress, those with acquisitions financed by share for share exchange, and those reporting low core earnings or small increases in core earnings.

Acknowledgements

My doctoral studies have been challenging but also very interesting. I have learned a lot and gained many valuable experiences, and I would like to express my deepest gratitude to all those without whom it would have been impossible for me to complete my PhD.

The first of these are my wonderful supervisors, Professor Stuart Manson and Professor Jerry Coakley, who provided me with excellent support during my doctoral studies since October 2012. I am extremely thankful to them for their valuable discussions, their guidance, and their theoretical and analytical advice. I would also like to express my deep gratitude to my examiners, Professor Andrew Stark (The University of Manchester) and Dr. Anastasia Kopita (University of Essex), for a challenging and stimulating discussion in the viva. Special thanks go to the government of the Republic of Azerbaijan that awarded a scholarship under the "State Program on Education of Azerbaijani Youth Abroad in 2007-2015" towards my doctoral studies at the University of Essex.

Last but certainly not least, I am truly indebted and grateful to my father, Professor Telman Malikov, who gave me not only moral support but provided me with the right research attitude. I also owe sincere thankfulness to my mother, Sevil Malikova, who supported and encouraged me all the time. Moreover, I want to extend my gratitude and appreciation to my friends and colleagues. You all have always been there and with your support and love, I can always go forward.

Table of Contents

Chapter 4

Chapter 5

List of Tables

Chapter 1

Introduction

1.1 Background and research questions

Accounting has been treated as the language of business because it provides the firm's external users with financial information. Using this, stakeholders can analyze the firm's operating and financial performances to help them in decision making process. This information can be found in companies' financial reports that are prepared by managers based on accounting standards. The latter are designed to ensure that financial reports are made transparently and fairly. Accounting standards, however, allow managers discretion which may lead to opportunistic behaviour.

Managers can use discretion opportunistically to manage earnings. According to Healy and Wahlen (1999, p. 368) earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers. The literature especially identifies two main sets of motives as to why firms managing earnings opportunistically (Dechow and Skinner 2000; Fields, Lys, and Vincent 2001; Walker 2013). These are the contracting and capital market motives.

The debt contracts of the firm and the compensation contracts of a firm's executives are examined as the contracting motives for earnings management in the literature. Banks impose conditions on loans via covenants that set out minimum or maximum threshold values. Violations of these by firms could ultimately result in the loans being recalled or the firms being placed in receivership. The debt-covenant hypothesis argues that those firms that are more susceptible to violating covenants inflate earnings because violation is costly (Watts and Zimmerman 1986). Several studies confirm that debt covenant violations are costly. Chava and Roberts (2008) and Nini, Smith, and Sufi (2009) document that violating debt covenants leads to a decrease in a firm's future investment. Roberts and Sufi (2009) find that debt covenant violations increase a firm's interest costs and decrease the availability of credit. Several studies using US debt contracting have investigated whether firms engage in earnings management to avoid debt covenant violations. Earlier studies mainly use the debt-equity ratio as a proxy for the tightness of debt covenants because of the costly nature of obtaining accounting-based debt covenant information (e.g. Lilien and Pastena 1982; Daley and Vigeland 1983; Ayres 1986; Zimmer 1986). Subsequent studies use actual debt contract information to test the debt-covenant hypothesis (DeFond and Jiambalvo 1994; Sweeney 1994; Dichev and Skinner 2002; Franz, HassabElnaby, and Lobo 2014). The findings of these studies generally support the debt-covenant hypothesis.

Early papers document that CEO bonus plan as a compensation contract is the leading incentive for executives to manipulate earnings (Healy 1985; Gaver, Gaver, and Austin 1995; Holthausen, Larcker, and Sloan 1995; Murphy 2000). Healy (1985) states executives try to maximize their short term bonus compensation by using discretionary accruals. According to Murphy (2000), those firms which set bonus payout standards internally smooth their earnings more than those firms which set bonus payout standards externally. The separation of ownership and control poses some problems such as agency conflict which

leads managers not to act in the best interests of shareholders (Jensen and Meckling 1976). Thus, corporations try to find remedies to this problem and, as one solution, they change the structure of executive compensation. In particular, the use of stock options as executive compensation increased significantly in late 1990s. This, however, has not deterred managers' opportunistic behavior. Bergstresser and Philippon (2006) find that when CEOs' compensation is mainly based on stock and option holdings they use discretionary accruals aggressively to increase their reported earnings, in line with Cheng and Warfield (2005).

Firms also manage earnings to inflate share prices due to capital market motives. This is more pervasive around corporate events. Teoh, Welch, and Wong (1998a) and Morsfield and Tan (2006) find that US firms use earnings management in the year before and during initial public offerings to boost the issue price. However, this is not supported by the similar UK-based study (Ball and Shivakumar 2006). This work around seasoned equity offerings (hereafter SEOs) provides conclusive findings that firms overestimate earnings in the issue year (Teoh, Welch, and Wong 1998b; Cohen and Zarowin 2010). Earnings management also occurs around mergers and acquisitions specifically among firms that use their stocks for an acquisition (e.g. Botsari and Meeks 2008). Furthermore, extant studies show that firms manage earnings to meet or beat analyst forecasts for earning a stock return premium (Bartov, Givoly, and Hayn 2002; Daske, Gebhardt, and McLeay 2006; Gore, Pope, and Singh 2007).

This thesis comprises three essays in earnings management using UK-based data samples. The first (Chapter 2) implements a first test of the debt covenant hypothesis for the UK. This hypothesis argues that those firms that are more susceptible to violating covenants inflate earnings (Watts and Zimmerman 1986). Specifically, Chapter 2 examines whether UK firms manage earnings to avoid debt covenant violations. The extant studies have tested the debt covenant hypothesis in the context of the USA. Chapter 3 investigates whether

SEOs affect the debt covenant hypothesis. The latter is likely to be affected by this corporate event but this has not been tested in the literature. Finally, Chapter 4 is the first to examine revenue reclassification as an earnings management tool. It tests whether firms shift other revenues to core revenues and whether this behavior changes after IFRS adoption.

1.2 Motivation for the research

Several factors motivate this research. First, the debt covenant hypothesis is mainly tested using small or large US samples. US researchers find that debt covenants are very common in loan contracts (Roberts and Sufi 2009; Demerjian 2011) and that firms use earnings management to avoid debt covenant violations (Dichev and Skinner 2002; Franz et al. 2014). UK studies (Citron 1992; Moir and Sudarsanam 2007) do not directly test the debt covenant hypothesis but their evidence on covenants is consistent with US studies. UK studies do not test the debt covenant hypothesis because they are all based on small samples from surveys or interviews due to the lack of published covenant data. In contrast to the USA, UK-based firms are not obliged by company law to disclose such information in the UK. However, the UK provides an interesting laboratory for a test of the debt covenant hypothesis for two reasons. On one hand, the large US-based banks have played a leading role in debt finance there since the late 1970s. In particular, they were instrumental in the development of the financial statement lending technology for medium term loans with their attendant accounting-based covenants. This has led to covenant convergence between the UK and USA. On the other hand, the UK and USA have contrasting bankruptcy codes. The UK's debt-friendly bankruptcy code implies that firms have strong incentives to employ earnings management to avoid covenant violations. Britain's insolvency law and its bankruptcy code means that adhering to debt covenants is more crucial for a firm's survival than in the equity-friendly US national jurisdiction. A covenant violation in the UK

ultimately entitles the lending bank – and by extension all banks through cross-default clauses– to place that firm directly into receivership and liquidate its assets. By contrast, banks in the USA cannot place firms directly into liquidation if they file for Chapter 11 bankruptcy protection. The latter gives them 120 days to recapitalize and potentially find a solution to their financial difficulties. Thus, this thesis is motivated to implement a first test of the debt covenant hypothesis for the UK.

Second, it examines whether corporate events such as SEOs affect the debt covenant hypothesis. This is motivated by the sharp increase in UK SEOs - particularly through private placements - which help strengthen their financial statement numbers and thus reduce the risk of breaching debt covenants. Firms which are in danger of breaching their covenants need additional funds since just managing earnings may not be sufficient to avoid covenant violations. SEOs are an obvious alternative source of funding that can help firms to improve their debt covenant financial ratios directly or indirectly. For instance, SEO firms can improve their interest coverage ratio (earnings before interest, taxes, depreciation and amortization divided by interest expense) directly or indirectly by employing the funds to reduce long-term debt or to make investment, respectively. Armitage, Dionysiou, and Gonzalez (2014) note that the majority of distressed UK firms issue straight equity whereas comparable US firms do not. Existing studies, however, do not examine whether firms improve their financial situation and, in the process, to become less susceptible to debt covenant violations following SEOs. Hence, the continued use of earnings management to avoid covenant violations in the post-issue period remains an open question.

Finally, this thesis examines revenue reclassification while existing studies have investigated expense misclassification (e.g. McVay 2006; Fan and Liu 2015). It analyses whether firms shift other revenues (e.g. one-time gain from the sale of assets) to core revenues. Several reasons motivate the examination of this research question. As the existing

literature (Ertimur, Livnat, and Martikainen 2003; Marguardt and Wiedman 2004) suggests that an increase in core revenues is more valued by investors than a decrease in core expenses, it is important to determine if management engages in this form of earnings management. The use of revenue reclassification reduces transitory gains which enables firms to manage investors' perceptions. Kinney and Trezevant (1997) and Weiss (2001) document that firms are more likely to decrease non-recurring gains to influence investors' perceptions by providing a signal that their earnings are mainly based on recurring operations. A further motivation is the finding in existing studies that core revenues are overestimated via real activities manipulation by offering price discounts or more lenient credit terms (Roychowdhury 2006; Gunny 2010). It may be of interest to investors, auditors and regulators to understand whether firms manage core revenues via other specific channel(s). Lastly, since extant studies show that other expenses (e.g. income-decreasing special items) are used by firms for classification shifting, investors may be aware of the use of such items for overestimating core earnings. Therefore, managers may prefer to use other revenues to manage core earnings since the former have been largely ignored.

1.3 Research design

This thesis develops a three-pronged approach aimed at estimating a proxy for debt covenant slack which can be used in those countries where there is a lack of published covenant data. The first stage in this approach is to select a sample of firms that are likely to have covenant(s) and thus there is a possibility of the covenant thresholds being violated. The second stage is to choose the most commonly used covenants. These are the ones that are more likely to feature in a sample of firms with covenants. The third and most important stage is to estimate covenant slack proxies for the commonly used covenants as actual covenant values divided by judiciously chosen threshold values. The latter are carefully selected to match the covenant thresholds reported in the existing literature and then adjusted

to reflect changes across industries and years. These covenant slack proxies have the additional merit of being a consistent measure since there is emerging evidence that, in many cases, loan covenant thresholds are informally changed a number of times over the life of loans (Denis and Wang 2014; Roberts 2015). The implication is that the covenant threshold information reported at the origination of loans *de facto* becomes proxy information unless updated when changed.

Real activities manipulation (hereafter RAM), accruals management (hereafter AM) and unexpected core revenues are used as earnings management measures. Three individual proxies: abnormal levels of production costs, abnormal levels of discretionary expenses and abnormal levels of cash flows from operations are investigated to determine firms' RAM following Roychowdhury (2006). AM is estimated following Collins, Pungaliya, and Vijh (2014). I construct the model which applies McVay's (2006) expected core earnings model to measure unexpected core revenues. Regression models are developed to test for 1) the relationships between earnings management measures and debt covenant slack proxies; 2) the effects of SEOs on the debt covenant hypotheses; and 3) the association between unexpected core revenues and other revenues.

1.4 Key findings

The results for testing the debt covenant hypothesis for the UK indicate that firms close to violation or in technical default of their interest coverage (debt to EBITDA) covenants engage in higher levels of RAM rather than AM relative to firms far from violation. These findings strongly supports the debt covenant hypothesis and suggests a switch from AM to RAM, consistent with those of Chan, Chen, Chen, and Yu (2015) and Kothari, Mizik, and Roychowdhury (2016) for the USA. I also find that mandatory IFRS adoption does not change the use of RAM for firms close to violation or in technical default of their interest

coverage covenants. However, it increases the propensity for employing RAM for firm close to default of their debt to EBITDA covenants.

The findings for the effect of SEOs on the debt covenant hypothesis show that the use of RAM to avoid the possibility of interest coverage covenant violations decreases from the pre-issue period to the post-issue period for SEO firms relative to the corresponding change for benchmark firms. This implies that firms improve their financial situation using SEO proceeds and, in the process, become less susceptible to debt covenant violations following SEOs. The results also show that the decrease in the use of RAM in the post SEO period to avoid the likelihood of breaching interest coverage covenant is more pervasive among SEO firms with low market to book ratios or high financial leverage. Furthermore, using accruals management and classification shifting measures of earnings management I find that firms do not engage in these manipulation methods to avoid the possibility of interest coverage covenant violations and this behaviour does not change following SEOs.

The results for testing the revenue reclassification as an earnings management tool indicate that unexpected core revenues increase as other revenues decrease. This provides evidence that firms shift other revenues to core revenues, consistent with revenue reclassification. The results show that firms engage in such activities to a greater extent after mandatory IFRS adoption suggesting that the latter offers more latitude for these practices. This supports Zalata and Roberts (2015) who document that IFRS allows firms to have more managerial discretion on classification of non-recurring items.

I also analyze whether firms with strong incentives use revenue reclassification to a greater extent. Existing studies document firms that make SEOs, are in financial distress, make acquisitions financed by share for share exchange, and meet certain earnings benchmarks have high incentives to engage in earnings management. Marguardt and Wiedman (2004) find that firms that plan to make equity offerings inflate sales by employing

accruals management. A similar result is found by Cohen and Zarowin (2010) with regard to using real earnings management to overestimate sales in the year of the SEOs. Fan and Liu (2015) find that firms shift core expenses both from the cost of goods sold and selling, general and administrative expenses to income-decreasing special items for meeting/beating zero core earnings and prior period core earnings. As revenue reclassification is likely to inflate core revenues and core earnings, I expect that firms conducting SEOs, firms in financial distress, firms with acquisitions financed by share for share exchange, and firms reporting small core earnings or small increases in core earnings employ revenue reclassification to a greater degree. My results are consistent with this expectation, suggesting that revenue reclassification is more pervasive among firms with strong incentives.

1.5 Main contributions

This thesis makes several contributions to the earnings management literature. First, it implements a first test of the debt covenant hypothesis for the UK. The debt covenant hypothesis is typically tested using small or large US samples (DeFond and Jiambalvo 1994; Dich1ev and Skinner 2002; Franz et al. 2014). It also tests whether IFRS affects the need for using earnings management to remain within debt covenant limits. This contributes to the literature that examines the effect of accounting standards on the use debt covenants (Demerjian 2011; Ball, Li, and Shivakumar 2015).

Second, it investigates the effect of SEOs on the debt covenant hypothesis which to the best of my knowledge has not been examined in the literature. The latter analyses how firms use the funds raised through equity offerings (Kim and Weisbach 2008; Walker and Yost 2008). They document increases in investments such as R&D and capital expenditures following SEOs. This, however, does not suggest that firms improve their financial situation and, in the process, become less susceptible to debt covenant violations following SEOs.

Third, it extends the classification shifting literature by being the first to examine whether firms shift other revenues to core revenues. Existing studies have investigated whether firms reclassify core expenses (selling, general and administrative expenses (SGA) and/or cost of goods sold (COGS)) as income-decreasing special items (e.g. McVay 2006; Fan and Liu 2015) to increase core earnings. Forth, it investigates the effect of IFRS on the use of revenue shifting whereas existing studies have done similar examination for the other forms of earnings management. Finally, extant research has examined whether firms with strong incentives employ AM or RAM or expense reclassification to a greater extent. This thesis sheds new light on this issue by examining whether firms with strong incentives use revenue reclassification to a greater extent.

1.6 Outline of the thesis

This thesis proceeds as follows. Chapter 2 implements a first test of the debt covenant hypothesis for the UK. It examines whether firms close to default or in violation use more RAM and/or AM than firms far from violation and whether IFRS adoption affects such practices. Chapter 3 investigates the effect of SEOs on the debt covenant hypothesis. Specifically, it tests whether firms change their RAM and/or AM practices to avoid interest coverage covenant violations following SEOs. Chapter 4 examines revenue reclassification as an earnings management tool. In particular, it tests whether firms shift other revenues to core revenues and whether this behavior changes after IFRS adoption. It also analyses whether firms with strong incentives use revenue reclassification to a greater extent. Chapter 5 summarizes the thesis and suggests some avenues for future research.

Chapter 2

A First Test of the Debt Covenant Hypothesis for the UK

2.1 Introduction

The Watts and Zimmerman (1986) debt-covenant hypothesis predicts that firms manage earnings to avoid covenant violations and existing studies provide some support for this. Earlier studies mainly use the debt-equity ratio as a proxy for covenant tightness or they study firms that enter technical default as a result of covenant violation(s) to examine the debt covenant hypothesis (e.g., Ayres 1986; DeFond and Jiambalvo 1994; Sweeney 1994). The introduction of the Dealscan database in the late 1990s allowed researchers to use actual covenant slack to test the debt covenant hypothesis for large samples of mainly US firms including those that enter technical default (Dichev and Skinner 2002; Franz, HassabElnaby, and Lobo 2014). These studies tend to restrict their focus to US-based samples due to the large published covenant data where the latter is limited in other countries. However, there are a number of different institutional factors between the US and other countries, for example, IFRS rather than US GAAP and the law relating to corporate bankruptcy. These other factors might have the potential to influence corporate behavior and therefore there is a need for non US studies.

The first contribution of this paper is that it employs a relatively large sample of UK firms to undertake a first test of the debt covenant hypothesis. UK studies (Citron 1992; Moir and Sudarsanam 2007) do not directly test the debt covenant hypothesis but their evidence on covenants is consistent with US studies that find debt covenants are very common in loan contracts (Roberts and Sufi 2009; Demerjian 2011). UK studies do not test the debt covenant hypothesis because they are all based on small samples from surveys or interviews due to the lack of published covenant data. In contrast to the USA, UK-based firms are not obliged by company law to disclose such information.

This paper focuses on the UK because it provides an interesting context for a test of the debt covenant hypothesis for two reasons. On one hand, the large US-based commercial banks have played a leading role in debt finance there since the late 1970s. In particular, they were instrumental in the development of the financial statement lending technology for medium term loans with financial ratio accounting covenants. This has led to covenant convergence between the UK and USA.[1] On the other hand, the UK and USA have contrasting bankruptcy codes. The UK's debt-friendly bankruptcy code implies that firms have strong incentives to employ accruals management (hereafter AM) and/or real activities manipulation (hereafter RAM) to avoid covenant violations. Britain's insolvency law and its bankruptcy code means that adhering to debt covenants is more crucial for a firm's survival than in the equity-friendly US national jurisdiction.[2] Generally, default events vest great power in the hands of banks in the UK since they imply that control rights over the borrower are transferred to them. A covenant violation in the UK ultimately entitles the lending bank – and by extension all banks through cross-default clauses[3] – to place that firm directly into

[1] US commercial banks flooded into London from the late 1970s and early 1980s with the rise of the Eurodollar market. London was used as the base for lending to both UK and European firms.

[2] See Acharya, Sundaram, and John (2011) for more details of bankruptcy codes in the UK and USA.

[3] Cross-default clauses are now standard in virtually all loan agreements as they prevent the bank with the defaulting covenant to get first bite of the firm's assets to the detriment of other lenders. For instance, 95 percent of the Li, Lou, and Vasvari (2015) sample of over 9000 US loan agreements had a cross-default clause.

receivership and liquidate its assets. By contrast, banks in the USA cannot place firms directly into liquidation if the firms file for Chapter 11 bankruptcy protection. The latter gives them 120 days to recapitalize and potentially find a solution to their financial difficulties.[4] The fact that banks in the UK can directly liquidate firms' assets following covenant violations provides further motivation for firms to manage earnings to avoid violations. Moreover, this may be good form of earnings management in the sense of Demerjian, Lewis-Western, and McVay (2015); both managers and shareholders share a common interest in minimizing the probability of covenant violations and of their firm going into liquidation. The implication is that I would expect to find stronger support for the debt covenant hypothesis in the UK.

The paper's second contribution is that it develops a three-pronged approach aimed at estimating a proxy for debt covenant slack which can be used in those countries where there is a lack of published covenant data.[5] The first stage in this approach is to select a sample of firms that are likely to have covenant(s) and thus there is a possibility of the covenant thresholds being violated. The second stage is to choose the most commonly used covenants. These are the ones that are more likely to feature in a sample of firms with covenants. The third and most important stage is to estimate covenant slack proxies for the commonly used covenants as actual covenant values divided by judiciously chosen threshold values. The latter are carefully selected to match the covenant thresholds reported in the existing literature and then adjusted to reflect changes across industries and years. These covenant slack proxies have the additional merit of being a consistent measure since there is emerging evidence that, in many cases, loan covenant thresholds are informally changed a number of

[4] See Li et al. (2015) for a recent discussion of default events in US loan and bond agreements.

[5] Roychowdhury (2006) states that debt covenant data are not easily available even for a wide sample of US firms because Dealscan mainly covers the data for syndicated loans only. She, thus, uses a proxy, the existence of debt. Similarly, employing Dealscan, Franz et al. (2014) test the debt covenant hypothesis for the USA and concludes that the generalizability of their results may be limited as their sample is based on syndicated loans.

times over the life of loans.[6] The implication is that the covenant threshold information reported at the origination of loans *de facto* becomes proxy information unless updated when changed.

I use this three-pronged approach to overcome the lack of covenant data available for UK companies. In selecting a sample of firms that are likely to have covenant(s) and therefore there is a possibility of the covenant thresholds being violated, I use FTSE All Share Index UK listed firms with relatively small market capitalization, a minimum gearing ratio of 10 percent and no explicit covenant information. This is motivated by the fact that such firms tend to be subject to more and tighter covenants (Billett, King, and Mauer 2007; Franz et al. 2014). In my sample I employ interest coverage and debt to cash flow (debt to earnings before interest, taxes, depreciation and amortization (EBITDA)) as the most commonly used covenants[7] obtained from extant UK and US studies and the limited sample of Dealscan data for UK firms. Finally, to estimate covenant slack proxies for interest coverage and debt to EBITDA I determine their threshold values. To do this, I first identify the average threshold values found in the studies of Moir and Sudarsanam (2007) and Rhodes (2016) for interest coverage and debt to EBITDA and then adjust them for industry and year effects.[8]

I investigate UK firms' use of AM and RAM to avoid debt covenant violations using 2,087 observations covering 445 firms over the period 1999-2014. I partition the sample into three groups – firms that are in technical default, firms that are close to violating covenants, and firms that are far from violating covenants. The results indicate that firms close to

[6] See Denis and Wang (2014), Roberts (2015) and Li, Vasvara, and Moerman (2015) for details of such covenant changes in the USA.

[7] Since we do not have actual covenant data, we focus on just two of the most commonly used covenants that on average a firm with debt are likely to have. For example, Rhodes (2016) reports in her US-based sample that the two most common covenants are debt to EBITDA and interest coverage and on average her sample has 2.1 covenants. However, if the covenant data was available we would have liked to employ the actual number of covenants in force in line with Demerjian and Owens (2014).

[8] This is discussed in Section 3.1 and Appendix A.

violation or in technical default of their interest coverage (debt to EBITDA) covenants engage in higher levels of RAM rather than AM relative to firms far from violation. These findings strongly support the debt covenant hypothesis and suggest a switch from AM to RAM, consistent with those of Chan, Chen, Chen, and Yu (2015) and Kothari, Mizik, and Roychowdhury (2016) for the USA.

The extant research has shown that traditional covenants are still frequently used although there is some evidence that their use decreases after IFRS adoption (Ball, Li, and Shivakumar 2015). Interestingly, both UK and US studies report the increasing use of the debt to EBITDA covenant (Moir and Sudarsanam 2007; Demerjian 2011). These findings suggest that the need for using earnings management to avoid breaching interest coverage and debt to EBITDA covenants does not change for the former but increases for the latter after IFRS adoption. Consistent with this, my results show that mandatory IFRS adoption does not change the use of RAM for firms close to violation or in technical default of their interest coverage covenants. However, it increases the propensity for employing RAM for firm close to default of their debt to EBITDA covenants.

Finally, I find that my main findings are robust after controlling for endogeneity, financial distress, including a net worth covenant, and excluding the financial crisis period. However, the use of earnings management to remain within interest coverage or debt to EBITDA covenant limits is not significant in the UK Dealscan sample where firms disclose interest coverage or debt to EBITDA covenants. The latter result suggests that disclosing accounting information discourages earnings management, consistent with Jo and Kim (2007).

This study proceeds as follows. Section 2 develops the main predictions and Section 3 presents the research design. Section 4 describes the data, sample selection and summary statistics. Section 5 analyses the empirical results. Section 6 concludes.

2.2 Predictions

Prior studies analyze which accounting and other debt-based covenants are used in bank debt contracts in the UK but do not formally test the debt covenant hypothesis due to the small sample sizes used. Citron (1992) investigates the types of accounting-based covenants using 25 UK bank loan contracts and 13 contract templates. He finds that interest coverage, net worth and gearing are the most frequently used accounting-based covenants. Day and Taylor (1996) interview 44 major UK corporate treasurers and provide findings that are consistent with Citron (1992). Chatterjee (2006) investigates performance pricing in debt contracts using a sample from 64 firms. He documents that debt to EBITDA and interest cover are the dominant debt covenants in UK debt contracting but that the debt to EBITDA ratio is the leading trigger in changing the terms of the debt contract. Moir and Sudarsanam (2007) in a survey of private debt contracts based on 72 large non-financial UK companies report that debt to EBITDA and interest cover are the most frequently occurring debt covenants along with gearing and net worth. Overall, the literature affirms that accounting-based covenants are widely used in UK debt contracting and that the traditional interest coverage covenant has been supplemented by the debt to EBITDA covenant.

The debt covenant hypothesis is mainly tested using small or large US samples. Early studies are based on small samples because of the hand-collected nature of the covenant data. Sweeney (1994) examines whether firms change accounting choices before the violations of debt covenants. She uses a sample of 130 firms which violate debt covenants for the first time during the sample period. She finds that firms are more likely to use income-increasing discretionary accounting changes when they are approaching violations of debt covenants. DeFond and Jiambalvo (1994) test the debt-covenant hypothesis by using 94 firms which violate debt covenants during the sample period. They use both time-series and cross-sectional models to estimate abnormal accruals. Both their models show that abnormal

total and working capital accruals are significant and positive in the year prior to violation. In terms of the year of violation, they find positive working capital accruals only after controlling for management changes and auditor going concern qualifications.

Recent US studies employ large samples and find that firms manage earnings to avoid covenant violations. Dichev and Skinner (2002) were the first to provide support for the debt-covenant hypothesis using a large sample of US firms. Similarly, employing a sample of 1,009 firms over the 1992-2007 period, Franz et al. (2014) find that US firms close to violation or in technical default of their current ratio covenants manage earnings more via RAM and AM than firms that are far from violating their current ratio covenants .[9] They also find that, after the adoption of Sarbanes-Oxley Act (SOX), the use of RAM increases while AM decreases. I expect that UK firms engage in AM and/or RAM because the incentives for avoiding debt covenant violations also exist in the UK. Furthermore, since the UK has a debt-friendly bankruptcy code I would suggest that there are greater incentives for UK firms to avoid infringing debt covenants. Therefore, I predict that UK firms close to violation or in technical default of their debt covenants have incentives to manage earnings.

The above suggests the following prediction:

P1A: Firms close to violation or in technical default of their interest coverage covenants use more RAM and/or AM than firms far from violating their interest coverage covenants.

P1B: Firms close to violation or in technical default of their debt to EBITDA covenants use more RAM and/or AM than firms far from violating their debt to EBITDA covenants.

[9] Kim, Lisic, and Pevzner (2011) find that US firms also employ RAM for avoiding net worth covenant violations. Furthermore, Demerjian (2009) finds that US firms manage depreciation and goodwill to avoid debt covenant violations.

The introduction of new accounting standards affects the use of accounting-based debt covenants. Ball et al. (2015) find that mandatory adoption of IFRS reduces both income-based and balance sheet-based covenants as the latter provides less efficient thresholds for debt contracting. Demerjian (2011) documents that only the use of balance-sheet based debt covenants decreases after the introduction of new accounting standards in the USA. He shows that the frequency of income-based covenants remains stable while that of debt to EBITDA increases. This is consistent with Dichev and Skinner (2002) and Chava and Roberts (2008) who indicate that debt to EBITDA is the most commonly employed covenant in the USA. Similarly, Moir and Sudarsanam (2007) report the increasing use of such cash flow-based covenant in the UK. Taylor (2013) reviews the debt covenant literature and reaches the conclusion that, although traditional accounting covenants are still commonly used, the use of new cash flow-based covenants such as debt to EBITDA is increasing. The existing – albeit limited – UK evidence suggest that the interest coverage covenant is frequently employed both in the pre- and post-IFRS periods whereas debt to EBITDA is used mainly in the post-IFRS period. Thus, I expect that the incentives for using AM and/or RAM to avoid interest coverage covenant violations remain while those associated with potential breaches of debt to EBITDA thresholds might actually increase after IFRS adoption.[10] This yields the following predictions:

P2A: Firms close to violation or in technical default of their interest coverage covenants do not alter the propensity for using RAM and/or AM after IFRS adoption.

[10] One could also argue that these practices are due to the tighter accounting standards following IFRS adoption. Barth, Landsman, and Lang (2008) find that IFRS reduces the use of AM. By contrast, existing studies show that the introduction of tighter and more rigid accounting standards increases RAM since it is not related to misleading disclosures and observable manipulations (e.g., Zang 2012). This implies that RAM can be used for avoiding both interest coverage and debt to EBITDA covenant violations to a greater extent after IFRS adoption. Thus, the effect of IFRS adoption on the use of accounting-based debt covenants is probably the main reason why firms change their earnings management practices in my analysis.

P2B: Firms close to violation or in technical default of their debt to EBITDA covenants increase the propensity for using RAM and/or AM after IFRS adoption.

2.3 Research design

2.3.1 Debt covenants

Disclosure requirements for private bank debt are far less demanding in the UK than in the USA. UK-based firms are required only to disclose the class, amount, active date and maturity date of the debt whereas in the USA they are required to disclose fully detailed information about covenants and performance pricing (Chatterjee 2006). The Dealscan database provides covenant data only on 523 loans for 176 UK firms during my sample period. The summary of covenant restrictions for these loans is shown in Table 2.1. Nearly 98 percent of these loans contain at least one accounting-based debt covenant which is consistent with US studies (e.g. Roberts and Sufi 2009). Table 2.1 indicates that interest coverage and debt to EBITDA are the most frequently occurring covenants, in line with the relevant UK studies (Chatterjee 2006; Moir and Sudarsanam 2007). Similar results are reported by large sample-based studies which cover US firms (Roberts and Sufi 2009; Rhodes 2016). Since there is covenant convergence between the UK and USA (Taylor 2013) I conclude that interest coverage and debt to EBITDA are likely to be the most frequently employed covenants in UK debt contracting. Thus, these two covenants are used in the main analysis.[11]

[Insert Table 2.1 about here]

[11] We also use a net worth covenant in a robustness check.

Debt covenant slack proxies are carefully constructed for interest coverage and debt to EBITDA to investigate their association with earnings management measures. The covenant slack proxies are estimated in the spirit of Demerjian and Owens (2014) as follows:

$$Proxy_{i,t} = \frac{Actual_{i,t}}{Threshold_{i,t}} \quad (1)$$

where $Actual_{i,t}$ is actual value of a particular debt covenant for firm *i* in year *t*; $Threshold_{i,t}$ is the corresponding threshold value of that debt covenant. The actual values of the debt covenants are calculated using the standard covenant definitions specified by Demerjian and Owens (2014). Interest coverage is EBITDA divided by interest expense; debt to EBITDA is the sum of, long term debt and debt in current liabilities (short-term debt) divided by EBITDA. To determine threshold values for interest coverage, I first identify what is the average threshold value for the interest coverage covenant reported in the literature.[12] I then adjust this average threshold value to obtain interest coverage threshold values for each industry-year group of companies. Industry effects are considered because they can impact debt contracts via their effects on firm-level fundamentals and probability of default related risk premiums (MacKay and Phillips 2005). I also consider year effects to control for economic factors. The same procedure is carried out to determine the threshold values for debt to EBITDA. Details of the calculation of the threshold values are provided in Appendix A.

Debt covenants can have minimum or maximum threshold values. For example, interest coverage has minimum threshold values while debt to EBITDA has maximum threshold values. Based on (1) above, a debt covenant slack proxy of less than one implies violation for minimum threshold covenants and a proxy exceeding one indicates violation for maximum threshold covenants.

[12] Gamba and Triantis (2014) use a similar approach.

2.3.2 Accruals management

I employ working capital discretionary accruals (*A_WCA*) to test for accruals management (AM). I use modified Jones (1991) model to estimate AM by taking into account firm growth and operating performance similar to Collins, Pungaliya, and Vijh (2014). Kothari, Leone, and Wasley (2005) indicate that extreme operating performance should be controlled for to avoid inaccurate estimation of abnormal accruals. Thus, following Collins et al. (2014), I run the following regression to estimate normal working capital accruals:

$$\frac{WCA_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{\Delta CR_{i,t}}{AT_{i,t-1}} + \sum_k \beta_{3,k}\, ROA\_DUM_{k,i,t-1} + \sum_k \beta_{4,k}\, SG\_DUM_{k,i,t-1 \text{ to } t} + \sum_k \beta_{5,k}\, MV\_DUM_{k,i,t-1} + \sum_k \beta_{6,k}\, MB\_DUM_{k,i,t-1} + \sum_k \beta_{7,k}\, EP\_DUM_{k,i,t-1} + e_{i,t} \quad (2)$$

where $WCA_{i,t}$ is working capital accruals for firm *i* in year *t*, calculated as the change in total current assets minus the change in cash minus the change in current liabilities minus the change in the current portion of long term debt; $AT_{i,t-1}$ is total assets for firm *i* in year *t*-1; $\Delta CR_{i,t}$ is the change in sales for firm *i* from year *t*-1 to year *t* minus the change in accounts receivable for firm *i* from year *t*-1 to year *t*; *k* takes the values of 1, 2, 4, and 5; $ROA\_DUM_{k,i,t-1}$ is quintile dummies for the return on assets, defined as earnings before extraordinary items and discontinued operations scaled by lagged total assets. $SG\_DUM_{k,i,t-1 \text{ to } t}$ is quintile dummies for the sales growth, defined as the change in sales from year *t*-1 to *t* divided by sales during year *t*-1. $MV\_DUM_{k,i,t-1}$ is quintile dummies for the market value of equity as of last year *t*-1; $MB\_DUM_{k,i,t-1}$ is quintile dummies for the market to book equity as of year *t*-1; $EP\_DUM_{k,i,t-1}$ is quintile dummies for earnings to price, calculated as net income for year *t*-1 divided by ending stock price as of year *t*-1; Each quintile dummy takes the value of 1 if the corresponding firm characteristic belongs to that *k*'th quintile, and zero otherwise. Regression (2) is estimated cross-sectionally within

industry-years and normal working capital accruals are estimated using the estimated coefficients from regression (2). The difference between actual and normal working capital accruals gives working capital discretionary accruals (*A_WCA*).

2.3.3 Real activities manipulation

Roychowdhury (2006) defines RAM as departures from normal operating practices, motivated my managers' desire to mislead at least some stakeholders into believing certain financial reporting goals have been met in the normal course of operations. Certain RAM methods, such as reduction of R&D and price discounts, are possibly optimal actions in certain economic circumstances. If managers, however, engage in these activities more extensively than is normal given their economic circumstances they are engaging in RAM. Roychowdhury (2006) develops models to derive normal levels of operating activities to detect RAM. I employ three individual proxies: abnormal levels of production costs (*A_PROD*), abnormal levels of discretionary expenses (*A_DISX*) and abnormal levels of cash flows from operations (*A_CFO*) to determine firms' RAM following Roychowdhury (2006). *A_PROD*, *A_DISX* and *A_CFO* are the residuals from the following regressions, respectively:

$$\frac{PROD_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{S_{i,t}}{AT_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t}}{AT_{i,t-1}} + \beta_4 \frac{\Delta S_{i,t-1}}{AT_{i,t-1}} + e_{i,t} \quad (3)$$

$$\frac{DISX_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{S_{i,t-1}}{AT_{i,t-1}} + e_{i,t} \quad (4)$$

$$\frac{CFO_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{S_{i,t}}{AT_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t}}{AT_{i,t-1}} + e_{i,t} \quad (5)$$

where $PROD_{i,t}$ is production costs for firm *i* in year *t*, defined as cost of sales plus change in inventory; $S_{i,t}$ is sales for firm *i* in year *t*; $DISX_{i,t}$ is discretionary expenses for firm *i* in year *t*, defined as SG&A (selling, general and administrative) expenses plus R&D expenses; $CFO_{i,t}$

is cash flows from operations for firm *i* in year *t.* Regressions (3), (4) and (5) are estimated cross-sectionally for each industry-year.

Given sales levels, firms with abnormally high production costs, abnormally low discretionary expenses, or with abnormally low cash flows from operations are regarded as engaging in RAM. Similar to existing studies, I multiply abnormal discretionary expenses and abnormal cash flows from operations by minus one for ease of interpretation of the RAM proxies. I also calculate an aggregated measure of RAM (*A_RAM*) by combining the three individual proxies to measure the total effect of RAM (Franz et al. 2014).[13] Therefore, a positive value of any RAM proxy or its aggregated measure is considered as real earnings manipulation.

2.3.4 Regression model

The following OLS regression model is run to test whether firms close to violation or in technical default of their interest coverage (debt to EBITDA) covenants use more RAM and/or AM than firms far from violating their interest coverage (debt to EBITDA) covenants (P1A and P1B)[14]:

$$EM_{i,t} = \alpha_0 + \alpha_1 CLOSE\_IC_{i,t-1} + \alpha_2 DEFAULT\_IC_{i,t-1} + \alpha_3 CLOSE\_DTE_{i,t-1} + \alpha_4 DEFAULT\_DTE_{i,t-1} + \alpha_5 MTB_{i,t} + \alpha_6 LEV_{i,t} + \alpha_7 MV_{i,t-1} + \alpha_8 ROA_{i,t} + \alpha_9 NOA_{i,t-1} + \alpha_{10} A\_WCA_{i,t} \ (or\ A\_RAM_{i,t}) + \varepsilon_{i,t} \quad (6)$$

where $EM_{i,t}$ is earnings management proxy for firm *i* in year *t* that refers to one of the five earnings management measures: abnormal production costs ($A\_PROD_{i,t}$), abnormal discretionary expenses ($A\_DISX_{i,t}$), abnormal cash flows from operations ($A\_CFO_{i,t}$), aggregated measure of RAM ($A\_RAM_{i,t}$), and working capital discretionary accruals

[13] I also use two different aggregate measures of RAM by summing 1) the abnormal production costs and abnormal discretionary expenses and 2) the abnormal discretionary expenses and abnormal cash flows from operations following Chan et al. (2015). I find similar results shown in Table 2.14.

[14] My results are very similar if I add industry fixed effects to my regression model (see Table 2.15).

($A\_WCA_{i,t}$); $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise. $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise. $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise. $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise. The variables $A\_DISX_{i,t}$ and $A\_CFO_{i,t}$ are multiplied by -1 to simplify the interpretation of my earnings management proxies, and I expect α_1, α_2, α_3, and α_4 to be positive in model (6).

I add $MTB_{i,t}$, $LEV_{i,t}$, $MV_{i,t-1}$, $ROA_{i,t}$, $NOA_{i,t-1}$ and $A\_RAM_{i,t}$ ($A\_WCA_{i,t}$) as control variables to my linear regression model (2) following the earnings management literature. $MTB_{i,t}$ is the market to book ratio for firm *i* in year *t*, defined as the market value of equity divided by the book value of equity. This variable is included to control for growth opportunities. $LEV_{i,t}$ is leverage ratio, defined as the sum of long term debt and debt in current liabilities divided by lagged total assets. This is included as a control for capital structure. $MV_{i,t-1}$ is the natural logarithm of the market value of equity and is added to control for firm size. $ROA_{i,t}$ is income before extraordinary items scaled by lagged total assets and is included to control for firm performance. $NOA_{i,t-1}$ is net operating assets, defined as common equity minus cash and short-term investment plus total debt divided by lagged total assets. The latter is added to control for the use of earnings management proxies. I include $A\_RAM_{i,t}$ ($A\_WCA_{i,t}$) to control for substitution mechanisms in earnings management proxies.

I extend model (6) by adding a dummy variable, IFRS, that is equal to 1 for observations after 2005 and 0 otherwise, and its interactions with $CLOSE\_IC_{i,t-1}$, $DEFAULT\_IC_{i,t-1}$, $CLOSE\_DTE_{i,t-1}$, and $DEFAULT\_DTE_{i,t-1}$. The estimated value of these coefficients is used to examine whether firms close to violation or in technical default of

their interest coverage (debt to EBITDA) covenants alter the propensity for using RAM and/or AM after IFRS adoption (P2A and P2B). Accordingly, the regression is:

$$EM_{i,t} = \alpha_0 + \alpha_1 CLOSE\_IC_{i,t-1} + \alpha_2 DEFAULT\_IC_{i,t-1} + \alpha_3 CLOSE\_DTE_{i,t-1} + \alpha_4 DEFAULT\_DTE_{i,t-1} + \alpha_5 IFRS_{i,t} + \alpha_6 IFRS_{i,t} \times CLOSE\_IC_{i,t-1} + \alpha_7 IFRS_{i,t} \times DEFAULT\_IC_{i,t-1} + \alpha_8 IFRS_{i,t} \times CLOSE\_DTE_{i,t-1} + \alpha_9 IFRS_{i,t} \times DEFAULT\_DTE_{i,t-1} + \alpha_{10} MTB_{i,t} + \alpha_{11} LEV_{i,t} + \alpha_{12} MV_{i,t-1} + \alpha_{13} ROA_{i,t} + \alpha_{14} NOA_{i,t-1} + \alpha_{15} A\_WCA_{i,t} \ (or\ A\_RAM_{i,t}) + \varepsilon_{i,t} \quad (7)$$

I expect $\alpha_6$and α_7 not to be significant while $\alpha_8$and α_9 to be significantly positive in model (7).

I determine whether there is cross sectional or time series dependence to avoid biased standard errors in my panel model following the Petersen (2009) methodology. This indicates that there is cross sectional dependence since the White standard errors are not the same as the standard errors clustered by year whereas they are the same as the standard errors clustered by firms. Accordingly, standard errors clustered by year are used to mitigate this problem.

2.4. Data, sample selection, and summary statistics

2.4.1 Data and sample selection

Accounting and financial data are collected from Compustat Global for UK listed firms that belong to the FTSE All Share Index for the period between 1998 and 2014.[15] Following existing studies, I exclude financial and utility firms because of their different financial reporting environment and highly predictable earnings, respectively. The estimation of the

[15] Dead firms that used to belong to FTSE All Share Index are also included across the test period to avoid survivorship bias.

production costs proxy of RAM requires two years of lagged data under the same accounting standards. As a result, I lose the data for 1998 and I also exclude 2005 since it is a transitional period for IFRS.

Researchers have found that firms with high gearing (Billett et al. 2007) and smaller size (Bradley and Roberts, 2004) have more and tighter debt covenants. Demerjian (2010) documents that the number of covenants decreases with firm size and increases with leverage level. Similarly, Day and Taylor (1995) found that borrower financial status, high gearing and firm size are the main determinants of the number and tightness of covenants in UK debt contracting.[16] Since there is a lack of explicit covenant data in the UK, I tailor my sample to include those firms that are likely to be constrained by more and tighter debt covenants. In other words, I select a sample of firms that has a higher propensity to violate covenant thresholds in contrast with Dealscan samples. The latter cover those UK firms that disclose covenant information, suggesting that they are far from violating covenants. Therefore, I exclude from my sample: 1) large firms that are in the highest quintile by lagged market value 2) low gearing firms that have a gearing ratio of less 10 percent[17,18] and 3) Dealscan firms. [19]

I require at least 6 observations per industry-year to ensure that I have sufficient data for the estimation of earnings management measures. The Global Industry Classification Scheme (GICS) industry classification is applied because it gives more accurate empirical results (Bhojraj, Lee, and Oler 2003). All variables are winsorised at the 1 percent and 99

[16] Moir and Sudarsanam (2007) also provide evidence that accounting-based debt covenants are less frequently used in debt contracts for large UK firms.

[17] After excluding firms with a lower than 10 percent gearing ratio, the mean and median of the latter becomes around 30 percent for the final sample which is consistent with previous studies examining debt covenants (e.g., Ball et al. 2015). I also analyze a further sample of firms with a higher than 15 percent gearing ratio and find qualitatively similar results.

[18] When we exclude firms with low gearing, I also lose most of the observations with high Z scores (Taffler (1983) Z score). This indicates that firms in my sample do not have negligible default risk and so they are more susceptible to violating debt covenant thresholds (Demiroglu and James 2010).

[19] As a result, I lose 70 large firms, 154 low gearing firms and 34 Dealscan firms. The main results remain qualitatively the same if I do not exclude Dealscan firms.

percent levels to eliminate the impact of outliers.[20] Consequently, the final sample consists of 444 firms and 2,083 observations.

2.4.2 Summary statistics

Table 2.2, Panel A and B show the descriptive statistics of the main variables for the three subsamples (firms close to violation (close), firms in technical default (default), and firms far from violation (far)) based on interest coverage and debt to EBITDA covenants, respectively.

[Table 2.2 around here]

Firms in the default subsample are significantly smaller, more leveraged and have lower market to book ratio and returns on assets than firms in the far subsample as shown by the descriptive statistics for the firm characteristic variables in Panel A. I also find similar results for firms in the close subsample relative to firms in the far subsample. Therefore, not surprisingly, the median and mean values of RAM measures (aggregated measure of real activities manipulation *(A_RAM)*, abnormal production costs *(A_PROD)*, abnormal discretionary expenses *(A_DISX)* and abnormal cash flows from operations *(A_CFO)*) are higher for firms in the close and default subsamples compared to firms in the far subsample. These imply that firms close to violation or in technical default use more RAM than firms far form violation. However, the medians and means of working capital discretionary accruals (*A_WCA*) is 0 for all subsamples, suggesting that the use of AM is limited. Panel A further shows that close and default subsamples have more or less the same firm characteristics. The main significant difference between these subsamples is that firms in the close subsample use more RAM and have higher returns on assets. I also find nearly similar differences

[20] This is more efficient in dealing with outliers than winsorising by year at the same percentage levels since the former gives lower levels of skewness, kurtosis and standard deviation.

among close, default, and far subsamples based on debt to EBITDA covenant. Overall, the results suggest that firms close to violation or in technical default have poorer financial health than firms far from violation, in line with Franz et al. (2014).[21]

2.5 Empirical results

2.5.1 The debt covenant hypothesis

Table 2.3, columns (1) to (4) present the RAM regression results for testing the debt covenant hypothesis and AM regression results are in column (5).

[Table 2.3 around here]

Column (1) indicates statistically significantly positive associations between aggregate RAM (*A_RAM*) and *CLOSE_IC* and *DEFAULT_IC* at the 1 percent and 5 percent levels, respectively. The coefficients are also economically significant. This implies that firms close to violation or in technical default of their interest coverage covenants use more RAM than firms far from violation of their interest coverage covenants. I also find similar results for the debt to EBITDA covenant as the coefficients on *CLOSE_DTE* and *DEFAULT_DTE* are significantly positive in column (1). Turning to the individual RAM measures, column (2) shows a significant relationship between abnormal production costs (*A_PROD*) and the dummy variable *CLOSE_IC*. This suggests that firms close to violation of their interest coverage covenants increase abnormal production more relative to firms far from violation of their interest coverage covenants. Furthermore, I find that firms close to default or in violation reduce discretionary expenses and lower abnormal cash flows more compared to firms far from violation as indicated by the significant coefficients on *CLOSE_IC*, *CLOSE_DTE* and *DEFAULT_DTE* in columns (3) and (4). These results are consistent with

[21] I also check whether my covenant measure can capture imputed slack without too much noise by comparing my covenant slack proxy for dead firms with the one for live firms. I find that dead firms in my sample have tighter covenant slack than live firms as they have significantly smaller covenant medians (means).

the debt covenant hypothesis (Dichev and Skinner 2002; Franz et al. 2014) and indicate that firms close to violation or in technical default engage in RAM to avoid covenant violations.

Column (5) shows a significant relationship between working capital discretionary accruals (*A_WCA*) and *DEFAULT_DTE*. This indicates that firms in technical default of their debt to EBITDA covenants employ more AM than firms far from violation of their debt to EBITDA covenants. I, however, do not find such evidence for firms close to violation of their debt to EBITDA covenants or for firms in violation or close to default of their interest coverage covenants. This is probably due to the costly nature of AM under UK GAAP (Peasnell, Pope, and Young 2000; Osma and Young 2009) and after IFRS adoption (Leuz, Nanda, and Wysocki 2003; Barth et al. 2008). My results are consistent with the findings that the introduction of tighter and more rigid accounting standards makes RAM an appealing proxy for earnings management (Cohen et al. 2008; Zang 2012).

Overall, the findings suggest that UK firms close to violation or in technical default of their interest coverage (debt to EBITDA) covenants employ RAM and AM more but mainly the former than firms far from violation of their interest coverage (debt to EBITDA) covenants.[22] Hence, P1A and P1B are supported.

2.5.2 IFRS adoption and the debt covenant hypothesis

Table 2.4, column (1) presents the RAM regression results for testing the effect of IFRS adoption on the debt covenant hypothesis while the AM regression results are in column (2).

[Table 2.4 around here]

[22] I also analyze the total use of earnings management for avoiding covenant violations by summing the working capital discretionary accruals and the aggregated measure of RAM. The results show that firms close to violation or in technical default use more total earnings management than firms far from violation (see Table 2.16).

Column (1) shows that *CLOSE_IC* and *DEFAULT_IC* are significant at the 1 percent levels, showing that firms close to violation or in technical default of their interest coverage covenants use more RAM than firms far from violation of their interest coverage covenants in the pre-IFRS period. Similar results are found for the debt to EBITDA covenant in the pre-IFRS period. As can be seen in column (1), the coefficients on *IFRS*CLOSE_DTE* and *IFRS*DEFAULT_DTE* are positive though only the coefficient on the former is significant. The implication is that the use of RAM particularly for firms close to default of their debt to EBITDA covenants increases following IFRS adoption. This confirms the enhanced importance of this cash flow-based debt covenant in the UK, consistent with Chatterjee (2006) and Moir and Sudarsanam (2007). Column (1) further shows that the coefficients on *IFRS*CLOSE_IC* and *IFRS*DEFAULT_IC* are negative and insignificant. This implies that IFRS adoption does not alter the use of RAM for firms close to default or in violation of their interest coverage covenants. This is possibly due to the more or less stable use of the interest coverage covenant in UK debt contracting both in the pre- and post-IFRS periods. Finally, the results in column (2) indicate no significant association between *A_WCA* and the interaction variables. This indicates that IFRS adoption does not change the use of AM for firms close to violation or in technical default of their interest coverage (debt to EBITDA) covenants.

To summarize, my results indicate some evidence that mandatory IFRS adoption increases the use of RAM for firms close to default of their debt to EBITDA covenants while it leaves unchanged the use of these activities for firms close to violation or in technical default of their interest coverage covenants.[23] Thus, P2A and P2B are supported.

[23] I also find that mandatory IFRS adoption increases the use of total earnings management for firms close to default or in violation of their debt to EBITDA covenants while it leaves unchanged the use of these activities for firms close to violation or in technical default of their interest coverage covenants (see Table 2.17).

2.6 Sensitivity tests

2.6.1 Alternative research design

In the main analysis, I use indicator variables for the interest coverage and debt to EBITDA covenants to test the debt covenant hypothesis. I further check whether the main results are robust using an alternative research design. To do so, I regress RAM and AM on the interest coverage covenant slack proxy (*IC_PROXY)* and the debt to EBITDA covenant slack proxy (*DTE_PROXY*) along with the control variables used in the main analysis. The results are presented in Table 2.5.

[Table 2.5 around here]

Column (1) indicates statistically significantly negative and positive associations at the 1% level between aggregate RAM (*A_RAM*) and the *IC_PROXY* and *DTE_PROXY*. This implies that firms use RAM to avoid interest coverage and debt to EBITDA covenant violations. I also find that firms employ AM only to avoid interest coverage covenant violations. Overall, the results show that the main findings are robust to an alternative research design.

2.6.2 Financial distress

Firms that are in financial distress have strong incentives to engage in earnings management (Butler, Leone, and Willenborg 2004). In my sample, 557 observations out of 2,087 have a negative Z score (Taffler model), indicating that they are close to financial distress. However, on average, the firms in my sample have a positive Z score as the mean lagged Z score is 2.72. In order to ensure that the main results are due to managing earnings to avoid covenant violations and not to firms suffering financial distress, I add a control

variable, lagged Z score to the main regression and re-estimate it. Table 2.6 shows that the findings are similar to the main results.

[Table 2.6 around here]

2.6.3 Debt covenants including net worth

I used the most popular traditional covenant (interest coverage) and one new widely used cash flow-based covenant (debt to EBITDA) in the main analysis. Demiroglu and James (2010) report that the average loan in their sample has three accounting-based covenants. Thus, a net worth based covenant is added to the main regression to check that my results are not driven by excluded accounting covenants. Extant studies and the limited covenant information on UK firms available in Dealscan show that this covenant is one of the frequently used traditional covenants. The 37th percentile of the net worth covenant is specified as the threshold value for this covenant following Nini et al. (2012) who report that the median net worth of the violators puts them at the 37th percentile of the overall sample. Table 2.7 indicates that the inclusion of the net worth covenant does not alter the main conclusion of the main findings.

[Table 2.7 around here]

2.6.4 Financial crisis period

Existing studies provide inconclusive results on the use of earnings management during the financial crisis period (e.g., Cohen and Zarowin, 2007). Moreover, debt contract designs during this time might have different features (Demerjian 2011). As my sample spans the recent financial crisis period (2008-2010), the primary results might not be based on a homogenous sample. Thus, I exclude the crisis period from the sample and re-run the main

analysis. Table 2.8 shows that firms close to violation or in technical default manage earnings more than firms far from violation, consistent with the primary findings.

[Table 2.8 around here]

2.6.5 Dealscan sample

My main analysis overcomes the lack of published UK covenant data by selecting a sample of firms that have a high propensity to violate covenant thresholds to test the debt covenant hypothesis. I now report the results from testing this hypothesis using the UK Dealscan sample of large firms.[24] An increase in accounting disclosures improves transparency and decreases the use of earnings management (Jo and Kim 2007). Therefore, I hypothesize that firms disclosing covenant information are less likely to manage earnings to avoid covenant violations. This additional analysis uses the Dealscan interest coverage or debt to EBITDA covenant data. After matching these loans to financial data, the interest coverage sample contains 44 firms and 150 loan-years while the debt to EBITDA sample has 18 firms and 67 loan-years.[25] I regress RAM and AM on the interest coverage (debt to EBITDA) covenant slack along with the control variables used in the main analysis. The results are presented in Table 2.9

[Table 2.9 around here]

The table shows that firms disclosing their interest coverage covenant or debt to EBITDA covenant do not employ RAM or AM to avoid covenant violations. This is perhaps because disclosing accounting information discourages earnings management or large and financially sound firms have a low propensity to violate their covenant thresholds.

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[24] For instance, the mean market capitalisation of £393.8m for my main sample is dwarfed by that of £5,518.7m for the Dealscan sample with interest coverage data.

[25] I lose a large number of these loans due to the lack of either financial data or threshold values.

2.6.6 Checking the sensitivity of debt covenant slack proxies

In the main analysis, the 20th percentile of interest coverage and the 80th percentile of debt to EBITDA are used to estimate interest coverage and debt to EBITDA covenant slack proxies. In order to check sensitivity of the main results, I first employ the 15th percentile of the interest coverage and the 85th percentile of the debt to EBITDA and then the 25th percentile of the interest coverage and the 75th percentile of the debt to EBITDA to estimate covenant slack proxies and re-run the main regressions. The results are presented in Table 2.10 and 2.11, respectively. Overall, they indicate that these sensitivity tests yield qualitatively similar findings.

[Table 2.10 around here]

[Table 2.11 around here]

2.6.7 Alternative measure for accruals management

Collins et al. (2014) recommend adding multiple factor quintile dummies to (modified) Jones (1991) model to measure AM. In the main analysis, I use quintile dummies for performance, growth, size, market to book, and earnings to price firm characteristics. I further check the robustness of my main results by adding only performance and growth firm characteristics to modified Jones (1991) model. The results are shown in Table 2.12. Overall, they indicate that this sensitivity test yields qualitatively similar findings.

[Table 2.12 around here]

2.6.8 Alternative measures for real activities manipulation

Fan and Liu (2015) find that firms can also manage selling, general and administrative and production expenses by shifting them to income-decreasing special items. This suggests

the importance of controlling for expense misclassification when firms' RAM are examined. To do so, I include income-decreasing special items in Roychowdhury's (2006) abnormal production costs (*A_PROD*) and discretionary expenses (*A_DISX*) models and re-estimate the main regressions. The results are similar to the main findings as shown in Table 2.13.

[Table 2.13 around here]

2.7 Conclusions

This study is the first to test the debt covenant hypothesis for a relatively large sample of UK FTSE All Share Index firms over the period 1999-2014. It investigates whether firms close to violation or in technical default of their interest coverage (debt to EBITDA) covenants engage in higher levels of accruals management and/or real activities manipulation relative to firms far from violation and whether IFRS adoption affects such practices. The findings indicate that firms close to violation or in technical default of interest coverage (debt to EBITDA) covenants use more real activities manipulation than firms far from violation. They show that mandatory IFRS adoption does not change the use of RAM for firms close to violation or in technical default of their interest coverage covenants. However, it increases the propensity for employing real activities manipulation for firm close to default of their debt to EBITDA covenants. The main results hold after controlling for the potential endogeneity of debt covenants. To sum up, the findings support the debt covenant hypothesis for the interest coverage covenant over the full sample and for debt to EBITDA, especially after mandatory IFRS adoption.

Appendix A

For the firms in my sample I calculate their actual year-end values for the two ratios interest coverage and debt to EBITDA. This gives us a sample of 2,083 observations for each ratio. I then list the ratios in rank order from lowest to highest obtaining a 2,083 X 1 column matrix. The next step is to identify what is the most likely covenant value for each of the two ratios. This is obtained by looking at the values reported in previous debt covenant survey papers in the UK. For example, Moir and Sudarsanam (2007) report that the interest coverage covenant generally has a threshold value of around 3 (between 2.5 and 4) and that of the debt to EBITDA covenant ranges between 2.5 and 4.5. These are consistent with the relevant Dealscan samples for UK firms and the large sample-based US study Rhodes (2016). I then identify the value in my matrix for interest coverage (debt to EBITDA) which is close to the relevant above average threshold value. This turned out to be at the 20^{th} (80^{th}) percentile. Table 2.18 shows the percentiles of the interest coverage and debt to EBITDA ratios in my sample.

I then list the actual interest coverage (debt to EBITDA) ratios for each firm by industry and year. For each industry-year group I identify the 20^{th} (80^{th}) percentile interest coverage (debt to EBITDA) figure. So for a particular industry/year group that might be an interest coverage (debt to EBITDA) ratio of say 2.5. This becomes my interest coverage (debt to EBITDA) threshold value for that industry/year group. After this I divide the actual interest coverage (debt to EBITDA) values for each firm in that industry/year group by the interest coverage (debt to EBITDA) threshold value (in my example the 2.5) and the resultant values I term my slack for interest coverage (debt to EBITDA). For example, if a firm has an actual interest coverage ratio in that industry/year group of say 10 then the slack will be 4 (10/2.5) whereas if its value was exactly 2.5 the slack would be 1(2.5/2.5).

Table 2.1

Summary of covenant restrictions

Covenant	Number of loans	Number of firms
Interest Coverage	287	98
Debt to EBITDA	141	47
(Tangible) Net Worth	69	36
Leverage Ratio	37	13
Fixed Charge Coverage	33	10
Senior Debt to EBITDA	23	7
Debt Service Coverage	21	8
Debt to Equity	18	11
EBITDA	17	7
Loan to Value	14	10
Cash Interest Coverage	11	3
Non-financial covenants	154	42

Source: Dealscan 1999-2014.

Table 2.2

Summary statistics

Panel A: Descriptive statistics based on interest coverage covenants

	$A\_RAM_{i,t}$	$A\_PROD_{i,t}$	$A\_CFO_{i,t}$	$A\_DISX_{i,t}$	$A\_WCA_{i,t}$	$MTB_{i,t}$	$LEV_{i,t}$	$MV_{i,t-1}$	$ROA_{i,t}$	$NOA_{i,t-1}$
Default subsample (1) (n=418)										
Mean	0.077	0.039	0.028	0.010	0.000	1.848	0.359	5.013	-0.056	0.649
Median	0.085	0.045	0.031	0.018	0.000	1.234	0.316	5.063	-0.011	0.611
Close subsample (2) (n=215)										
Mean	0.125	0.089	0.018	0.018	0.000	1.794	0.335	5.188	0.004	0.619
Median	0.117	0.052	0.017	0.031	0.000	1.272	0.294	5.164	0.028	0.605
diff. in mean (1)-(2)	*	**	*						***	
diff. in median (1)-(2)	*		***						***	
Far subsample (3) (n=1,450)										
Mean	-0.039	-0.023	-0.011	-0.005	0.000	2.516	0.280	5.432	0.049	0.644
Median	-0.010	0.000	-0.006	0.009	0.000	1.819	0.252	5.478	0.051	0.625
diff. in mean (1)-(3)	***	***	***	*		***	***	***	***	
diff. in median (1)-(3)	***	***	***			***	***	***	***	
diff. in mean (2)-(3)	***	***	***	**		**	***	***	***	
diff. in median (2)-(3)	***	***	***	**		***	***	***	***	

Notes

$A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_PROD_{i,t}$ is abnormal production costs, $A\_DISX_{i,t}$ is abnormal discretionary expenses, $A\_CFO_{i,t}$ is abnormal cash flows from operations $A\_WCA_{i,t}$ is working capital discretionary accruals, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10%

Panel B: Descriptive statistics based on debt to EBITDA covenants

	$A\_RAM_{i,t}$	$A\_PROD_{i,t}$	$A\_CFO_{i,t}$	$A\_DISX_{i,t}$	$A\_WCA_{i,t}$	$MTB_{i,t}$	$LEV_{i,t}$	$MV_{i,t-1}$	$ROA_{i,t}$	$NOA_{i,t-1}$
Default subsample (1) (n=469)										
Mean	0.095	0.046	0.036	0.012	0.000	1.649	0.380	4.910	-0.071	0.663
Median	0.105	0.056	0.033	0.019	0.000	1.205	0.336	4.951	-0.014	0.629
Close subsample (2) (n=278)										
Mean	0.022	0.010	0.005	0.007	0.000	1.863	0.382	5.417	0.023	0.679
Median	0.053	0.023	0.010	0.019	0.000	1.273	0.333	5.437	0.031	0.636
diff. in mean (1)-(2)	***	**	***					***	***	
diff. in median (1)-(2)	***	***	***			**		***	***	
Far subsample (3) (n=1,336)										
Mean	-0.036	-0.017	-0.014	-0.005	0.000	2.631	0.258	5.448	0.056	0.627
Median	-0.014	-0.002	-0.008	0.009	0.000	1.869	0.233	5.507	0.054	0.617
diff. in mean (1)-(3)	***	***	***	**		***	***	***	***	*
diff. in median (1)-(3)	***	***	***	*		***	***	***	***	
diff. in mean (2)-(3)	***		***			***	***		***	**
diff. in median (2)-(3)	***	**	***	*		***	***		***	**

Notes

$A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_PROD_{i,t}$ is abnormal production costs, $A\_DISX_{i,t}$ is abnormal discretionary expenses, $A\_CFO_{i,t}$ is abnormal cash flows from operations $A\_WCA_{i,t}$ is working capital discretionary accruals, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10%

Table 2.3

The debt covenant hypothesis

Variable	(1) $A\_RAM_{i,t}$	(2) $A\_PROD_{i,t}$	(3) $A\_DISX_{i,t}$	(4) $A\_CFO_{i,t}$	(5) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0951***	0.0731***	0.0099	0.0122**	-0.0020
	(3.574)	(3.153)	(0.740)	(2.448)	(-0.964)
$DEFAULT\_IC_{i,t-1}$	0.0515**	0.0294	0.0170	0.0051	-0.0014
	(2.875)	(1.592)	(1.333)	(1.148)	(-1.897)
$CLOSE\_DTE_{i,t-1}$	0.0304*	0.0047	0.0156*	0.0102*	0.0003
	(1.564)	(0.377)	(1.820)	(1.759)	(0.197)
$DEFAULT\_DTE_{i,t-1}$	0.0625***	0.0227	0.0144	0.0254***	0.0031*
	(3.162)	(1.301)	(1.026)	(4.510)	(2.146)
$MTB_{i,t}$	-0.0007	0.0019*	-0.0022**	-0.0004	0.0001
	(-0.480)	(2.137)	(-2.831)	(-1.357)	(1.133)
$LEV_{i,t}$	-0.1280***	-0.0744**	-0.0140	-0.0396***	-0.0028
	(-4.127)	(-2.865)	(-0.754)	(-7.396)	(-1.595)
$MV_{i,t-1}$	-0.0181***	-0.0111**	-0.0062***	-0.0007	-0.0002
	(-3.241)	(-2.785)	(-3.205)	(-0.755)	(-0.532)
$ROA_{i,t}$	-0.0785	-0.0329	0.1188***	-0.1644***	0.0086*
	(-1.073)	(-0.929)	(3.429)	(-8.730)	(1.849)
$NOA_{i,t-1}$	-0.0037	-0.0120	0.0136	-0.0053**	-0.0019
	(-0.268)	(-1.706)	(1.706)	(-2.654)	(-1.395)
$A\_WCA_{i,t}$	-0.2072	-0.3148	0.0361	0.0714*	
	(-1.303)	(-1.291)	(0.320)	(2.125)	
$A\_RAM_{i,t}$					-0.0014
					(-1.351)
Constant	0.1053**	0.0680**	0.0224	0.0149*	0.0025
	(2.430)	(2.435)	(1.443)	(2.009)	(1.553)
Observations	2,083	2,083	2,083	2,083	2,083
Adjusted R-squared	0.032	0.013	0.011	0.167	-0.001

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_PROD_{i,t}$ is abnormal production costs, $A\_DISX_{i,t}$ is abnormal discretionary expenses, $A\_CFO_{i,t}$ is abnormal cash flows from operations, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.4

The debt covenant hypothesis before and after mandatory IFRS adoption

Variables	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.1303***	-0.0059*
	(3.264)	(-2.127)
$DEFAULT\_IC_{i,t-1}$	0.0729***	-0.0010
	(3.149)	(-1.337)
$CLOSE\_DTE_{i,t-1}$	0.0019	0.0011
	(0.080)	(0.500)
$DEFAULT\_DTE_{i,t-1}$	0.0473*	0.0040*
	(1.953)	(1.983)
$IFRS_{i,t}$	0.0132	-0.0005
	(1.004)	(-1.227)
$IFRS_{i,t}$* $CLOSE\_IC_{i,t-1}$	-0.0787	0.0077
	(-1.686)	(2.164)
$IFRS_{i,t}$* $DEFAULT\_IC_{i,t-1}$	-0.0550	-0.0009
	(-1.761)	(-0.611)
$IFRS_{i,t}$* $CLOSE\_DTE_{i,t-1}$	0.0664*	-0.0018
	(1.978)	(-0.581)
$IFRS_{i,t}$* $DEFAULT\_DTE_{i,t-1}$	0.0365	-0.0019
	(1.382)	(-0.960)
$MTB_{i,t}$	-0.0006	0.0001
	(-0.408)	(1.040)
$LEV_{i,t}$	-0.1253***	-0.0029
	(-4.053)	(-1.696)
$MV_{i,t-1}$	-0.0191***	-0.0001
	(-3.132)	(-0.368)
$ROA_{i,t}$	-0.0818	0.0095*
	(-1.103)	(2.116)
$NOA_{i,t-1}$	-0.0008	-0.0021
	(-0.059)	(-1.474)
$A\_WCA_{i,t}$	-0.1933	
	(-1.237)	
$A\_RAM_{i,t}$		-0.0013
		(-1.282)
Constant	0.1024*	0.0026
	(2.139)	(1.608)
Observations	2,083	2,083
Adjusted R-squared	0.032	-0.002

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation

threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $IFRS_{i,t}$ is a dummy variable that is equal to 1 for observations after 2005 and 0 otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.5

The debt covenant hypothesis an alternative research design

Variable	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$IC\_PROXY_{i,t-1}$	-0.0111***	-0.0002***
	(-6.702)	(-6.209)
$DTE\_PROXY_{i,t-1}$	0.0256***	-0.0025***
	(3.651)	(-3.874)
$MTB_{i,t}$	-0.0003	0.0000
	(-0.212)	(0.760)
$LEV_{i,t}$	-0.1515***	0.0001
	(-4.222)	(0.033)
$MV_{i,t-1}$	-0.0221***	-0.0002
	(-3.877)	(-0.658)
$ROA_{i,t}$	-0.1186*	0.0084*
	(-1.854)	(2.171)
$NOA_{i,t-1}$	-0.0151	-0.0016
	(-1.008)	(-1.068)
$A\_WCA_{i,t}$	-0.1599	
	(-1.055)	
$A\_RAM_{i,t}$		-0.0011
		(-1.074)
Constant	0.1899***	0.0040*
	(4.153)	(2.030)
Observations	2,083	2,083
Adjusted R-squared	0.034	0.004

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $DTE\_PROXY_{i,t-1}$ is the debt to EBITDA covenant slack proxy, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.6

The debt covenant hypothesis controlling for financial distress

Variable	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0945***	-0.0021
	(3.520)	(-1.004)
$DEFAULT\_IC_{i,t-1}$	0.0513**	-0.0014*
	(2.882)	(-1.933)
$CLOSE\_DTE_{i,t-1}$	0.0300	0.0003
	(1.544)	(0.159)
$DEFAULT\_DTE_{i,t-1}$	0.0617***	0.0030*
	(3.099)	(1.996)
$MTB_{i,t}$	-0.0007	0.0001
	(-0.493)	(1.062)
$LEV_{i,t}$	-0.1286***	-0.0029
	(-4.164)	(-1.583)
$MV_{i,t-1}$	-0.0173**	-0.0001
	(-2.715)	(-0.121)
$ROA_{i,t}$	-0.0594	0.0115**
	(-0.733)	(2.210)
$NOA_{i,t-1}$	-0.0003	-0.0014
	(-0.016)	(-1.127)
$Z\_SCORE_{i,t-1}$	-0.0007	-0.0001
	(-0.714)	(-0.782)
$A\_WCA_{i,t}$	-0.2121	
	(-1.348)	
$A\_RAM_{i,t}$		-0.0014
		(-1.405)
Constant	0.1008*	0.0018
	(2.083)	(0.911)
Observations	2,083	2,083
Adjusted R-squared	0.032	-0.001

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, $NOA_{i,t-1}$ is net operating assets, and $Z\_SCORE_{i,t-1}$ is the Taffler Z-score.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.7

The debt covenant hypothesis including net worth covenant

Variables	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0960***	-0.0020
	(3.658)	(-0.964)
$DEFAULT\_IC_{i,t-1}$	0.0517**	-0.0014*
	(2.764)	(-1.838)
$CLOSE\_DTE_{i,t-1}$	0.0322	0.0002
	(1.664)	(0.137)
$DEFAULT\_DTE_{i,t-1}$	0.0628***	0.0031*
	(3.103)	(2.160)
$CLOSE\_NW_{i,t-1}$	0.0115	0.0015
	(0.540)	(0.671)
$DEFAULT\_NW_{i,t-1}$	-0.0467**	0.0016
	(-2.693)	(1.216)
$MTB_{i,t}$	-0.0000	0.0000
	(-0.016)	(0.640)
$LEV_{i,t}$	-0.1136***	-0.0031
	(-3.327)	(-1.657)
$MV_{i,t-1}$	-0.0262***	0.0002
	(-3.910)	(0.309)
$ROA_{i,t}$	-0.0822	0.0086*
	(-1.115)	(1.924)
$NOA_{i,t-1}$	-0.0134	-0.0016
	(-1.097)	(-1.174)
$A\_WCA_{i,t}$	-0.1946	
	(-1.127)	
$A\_RAM_{i,t}$		-0.0013
		(-1.167)
Constant	0.1637***	-0.0001
	(3.251)	(-0.026)
Observations	2,083	2,083
Adjusted R-squared	0.035	-0.002

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $CLOSE\_NW_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the net worth covenant violation threshold and zero otherwise,

$DEFAULT\_NW_{i,t-1}$ is equal to one for firm-years that are in technical default on net worth and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.8

The debt covenant hypothesis excluding financial crisis period

Variables	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.1027***	-0.0038
	(3.542)	(-1.880)
$DEFAULT\_IC_{i,t-1}$	0.0634**	-0.0007
	(3.228)	(-1.039)
$CLOSE\_DTE_{i,t-1}$	0.0219	0.0012
	(1.039)	(0.782)
$DEFAULT\_DTE_{i,t-1}$	0.0517*	0.0038**
	(2.160)	(2.350)
$MTB_{i,t}$	0.0010	0.0001
	(0.612)	(1.153)
$LEV_{i,t}$	-0.1713***	-0.0041**
	(-7.753)	(-2.522)
$MV_{i,t-1}$	-0.0229***	-0.0002
	(-3.996)	(-0.611)
$ROA_{i,t}$	-0.0949	0.0113**
	(-1.117)	(2.287)
$NOA_{i,t-1}$	-0.0159	-0.0024
	(-1.176)	(-1.404)
$A\_WCA_{i,t}$	-0.1527	
	(-0.857)	
$A\_RAM_{i,t}$		-0.0010
		(-0.875)
Constant	0.1488***	0.0032
	(3.716)	(1.640)
Observations	1,642	1,642
Adjusted R-squared	0.034	-0.001

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.9

The debt covenant hypothesis for Dealscan sample

Variables	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$	(3) $A\_RAM_{i,t}$	(4) $A\_WCA_{i,t}$
$IC\_SLACK_{i,t-1}$	0.0017	-0.0005		
	(1.352)	(-1.080)		
$DTE\_SLACK_{i,t-1}$			-0.0042*	-0.0016**
			(-2.024)	(-2.760)
$MTB_{i,t}$	-0.0030	0.0054***	0.0062	0.0004
	(-0.476)	(3.296)	(0.723)	(0.084)
$LEV_{i,t}$	0.0021	-0.0178	0.1443	-0.0540
	(0.024)	(-1.039)	(0.662)	(-1.432)
$MV_{i,t-1}$	0.0108	-0.0022	-0.0002	-0.0025
	(1.066)	(-1.033)	(-0.039)	(-1.688)
$ROA_{i,t}$	-0.4207*	0.0740**	-0.2510	0.0297
	(-1.804)	(2.320)	(-0.810)	(0.458)
$NOA_{i,t-1}$	-0.0354	0.0083	0.0260	0.0013
	(-0.826)	(1.581)	(0.701)	(0.111)
$A\_WCA_{i,t}$	2.5171***		1.6776**	
	(7.928)		(2.619)	
$A\_RAM_{i,t}$		0.0640***		0.0707*
		(3.216)		(1.795)
Constant	-0.0464	0.0115	-0.0167	0.0304*
	(-0.757)	(1.184)	(-0.388)	(1.991)
Observations	150	150	67	67
Adjusted R-squared	0.147	0.205	0.082	0.179

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $IC\_SLACK_{i,t-1}$ is the interest coverage covenant slack, $DTE\_PROXY_{i,t-1}$ is the debt to EBITDA covenant slack, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.10

An alternative specification for threshold value (1)

Variable	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0385	-0.0008
	(1.610)	(-0.468)
$DEFAULT\_IC_{i,t-1}$	0.0483**	-0.0007
	(3.003)	(-0.342)
$CLOSE\_DTE_{i,t-1}$	0.0912***	0.0005
	(3.793)	(0.186)
$DEFAULT\_DTE_{i,t-1}$	0.1233***	0.0002
	(6.934)	(0.113)
$MTB_{i,t}$	-0.0007	0.0001
	(-0.394)	(1.142)
$LEV_{i,t}$	-0.2112***	-0.0023
	(-5.075)	(-0.929)
$MV_{i,t-1}$	-0.0179***	-0.0003
	(-3.168)	(-0.844)
$ROA_{i,t}$	0.0453	0.0052
	(0.689)	(1.295)
$NOA_{i,t-1}$	-0.0070	-0.0018
	(-0.439)	(-1.297)
$A\_WCA_{i,t}$	-0.1892	
	(-1.245)	
$A\_RAM_{i,t}$		-0.0013
		(-1.263)
Constant	0.1047**	0.0031
	(2.532)	(1.682)
Observations	2,083	2,083
Adjusted R-squared	0.042	-0.003

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.11

An alternative specification for threshold value (2)

Variable	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0951***	0.0009
	(5.671)	(1.084)
$DEFAULT\_IC_{i,t-1}$	0.1216***	-0.0030
	(6.708)	(-1.762)
$CLOSE\_DTE_{i,t-1}$	0.0221	0.0015
	(1.137)	(0.980)
$DEFAULT\_DTE_{i,t-1}$	0.0535**	0.0042**
	(2.672)	(2.815)
$MTB_{i,t}$	-0.0004	0.0001
	(-0.231)	(1.289)
$LEV_{i,t}$	-0.1773***	-0.0035*
	(-4.470)	(-1.786)
$MV_{i,t-1}$	-0.0183***	-0.0003
	(-3.223)	(-0.864)
$ROA_{i,t}$	0.0313	0.0088
	(0.473)	(1.614)
$NOA_{i,t-1}$	-0.0047	-0.0019
	(-0.304)	(-1.384)
$A\_WCA_{i,t}$	-0.1983	
	(-1.178)	
$A\_RAM_{i,t}$		-0.0014
		(-1.200)
Constant	0.1022**	0.0030*
	(2.479)	(1.919)
Observations	2,083	2,083
Adjusted R-squared	0.0450	-0.0007

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.12

Alternative measure for accruals management

Variable	(1) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0056
	(0.858)
$DEFAULT\_IC_{i,t-1}$	0.0020
	(0.482)
$CLOSE\_DTE_{i,t-1}$	-0.0045
	(-0.906)
$DEFAULT\_DTE_{i,t-1}$	0.0010
	(0.227)
$MTB_{i,t}$	0.0005
	(1.520)
$LEV_{i,t}$	0.0008
	(0.098)
$MV_{i,t-1}$	-0.0008
	(-0.758)
$ROA_{i,t}$	0.0169*
	(1.870)
$NOA_{i,t-1}$	-0.0022
	(-0.531)
$A\_RAM_{i,t}$	0.0107***
	(4.427)
Constant	0.0034
	(0.525)
Observations	2,083
Adjusted R-squared	0.001

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_WCA_{i,t}$ is working capital discretionary accruals, $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.13

Alternative measures for real activities manipulation

Variable	(1) $A\_PROD_{i,t}$	(2) $A\_CFO_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.1055***	0.0169*
	(4.498)	(1.731)
$DEFAULT\_IC_{i,t-1}$	0.0445*	0.0124
	(2.052)	(1.629)
$CLOSE\_DTE_{i,t-1}$	0.0017	0.0079
	(0.102)	(1.120)
$DEFAULT\_DTE_{i,t-1}$	0.0199	0.0207**
	(0.870)	(2.582)
$MTB_{i,t}$	0.0026**	-0.0022**
	(2.342)	(-2.531)
$LEV_{i,t}$	-0.0876**	-0.0167
	(-2.620)	(-0.641)
$MV_{i,t-1}$	-0.0098**	-0.0062***
	(-2.749)	(-3.057)
$ROA_{i,t}$	0.0051	0.1303***
	(0.154)	(5.844)
$NOA_{i,t-1}$	-0.0161**	0.0140
	(-2.374)	(1.566)
$A\_WCA_{i,t}$	0.5837***	0.1586**
	(5.723)	(2.663)
Constant	0.0582**	0.0215
	(2.625)	(1.349)
Observations	2,001	2,001
Adjusted R-squared	0.032	0.015

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_PROD_{i,t}$ is abnormal production costs, $A\_DISX_{i,t}$ is abnormal discretionary expenses, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.14

Alternative aggregated real activities manipulation measures

Variable	(1) $A\_RAM1_{i,t}$	(2) $A\_RAM2_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0794***	0.0166
	(3.145)	(1.083)
$DEFAULT\_IC_{i,t-1}$	0.0376**	0.0104
	(2.679)	(0.833)
$CLOSE\_DTE_{i,t-1}$	0.0171	0.0220*
	(1.050)	(2.174)
$DEFAULT\_DTE_{i,t-1}$	0.0264*	0.0277*
	(1.823)	(1.792)
$MTB_{i,t}$	0.0000	-0.0021**
	(0.027)	(-2.676)
$LEV_{i,t}$	-0.0645**	-0.0247
	(-2.433)	(-1.212)
$MV_{i,t-1}$	-0.0155***	-0.0047**
	(-3.215)	(-2.762)
$ROA_{i,t}$	0.0499	-0.0871*
	(0.969)	(-1.920)
$NOA_{i,t-1}$	-0.0005	0.0047
	(-0.038)	(0.488)
$A\_WCA_{i,t}$	0.7501***	0.9473***
	(6.060)	(16.870)
Constant	0.0793*	0.0243
	(2.167)	(1.518)
Observations	2,083	2,083
Adjusted R-squared	0.027	0.106

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM1_{i,t}$ is aggregated measure of real activities manipulation, defined as the sum of the abnormal production costs and abnormal discretionary expenses, $A\_RAM2_{i,t}$ is aggregated measure of real activities manipulation, defined as the sum of the abnormal discretionary expenses and abnormal cash flows from operations, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.15

The debt covenant hypothesis controlling for industry effect

Variable	(1) $A\_RAM_{i,t}$	(2) $A\_WCA_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0960***	-0.0021
	(3.603)	(-0.985)
$DEFAULT\_IC_{i,t-1}$	0.0561**	-0.0015*
	(2.966)	(-1.885)
$CLOSE\_DTE_{i,t-1}$	0.0323	0.0004
	(1.682)	(0.233)
$DEFAULT\_DTE_{i,t-1}$	0.0626***	0.0033**
	(3.093)	(2.233)
$MTB_{i,t}$	-0.0006	0.0001
	(-0.386)	(0.840)
$LEV_{i,t}$	-0.1417***	-0.0036
	(-4.236)	(-1.625)
$MV_{i,t-1}$	-0.0192***	-0.0002
	(-3.287)	(-0.517)
$ROA_{i,t}$	-0.1054	0.0094*
	(-1.297)	(1.912)
$NOA_{i,t-1}$	-0.0074	-0.0022
	(-0.446)	(-1.479)
$A\_WCA_{i,t}$	-0.2101	
	(-1.332)	
$A\_RAM_{i,t}$		-0.0014
		(-1.378)
Constant	0.1137**	0.0034*
	(2.284)	(1.883)
Industry fixed effect	Yes	Yes
Observations	2,083	2,083
Adjusted R-squared	0.028	-0.008

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_WCA_{i,t}$ is working capital discretionary accruals, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.16

The debt covenant hypothesis using total earnings management

Variable	(1) $TEM_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.0848***
	(3.263)
$DEFAULT\_IC_{i,t-1}$	0.0311**
	(2.239)
$CLOSE\_DTE_{i,t-1}$	0.0244
	(1.536)
$DEFAULT\_DTE_{i,t-1}$	0.0443***
	(3.057)
$MTB_{i,t}$	0.0001
	(0.092)
$LEV_{i,t}$	-0.0817**
	(-2.546)
$MV_{i,t-1}$	-0.0144**
	(-3.011)
$ROA_{i,t}$	-0.1418**
	(-2.318)
$NOA_{i,t-1}$	-0.0108
	(-0.738)
Constant	0.0853**
	(2.195)
Observations	2,083
Adjusted R-squared	0.078

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $TEM_{i,t}$ is total earnings management, defined as the sum of the working capital discretionary accruals and the aggregated measure of real activities manipulation, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise, $DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset, and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.17

The debt covenant hypothesis before and after mandatory IFRS adoption using total earnings management

Variable	(1) $TEM_{i,t}$
$CLOSE\_IC_{i,t-1}$	0.1142**
	(2.902)
$DEFAULT\_IC_{i,t-1}$	0.0443**
	(2.376)
$CLOSE\_DTE_{i,t-1}$	-0.0003
	(-0.018)
$DEFAULT\_DTE_{i,t-1}$	0.0289*
	(1.950)
$IFRS_{i,t}$	0.0081
	(0.765)
$IFRS_{i,t}$* $CLOSE\_IC_{i,t-1}$	-0.0655
	(-1.400)
$IFRS_{i,t}$* $DEFAULT\_IC_{i,t-1}$	-0.0344
	(-1.300)
$IFRS_{i,t}$* $CLOSE\_DTE_{i,t-1}$	0.0566*
	(1.933)
$IFRS_{i,t}$* $DEFAULT\_DTE_{i,t-1}$	0.0368*
	(1.829)
$MTB_{i,t}$	0.0003
	(0.177)
$LEV_{i,t}$	-0.0801**
	(-2.510)
$MV_{i,t-1}$	-0.0153**
	(-2.969)
$ROA_{i,t}$	-0.1476**
	(-2.397)
$NOA_{i,t-1}$	-0.0086
	(-0.594)
Constant	0.0851*
	(2.033)
Observations	2,083
Adjusted R-squared	0.078

Notes

t-statistics (in parentheses) based on robust standard errors clustered by year. $TEM_{i,t}$ is total earnings management, defined as the sum of the working capital discretionary accruals and the aggregated measure of real activities manipulation, $CLOSE\_IC_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the interest coverage covenant violation threshold and zero otherwise, $DEFAULT\_IC_{i,t-1}$ is equal to one for firm-years that are in technical default on interest coverage and zero otherwise, $CLOSE\_DTE_{i,t-1}$ is equal to one for firm-years that are between 0% and 15% away from the debt to EBITDA covenant violation threshold and zero otherwise,

$DEFAULT\_DTE_{i,t-1}$ is equal to one for firm-years that are in technical default on debt to EBITDA and zero otherwise, $IFRS_{i,t}$ is a dummy variable that is equal to 1 for observations after 2005 and 0 otherwise, $MTB_{i,t}$ is the market-to-book ratio, $LEV_{i,t}$ is leverage ratio, $MV_{i,t-1}$ is the natural logarithm of the market value of equity, $ROA_{i,t}$ is return on asset and $NOA_{i,t-1}$ is net operating assets.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 2.18

Percentiles of the Debt Covenants

Variable	10th	15th	20th	25th	30th	50th	70th	75th	80th	85th	90th
$IC_{i,t}$	1.82	2.92	3.70	4.35	4.96	7.13	10.73	12.05	13.93	16.47	21.91
$DTE_{i,t}$	0.61	0.82	1.01	1.19	1.34	2.06	2.80	3.04	3.36	3.77	4.56
N	2,083										

Notes

$IC_{i,t}$ is interest coverage and $DTE_{i,t}$ is debt to EBITDA.

Chapter 3

Seasoned Equity Offerings and the Debt Covenant Hypothesis

3.1 Introduction

In recent years there has been considerable research into why firms manage earnings and the events that might prompt such activity. One particular event that provides the motivation to manage earnings is the possibility of violating debt covenants. This originally predicted by Watts and Zimmerman (1986) they termed it the debt covenant hypothesis. Existing studies, focussing on large samples or firms that entered technical default, as a whole find results consistent with the debt covenant hypothesis (e.g., DeFond & Jiambalvo, 1994; Franz, HassabElnaby, & Lobo, 2014; Sweeney, 1994;). Firms with debt covenants can raise capital via seasoned equity offerings (hereafter SEOs) and this may motivate them to window dress their financial performance to induce investors to take up their shares. Prior studies document that earnings are inflated around SEOs (Cohen & Zarowin, 2010; Shivakumar, 2000; Teoh, Welch, & Wong, 1998; Yoon & Miller, 2002).

Firms may conduct SEOs for different reasons. Several papers find that firms conduct SEOs to use the funds raised for investments and for debt reductions (e.g., Kim & Weisbach, 2008) whereas other papers document that a near-term need for cash is the primary reason

for conducting SEOs (e.g., DeAngelo, DeAngelo, & Stulz, 2010). Therefore, it is not clear from the above studies whether firms improve their financial situation and, in the process, become less susceptible to debt covenant violations following SEOs. In other words, the continued use of earnings management to avoid covenant violations in the post-issue period remains an open question. This is an important issue to investigate because firms can improve their debt covenant financial ratios via SEOs and thus, may reduce managing earnings to avoid covenant violations thereafter. For instance, SEO firms can improve their cash flow based interest coverage ratio directly or indirectly by employing the funds to reduce long-term debt or to make investment, respectively.

The purpose of this study is to examine the effect of SEOs on the debt covenant hypothesis. Specifically, it tests whether SEO firms' use of earnings management to avoid covenant violations is different in the post-issue period relative to the pre-issue period. A firm is likely to employ real activities manipulation (hereafter RAM) as an earnings management method because of two reasons. First, RAM is more difficult to detect (Roychowdhury, 2006; Zang, 2012) and therefore may go unnoticed by auditors and market participants.. Second, RAM has more direct cash flow implications (Cohen & Zarowin, 2010) than other earnings management methods. As such, I predict that the use of RAM to avoid covenant violations decreases following SEOs.

The paper tests the effect of SEOs on the debt covenant hypothesis in the UK setting. The UK provides an interesting laboratory for this test for two reasons. First, there has been a sharp increase in UK SEOs through private placements from 2004 and the latter has become a common type of SEO in the UK since that time.[26] Private placements are mainly made by firms in financial difficulties and such SEO firms are likely to use the raised funds

[26] Slovin, Sushka, and Lai (2000) and Barnes and Walker (2006) note that the issue of private placements has increased in the UK. Armitage, Dionysiou, and Gonzalez (2014) show that private placements are common in the UK after 2004.

for reducing debt or recapitalization (Wu, 2004). This implies that private placements are more likely to impact on the debt covenant hypothesis directly and within a short period of time. Second, the UK has a debt-friendly bankruptcy code implying that covenant violation in the UK entitles the lending bank – and by extension all banks through cross-default clauses – to place that firm directly into receivership and liquidate its assets (Acharya, Sundaram, & John, 2011).This provides another motivation for why UK firms are likely to employ the raised funds directly to improve their financial situation and, in the process, become less susceptible to covenant violations.

UK firms are not obliged to disclose covenant information and so extant studies are based on interviews or surveys (Citron, 1992; Moir & Sudarsanam, 2007). This has also been noted by Christensen, Lee, and Walker (2009) who highlight the lack of public covenant data in the UK and therefore they use proxies such as interest cover ratio for the likelihood and costs of covenant violation. They use the interest cover ratio because it is the most commonly used covenant in UK debt contracting and is consistent with the limited covenant information on UK firms available in Dealscan. This paper uses two strategies to estimate a slack proxy for interest coverage to overcome the lack of covenant data. First, it selects those UK firms that are likely to be constrained by a covenant(s) or more importantly by an interest coverage covenant. Accordingly, I exclude firms without outstanding debt because these firms will not have a loan covenant. Firms with negative lagged EBITDA are also excluded as such firms are less likely to have an interest coverage covenant (Demerjian, 2007). Second, it estimates an interest coverage covenant slack proxy as interest coverage ratio divided by judiciously chosen threshold values. To determine the latter, I first identify the average threshold value for the interest coverage covenant reported in the literature (e.g., Moir & Sudarsanam, 2007) and then adjust it for industry and year effects.

I test the effects of SEOs on the debt covenant hypothesis using a difference-in-differences research design that includes a treatment sample of 846 observations covering 232 UK SEOs up to 3 years before and after issuing years with outstanding debt and positive lagged EBITDA from the period 2005-2013. To compare the change in the use of RAM to avoid interest coverage covenant violations from the pre-issue period to the post-issue period for the treatment sample with corresponding changes for benchmark firms, I employ 690 observations covering 232 non-SEOs with outstanding debt and positive lagged EBITDA from the period 2005-2013. I select these matching firms based on industry, size, and performance criteria in the pre-issue year from all listed non-SEO UK firms with outstanding debt and positive lagged EBITDA. I include the benchmark sample to control for the non-SEO related factors that may affect the debt covenant hypothesis.

I find that the use of RAM to avoid the possibility of interest coverage covenant violations decreases from the pre-issue period to the post-issue period for SEO firms relative to the corresponding change for benchmark firms. This implies that firms improve their financial situation using SEO proceeds and, in the process, become less susceptible to debt covenant violations following SEOs. The results show that the decrease in the use of RAM in the post SEO period to avoid the likelihood of breaching interest coverage covenant is more pervasive among SEO firms with low market to book ratios or high financial leverage. Furthermore, using accruals management and classification shifting measures of earnings management I find that firms do not engage in these manipulation methods to avoid the possibility of interest coverage covenant violations and this behaviour does not change following SEOs. Lastly, I find that the main results are robust to the exclusion of SEO firms with syndicated loans and to an alternative proxy for covenant violation.

This paper proceeds as follows: Section 2 develops my main hypotheses. Section 3 presents the research design and discusses the data and sample selection. Section 4 reports the empirical results and Section 5 shows the robustness checks. Section 6 concludes.

3.2 Hypothesis development

The debt-covenant hypothesis implies that firms manage earnings to avoid covenant violations because the violating of them is costly (Watts & Zimmerman, 1986). Several studies confirm that debt covenant violations are costly. Chava and Roberts (2008) and Nini, Smith, and Sufi (2009) find that firms' future investment decreases as a result of covenant violations Earlier studies test the debt-covenant hypothesis by using the gearing ratio as a proxy for debt covenant tightness or using firms that enter technical default and find consistent results (e.g., Ayres, 1986; Daley & Vigeland, 1983; DeFond & Jiambalvo, 1994; Sweeney, 1994). Subsequent studies which are based on large Dealscan samples find supportive results for the debt covenant hypothesis. For instance, Franz et al. (2014) find that firms engage in RAM and accruals management to avoid violating covenants and this behaviour increases with the tightness of the covenant slack. These studies mainly use US samples to test the debt covenant hypothesis as there is a lack of public covenant data in other countries.

Firms with debt covenants can raise capital via SEOs and this may motivate them to manipulate earnings. Rangan (1998) and Teoh et al. (1998) examine the use of earnings management around SEOs. Using abnormal accruals as an earnings management proxy, they find that firms inflate earnings at the time of SEOs and operating performance declines in the post-issue period due to accrual reversals. Cohen and Zarowin (2010) extend these studies by investigating both RAM and AM around SEOs. Their findings show that firms engage in RAM along with accrual-based activities in the year of the offerings and the decrease in

post-SEO performance is mainly due to RAM rather than accruals management. These US-based studies are also supported by Iqbal, Espenlaub, and Strong (2009) who examine earnings management around SEOs in the UK. Their results indicate that SEO firms engage in discretionary current accruals but not discretionary long-term accruals around offerings and their return performance improves in the pre-issue period but deteriorates in the post-issue period due to accrual reversals.

SEOs can be made by issuing new (primary) shares or offering existing (secondary) shares, where the former brings cash inflows to the firm and the latter to the insiders. SEO firms with primary shares may reduce the need for earnings management to avoid covenant violations in the post-issue period. Christensen et al. (2009) document that interest coverage is the most commonly used accounting covenant in UK debt contracting. UK firms conducting SEOs can improve their interest coverage ratio in two ways. First, they can use the proceeds to reduce long-term debt and, thus, directly improve their interest coverage ratio. Second, they can invest the raised capital which may increase earnings and, therefore, improve their interest coverage ratio. However, the return on any investment may take time to come through and improve the financial performance of the company. Nevertheless, in both cases firms are likely to reduce the use of earnings management to avoid breaching interest coverage covenant in the post-SEO period. Kim and Weisbach (2008) analyse how firms use the funds raised through SEOs. They document increases in investments such as R&D and capital expenditures following SEOs. Walker and Yost (2008) report that the most SEO firms are expected to use the proceeds for investment or debt reduction while mainly their investment increases in the post-issue period. Similarly, DeAngelo, DeAngelo, and Stulz (2010) find that capital expenditures increase after the SEO but a near-term need for cash is the primary reason for conducting equity offerings.

The effect of SEOs on the debt covenant hypothesis is more likely to be detected in those firms that conduct SEOs via private placements. This form of SEO, which is commonly used in the UK, is mainly made by firms in financial difficulties to use the raised funds for reducing debt or recapitalization (Wu, 2004). Furthermore, firms conducting private placements appear not to manage earnings around such events unlike other types of SEOs in the UK (Dionysiou, 2015). This suggests that there is less likely to be a reversal in a firm's operating performance in the post-issue period relative to the pre-issue period that typically occurs due to the use of earnings management around SEOs. The implication is that private placement firms can improve their financial situation in the post-issue period. Even if there is a reversal, it affects firms' earnings but not cash flows (Iqbal et al., 2009) and improving the latter is more important for avoiding breaching covenants like interest coverage.

Although a number of earnings management methods are available to management I would suggest that RAM is more likely to be employed for avoiding interest coverage covenant violations for two reasons. First, RAM is more pervasive because it is more difficult to detect (Roychowdhury, 2006; Zang, 2012). Second, firms are more likely to use RAM to avoid infringing EBITDA-based interest coverage because RAM has direct cash flow implications (Cohen & Zarowin, 2010). Thus, I expect that the use of RAM to remain within interest coverage covenant limits decreases following SEOs. Based on the above discussion, I hypothesize the following:

H1: The use of RAM to avoid interest coverage covenant violations decreases following SEOs.

I expect that the decrease in the use of RAM to remain within interest coverage covenant limits subsequent to SEOs occurs primarily in firms with low market to book ratios. Kim and Weisbach (2008) document SEOs are made for investment and exploiting

favorable market conditions. Specifically, their results show that SEO firms with low market to book ratios (low valuation firms) tend to use the raised funds for investment and debt reduction while SEO firms with high market to book ratios (high valuation firms) keep them as cash. These findings suggest that firms with low market to books ratios improve their interest coverage ratio and thus decrease the use of RAM to avoid interest coverage covenant violations following SEOs. More formally:

H2: The decrease in the use of RAM to avoid interest coverage covenant violations is more pervasive among firms with low market to books ratios following SEOs.

The use of SEO proceeds can vary depending on the level of financial leverage. Specifically, firms with high financial leverage are likely to use the raised funds differently relative to firms with low financial leverage. The former are more likely to employ SEO proceeds to reduce debt compared to the latter. High-debt firms have strong monitoring from lender firms (Ahn & Choi, 2009; Anagnostopoulou & Tsekrekos, 2016) and thus they have incentives to reduce debt which directly improves their interest coverage ratio. Consequently, I expect that the decrease in the use of RAM to avoid infringing interest coverage covenant is more pervasive among firms with high financial leverage following SEOs. More formally:

H3: The decrease in the use of RAM to avoid interest coverage covenant violations is more pervasive among firms with high financial leverage following SEOs.

3.3 Research design and sample

3.3.1 Real activities manipulation

Roychowdhury (2006) defines RAM as departures from normal operating practices, motivated my managers' desire to mislead at least some stakeholders into believing certain

financial reporting goals have been met in the normal course of operations. Certain RAM methods, such as reduction of R&D and price discounts, are possibly optimal actions in certain economic circumstances. If managers, however, engage in these activities more extensively than is normal given their economic circumstances they are engaging in RAM. Roychowdhury (2006) develops models to derive normal levels of operating activities to detect RAM. I examine three RAM proxies: abnormal levels of cash flows from operations (*A_CFO*), abnormal levels of production costs (*A_PROD*) and abnormal levels of discretionary expenses *(A_DISX)* following Roychowdhury (2006).[27] *A_CFO*, *A_PROD* and *A_DISX* are residuals from the following regressions, respectively:

$$\frac{CFO_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{S_{i,t}}{AT_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t}}{AT_{i,t-1}} + e_{i,t} \quad (1)$$

$$\frac{PROD_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{S_{i,t}}{AT_{i,t-1}} + \beta_3 \frac{\Delta S_{i,t}}{AT_{i,t-1}} + \beta_4 \frac{\Delta S_{i,t-1}}{AT_{i,t-1}} + e_{i,t} \quad (2)$$

$$\frac{DISX_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{S_{i,t-1}}{AT_{i,t-1}} + e_{i,t} \quad (3)$$

where $CFO_{i,t}$ is cash flows from operations for firm *i* in year *t;* $S_{i,t}$ is sales for firm *i* in year *t*; $PROD_{i,t}$ is production costs for firm *i* in year *t*, defined as cost of sales plus change in inventory; $DISX_{i,t}$ is discretionary expenses for firm *i* in year *t*, defined as SG&A (selling, general and administrative) expenses plus R&D expenses. Regressions (1), (2), and (3) are estimated cross-sectionally for each industry-year.[28]

Firms with either abnormally low cash flows from operations or abnormally low discretionary expenses or abnormally high production costs are considered as engaging in RAM. Abnormal discretionary expenses and abnormal cash flows from operations are

[27] I find similar results if I add returns on assets to Roychowdhury (2006)'s models to control extreme operating performance similar to Athanasakou, Strong, and Walker (2011).

[28] I require at least 6 observations per industry-year to ensure that I have sufficient data for estimation of earnings management proxies following Athanasakou et al. (2011). The Global Industry Classification Scheme (GICS) for the classification of industries is applied because it gives more accurate empirical results (e.g., Bhojraj, Lee, & Oler, 2003).

multiplied by minus one similar to prior studies to ease the interpretation of RAM measures. An aggregated measure of RAM (*A_RAM*) is also calculated by combining the three individual proxies to measure the total effect of RAM (Franz et al., 2014). Thus, a positive value of any RAM proxy or its aggregated measure is regarded as real earnings manipulation.

3.3.2 Debt covenants

Disclosure requirements on debt covenants are far less demanding in the UK than in the USA. UK firms are only required to disclose the class, amount, active date and maturity date of the debt whereas they are required to disclose fully in the USA detailed information about covenants and performance pricing (Chatterjee, 2006). The Dealscan database provides covenant information only for some loans in UK debt contracting. The majority of these loans have at least one accounting-based debt covenant which is consistent with US studies (e.g., Roberts & Sufi, 2009). Of these, interest coverage is the most frequently occurring covenant. This is in line with the relevant UK and US studies that find interest coverage is the most commonly used covenant (Christensen et al., 2009; Roberts & Sufi, 2009). Based on the above, I use minimum interest coverage as the accounting-based debt covenant.

I develop a covenant slack proxy for interest coverage to examine the effect of SEOs on the debt covenant hypothesis. The proxy in the spirit of Demerjian and Owens (2014) is estimated as follows:

$$Proxy_{i,t} = \frac{Actual_{i,t}}{Threshold_{i,t}} \quad (4)$$

where $Actual_{i,t}$ is the interest coverage ratio for firm *i* in year *t*; $Threshold_{i,t}$ is threshold value of the interest coverage covenant for firm *i* in year *t*. The interest coverage ratio is calculated using the standard definition specified by Demerjian and Owens (2014). Minimum interest coverage is EBITDA divided by interest expense. To determine threshold values for interest

coverage, I first identify what is the average threshold value for the interest coverage covenant reported in the literature (Moir & Sudarsanam, 2007; Rhodes, 2016)[29,30]. I then adjust this average threshold value to obtain interest coverage threshold values for each industry-year group of companies.[31] Based on formula (4), a covenant slack proxy of less than one implies violation of the minimum interest coverage covenant.

3.3.3 Regression model

To test the effect of SEOs on the debt covenant hypothesis (Hypothesis 1), I use a difference in differences research design which deals with confounding events. Specifically, I employ the following OLS regression model:

$$EM_{i,t} = \alpha_0 + \alpha_1 IC\_PROXY_{i,t-1} + \alpha_2 SEO_{i,t} + \alpha_3 POST_{i,t} + \alpha_4 IC\_PROXY_{i,t-1} \times SEO_{i,t} + \alpha_5 IC\_PROXY_{i,t-1} \times POST_{i,t} + \alpha_6 SEO_{i,t} \times POST_{i,t} + \alpha_7 IC\_PROXY_{i,t-1} \times SEO_{i,t} \times POST_{i,t} + \alpha_j C_{i,t} + \varepsilon_{i,t} \quad (5)$$

where $EM_{i,t}$ is earnings management proxy for firm i in year t that refers to one of the following RAM proxies, aggregated measure of RAM ($A\_RAM_{i,t}$), abnormal levels of production costs ($A\_PROD_{i,t}$), abnormal levels of discretionary expenses ($A\_DISX_{i,t}$), and abnormal levels of cash flows from operations ($A\_CFO_{i,t}$); $IC\_PROXY_{i,t-1}$ is an interest coverage covenant slack proxy; $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise; $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-SEO firms in the post-issue years and 0 otherwise. My variable of interest is the coefficient on the

[29] Gamba and Triantis (2014) use a similar approach.

[30] They document that the interest coverage covenant generally has a threshold value of 3. I identify that the 15th percentile interest coverage figure in my sample has the value close to this average threshold value. Thus, I use the 15th percentile of the interest coverage to determine my threshold values. In order to check sensitivity of the main results, I also use the 10th percentile of the interest coverage and the 20th percentile of the interest coverage to obtain my threshold values and re-run the main regressions. The results indicate that these sensitivity tests yield qualitatively similar findings.

[31] I consider industry effects because they can impact debt contracts via their effects on firm-level fundamentals and probability of default related risk premiums (MacKay & Phillips, 2005). I also consider year effects to control for economic factors.

triple interaction term (α_7). This coefficient captures the change in the use of RAM to avoid the possibility of interest coverage covenant violations from the pre-issue period to the post-issue period for SEO firms relative to the corresponding change for benchmark firms. Since I multiply $A\_CFO_{i,t}$ and $A\_DISX_{i,t}$ by minus one to simplify the interpretation of my earnings management proxies, Hypothesis 1 predicts α_7 to be positive in model (5).

$C_{i,t}$ are control variables for $MV_{i,t}$, $Z\_SCORE_{i,t}$, $CAPEX_{i,t}$, $GROWTH_{i,t}$, $LEV_{i,t}$, $CL_{i,t}$, MTB_{it}, and $ISSUE_{i,t}$. These are added to the regression model (5) because they are expected to affect the use of earnings management (e.g., Bozzolan, Fabrizi, Mallin, & Michelon, 2015; He, 2016; Karampinis & Hevas, 2013; Roychowdhury, 2006). $MV_{i,t}$ is the natural logarithm of the market value of equity for firm i in year t and is included to control for firm size. $Z\_SCORE_{i,t}$ is the Taffler Z-score and is added to control for financial distress. $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets. This is included to control for capital intensity. $LEV_{i,t}$ is leverage ratio, defined as the sum of, long term debt and debt in current liabilities divided by total assets. This is included as a control for capital structure. $CL_{i,t}$ is the ratio of current liabilities to total asset and is added to control for short-term liabilities. $GROWTH_{i,t}$ is the percentage change in sales. $MTB_{i,t}$ is the market to book ratio, defined as the market value of equity divided by the book value of equity. $GROWTH_{i,t}$ and $MTB_{i,t}$ are included to control for growth opportunities. $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise. This is included to control for the use of earnings management in the year when firms conduct SEOs. All variables are winsorised at the 1 percent and 99 percent levels to eliminate the impact of outliers.

Since the above regression model involves panel data, I determine whether there is cross sectional or time series dependence to avoid biased standard errors. Following the Petersen (2009) methodology, it is concluded that there is cross sectional dependence since the White standard errors are not the same as the standard errors clustered by year whereas they are the

same as the standard errors clustered by firms. Accordingly, standard errors clustered by year are used to mitigate this problem.

3.3.4 Data and sample

My treatment sample includes all UK (dead and live) listed firms that conduct SEOs during the period between 2008 and 2012.[32] I focus on the period three years before and after each firms SEO and treat them as the pre and post-SEO periods, respectively. This indicates that my treatment sample starts from the year 2005. The latter is chosen as the starting point because the EU (European Union) requires all European listed firms to follow IFRS from the beginning of 2005. The Thomson 1 database is used to identify SEO firms.[33] Accounting data are obtained from Compustat Global. Following existing studies, financial and utility firms are excluded from my sample because of their different financial reporting environment and highly predictable earnings, respectively. Equity offerings with secondary shares are excluded from the sample because they do not bring cash inflows into the firm. Firms that conduct SEOs within the previous 3 years prior to my treatment sample period are excluded to fully capture the effect of SEOs on the debt covenant hypothesis. Since there is a lack of explicit covenant data in the UK, I tailor my sample to include those UK firms that are likely to be constrained by threshold values for the minimum interest coverage covenant. Thus, I exclude firms with zero outstanding long-term debt and negative lagged EBITDA.[34] Consequently, the final treatment sample contains 232 SEOs and 846 observations.

I include a benchmark sample to control for the effect of potentially confounding concurrent events. To do so, I, first, select firms from all non-SEO UK listed firms with

[32] Dead firms are also included to avoid survivorship bias.

[33] Most of the SEOs in my sample are private placements.

[34] Roychowdhury (2006) states that debt covenant data are not readily available even for a large US sample. Therefore, he uses a proxy, the existence of debt. Demerjian (2007) finds that borrowers with negative earnings are less likely to have an interest coverage covenant.

outstanding debt and positive lagged EBITDA. Next, among these for each SEO firm I choose a matched non-SEO firm from the same industry with the closest size and performance in the pre-offer year. These selection criteria result in a benchmark sample of 232 non-SEOs and 690 observations.

3.4 Empirical results

3.4.1 Descriptive statistics and univariate analysis

Table 3.1, Panels A and B present descriptive statistics for my treatment and benchmark samples for the whole sample period and for the pre-issue year, respectively.

[Table 3.1 around here]

Panel A shows that although SEO and non-SEO firms have similar firm size (*MV*), they have different firm characteristics. Specifically, SEO firms are significantly more leveraged than non-SEO firms. The median (mean) leverage ratio (*LEV*) is 0.233 for SEO firms while it is 0.195 (0.213) for non-SEO firms. SEO firms are less financially healthy relative to non-SEO firms as they have significantly lower median (mean) Z-score. Therefore, it is not surprising that my interest coverage slack proxy (*IC_PROXY*) is significantly lower for SEO firms than non-SEO firms. This indicates that SEO firms are potentially subject to tighter interest coverage covenant slack proxy. Furthermore, SEO firms have positive median (mean) values for all RAM measures unlike non-SEO firms. The medians (means) of these measures are significantly higher for SEO firms. Panel B also shows similar results for the pre-issue year. Specifically, SEO firms are more leveraged and more financially distressed than non-SEO firms and thus they have tighter interest coverage slack proxy in the pre-issue year. Overall, the results suggest that firms in poor financial health are more likely to have tighter covenant slack which are consistent with Franz et al. (2014).

Table 3.2, Panels A and B indicate how SEO and matched non-SEO firms' leverage ratio, capital expenditures, cash holdings, and interest coverage ratio change around the issue year, respectively. This univariate analysis shows how SEO firms use the raised funds. This helps to determine whether such firms' improve their interest coverage ratio following SEOs.

[Table 3.2 around here]

Panel A shows the median leverage ratio (*LEV*) for SEO firms decreases from 0.24 in year -1 to 0.21 in year +1, and remains at this level by year +3.[35] SEO firms' median capital expenditures (*CAPEX*) goes down from 0.03 in year -1 to 0.02 in year +1, and remains stable by year +3. The median of cash holdings (*CASH*) for SEO firms does not change in the post-issue years relative to the pre-issue year. These results imply that SEO firms appear to use the raised funds for reducing their debt and consequently this is likely to improve their interest coverage ratio. Not surprisingly, the median of my interest coverage slack proxy (*IC_PROXY*) goes up from 1.70 in year -1 to 1.91 in year +1, and increases to 2.35 by year +3. The implication is that firms decrease their debt which moves their interest coverage ratio further from their threshold levels following SEOs.

Panel B indicates that matched non-SEO firms have different patterns for the medians of leverage ratio, capital expenditures, cash holdings, and interest coverage covenant slack proxy during the same time period compared to SEO firms. Univariate analysis also shows that non-SEO firms are much less leveraged than their SEO counterparts in year -1 and in line with this they have a higher interest coverage covenant slack proxy. However, the differences between SEO and non-SEO firms decrease in the post-issue year.

[35] I focus on the medians rather than the means as my sample distribution is skewed. The overall conclusion of my univariate analysis does not change if I also consider the means.

3.4.2 The effect of SEOs on the debt covenant hypothesis

Table 3.3, reports the test results for Hypothesis 1 which predicts that the coefficient on *IC_PROXY×SEO×POST* interaction variable is positive. Columns (1) and (2)-(4) show the results for the total and individual RAM measures, respectively.

[Table 3.3 around here]

Column (1) indicates that the coefficient on *IC_PROXY×SEO×POST* interaction variable is positive and significant at the 5% significance level. This implies that the use of RAM to remain within interest coverage covenant limits decreases from the pre-issue period to the post-issue period for SEO firms relative to the corresponding change for benchmark firms. Focusing on the individual RAM measures, the coefficient on *IC_PROXY×SEO×POST* interaction variable is also significantly positive for abnormal levels of production costs (*A_PROD*) and discretionary expenses (*A_DISX*) dependent variables in columns (2) and (3), respectively. The implication is that firms decrease abnormal production and reduce cutting discretionary expenses to avoid the possibility of interest coverage covenant violations following SEOs. These results support Hypothesis 1.

The results in Table 3.3 suggest that SEOs affect the debt covenant hypothesis as the use of RAM to avoid breaching interest coverage covenant decreases following SEOs.[36] The implication is that firms become less susceptible to debt covenant violations using SEO proceeds and therefore decrease managing earnings.

[36] Regarding control variables, column (4) shows that the *ISSUE* dummy coefficient is significantly positive at the 5% significance level suggesting that issuing firms accelerate sales for window dressing in the year of the issue. I, however, do not find evidence for total RAM as shown by insignificant coefficients on *ISSUE* in columns (1). This is because most of the SEOs in my sample are private placements and the use of earnings management for this type of SEOs is not common in the UK (Dionysiou, 2015).

3.4.3 Subgroup analysis

Hypothesis 2 predicts that firms with low market to book ratios are more likely to decrease the use of RAM to remain within interest coverage covenant limits relative to firms with high market to book ratios following SEOs. In order to test this conjecture, the treatment sample (SEO firms) is divided into two groups based on the median market to book ratio in the pre-SEO year. Similarly, I also divide the control sample (non-SEO firms) into two groups. Firms in each sample below and above the medians are used as SEO and non-SEO firms with low and high market to book ratios, respectively. Regression (5) is then run separately for SOE and non-SOE firms with low market to book ratios and those with high market to book ratios. This allows us to compare SEO firms and non-SEO firms using the same criterion. The results are reported in Table 3.4.

[Table 3.4 around here]

I find that SEO firms with low market to book ratios decrease the use of RAM to remain within interest coverage covenant limits in the post-issue period relative to the pre-issue period as the coefficient on *IC_PROXY*×*SEO*×*POST* interaction variable is significantly positive in columns (1). By contrast, I do not find the same the same phenomenon for SEO firms with high market to book ratios since the coefficient on *IC_PROXY*×*SEO*×*POST* interaction variable is not significant in column (2). These findings support Hypothesis 2. Overall, the results suggest that my main findings are driven by SEO firms with low market to book ratios.

Hypothesis 3 predicts that firms with high financial leverage are more likely to decrease the use of RAM to remain within interest coverage covenant limits than firms with low financial leverage following SEOs. I again divide the treatment and control samples into two groups based on the median leverage ratio in the pre-SEO year. Firms in each sample above

and below the medians are used as SEO and non-SEO firms with high and low financial leverage, respectively. Regression (5) is then run separately for SOE and non-SOE firms with high financial leverage and those with low financial leverage. The results are reported in Table 3.5.

[Table 3.5 around here]

The table shows that SEO firms with high financial leverage decrease the use of RAM to avoid the possibility of interest coverage covenant violations in the post-issue period relative to the pre-issue period as the coefficient on *IC_PROXY*×*SEO*×*POST* interaction variable is significantly positive in columns (1). However, I do not find the same the same phenomenon for SEO firms with low financial leverage since the coefficient on *IC_PROXY*×*SEO*×*POST* interaction variable is not significant in column (2). These findings support Hypothesis 3. Overall, the results suggest that my main findings are driven by SEO firms with high financial leverage.

3.5 Robustness checks

3.5.1 Accruals management and classification shifting

I also test the effect of SEOs on the debt covenant hypothesis using accruals management and classification shifting measures of earnings management. I employ working capital discretionary accruals (*A_WCA*) as the accruals management measure for regression (5).[37] This is because studies show that the former captures more subtle instances

[37] I use modified Jones (1991) model to estimate AM by taking into account firm growth and operating performance similar to Collins, Pungaliya, and Vijh (2014). Kothari, Leone, and Wasley (2005) indicate that extreme operating performance should be controlled for to avoid inaccurate estimation of abnormal accruals. Thus, following Collins et al. (2014), I run the following regression to estimate normal working capital accruals:

$$\frac{WCA_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{\Delta CR_{i,t}}{AT_{i,t-1}} + \sum_k \beta_{3,k}\, ROA\_DUM_{k,i,t-1} + \sum_k \beta_{4,k}\, SG\_DUM_{k,i,t-1\text{ to }t} + \sum_k \beta_{5,k}\, MV\_DUM_{k,i,t-1} + \sum_k \beta_{6,k}\, MB\_DUM_{k,i,t-1} + \sum_k \beta_{7,k}\, EP\_DUM_{k,i,t-1} + e_{i,t} \quad (6)$$

of accruals management than total discretionary accruals in the UK (e.g. Peasnell, Pope, & Young, 2000).[38] The results are presented in Table 3.6, columns (1). They show that firms do not employ accruals management to remain within interest coverage covenant limits and this behaviour does not change following SEOs. This is probably because accruals management is not pervasively used and it has no direct cash flow implications (Cohen & Zarowin, 2010; Zang, 2012).

[Table 3.6 around here]

Regarding classification shifting, following Athanasakou et al. (2011) I use a dependent dummy variable, *CS*, that is equal to 1 for firms that have positive unexpected core earnings[39] and higher I/B/E/S earnings[40] than net income per share and 0 otherwise for regression (5). This captures those firms that are likely to engage in classification shifting by

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where $WCA_{i,t}$ is working capital accruals for firm *i* in year *t*, calculated as the change in total current assets minus the change in cash minus the change in current liabilities minus the change in the current portion of long term debt; $AT_{i,t-1}$ is total assets for firm *i* in year *t*-1; $\Delta CR_{i,t}$ is the change in sales for firm *i* from year *t*-1 to year *t* minus the change in accounts receivable for firm *i* from year *t*-1 to year *t*; *k* takes the values of 1, 2, 4, and 5; $ROA\_DUM_{k,i,t-1}$ is quintile dummies for the return on assets, defined as earnings before extraordinary items and discontinued operations scaled by lagged total assets. $SG\_DUM_{k,i,t-1 \text{ to } t}$ is quintile dummies for the sales growth, defined as the change in sales from year *t*-1 to *t* divided by sales during year *t*-1. $MV\_DUM_{k,i,t-1}$ is quintile dummies for the market value of equity as of last year *t*-1; $MB\_DUM_{k,i,t-1}$ is quintile dummies for the market to book equity as of year *t*-1; $EP\_DUM_{k,i,t-1}$ is quintile dummies for earnings to price, calculated as net income for year *t*-1 divided by ending stock price as of year *t*-1; Each quintile dummy takes the value of 1 if the corresponding firm characteristic belongs to that *k*'th quintile, and zero otherwise. Regression (6) is estimated cross-sectionally within industry-years and normal working capital accruals are estimated using the estimated coefficients from regression (6). The difference between actual and normal working capital accruals gives working capital discretionary accruals (*A_WCA*).

[38] The other reason why I employ working capital discretionary accruals rather than total discretionary accruals is because I use EBITDA-based covenant (interest coverage).

[39] Unexpected core earnings (*UCE*) are estimated following McVay (2006). *UCE* is the residual from the following regression estimated cross sectionally within industry-years:

$$CE_{i,t} = \alpha_0 + \beta_1 CE_{i,t-1} + \beta_2 ATO_{i,t} + \beta_3 ACCR_{i,t-1} + \beta_4 ACCR_{i,t} + \beta_5 \Delta SALES_{i,t} + \beta_6 NEG\_\Delta SALES_{i,t} + e_{i,t} \qquad (7)$$

where $CE_{i,t}$ is core earnings for firm *i* in year *t* scaled by sales where the former is defined as sales minus cost of goods sold minus selling, general and administrative expenses ; $ATO_{i,t}$ is asset turnover ratio, calculated as sales over average net operating assets; $ACCR_{i,t}$ is accruals, defined as the difference between net income before extraordinary items and cash from operations divided by sales; $\Delta SALES_{i,t}$ is percentage change in sales; $NEG\_\Delta SALES_{i,t}$ is percentage change in sales if it is less than 0, and 0 otherwise.

[40] This is obtained from I/B/E/S.

reclassifying core expenses as non-recurring items. The results for this logit regression are presented in Table 3.6 column (2). It shows that firms do not use classification shifting to remain within interest coverage covenant limits and this behaviour does not change following SEOs. This is perhaps because classification shifting does not have cash flow implications and thus firms may not employ it to avoid EBITDA-based interest coverage covenant.

3.5.2 SEO firms with syndicated loans

Firms that conduct SEOs may also take a syndicate loan by entering a new debt contract. On the one hand, syndicated borrowers that enter a new debt contract may increase the use of earnings management to avoid covenant violations in the post-lending period. For instance, suppose a firm with an interest coverage debt covenant takes a new syndicated loan. The interest expenses of this firm are likely to increase after the new loan and, thus, to worsen its interest coverage ratio. This would increase the demand for earnings management to remain within interest coverage covenant limits. On the other hand, although taking new syndicated loans increases firms' leverage ratio, it does not follow that their financial ratio covenants deteriorate leading them to increase earnings management. This is because syndicated loans are mainly used by large and healthy firms that also are more likely to employ the new funds efficiently. Therefore, my main results may be affected by SEO firms with syndicated loans.

Using the Dealscan database I find 87 firms in the SEO sample also take new syndicated loans. To check the robustness of the main findings, I rerun regression (5) after excluding SEO firms with syndicated loans. The results are reported in Table 3.7.

[Table 3.7 around here]

As can be seen, the findings are consistent with the main results. This suggests that the exclusion of SEO firms with syndicated loans does not alter the effect of SEOs on the debt covenant hypothesis.

3.5.3 Alternative proxy for covenant violation

Christensen et al. (2009) highlight the lack of public covenant data in the UK and therefore they use the interest coverage ratio itself for the likelihood and costs of covenant violation. This, however, is less likely to test directly the effect of SEOs on the debt covenant hypothesis. Thus, I estimate a slack proxy for the interest coverage covenant in my main analysis to examine the direct effect of SEOs on the debt covenant hypothesis. As I do not use actual threshold values, my interest coverage slack proxy may be noisy. I, therefore, also employ interest coverage ratio itself to check the robustness of the main results. To do so, I replace interest coverage slack proxy (*IC_PROXY*) with interest coverage ratio (*IC*) in regression (5) and rerun it. The results are presented in Table 3.8.

[Table 3.8 around here]

The table shows that the coefficient on *IC*×*SEO*×*POST* interaction variable is significantly positive. The implication is that the use of RAM to avoid the possibility of interest coverage covenant violations decreases following SEOs. This is because the interest coverage ratio is inversely related to the likelihood of covenant violation. Overall, the main results are robust to the alternative proxy for covenant violation.

3.5.4 The effect of syndicated lending on the debt covenant hypothesis

Firms can also obtain additional funds by raising syndicated loans. Recent studies analyse whether firms window dress their accounting numbers around syndicated lending. El-Mahdy and Cheng (2014) find that earnings are manipulated around a syndicated loan

origination. Firms entering a new debt contract by taking syndicated loans increase their overall debt level. The existing research examines the relationship between earnings management and debt level and document inconclusive results. For example, Ghosh and Moon (2010) find a positive relationship while Ahn and Choi (2009) a negative association. Although taking new syndicated loans increases firms' leverage ratio, it does not follow that their financial ratio covenants deteriorate leading them to increase earnings management. This is because syndicated loans are mainly originated by large and healthy firms that also are more likely to employ the new funds efficiently. As such, there is no evidence that entering a new debt contract with covenants via syndicated loans moves their financial ratios closer to their threshold levels and thus, increases the demand for earnings management. Thus I also tests the effect of additional funds raised via syndicated loans on the debt covenant hypothesis. To do so, I run regression (5) for syndicated borrowers and matched non-syndicated borrowers. As can be seen in Table 3.9, the use of RAM to avoid interest coverage covenant violations does not change following syndicated lending.

[Table 3.9 around here]

3.5.5 Non-frequent issuers

Some firms may make SEOs frequently and they may have different earnings management policy. Dechow, Sloan, and Sweeney (1996) state that firms that raise external capital frequently are less likely to manage earnings because they want to have a positive reputation in the market so that to conduct subsequent offerings successfully. Hence, such firms may decrease or not to do manipulations to avoid covenant violations in the post-issue period. To check the robustness of the main findings, frequent issuers are excluded from the sample.[41] Those that make more than one SEO in a two-year period are defined as frequent

[41] 36 frequent issuers are found in the SEO sample.

issuers following Shivakumar (2000). Regression (5) is re-run after the exclusion of frequent issuers and the findings are reported in Table 3.10. The results are consistent with the overall conclusion of my main findings.

[Table 3.10 around here]

3.6 Conclusions

This study examines the effect of SEOs on the debt covenant hypothesis using a sample of UK firms for the years 2005-2013. Specifically, it tests whether SEO firms' use of real activities manipulation to remain within interest coverage covenant limits is different in the post-issue period relative to the pre-issue period. Using a difference in differences design, it finds that SEO firms engage less in real activities manipulation to avoid the possibility of interest coverage covenant violations in the post-issue period relative to the pre-issue period. The results show that the decrease in the use of RAM in the post SEO period to avoid the likelihood of breaching interest coverage covenant is more pervasive among SEO firms with low market to book ratios or high financial leverage. This suggests that firms use at least some of their SEO proceeds to reduce their debt and this improves their interest coverage covenant. Consequently, the results suggest that SEOs have a strong effect on the debt covenant hypothesis.

Additional analysis also tests the effect of SEOs on the debt covenant hypothesis using accruals management and classification shifting measures of earnings management. I find that firms do not engage in these earnings management methods to avoid the possibility of interest coverage covenant violations and this behaviour does not change following SEOs. Lastly, I find that the main results are robust to the exclusion of SEO firms with syndicated loans and to an alternative proxy for covenant violation.

Table 3.1

Descriptive statistics

Panel A: SEO and non-SEO firms during the whole sample period

Variables	SEO firms			Non-SEO firms				
	N	Mean	Median	N	Mean	Median	Diff. in Mean	Diff. in median
$A\_RAM_{i,t}$	846	0.031	0.045	690	-0.025	0.010	***	***
$A\_PROD_{i,t}$	846	0.016	0.026	690	-0.005	0.016	**	*
$A\_DISX_{i,t}$	846	0.008	0.026	690	-0.013	0.006	**	**
$A\_CFO_{i,t}$	846	0.006	0.007	690	-0.007	-0.001	***	***
$IC\_PROXY_{i,t-1}$	846	5.349	1.978	690	7.466	3.231	***	***
$MV_{i,t}$	846	4.891	4.922	690	4.907	5.048		
$Z\_SCORE_{i,t}$	846	2.595	2.678	690	3.901	3.668	***	***
$CAPEX_{i,t}$	846	0.037	0.023	690	0.036	0.024		
$GROWTH_{i,t}$	846	0.077	0.056	690	0.061	0.042		
$LEV_{i,t}$	846	0.257	0.233	690	0.213	0.195	***	***
$CL_{i,t}$	846	0.308	0.270	690	0.348	0.323	***	***
$MTB_{i,t}$	846	1.757	1.188	690	2.215	1.452	**	***

Notes

$A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_PROD_{i,t}$ is abnormal levels of production costs, $A\_DISX_{i,t}$ is abnormal levels of discretionary expenses, $A\_CFO_{i,t}$ is abnormal levels of cash flows from operations, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets, $MTB_{i,t}$ is the market to book ratio.

***/**/* indicate significance at 1%/5%/10%

Panel B: SEO and non-SEO firms in the pre-offer year

	SEO firms			Non-SEO firms				
Variables	N	Mean	Median	N	Mean	Median	Diff. in Mean	Diff. in Median
$A\_RAM_{i,t}$	232	0.022	0.025	232	-0.011	0.031		
$A\_PROD_{i,t}$	232	0.017	0.018	232	0.003	0.031		
$A\_DISX_{i,t}$	232	-0.004	0.011	232	-0.010	0.009		
$A\_CFO_{i,t}$	232	0.008	0.013	232	-0.003	0.001	*	*
$IC\_PROXY_{i,t-1}$	232	4.771	1.739	232	7.769	3.350	***	***
$MV_{i,t}$	232	4.461	4.387	232	4.731	4.863		
$Z\_SCORE_{i,t}$	232	1.161	2.026	232	4.165	3.908	***	***
$CAPEX_{i,t}$	232	0.040	0.026	232	0.035	0.022		
$GROWTH_{i,t}$	232	0.092	0.081	232	0.078	0.057		
$LEV_{i,t}$	232	0.271	0.242	232	0.205	0.186	***	***
$CL_{i,t}$	232	0.332	0.291	232	0.340	0.319		
$MTB_{i,t}$	232	1.696	1.158	232	1.747	1.392		

Notes

$A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_PROD_{i,t}$ is abnormal levels of production costs, $A\_DISX_{i,t}$ is abnormal levels of discretionary expenses, $A\_CFO_{i,t}$ is abnormal levels of cash flows from operations, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets, $MTB_{i,t}$ is the market to book ratio.

***/**/* indicate significance at 1%/5%/10%

Table 3.2

Univariate analysis

Panel A: Univariate analysis for SEO firms

Year	N	$LEV_{i,t}$ Median	$CAPEX_{i,t}$ Median	$CASH_{i,t}$ Median	$IC\_PROXY_{i,t-1}$ Median
-1	232	0.24	0.03	0.05	1.74
0	240	0.24	0.02	0.06	1.90
1	214	0.21	0.02	0.05	1.91
2	155	0.21	0.02	0.05	2.05
3	116	0.21	0.02	0.05	2.34

Panel B: Univariate analysis for non-SEO firms

Year	N	$LEV_{i,t}$ Median	$CAPEX_{i,t}$ Median	$CASH_{i,t}$ Median	$IC\_PROXY_{i,t-1}$ Median
-1	232	0.19	0.02	0.06	3.35
0	192	0.18	0.02	0.07	3.80
1	131	0.19	0.02	0.07	3.80
2	94	0.19	0.03	0.07	3.80
3	63	0.17	0.03	0.07	3.65

Notes

$LEV_{i,t}$ is leverage ratio, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $CASH_{i,t}$ is cash scaled by total assets, and $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy.

Table 3.3

The effect of SEOs on the debt covenant hypothesis

Variables	(1) $A\_RAM_{i,t}$	(2) $A\_PROD_{i,t}$	(3) $A\_DISX_{i,t}$	(4) $A\_CFO_{i,t}$
$IC\_PROXY_{i,t-1}$	-0.0039	-0.0020*	-0.0015*	-0.0004
	(-1.841)	(-1.991)	(-1.986)	(-1.154)
$SEO_{i,t}$	0.0465**	0.0144	0.0270**	0.0051*
	(2.780)	(1.423)	(3.200)	(1.970)
$POST_{i,t}$	-0.0380	-0.0198	-0.0230*	0.0049
	(-1.639)	(-1.559)	(-2.129)	(0.943)
$IC\_PROXY_{i,t-1}*SEO_{i,t}$	0.0007	0.0007	-0.0002	0.0001
	(0.326)	(0.801)	(-0.174)	(0.276)
$IC\_PROXY_{i,t-1}*POST_{i,t}$	-0.0018	-0.0010*	-0.0005	-0.0002
	(-1.389)	(-1.962)	(-0.876)	(-0.751)
$SEO_{i,t}*POST_{i,t}$	-0.0073	-0.0082	0.0003	0.0006
	(-0.413)	(-0.582)	(0.027)	(0.135)
$IC\_PROXY_{i,t-1}*SEO_{i,t}*POST_{i,t}$	0.0043**	0.0021**	0.0021*	0.0001
	(2.701)	(2.746)	(2.040)	(0.238)
$MV_{i,t}$	0.0178***	0.0080***	0.0127***	-0.0029***
	(6.875)	(5.521)	(8.724)	(-4.302)
$Z\_SCORE_{i,t}$	-0.0054***	-0.0036***	0.0005	-0.0024***
	(-5.538)	(-8.677)	(0.821)	(-11.602)
$CAPEX_{i,t}$	-1.3830***	-0.7542***	-0.1903**	-0.4385***
	(-7.683)	(-6.744)	(-2.754)	(-9.682)
$GROWTH_{i,t}$	-0.1049***	0.0146	-0.1323***	0.0128
	(-4.132)	(1.009)	(-5.953)	(1.357)
$LEV_{i,t}$	-0.1815*	-0.1046*	-0.0068	-0.0701***
	(-2.291)	(-2.414)	(-0.167)	(-5.755)
$CL_{i,t}$	-0.0197	-0.0085	0.0554	-0.0665***
	(-0.273)	(-0.220)	(1.771)	(-6.488)
$MTB_{i,t}$	-0.0015	-0.0009	-0.0000	-0.0006
	(-0.819)	(-0.841)	(-0.000)	(-1.449)
$ISSUE_{i,t}$	-0.0140	-0.0048	-0.0179	0.0087**
	(-0.449)	(-0.268)	(-1.262)	(2.761)
Constant	0.1664*	0.0925**	-0.0269	0.1009***
	(2.442)	(2.929)	(-0.702)	(8.094)
Industry dummies	Yes	Yes	Yes	Yes
Observations	1,536	1,536	1,536	1,536
Adjusted R-squared	0.069	0.060	0.060	0.171

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $A\_PROD_{i,t}$ is abnormal levels of production costs, $A\_DISX_{i,t}$ is abnormal levels of discretionary expenses, $A\_CFO_{i,t}$ is abnormal levels of cash flows from operations, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-

SEO firms in the post-issue years and 0 otherwise, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 3.4

SEO firms with low and high market to book ratios

Variables	(1) Low market to book $A\_RAM_{i,t}$	(2) High market to book $A\_RAM_{i,t}$
$IC\_PROXY_{i,t-1}$	-0.0020	-0.0040
	(-0.702)	(-1.459)
$SEO_{i,t}$	0.1021**	-0.0250
	(3.050)	(-0.943)
$POST_{i,t}$	0.0048	-0.0644
	(0.137)	(-1.872)
$IC\_PROXY_{i,t-1}*SEO_{i,t}$	-0.0018	0.0012
	(-0.713)	(0.460)
$IC\_PROXY_{i,t-1}*POST_{i,t}$	-0.0140**	0.0040
	(-3.576)	(1.429)
$SEO_{i,t}*POST_{i,t}$	-0.1346***	0.1161**
	(-4.084)	(2.810)
$IC\_PROXY_{i,t-1}*SEO_{i,t}*POST_{i,t}$	0.0168***	-0.0012
	(3.651)	(-0.448)
$MV_{i,t}$	0.0110**	0.0401***
	(3.270)	(6.662)
$Z\_SCORE_{i,t}$	-0.0014	-0.0102***
	(-1.139)	(-6.143)
$CAPEX_{i,t}$	-1.3972***	-1.2388***
	(-4.838)	(-5.350)
$GROWTH_{i,t}$	-0.0554**	-0.1802***
	(-3.151)	(-5.948)
$LEV_{i,t}$	-0.4034**	0.0839
	(-3.419)	(0.854)
$CL_{i,t}$	0.1638	-0.0652
	(1.519)	(-0.628)
$MTB_{i,t}$	0.0003	-0.0071**
	(0.186)	(-3.367)
$ISSUE_{i,t}$	-0.0344	0.0043
	(-0.991)	(0.071)
Constant	0.2101	-0.0017
	(1.712)	(-0.019)
Industry dummies	Yes	Yes
Observations	862	674
Adjusted R-squared	0.081	0.170

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-SEO firms in the post-issue years and 0 otherwise, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital

expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 3.5

SEO firms with high and low financial leverage

Variables	(1) High leverage $A\_RAM_{i,t}$	(2) Low leverage $A\_RAM_{i,t}$
$IC\_PROXY_{i,t-1}$	-0.0030	-0.0048*
	(-0.938)	(-2.146)
$SEO_{i,t}$	0.0693**	0.0408
	(2.653)	(1.837)
$POST_{i,t}$	0.0186	-0.0667
	(0.429)	(-1.797)
$IC\_PROXY_{i,t-1}*SEO_{i,t}$	-0.0050	0.0017
	(-1.318)	(0.783)
$IC\_PROXY_{i,t-1}*POST_{i,t}$	-0.0185***	0.0035
	(-5.012)	(1.428)
$SEO_{i,t}*POST_{i,t}$	-0.0983*	0.0569*
	(-2.251)	(1.985)
$IC\_PROXY_{i,t-1}*SEO_{i,t}*POST_{i,t}$	0.0197*	-0.0013
	(2.237)	(-0.624)
$MV_{i,t}$	0.0281***	0.0147*
	(9.377)	(2.389)
$Z\_SCORE_{i,t}$	-0.0077***	-0.0013
	(-8.710)	(-0.667)
$CAPEX_{i,t}$	-1.3201***	-1.4005***
	(-4.742)	(-3.734)
$GROWTH_{i,t}$	-0.1512***	-0.0933
	(-3.902)	(-1.680)
$LEV_{i,t}$	-0.4014**	-0.2505**
	(-3.118)	(-2.739)
$CL_{i,t}$	-0.1182	0.2257**
	(-1.120)	(3.270)
$MTB_{i,t}$	0.0029*	-0.0316**
	(2.029)	(-2.458)
$ISSUE_{i,t}$	0.0238	-0.0249
	(0.561)	(-1.111)
Constant	0.2596**	0.1366*
	(2.916)	(2.364)
Industry dummies	Yes	Yes
Observations	734	802
Adjusted R-squared	0.153	0.141

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-SEO firms in the post-issue years and 0

otherwise, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 3.6

Accruals management and classification shifting

Variables		(1) $A\_WCA_{i,t}$	(2) $CS_{i,t}$
$IC\_PROXY_{i,t-1}$		-0.0003	0.0082
		(-0.717)	(1.058)
$SEO_{i,t}$		0.0110	-0.0399
		(1.231)	(-0.362)
$POST_{i,t}$		0.0199**	0.0873
		(2.592)	(0.398)
$IC\_PROXY_{i,t-1}*SEO_{i,t}$		-0.0002	0.0229
		(-0.453)	(1.591)
$IC\_PROXY_{i,t-1}*POST_{i,t}$		-0.0001	-0.0054
		(-0.189)	(-0.577)
$SEO_{i,t}*POST_{i,t}$		-0.0174*	0.2237
		(-2.288)	(1.309)
$IC\_PROXY_{i,t-1}*SEO_{i,t}*POST_{i,t}$		0.0002	-0.0156
		(0.424)	(-1.270)
$MV_{i,t}$		-0.0047**	0.1592***
		(-2.649)	(6.743)
$Z\_SCORE_{i,t}$		0.0013**	-0.0509***
		(3.501)	(-7.488)
$CAPEX_{i,t}$		-0.2460**	-1.3357**
		(-3.289)	(-2.223)
$GROWTH_{i,t}$		-0.0193	-0.4399*
		(-1.794)	(-1.819)
$LEV_{i,t}$		-0.0428	0.5005
		(-1.530)	(1.178)
$CL_{i,t}$		-0.1382***	-1.8337***
		(-5.972)	(-3.136)
$MTB_{i,t}$		0.0009	-0.0217
		(0.914)	(-1.521)
$ISSUE_{i,t}$		-0.0020	-0.1328
		(-0.220)	(-1.003)
Constant		0.0822**	-0.8373*
		(3.518)	(-1.898)
Industry dummies		Yes	Yes
Observations		1,536	1,529
Adjusted R-squared	0.050	Pseudo R-squared	0.051

Notes

t- statistics and *z*-statistics (in parentheses) based on robust standard errors clustered by year. $A\_WCA_{i,t}$ is abnormal working capital accruals, $CS_{i,t}$ is a dummy variable that is equal to 1 for firms have positive unexpected core earnings and higher I/B/E/S earnings than net income per share and 0 otherwise, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-SEO firms in the post-issue

years and 0 otherwise, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 3.7

The effect of SEOs on the debt covenant hypothesis excluding syndicated borrowers

Variables	$A\_RAM_{i,t}$
$IC\_PROXY_{i,t-1}$	-0.0027
	(-1.320)
$SEO_{i,t}$	0.0587*
	(2.049)
$POST_{i,t}$	-0.0397
	(-1.799)
$IC\_PROXY_{i,t-1}*SEO_{i,t}$	0.0001
	(0.055)
$IC\_PROXY_{i,t-1}*POST_{i,t}$	-0.0011
	(-0.801)
$SEO_{i,t}*POST_{i,t}$	0.0100
	(0.306)
$IC\_PROXY_{i,t-1}*SEO_{i,t}*POST_{i,t}$	0.0043*
	(1.979)
$MV_{i,t}$	0.0207***
	(7.710)
$Z\_SCORE_{i,t}$	-0.0050**
	(-3.399)
$CAPEX_{i,t}$	-1.7342***
	(-8.366)
$GROWTH_{i,t}$	-0.1035*
	(-2.209)
$LEV_{i,t}$	0.0487
	(0.590)
$CL_{i,t}$	0.0146
	(0.290)
$MTB_{i,t}$	-0.0059
	(-1.696)
$ISSUE_{i,t}$	0.0009
	(0.029)
Constant	0.1898***
	(3.949)
Industry dummies	Yes
Observations	1,050
Adjusted R-squared	0.073

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-SEO firms in the post-issue years and 0 otherwise, $MV_{i,t}$

is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 3.8

Alternative proxy for covenant violation

Variables	$A\_RAM_{i,t}$
$IC_{i,t}$	-0.0023**
	(-2.694)
$SEO_{i,t}$	0.0414**
	(2.584)
$POST_{i,t}$	-0.0412
	(-1.882)
$IC_{i,t}*SEO_{i,t}$	0.0006
	(1.226)
$IC_{i,t}*POST_{i,t}$	-0.0000
	(-0.028)
$SEO_{i,t}*POST_{i,t}$	-0.0139
	(-0.806)
$IC_{i,t}*SEO_{i,t}*POST_{i,t}$	0.0014*
	(1.904)
$MV_{i,t}$	0.0178***
	(6.726)
$Z\_SCORE_{i,t}$	-0.0048***
	(-5.371)
$CAPEX_{i,t}$	-1.3697***
	(-7.919)
$GROWTH_{i,t}$	-0.1081***
	(-4.548)
$LEV_{i,t}$	-0.2206**
	(-2.474)
$CL_{i,t}$	-0.0104
	(-0.152)
$MTB_{i,t}$	-0.0013
	(-0.728)
$ISSUE_{i,t}$	-0.0139
	(-0.443)
Constant	0.1833**
	(2.648)
Industry dummies	Yes
Observations	1,536
Adjusted R-squared	0.074

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $IC_{i,t}$ is the interest coverage ratio, $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-SEO firms in the post-issue

years and 0 otherwise, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 3.9

The effect of syndicated lending on the debt covenant hypothesis

Variables	$A\_RAM_{i,t}$
$IC\_PROXY_{i,t-1}$	-0.0007
	(-0.877)
$SYND_{i,t}$	0.0114
	(0.360)
$POST_{i,t}$	0.0219
	(1.214)
$IC\_PROXY_{i,t-1}*SYND_{i,t}$	-0.0051**
	(-2.453)
$IC\_PROXY_{i,t-1}*POST_{i,t}$	0.0004
	(0.679)
$SYND_{i,t}*POST_{i,t}$	0.0092
	(0.291)
$IC\_PROXY_{i,t-1}*SYND_{i,t}*POST_{i,t}$	0.0013
	(0.575)
$MV_{i,t}$	0.0030
	(0.550)
$Z\_SCORE_{i,t}$	-0.0077***
	(-6.075)
$CAPEX_{i,t}$	-1.2751***
	(-5.792)
$GROWTH_{i,t}$	-0.0506
	(-1.745)
$LEV_{i,t}$	-0.0053
	(-0.343)
$CL_{i,t}$	0.1464**
	(3.228)
$MTB_{i,t}$	-0.0023
	(-1.091)
$LOAN_{i,t}$	0.0218
	(1.579)
Constant	0.1404**
	(3.522)
Industry dummies	Yes
Observations	1,361
Adjusted R-squared	0.077

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $SYND_{i,t}$ is a dummy variable that is equal to 1 for syndicated borrowers and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both syndicated and non-syndicated borrowers in the post-issue years and 0 otherwise, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is the

Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $LOAN_{i,t}$ is a dummy variable that is equal to1 in the syndicated lending year and 0 otherwise

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 3.10

Non-frequent issuers

Variables	$A\_RAM_{i,t}$
$IC\_PROXY_{i,t-1}$	-0.0039
	(-1.868)
$SEO_{i,t}$	0.0582**
	(2.949)
$POST_{i,t}$	-0.0369
	(-1.480)
$IC\_PROXY_{i,t-1}*SEO_{i,t}$	0.0014
	(0.666)
$IC\_PROXY_{i,t-1}*POST_{i,t}$	-0.0019
	(-1.433)
$SEO_{i,t}*POST_{i,t}$	-0.0182
	(-0.764)
$IC\_PROXY_{i,t-1}*SEO_{i,t}*POST_{i,t}$	0.0034*
	(1.862)
$MV_{i,t}$	0.0141***
	(7.264)
$Z\_SCORE_{i,t}$	-0.0043***
	(-5.086)
$CAPEX_{i,t}$	-1.4075***
	(-5.274)
$GROWTH_{i,t}$	-0.1058***
	(-5.594)
$LEV_{i,t}$	-0.1600*
	(-1.990)
$CL_{i,t}$	0.0207
	(0.249)
$MTB_{i,t}$	0.0003
	(0.098)
$ISSUE_{i,t}$	-0.0274
	(-1.058)
Constant	0.1555
	(1.909)
Industry dummies	Yes
Observations	1,350
Adjusted R-squared	0.057

Notes

t- statistics (in parentheses) based on robust standard errors clustered by year. $A\_RAM_{i,t}$ is aggregated measure of real activities manipulation, $IC\_PROXY_{i,t-1}$ is the interest coverage covenant slack proxy, $SEO_{i,t}$ is a dummy variable that is equal to 1 for SEO firms and 0 otherwise, $POST_{i,t}$ is a dummy variable that is equal to 1 for both SEO and non-SEO firms in the post-issue years and 0 otherwise, $MV_{i,t}$ is market value, $Z\_SCORE_{i,t}$ is

the Taffler Z-score, $CAPEX_{i,t}$ is the ratio of capital expenditures to total assets, $GROWTH_{i,t}$ is the percentage change in sales, $LEV_{i,t}$ is leverage ratio, $CL_{i,t}$ is the ratio of current liabilities to total assets. $MTB_{i,t}$ is the market to book ratio, and $ISSUE_{i,t}$ is a dummy variable that is equal to1 in the SEO year and 0 otherwise

***/**/* indicate significance at 1%/5%/10% (two tailed).

Chapter 4

Revenue reclassification before and after IFRS

4.1 Introduction

There is a huge literature on earnings management under which accounting information can be manipulated in various ways to mask a firms' true economic performance. One recently established form of earnings management is classification shifting. This is based on the misclassification of items within the income statement but does not change net income. This study investigates the misclassification of revenue items. There are at least two theoretical motivations why firms may engage in this activity. One is based on investor perception of accounting information items. Investors appear to weight individual line items in the income statement differently (Bradshaw & Sloan, 2002; Davis, 2002). In particular, the core revenues item or those close to it tend to be given more weight by financial statement users.[42]

The other motivation is catering theory originally developed in the context of dividends (Baker & Wurgler, 2004).[43] Since then, the concept of catering has become one of the

[42] I use the nomenclature 'core revenues' throughout the paper, when referring to operating revenues (sales) subtotal that generally comes as a first line item on the face of the income statement.

[43] In this context, managers were viewed as catering to investors by paying dividends when investors put a stock price premium on dividends, and by not paying when investors prefer nonpayers.

building blocks of behavioural corporate finance and has been generalized to the idea that managers take non-value maximising actions (e.g. earnings management) to cater for investors to boost their short run share price (Baker & Wurgler, 2012). In this context, misclassification of revenue items can be employed to boost core revenues and, relatedly, core earnings. These can have a positive short run impact on the share price since analysts use them as an input to make price forecasts using the residual income model.

McVay (2006) was the first to find empirical evidence for classification shifting in the context of expense items. She found that US firms engage in classification shifting to manipulate core earnings by shifting core expenses from cost of goods sold and selling, general and administrative expenses to income-decreasing special items. Subsequent studies have also produced empirical evidence that UK firms (Athanasakou, Strong, & Walker, 2011; Zalata & Roberts, 2015) as well as East Asian firms (Haw, Ho, & Li, 2011) misclassify core expenses as non-recurring expenses.

The above studies examined the understatement of core expenses, which generally appear in the income statement after core revenues, for increasing core earnings. Firms, however, can also overstate core earnings by shifting other revenues to core revenues.[44] Indeed, McVay (2006) observed that firms may shift other revenues up the income statement but she left this type of classification shifting for future research. Concern about the reclassification has been shown by organizations such as the Securities and Exchange

[44] Oher revenues are those that firms achieve from non-operating activities (e.g. rental income, investment income) including those from non-recurring items (e.g. gains on disposals of assets). Firms are likely to shift them to core revenues as they are less valuable to investors (Bradshaw & Sloan, 2002; Davis, 2002) and analysts (Abarbanell & Lehavy, 2002) relative to core revenues. I calculate other revenues as the difference between net income pre-tax (adjusted for interest payments) and core earnings where the latter is defined as core revenues minus cost of goods sold minus selling, general and administrative expenses. This difference gives total non-operating items which capture both non-operating revenues and expenses (excluding interest payments) and throughout the paper I use the nomenclature 'other revenues' which refer to total non-operating items. The advantage of using total non-operating items is that they allow having a non-zero number in the dataset in the case when firms successfully shift all their other revenues to core revenues. Having zero other revenues in the dataset is likely to give biased results for examining revenue shifting. I am very thankful to an anonymous reviewer for the valuable comment on this issue.

Commission (SEC). They were particularly worried about the misclassification of income statement line items such as improperly showing investment income or gains on disposals of assets as product or service revenue (SEC, 2000). As an anecdotal example, a global electrical engineering company ABB that has branches in countries such as the USA and the UK was able continually to misclassify other revenues from the sale of fixed assets as core revenues (Jones, 2011).

Firms may have more incentives to inflate core revenues than to understate core expenses through misclassification as an increase in core revenues is more valued by investors than a decrease in core expenses (Ertimur, Livnat, & Martikainen, 2003; Marguardt & Wiedman, 2004). Furthermore, analysts forecast sales, core earnings, and cash flows but not core expenses. Inflating core revenues via classification shifting enables managers to meet both analyst's sales and core earnings forecasts while understating core expenses through shifting they can only meet analyst's core earnings forecasts. Kinney and Trezevant (1997) and Weiss (2001) document that firms are more likely to decrease non-recurring gains to influence investors' perceptions by providing a signal that their earnings are mainly based on recurring operations. These firms may reduce transitory gains by shifting them to core revenues. Existing studies find that core revenues are overestimated via real earnings management by offering price discounts or more lenient credit terms (e.g. Gunny, 2010; Roychowdhury, 2006). This study complements the previous work and can help market participants by alerting them to potential earnings management using revenue shifting for inflating core revenues when a firm does not disclose the components of core revenues and other revenues in its annual report. These factors suggest the importance of examining revenue reclassification in addition to expense misclassification.

The first contribution of this paper is that it extends the classification shifting literature by being the first to examine revenue reclassification. Specifically, it investigates and tests

whether firms shift other revenues to core revenues.[45] This is tested in the context of the UK because the latter provides an interesting laboratory for this test for two reasons. On the one hand, UK firms have followed International Financial Reporting Standards (IFRS) since 2005. As more countries adopt IFRS, considerable effort has focused on the extent to which it influences financial reporting (Christensen, Lee, Walker, & Zeng, 2015; Iatridis, 2012) in the major economies.[46] Thus, focusing on one of the latter enables us to determine whether IFRS allows firms to engage in revenue reclassification. On the other hand, the UK enjoyed one of the highest quality sets of national accounting standards (UK GAAP) prior to IFRS (Horton & Serafeim, 2010). This allows us to ascertain what opportunities (if any) IFRS adoption provided in relation to revenue shifting for UK firms.

Firms can use different items in other revenues to employ revenue shifting depending on the accounting standards in operation. In other words, the scope for firms' revenue reclassification practices depends on the flexibility or strictness of the accounting standards with regard to income statement items. Therefore, the second contribution of this paper is to examine revenue reclassification in the UK setting both under UK GAAP and IFRS to determine which of these standards offer broader scope for this earnings management method.

UK firms followed Financial Reporting Standard No. 3: *Reporting Financial Performance* (FRS 3) to prepare their income statement under UK GAAP from 1993 till IFRS adoption. The main intention of introducing this standard was to improve performance assessments and to constrain earnings manipulations. FRS 3 required firms to disclose

[45] I do not assume that all firms do revenue shifting as the latter may also occur naturally without any accounting manipulation. For instance, a firm may show rental income as core revenues due to the fact that such classification fits its business model. This is because standards such as IFRS give firms flexibility to do their own judgements regarding classification.

[46] In addition to investigating if revenue reclassification also occurs in other countries, it would be useful to determine the extent to which a particular country's GAAP allowed reclassification compared to when IFRS was introduced.

operating profit and core revenues separately on the face of the income statement but they did not define them. Thus, how they are defined is subject to managerial judgement suggesting that firms may classify non-operating revenues such as rental income, ancillary revenues, and investment income as core revenues. FRS 3 also required firms to distinguish operating and non-operating exceptional items and show for the latter certain components separately on the face of the income statement. Although discontinued operations should be shown in the income statement under UK GAAP, their restrictive definition creates room for managerial discretion. Choi, Lin, Walker, and Young (2007) document that FRS 3 improves transparency with regard to non-operating exceptional items but still offers some latitude for managements' opportunistic discretion with regard to operating exceptional items and discontinued operations. This implies that firms may use other revenues from discontinued operations and from operating exceptional items (e.g. foreign currency gains) for revenue shifting under UK GAAP.

IFRS requires firms to disclose revenues but not operating profit. There is a specific standard on revenue, IAS 18, which has a broader scope thus allowing managers more opportunity to determine core revenues (Nobes, 2012). Although IFRS does not require firms to show operating profit on the face of the income statement, it allows firms to present such a subtotal without providing them with guidance. The implication is that firms under IFRS may use non-operating revenues such as investment income and rental income for revenue reclassification just like under UK GAAP. Furthermore, IFRS (IAS 1) has very weak disclosure requirements and guidance for non-recurring items compared to UK GAAP (Zalata & Roberts, 2015). IAS 1 only states that an entity should disclose non-recurring items either on the face of the income statement or in the notes when such items are material. This means that IFRS allows firms to classify transitory gains such as income from the sale of the assets, investments, and changes in exchange rate as core revenues without disclosing

them. I, thus, expect that IFRS broadens the scope for revenue reclassification because of the more flexible requirements for non-recurring items.

I develop an expectation model for decomposing core revenues into expected and unexpected components similar to McVay's (2006) core earnings model. Drawing on 13,915 firm-year observations from all UK listed firms for the 1995-2014 period, I find that unexpected core revenues increase as other revenues decrease. This provides evidence that firms shift other revenues to core revenues, consistent with revenue reclassification. The results show that firms engage in such activities to a greater extent after mandatory IFRS adoption suggesting that the latter offers more latitude for these practices. This supports Zalata and Roberts (2015) who document that IFRS allows firms to have more managerial discretion on classification of non-recurring items.

The final contribution of this paper is that it examines whether firms with strong incentives use revenue reclassification to a greater extent. Existing studies document firms that make seasoned equity offerings (hereafter SEOs), are in financial distress, make acquisitions financed by share for share exchange, and meet certain earnings benchmarks have high incentives to engage in earnings management. Marguardt and Wiedman (2004) find that firms that plan to make equity offerings inflate sales by employing accruals management. A similar result is found by Cohen and Zarowin (2010) with regard to using real earnings management to overestimate sales in the year of the SEOs. Fan and Liu (2015) find that firms shift core expenses both from the cost of goods sold and selling, general and administrative expenses to income-decreasing special items for meeting/beating zero core earnings and prior period core earnings. As revenue reclassification is likely to inflate core revenues and core earnings, I expect that firms conducting SEOs, firms in financial distress, firms with acquisitions financed by share for share exchange, and firms reporting small core earnings or small increases in core earnings employ revenue reclassification to a greater

degree. My results are consistent with this expectation, suggesting that revenue reclassification is more pervasive among firms with strong incentives.

This study proceeds as follows: Section 2 reviews the literature and develops the main hypotheses. Section 3 describes the research design and discusses the data and sample. Section 4 reports the empirical results and Section 5 shows robustness check. Section 6 concludes.

4.2 Literature review and hypothesis development

4.2.1 Literature review

Existing studies have examined three earnings management tools (e.g. Jones, 1991; Roychowdhury, 2006). These are accruals management, real earnings management, and classification shifting.[47] The latter has been the main focus of several recent papers and McVay (2006), using a sample of US firms, was first to analyze the possibility of shifting items intentionally within the income statement. The main advantage of classification shifting is that it does not change bottom line earnings and does not affect long term firm value unlike discretionary accruals and RAM. This may limit the scrutiny of auditors and regulators. McVay found that firms engage in classification shifting to increase core earnings by determining the relationship between core earnings and income-decreasing special items. She explains her results as being due to the shifting of core expenses from the cost of goods sold and selling, general, and administrative expenses to income-decreasing special items. However, she does not test expense shifting directly and core earnings may also go up due to misclassifying transitory gains as core revenues. This suggests that her results must be tempered by the potential for manipulation using revenue shifting rather than expense shifting.

[47] Dechow and Skinner (2000) and Kothari (2001) conduct studies that review discretionary accruals literature while RAM literature can be found in Xu, Taylor, and Dugan (2007).

Fan et al. (2010) also find that US firms use classification shifting and that managers shift core expenses to income-decreasing special items to a greater extent when they cannot manipulate earnings through accruals. Although they do not test expense shifting directly, their results are less biased as they use quarterly data and control for the possibility of inflating core earnings via accruals management. There may be other non-operating items in addition to special items that firms can use to increase core earnings. Barua et al. (2010) address this issue by examining whether firms employ classification shifting using discontinued operations. They document that US firms shift core expenses to income-decreasing discontinued operations to overestimate core earnings.

Several studies test whether firms in other developed economies or in emerging economies use classification shifting. These papers can help to determine the specific requirements of standards that should be in place to deter the misclassification of income statement line items. Athanasakou, Strong, and Walker (2009) examine UK firms' classification shifting in the UK GAAP period. They find that only large firms in their sample shift small core expenses to operating exceptional or to other non-recurring items to overstate core earnings to meet earnings targets. Zalata and Roberts (2015) test expense shifting for UK firms under IFRS and their results suggest that IFRS offers greater latitude for misclassification than UK GAAP. They also find that firms having independent directors, directors with long tenure, audit committees that meet frequently, and have more financial experts appear to be less likely to reclassify core expenses. Haw et al. (2011) document that firms in East Asia using different local GAAP regimes shift core expenses to special items opportunistically to exaggerate core earnings and misclassification is more pervasive when classification shifting enables firms to meet or beat analysts' earnings forecasts. They also find that family controlled firms use more misclassification but firms with a Big-4 auditor or in countries with a well-functioning legal framework are less likely to employ classification

shifting. The implication of the above studies is that relatively rigid accounting standards such as UK GAAP or strong corporate governance are likely to reduce the scope for classification shifting. Therefore, it would be useful if standard setters improve their requirements and guidance regarding key income statement line items to mitigate their possible misclassification.

Research in the area of reclassification was extended by Fan and Liu (2015) who sought to determine how and to what extent reclassification occurred through cost of goods sold and selling, general, and administrative expenses. In other words, they examine expense shifting directly unlike existing relevant studies by regressing core expenses on special items. This can help to determine whether indeed an increase in core earnings was due to expense shifting as documented by prior classification shifting studies. Their results indicate that firms underestimate cost of goods sold via income-decreasing special items to improve their gross margin. In contrast, firms shift core expenses both from cost of goods sold and selling, general, and administrative expenses to income-decreasing special items for meeting/beating zero core earnings, prior period core earnings, and analyst forecasts. Another important contribution of their study is that they also consider the possibility of managing earnings for inflating gross margin which has been largely ignored by previous earnings management studies. Furthermore, they show that firms employ real earnings management and expense reclassification jointly to inflate gross margin and to meet or beat prior period core earnings.[48]

4.2.2 Hypothesis development

This study extends the classification shifting literature by examining whether firms use revenue reclassification to increase core revenues. Firms are likely to have incentives to

[48] Abernathy, Beyer, and Rapley (2014), find that there is tradeoff between classification shifting and real earnings management.

misclassify other revenues as core revenues in addition to expense shifting for a number of reasons. First, revenue reclassification inflates core revenues while expense shifting decreases core expenses. An increase in core revenues is likely to be more appealing to investors than core expense reductions. Anthony and Ramesh (1992) and Ertimur et al. (2003) found that investors value a dollar of core revenues surprises more highly than a dollar decrease in core expenses. Bradshaw and Sloan (2002) and Davis (2002) document that investors give more value to the core revenues subtotal or those individual line items in income statement that are close to it. This suggests that the core revenues item is one of the key indicators that investors consider in assessing a firm's financial performance. Second, analysts make sales and core earnings forecasts while they do not make core expenses forecasts. The implication is that if firms engage in revenue shifting they can meet both sales and core earnings forecasts while expense shifting can help them to meet core earnings forecasts only. The other benefit of using revenue shifting is that it allows firms to manage earnings when real earnings management and accruals management are costly. For instance, firms with higher effective tax rate are likely to use revenue reclassification as the latter increases core earnings without tax consequences unlike real earnings management and accruals management.[49] Third, those firms that have transitory gains are likely to reduce them to signal that their income is mainly based on core earnings. Such firms can reduce their transitory gains by shifting them to core revenues. Kinney and Trezevant (1997) document that firms with gains from non-recurring operations tend to report them in footnotes rather than on the income statement to shift attention away from the transitory nature of these items. Consistent with this, Weiss (2001) found that firms try to decrease their transitory gains by recognizing income-decreasing special items. Furthermore, this

[49] However, the use of revenue shifting can be costly in cases such as when firms have higher institutional ownership and have longer auditor tenure. This is because the misclassification of revenue items can be recognized in such firms.

earnings management method may not be subject to extensive scrutiny by auditors. This is because the classification of some revenues can be subjective which may limit auditors' ability to challenge managements' classification. Also, revenue reclassification does not change bottom-line income which auditors may perceive as less important and therefore they may spend less energy to identify or adjust such misclassification (Nelson, Elliott, & Tarpley, 2002). Overall, the above suggests that firms are likely to have incentives to engage in revenue reclassification. More formally:

H1: Firms engage in revenue reclassification.

Firms can use different items of other revenues to employ revenue shifting depending on the accounting standards in operation. In other words, the scope for firms' revenue reclassification practices depends on the flexibility or strictness of accounting standards. I, thus, discuss UK GAAP and IFRS to provide examples for the mechanism of revenue reclassification and, more importantly, to determine which of these standards are likely to offer broader scope for revenue shifting.

UK firms followed FRS 3 to prepare their income statement under UK GAAP from 1993 till 2005. The main intention of introducing this standard was to improve performance assessments and to constrain earnings manipulations. FRS 3 required firms to disclose operating profit and core revenues separately on the face of the income statement but it did not define them. Their definitions are subject to managerial judgement suggesting that there may be opportunity for management to classify non-operating revenues such as rental income, ancillary revenues, and investment income as core revenues.[50] FRS 3 also required that companies should distinguish between operating and non-operating exceptional items. UK firms had to show 3 types of non-operating exceptional items: 1) profits or losses on the

[50] Ancillary revenues are generated from the sale of products (services) that are not the main products (services) of the company. For example, baggage fees and food or beverage sales at petrol stations are ancillary revenues for airline and oil firms, respectively.

sale or termination of an operation 2) fundamental reorganization or restructuring costs and 3) profits or losses on the disposal of fixed assets after operating profit on the face of the income statement. The implication is that UK firms had limited or no opportunity to use these non-recurring items for classification shifting. Regarding operating exceptional items, firms could show them either as footnotes or on the face of the income statement. Furthermore, although discontinued operations should be shown in the income statement under UK GAAP, the restrictive definition used for discontinued operations creates room for managerial discretion. Choi et al. (2007) document that FRS 3 improves transparency with regard to non-operating exceptional items but still offers some latitude for managements' opportunistic discretion regarding operating exceptional items and discontinued operations. This suggests that non-recurring items such as gains from discontinued operations and income from operating exceptional items (e.g. net foreign exchange gains) offer latitude for revenue reclassification. Therefore, a further scope for revenue reclassification under UK GAAP is that firms may use such types of income-increasing non-recurring items to inflate core revenues.

By contrast IFRS does not require firms to disclose operating profits or to distinguish different types of non-recurring items on the face of the income statement and does not list the items that should be taken into account when working out core earnings. In other words, it does not have particular requirements for core revenues and core expenses which help to determine operating profit. However, it allows firms to disclose as many subtotals as they wish if they believe such items help users to understand their financial performance. IFRS permits companies to determine core revenues and core earnings based on the nature of their operations. This in turn is likely to create scope for potential revenue reclassification.

Revenue recognition under IFRS, IAS 18 defines those transactions as revenue that arises from the ordinary activities of an entity. It captures revenues from the sale of goods,

the rendering of services, and the use by others of entity assets giving rise to interest, dividends and royalties. The main limitation of this standard is that it has a broad scope as the revenue item conventionally comes first in the income statement and mainly covers a firm's trading activities. In this case, interest or dividends are not revenue for non-financial firms but are defined as revenue in IAS 18 (Nobes, 2012). Furthermore, IFRS (IAS 1) does not require firms to present finance income separately on the face of the income statement and allows them to make their own judgments for the classification of such items.[51] This lack of guidance and requirements may allow firms to engage in revenue reclassification by classifying dividends or interest income as part of the first income statement line item. A further scope for revenue shifting under IFRS is likely to be due to the other income or other operating profit items. This is because IFRS does not require firms to disclose other operating profit or other income subtotals but allows them to do this without providing detailed guidance. For instance Next plc (Annual Report, 2012) shows rental income from operating lease as part of core revenues while Morrison Supermarkets (Annual Report, 2013) shows it as part of other operating income.

The requirements for non-recurring items are more flexible and less rigid under IFRS than under UK GAAP. IAS 1 merely provides firms with guidance by stating that an entity should disclose non-recurring items either on the face of the income statement or in the notes when such items are material. Zalata and Roberts (2015) show that the lack guidance for non-recurring items under IFRS offers more latitude for classification shifting. The implication is that IFRS may encourage firms to classify transitory gains as core revenues without disclosing them.[52] These transitory items could be gains from the sale of assets/ investments and the gain/loss arising from a change in exchange rates.

[51] An entity may include finance income in core revenues or in other operating income/other income subtotals depending on the view they take.

[52] Firms, however, may not be able to use gains from discontinued operations under IFRS. This is because IFRS 5 (the main relevant standard on discontinued operations under IFRS) provides detailed guidance about

Overall, the above discussion suggests that UK GAAP offers some scope for revenue reclassification but IFRS offers even greater scope for this earnings management method. Therefore, I expect that mandatory IFRS adoption increases the use of revenue reclassification. More formally:

H2: Firms engage in revenue reclassification to a greater extent after mandatory IFRS adoption.

The literature provides evidence that firms such as those conducting SEOs, in financial distress, with acquisitions financed by share for share exchange, and meeting earnings benchmarks have greater incentives to engage in earnings management. Firms engaging in SEOs have a strong incentive to overestimate earnings in the issue year to maximize their short run share price and thus their SEO proceeds. This incentive is consistent with the Baker, Rubak, and Wurgler (2007) catering approach where managers seek to boost their firm's short run price for their own ends. It also links neatly with misvaluation[53] approaches where overvalued firms use market timing to take advantage of temporary mispricing when raising external funds. The empirical evidence for managing earnings at the time of SEOs is provided by Marguardt and Wiedman (2004) and Cohen and Zarowin (2010) who find that firms inflate sales around this corporate event via accruals management and real earnings management, respectively.

Firms in financial distress have strong incentives to manage core earnings especially to avoid costly actions or being placed into receivership (Franz, HassabElnaby, & Lobo, 2014).

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the conditions when an asset can be classified as held for sale, the measurement of an asset or disposal group and the disclosure and presentation of an asset in the financial statements. In particular, IFRS 5 requires firms to disclose revenue, expenses, income tax expense of discontinued operations either in the notes or income statement but post-tax profit or loss of discontinued operations on the face of the income statement and cash flow statement.

[53] See Shleifer and Vishny (2003) and Dong, Hirshleifer, Richardson, and Teoh (2006) for behavioural misvaluation approaches and Rhodes-Kropf, Robinson, and Viswanathan (2005) for a rational misvaluation approach.

This is more likely to be pervasive among firms in financial distress in the UK where firms operate under a debt-friendly bankruptcy code.[54] Similarly, Botsari and Meeks (2008) find that acquirers manage earnings to increase their share price prior to a share for share bid. Furthermore, Fan and Liu (2015) find that firms have strong incentives to shift core expenses both from the cost of goods sold and selling, general, and administrative expenses to income-decreasing special items to meet earnings benchmarks such as zero core earnings and prior year's core earnings and this is consistent with the results of Fan et al. (2010). The main motivation for meeting earnings benchmarks is related to market-based benefits. For example, Barth, Elliott, and Finn (1999) document that firms which meet prior year's earnings have higher price-earnings multiples compared to those who do not. Jiang (2008) finds that firms which exceed the zero earnings benchmark also have lower costs of debt.

Based on above, I expect that firms conducting SEOs, firms in financial distress, firms with acquisitions financed by share for share exchange, and firms reporting small core earnings or small increases in core earnings employ revenue reclassification to a greater degree. These firms' revenue shifting practices may be missed by auditors as such classification may fit their business model. More formally:

H3A: Firms engage in revenue reclassification to a greater extent when they conduct SEOs.

H3B: Firms engage in revenue reclassification to a greater extent when they are in financial distress.

H3C: Firms engage in revenue reclassification to a greater extent when they use their shares to pay for acquisitions.

H3D: Firms engage in revenue reclassification to a greater extent when they report small core earnings.

[54] See Acharya, Sundaram, and John (2011) for more details of bankruptcy codes in the UK.

H3E: Firms engage in revenue reclassification to a greater extent when they report small increases in core earnings.

4.3 Research design and data

4.3.1 Measuring revenue reclassification

This section outlines my methodology to estimate revenue reclassification. I expect that core revenues of firms are inflated in the year in which the components of other revenues are not disclosed. I model the level of core revenues and anticipate that unexpected core revenues (reported core revenues less expected core revenues) in year *t* increase as other revenues in year *t* decrease if managers use revenue reclassification. Thus, I expect firms that engage in revenue reclassification to have a higher than expected level of core revenues in year *t*.

I develop the following model to estimate the expected level of core revenues:

$$\frac{CR_{i,t}}{AT_{i,t-1}} = \alpha_0 + \beta_1 \frac{1}{AT_{i,t-1}} + \beta_2 \frac{CR_{i,t-1}}{AT_{i,t-2}} + \beta_3 \frac{TR_{i,t-1}}{AT_{i,t-2}} + \beta_4 \frac{TR_{i,t}}{AT_{i,t-1}} + e_{i,t} \quad (1)$$

where $CR_{i,t}$ is core revenues for firm *i* in year *t*; $AT_{i,t-1}$ is total assets; $TR_{i,t}$ is trade receivables.

The independent variables in model (1) are designed to control for factors that are likely to affect the expected level of core revenues. All variables are scaled by lagged total assets. The latter is used as a deflator following Roychowdhury (2006) and Fan and Liu (2015) who develop models for the expected level of core expenses. Similar to the studies that estimate earnings management measures, a scaled intercept is included (e.g. Fan & Liu, 2015; Gunny, 2010; Roychowdhury, 2006).[55] This helps to avoid a spurious correlation between scaled core revenues and scaled trade receivables due to the variation in scaling variable, total assets. Lagged core revenues ($CR_{i,t-1}$) are included to control for core revenues persistence. In other words, previous year's core revenues are a good proxy to predict the following

[55] The main results do not change if I do not include the scaled intercept.

year's core revenues. Sloan (1996) finds that current accruals are negatively associated with future earnings performance. Since my model is concerned with estimating core revenues I believe it is more appropriate to use trade receivables rather than total accruals because the former is likely to be more directly related to core revenues. Following the argument by Sloan (1996) I include lagged trade receivables ($TR_{i,t-1}$) as they may possibly affect the current level of core revenues.[56] DeAngelo, DeAngelo, and Skinner (1994) find that there is a positive correlation between extreme performance and accrual levels. This suggests that firms with unusually high core revenues are likely to have high trade receivables. I, thus, also include current-year trade receivables ($TR_{i,t}$) in my model. Moreover, a large value for trade receivables can also be due to accruals earnings management and so, the inclusion of this variable should ensure that I only capture any excess core revenues associated with revenue reclassification.[57]

Model (1) is estimated cross-sectionally for each industry-year to control for macroeconomic and industry shocks similar to the other earnings management models (e.g. Fan & Liu, 2015; McVay, 2006). Unexpected core revenues are calculated as the difference between reported and expected core revenues, where the latter are estimated using the coefficients from model (1).

4.3.2 Regression models

Hypothesis 1 states that firms reclassify other revenues as core revenues. Since I anticipate that unexpected core revenues increase as other revenues decrease if managers use revenue reclassification, the former is regressed on the latter along with the control variables to test Hypothesis 1. The regression is:

[56] The main results do not alter if I use working capital accruals or total accruals instead of trade receivables in model (1). I also tried a model including the change in trade receivables as an independent variable and obtained similar results.

[57] As core revenues can also be inflated via real earnings management (e.g. Gunny, 2010; Roychowdhury, 2006), I mitigate this possibility by using control variables when I regress unexpected core revenues on other revenues.

$$UE\_CR_{i,t} = \alpha_0 + \alpha_1 OR_{i,t} + \alpha_2 ROA_{i,t} + \alpha_3 LEV_{i,t} + \alpha_4 NOA_{i,t-1} + \alpha_5 SIZE_{i,t-1} + \alpha_6 CL_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $UE\_CR_{i,t}$ is unexpected core revenues for firm *i* in year *t*; $OR_{i,t}$ is other revenues, defined as net income pre-tax plus interest payments minus core earnings divided by lagged total assets. Hypothesis 1 predicts α_1 to be negative in regression (2).

$ROA_{i,t}$, $LEV_{i,t}$, $NOA_{i,t-1}$, $SIZE_{i,t-1}$, and $CL_{i,t}$ are added as control variables to the linear regression model (2) following the earnings management literature (e.g. Roychowdhury, 2006). $ROA_{i,t}$, is return on asset, defined as net income for firm *i* in year *t* scaled by lagged total assets and is added to control for firm performance. $LEV_{i,t}$ is leverage ratio, defined as the sum of, long term debt and debt in current liabilities (short-term debt) divided by lagged total assets. This is included as a control for capital structure. $NOA_{i,t-1}$ is net operating assets, defined as common equity minus cash and short-term investment plus total debt divided by lagged total assets. This is added to control for the use of earnings management proxies. $SIZE_{i,t-1}$ is the natural logarithm of the lagged total assets and is included to control for firm size. $CL_{i,t}$ is ratio of current liabilities excluding short-term debt to total assets and is added to control for short-term liabilities.

Hypothesis 2 states that firms engage in revenue reclassification to a greater extent after mandatory IFRS adoption. To test this, I extend regression (2) by adding a dummy variable, *IFRS*, that is equal to one for the years after 2005 and zero otherwise, and its interaction with other revenues (*OR*). Accordingly the regression is:

$$UE\_CR_{i,t} = \alpha_0 + \alpha_1 OR_{i,t} + \alpha_2 IFRS_{i,t} + \alpha_3 OR_{i,t} \times IFRS_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 NOA_{i,t-1} + \alpha_7 SIZE_{i,t-1} + \alpha_8 CL_{i,t} + \varepsilon_{i,t} \quad (3)$$

Hypothesis 2 predicts α_3 to be negative in regression (3).

To test whether firms with high incentives employ revenue reclassification to a greater extent (H3A, H3B, H3C, H3D. and H3E), I extend regression (2) by adding a dummy

variable, *INSTV*¸ that is equal to one for firms with high incentives and zero otherwise, and its interaction with other revenues (*OR*). Accordingly the regression is:

$$UE\_CR_{i,t} = \alpha_0 + \alpha_1 OR_{i,t} + \alpha_2 INSTV_{i,t} + \alpha_3 OR_{i,t} \times INSTV_{i,t} + \alpha_4 ROA_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 NOA_{i,t-1} + \alpha_7 SIZE_{i,t-1} + \alpha_8 CL_{i,t} + \varepsilon_{i,t} \quad (4)$$

where $INSTV_{i,t}$ is defined in five alternatives ways. The first is for firms conducting SEOs, ($INSTV_{i,t} = SEO_{i,t}$). $SEO_{i,t}$ is equal to one for firm-years that are in the top quartile of the percentage increase in common stock and zero otherwise.[58] The second is for firms in financial distress ($INSTV_{i,t} = DISTRESS_{i,t}$). $DISTRESS_{i,t}$ is equal to one for firm-years that have negative Z scores and zero otherwise.[59] The third is for firms with acquisitions financed by share for share exchange ($INSTV_{i,t} = AC_{i,t}$). $AC_{i,t}$ is equal to one in the year before the takeover and zero otherwise.[60] The forth is for firms reporting small core earnings ($INSTV_{i,t} = MBZ\_CE_{i,t}$). $MBZ\_CE_{i,t}$ is equal to one for firm-years that have core earnings of between 0 and 0.005, and zero otherwise. The fifth is for firms reporting small increases in core earnings ($INSTV_{i,t} = MBP\_CE_{i,t}$). $MBP\_CE_{i,t}$ is equal to one for firm-years that have an increase in core earnings of between 0 and 0.005, and zero otherwise. I expect α_3 to be negative in regression (4).

Since the above regressions involve panel data, I determine whether there is cross sectional or time series dependence to avoid biased standard errors. Following the Petersen (2009) methodology, it is concluded that there is cross sectional dependence since the White standard errors are not the same as the standard errors clustered by year whereas they are the same as the standard errors clustered by firms. Accordingly, standard errors clustered by year are used to mitigate this problem.

[58] This dummy variable is defined following Doukakis (2014) which captures firms that make SEOs. I have 1373 such firms in the sample.

[59] Z score is calculated using the Taffler (1983) Z score model. According to this model, if a firm has a negative Z score, it is likely to be in financial distress.

[60] Firms that make takeover bids are obtained from the Thomson 1 database.

4.3.3 Data and sample

Data are obtained from Compustat Global for all UK (dead and live) listed firms for the period between 1994 and 2014.[61] The sample period begins in 1994 because UK firms were required to follow FRS 3 (UK GAAP) after June 23, 1993 until mandatory IFRS adoption in 2005. It is required that firm-years have positive core revenues and total assets. Following prior studies, I exclude financial and utility firms because the former have a different financial reporting environment and the latter have more predictable earnings growth. The estimation of the expected core revenues requires two years of lagged data and as a result, the data for 1994 is lost.

Finally, to make sure that I have sufficient data for the estimation of expected core revenues, I require at least 6 observations per industry-year following Athanasakou et al. (2009). I apply the Global Industry Classification Scheme (GICS) for the classification of industries because it gives more accurate empirical results (Bhojraj, Lee, & Oler, 2003; Hrazdil, Trottier, & Zhang, 2013; Kile & Philips, 2009). I winsorize all variables at the 1 percent and 99 percent levels to eliminate the impact of outliers. Consequently, my final sample contains 1,925 firms and 13,915 observations.

Table 4.1 shows the descriptive statistics of the main variables. The mean (median) of unexpected core revenues is 0 (-0.006).

[Table 4.1 around here]

As shown in Table 2, the mean (median) of other revenues is -0.159 (-0.055).This indicates that UK firms on average report more expenses than revenues from non-operating activities. This may suggest the possibility that firms have used revenue reclassification by misclassifying revenues from non-operating activities as core revenues.

[61] Dead firms are included across the test period to avoid survivorship bias.

4.4 Empirical results

4.4.1 Revenue reclassification

The results for testing revenue reclassification are shown in Table 4.2.[62]

[Table 4.2 around here]

The table indicates a significantly negative association between unexpected core revenues and *OR* at the 1% significance level. This implies that firms engage in revenue reclassification by shifting other revenues to core revenues and supports Hypothesis 1. The coefficient of *OR* (α_1 = -0.048) is also economically significant showing that the use of revenue reclassification is common practice. The results are consistent with the proposition that financial statement users value income statement line items differently and give more value to the core revenues item or those close to it (Bradshaw & Sloan, 2002; Davis, 2002). Overall, the results provide evidence that misclassification not only takes place among expense items (Fan & Liu, 2015; McVay, 2006) but also among revenue items.

4.4.2 IFRS adoption and revenue reclassification

The results for testing the effect of mandatory IFRS adoption on revenue reclassification are presented in Table 4.3.

[Table 4.3 around here]

The table shows a significantly negative association between unexpected core revenues and *OR* at the 1% significance level. The implication is that firms misclassify other revenues as core revenues in the pre-IFRS period. Their post-IFRS behavior is explained by the coefficient on the *OR*×*IFRS* variable. The coefficient is significantly negative at the 1% significance level for unexpected core revenues indicating that firms engage in revenue

[62] Table 2 shows that adjusted R^2 is 0.039 (3.9%). Although it is quite low, it is larger than those reported in existing classification shifting studies (e.g. Fan and Liu, 2015; McVay, 2006).

reclassification to a greater extent after mandatory IFRS adoption, consistent with Hypothesis 2. The coefficient for *OR* is -0.039 for the pre-IFRS period and -0.097 (-0.039-0.058) for the post-IFRS period which demonstrates that IFRS adoption increases the use of revenue shifting. This suggests that mandatory IFRS adoption enhances the scope for revenue reclassification which supports the Zalata and Roberts (2015) findings that IFRS allow firms more managerial discretion on the classification of income statement items.

4.4.3 Firms with strong incentives and revenue reclassification

The results for testing whether firms conducting SEOs, firms in financial distress, firms with acquisitions financed by share for share exchange, and firms reporting small core earnings or small increases in core earnings engage in revenue reclassification to a greater extent are presented in Table 4.4, columns (1) to (5), respectively.

[Table 4.4 around here]

Column (1) shows a negative relationship between unexpected core revenues and the *OR*×*SEO* interaction variable at the 1% significance level which implies that firms employ revenue reclassification to a greater extent at the time of SEOs.[63] Thus, Hypothesis 3A is supported. The coefficient on the *OR*×*DISTRESS* interaction variable is both significant and negative at the 5% significance level as indicated in column (2). This suggests that firms in financial distress use more revenue reclassification, in line with Hypothesis 3B. Firms with acquisitions financed by share for share exchange use revenue reclassification to a greater extent in the year before the takeover as the coefficient on the *OR*×*AC* interaction variable is significantly negative in column (3). This supports Hypothesis 3C. Columns (4) and (5) show significantly negative coefficients on the *OR*×*MBZ_CE* and *OR*×*MBP_CE* interaction

[63] Further analysis shows that the mean (median) of other revenues is significantly lower for SEO firms than other firms. This implies that SEO firms shift more other revenues to core revenues than their counterparts.

variables at the 5% and 10% significance levels, respectively. The implication is that firms reporting small core earnings or small increases in core earnings engage in revenue reclassification to a greater degree. These findings are consistent with Hypotheses 3D and 3E. Overall, it appears that revenue reclassification is more pervasive among firms with high managerial incentives which support the studies that find similar results with regard to other earnings management methods (e.g. Cohen & Zarowin, 2010; Fan & Liu, 2015).

4.5 Robustness checks

4.5.1 Alternative core revenues expectation model

I use prior year's core revenues, prior year's trade receivables and current year's trade receivables to measure expected core revenues in the main analysis. However, there may be other factors that affect core revenues and the omission of these factors may influence my main results. These factors include the change in inventories and the change in property, plant, and equipment. Thomas and Zhang (2002) document firms with inventory increases have higher growth in core revenues over the prior five years and this trend reverses after the change in inventory. Regarding the change in property, plant, and equipment, an increase in such assets in year *t-1* is likely boost core revenues in year *t*. This is because firms may buy new fixed assets to increase production in the following year. Thus, I test the validity of my main results by adding the change in inventories in year *t-1* and the change in property, plant and equipment in year *t-1* to my core revenues expectation model.[64] I, then, re-estimate the model to calculate unexpected core revenues. The results are presented in Table 4.5.

[Table 4.5 around here]

[64] My results do not alter if I use the change in capital expenditures in year *t-1* rather than the change in property, plant, and equipment in year *t-1*.

The findings indicate that firms reclassify other revenues as core revenues, in line with revenue reclassification. This suggests that my main findings are not sensitive to the alternative core revenues expectation model.

4.5.2 Excluding the financial crisis period

A number of studies have argued that the recent financial crisis might impact upon the results of any given study that has a timeframe which includes the crisis period. In the earnings management literature existing studies provide inconclusive results on the use of earnings management during the financial crisis period. Strobl (2013) developed a model which suggested that earnings management practices mostly occur during booms and this is consistent with the empirical evidence which shows that firms engage in more earnings management during economic expansion than during economic recession (Cohen & Zarowin, 2007). Similarly, Filip and Raffournier (2014) found that European companies including UK ones decreased discretionary accruals during the 2008-2009 financial crisis period. Nevertheless, some other studies have found significantly contrary results especially, during the 1997 Asian financial crisis. For instance, Saleh and Ahmed (2005) found that Malaysian firms engaged in income-decreasing earnings management to obtain financial support from the government during economic recession.

As my sample spans the recent financial crisis period, the results of the main analysis may have been influenced by the financial crisis period. To test this I exclude the crisis period (2008-2011) from the sample and re-run the main regression. The results are presented in Table 4.6.

[Table 4.6 around here]

It shows that firms engage in revenue reclassification as the coefficient on *OR* is both significant and negative. This implies that excluding the financial crisis period appears to make no difference to my main results.

4.6 Conclusions

This paper is the first to examine revenue reclassification as an earnings management tool using a large sample of 13,915 UK listed firm-year observations for the 1995-2014 period. First, it tests whether firms shift other revenues to core revenues. Firms have incentives to employ this manipulation method as financial statement users value income statement line items differently and they give more value to the core revenues item or those close to it (Bradshaw & Sloan, 2002; Davis, 2002). Furthermore, an increase in core revenues is more valued by investors than a decrease in core expenses (Ertimur, Livnat, & Martikainen, 2003; Marguardt & Wiedman, 2004). I find that firms engage in revenue reclassification to inflate core revenues, in line with the incentives for increasing such top income statement line item.

Second, it examines revenue reclassification in the UK setting both under UK GAAP and IFRS to determine which of these standards offer broader scope for such earnings management method. IFRS is likely to enhance the scope for revenue shifting especially due to the more flexible requirements for other revenues such as non-recurring items compared to UK GAAP. Consistent with this expectation, my results show firms employ revenue reclassification under UK GAAP and mandatory IFRS adoption increases this practice. Overall, the results suggest that the scope for revenue reclassification depends on the accounting standards in operation at the time.

My supplementary tests indicate that firms with high incentives such as those conducting seasoned equity offerings, those in financial distress, those with acquisitions financed by share for share exchange, and those reporting small core earnings or small

increases in core earnings employ revenue reclassification to a greater degree. I acknowledge that there are also other categories of firms (e.g. firms conducting initial public offerings (Teoh, Welch, & Wong, 1998)) with high incentives that may use revenue reclassification to a greater extent. It is also possible that strong corporate governance or firms audited by big four audit firms are deterred from engaging in revenue reclassification but I leave the investigation of this for future research.

Table 4.1

Summary Statistics

Variables	(1) N	(2) Mean	(3) 25th	(4) Median	(5) 75th	(6) Std. Dev
$CR_{i,t}$	13,915	1.409	0.723	1.193	1.804	0.995
$CR_{i,t-1}$	13,915	1.470	0.756	1.230	1.868	1.064
$TR_{i,t}$	13,915	0.241	0.102	0.198	0.323	0.197
$TR_{i,t-1}$	13,915	0.257	0.106	0.207	0.337	0.222
$UE\_CR_{i,t}$	13,915	0.000	-0.126	-0.006	0.118	0.291
$OR_{i,t}$	13,915	-0.159	-0.132	-0.055	-0.022	0.334
$ROA_{i,t}$	13,915	-0.002	-0.018	0.042	0.088	0.202
$LEV_{i,t}$	13,915	0.221	0.047	0.171	0.310	0.233
$NOA_{i,t-1}$	13,915	0.591	0.380	0.580	0.750	0.421
$SIZE_{i,t-1}$	13,915	4.409	2.984	4.285	5.760	2.029
$CL_{i,t}$	13,915	0.304	0.181	0.275	0.387	0.175

Notes:

$CR_{i,t}$ is core revenues, $TR_{i,t}$ is trade receivables, $UE\_CR_{i,t}$ is unexpected core revenues, $OR_{i,t}$ is other revenues, $ROA_{i,t}$, is return on asset, $LEV_{i,t}$ is leverage ratio, $NOA_{i,t-1}$ is net operating assets, $SIZE_{i,t-1}$ is the natural logarithm of the lagged total assets and $CL_{i,t}$ is ratio of current liabilities.

Table 4.2

Revenue reclassification

Variables	$UE\_CR_{i,t}$
$OR_{i,t}$	-0.048***
	(-6.647)
$ROA_{i,t}$	0.151***
	(8.612)
$LEV_{i,t}$	0.044**
	(2.584)
$NOA_{i,t-1}$	-0.071***
	(-5.790)
$SIZE_{i,t-1}$	-0.002*
	(-1.954)
$CL_{i,t}$	0.165***
	(6.936)
Constant	-0.017
	(-1.146)
Observations	13,915
Adjusted R-squared	0.039

Notes:

t- statistics (in parentheses) based on robust standard errors clustered by year. $UE\_CR_{i,t}$ is unexpected core revenues, $OR_{i,t}$ is other revenues, $ROA_{i,t}$, is return on asset, $LEV_{i,t}$ is leverage ratio, $NOA_{i,t-1}$ is net operating assets, $SIZE_{i,t-1}$ is the natural logarithm of the lagged total assets and $CL_{i,t}$ is ratio of current liabilities.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 4.3

Revenue reclassification and IFRS adoption

Variables	$UE\_CR_{i,t}$
$OR_{i,t}$	-0.039***
	(-6.286)
$IFRS_{i,t}$	0.001
	(0.205)
$OR_{i,t} \times IFRS_{i,t}$	-0.058***
	(-3.643)
$ROA_{i,t}$	0.159***
	(8.786)
$LEV_{i,t}$	0.042**
	(2.457)
$NOA_{i,t-1}$	-0.070***
	(-5.672)
$SIZE_{i,t-1}$	-0.002
	(-1.716)
$CL_{i,t}$	0.166***
	(7.092)
Constant	-0.020
	(-1.331)
Observations	13,915
Adjusted R-squared	0.040

Notes:

t- statistics (in parentheses) based on robust standard errors clustered by year. $UE\_CR_{i,t}$ is unexpected core revenues, $OR_{i,t}$ is other revenues, $IFRS_{i,t}$ is a dummy variable that is equal to one for the years after 2005 and zero otherwise, $ROA_{i,t}$, is return on asset, $LEV_{i,t}$ is leverage ratio, $NOA_{i,t-1}$ is net operating assets, $SIZE_{i,t-1}$ is the natural logarithm of the lagged total assets and $CL_{i,t}$ is ratio of current liabilities.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 4.4

Revenue reclassification and firms with high incentives

Variables	(1) $UE\_CR_{i,t}$	(2) $UE\_CR_{i,t}$	(3) $UE\_CR_{i,t}$	(4) $UE\_CR_{i,t}$	(5) $UE\_CR_{i,t}$
$OR_{i,t}$	-0.027***	-0.035***	-0.045***	-0.047***	-0.047***
	(-3.719)	(-4.921)	(-6.244)	(-6.665)	(-6.033)
$SEO_{i,t}$	0.005				
	(0.680)				
$OR_{i,t} \times SEO_{i,t}$	-0.077***				
	(-3.115)				
$DISTRESS_{i,t}$		0.022***			
		(4.297)			
$OR_{i,t} \times DISTRESS_{i,t}$		-0.041**			
		(-2.768)			
$AC_{i,t}$			0.003		
			(0.128)		
$OR_{i,t} \times AC_{i,t}$			-0.092*		
			(-1.902)		
$MBZ\_CE_{i,t}$				-0.048	
				(-1.426)	
$OR_{i,t} \times MBZ\_CE_{i,t}$				-0.234**	
				(-2.701)	
$MBP\_CE_{i,t}$					-0.004
					(-0.221)
$OR_{i,t} \times MBP\_CE_{i,t}$					-0.140*
					(-1.837)
$ROA_{i,t}$	0.165***	0.175***	0.150***	0.151***	0.151***
	(10.075)	(9.766)	(8.488)	(8.611)	(8.573)
$LEV_{i,t}$	0.039**	0.035*	0.043**	0.044**	0.044**
	(2.246)	(2.020)	(2.495)	(2.585)	(2.582)
$NOA_{i,t-1}$	-0.072***	-0.069***	-0.071***	-0.071***	-0.071***
	(-5.815)	(-5.760)	(-5.755)	(-5.789)	(-5.785)
$SIZE_{i,t-1}$	-0.001	-0.001	-0.002*	-0.002*	-0.002*
	(-1.258)	(-1.351)	(-2.009)	(-1.969)	(-2.037)
$CL_{i,t}$	0.166***	0.148***	0.166***	0.165***	0.166***
	(6.980)	(6.073)	(6.934)	(6.932)	(6.982)
Constant	-0.020	-0.020	-0.016	-0.016	-0.017
	(-1.389)	(-1.457)	(-1.102)	(-1.125)	(-1.143)
Observations	13,915	13,915	13,915	13,915	13,915
Adjusted R-squared	0.041	0.041	0.039	0.039	0.039

Notes:

t- statistics (in parentheses) based on robust standard errors clustered by year. $UE\_CR_{i,t}$ is unexpected core revenues, $OR_{i,t}$ is other revenues, $SEO_{i,t}$ is equal to one for firm-years that are in the top quartile of the percentage increase in common stock and zero otherwise, $DISTRESS_{i,t}$ is equal to one for firm-years that have negative Z scores and zero otherwise, $AC_{i,t}$ is equal to one in the year before the takeover and zero otherwise, $MBZ\_CE_{i,t}$ is equal to one for firm-years that have core earnings of between 0 and 0.005, and zero otherwise, $MBP\_CE_{i,t}$ is equal to one for firm-years that have an increase in core earnings of between 0 and 0.005, and zero otherwise, $ROA_{i,t}$, is return on asset, $LEV_{i,t}$ is leverage ratio, $NOA_{i,t-1}$ is net operating assets, $SIZE_{i,t-1}$ is the natural logarithm of the lagged total assets and $CL_{i,t}$ is ratio of current liabilities.

$^{***/**/*}$ indicate significance at 1%/5%/10% (two tailed).

Table 4.5

Validity of the core revenues expectation model

Variables	$UE\_CR_{i,t}$
$OR_{i,t}$	-0.043***
	(-6.348)
$ROA_{i,t}$	0.144***
	(8.772)
$LEV_{i,t}$	0.061***
	(3.839)
$NOA_{i,t-1}$	-0.036***
	(-4.327)
$SIZE_{i,t-1}$	-0.003**
	(-2.663)
$CL_{i,t}$	0.160***
	(8.257)
Constant	-0.037***
	(-3.497)
Observations	13,915
Adjusted R-squared	0.029

Notes:

t- statistics (in parentheses) based on robust standard errors clustered by year. $UE\_CR_{i,t}$ is unexpected core revenues, $OR_{i,t}$ is other revenues, $ROA_{i,t}$, is return on asset, $LEV_{i,t}$ is leverage ratio, $NOA_{i,t-1}$ is net operating assets, $SIZE_{i,t-1}$ is the natural logarithm of the lagged total assets and $CL_{i,t}$ is ratio of current liabilities.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Table 4.6

Revenue reclassification: Excluding crisis period

Variables	$UE\_CR_{i,t}$
$OR_{i,t}$	-0.043***
	(-6.590)
$ROA_{i,t}$	0.148***
	(7.789)
$LEV_{i,t}$	0.048**
	(2.288)
$NOA_{i,t-1}$	-0.070***
	(-4.837)
$SIZE_{i,t-1}$	-0.001
	(-1.107)
$CL_{i,t}$	0.170***
	(5.801)
Constant	-0.024
	(-1.384)
Observations	11,028
Adjusted R-squared	0.038

Notes:

t- statistics (in parentheses) based on robust standard errors clustered by year. $UE\_CR_{i,t}$ is unexpected core revenues, $OR_{i,t}$ is other revenues, $ROA_{i,t}$, is return on asset, $LEV_{i,t}$ is leverage ratio, $NOA_{i,t-1}$ is net operating assets, $SIZE_{i,t-1}$ is the natural logarithm of the lagged total assets and $CL_{i,t}$ is ratio of current liabilities.

***/**/* indicate significance at 1%/5%/10% (two tailed).

Chapter 5

Conclusion

5.1 Introduction

This thesis comprises three essays in earnings management using UK-based data samples. The first (Chapter 2) implements a first test of the debt covenant hypothesis for the UK. Specifically, it examines whether UK firms manage earnings to avoid debt covenant violations. The extant studies have tested this hypothesis in the context of the USA. Chapter 3 examines whether SEOs affect the debt covenant hypothesis. The latter is likely to be affected by this corporate event but this has not been tested in the literature. Finally, Chapter 4 is the first to examine revenue reclassification as an earnings management tool. It tests whether firms shift other revenues to core revenues and whether this behavior changes after IFRS. The main results along with their implications are summarized in the following sections.

5.2 The debt covenant hypothesis

Chapter 2 implements a first test of the debt covenant hypothesis for the UK. It examines whether firms close to violation or in technical default of their debt covenants use more real activities manipulation and/or accruals management than firms far from violation. The debt covenant hypothesis has often been tested using small or large US samples

(DeFond and Jiambalvo 1994; Dichev and Skinner 2002; Franz et al. 2014). UK studies (Citron 1992; Moir and Sudarsanam 2007) do not directly test the debt covenant hypothesis because UK-based firms are not obliged by company law to disclose detailed covenant information unlike their US-based counterparts. I use carefully estimated covenant slack proxies to overcome the UK data problem motivated by the common use of covenants in loan contracts and by the covenant convergence between the USA and UK.

The results for testing the debt covenant hypothesis for the UK indicate that firms close to violation or in technical default of their interest coverage (debt to EBITDA) covenants engage in higher levels of RAM rather than AM relative to firms far from violation. These findings strongly supports the debt covenant hypothesis and suggests a switch from AM to RAM, consistent with those of Chan, Chen, Chen, and Yu (2015) and Kothari, Mizik, and Roychowdhury (2016) for the USA. I also find that mandatory IFRS adoption does not change the use of RAM for firms close to violation or in technical default of their interest coverage covenants. However, it increases the propensity for employing RAM for firm close to default of their debt to EBITDA covenants.

5.3 SEOs and the debt covenant hypothesis

Chapter 3 examines whether SEOs affect the debt covenant hypothesis. It tests whether SEO firms' real activities manipulation practices change to avoid covenant violations in the post-issue period relative to the pre-issue period. SEOs are likely to strengthen financial statement numbers which may reduce the risk of breaching debt covenants. The latter, however, has not been tested empirically by the existing studies.

The findings for the effect of SEOs on the debt covenant hypothesis show that the use of real activities manipulation to avoid the possibility of interest coverage covenant violations decreases from the pre-issue period to the post-issue period for SEO firms relative to the corresponding change for benchmark firms. This implies that firms improve their financial

situation using SEO proceeds and, in the process, become less susceptible to debt covenant violations following SEOs. The results also show that the decrease in the use of real activities manipulation in the post SEO period to avoid the likelihood of breaching interest coverage covenant is more pervasive among SEO firms with low market to book ratios or high financial leverage. Furthermore, using accruals management and classification shifting measures of earnings management I find that firms do not engage in these manipulation methods to avoid the possibility of interest coverage covenant violations and this behaviour does not change following SEOs.

5.4 Revenue reclassification before and after IFRS

Chapter 4 extends the classification shifting literature by being the first to examine revenue reclassification. Specifically, it tests whether firms shift other revenues to core revenues and whether this behavior changes after IFRS. This is motivated by several reasons such as the belief that an increase in core revenues is more valued by investors than a decrease in core expenses (Ertimur et. 2003; Marguardt and Wiedman 2004).

The results for testing the revenue reclassification as an earnings management tool indicate that unexpected core revenues increase as other revenues decrease. This provides evidence that firms shift other revenues to core revenues, consistent with revenue reclassification. The results show that firms engage in such activities to a greater extent after mandatory IFRS adoption suggesting that the latter offers more latitude for these practices. This supports Zalata and Roberts (2015) who document that IFRS allows firms to have more managerial discretion on classification of non-recurring items.

I also analyze whether firms with strong incentives use revenue reclassification to a greater extent. Existing studies document firms that make SEOs, are in financial distress, make acquisitions financed by share for share exchange, and meet certain earnings benchmarks have high incentives to engage in earnings management. Marguardt and

Wiedman (2004) find that firms that plan to make equity offerings inflate sales by employing accruals management. A similar result is found by Cohen and Zarowin (2010) with regard to using real earnings management to overestimate sales in the year of the SEOs. Fan and Liu (2015) find that firms shift core expenses both from the cost of goods sold and selling, general and administrative expenses to income-decreasing special items for meeting/beating zero core earnings and prior period core earnings. As revenue reclassification is likely to inflate core revenues and core earnings, I expect that firms conducting SEOs, firms in financial distress, firms with acquisitions financed by share for share exchange, and firms reporting small core earnings or small increases in core earnings employ revenue reclassification to a greater degree. My results are consistent with this expectation, suggesting that revenue reclassification is more pervasive among firms with strong incentives.

5.5 Future research

The thesis suggests some avenues for future research which could potentially shed new light on issues in earnings management. In Chapter 2, I use carefully calibrated covenant slack proxies to test the debt covenant hypothesis for the UK because UK-based firms are not obliged by company law to disclose covenant information. Future research could conduct interviews and surveys to determine more clearly what accounting-based debt covenants are now frequently used in the UK and whether their use decreases after IFRS adoption. Given that I test the debt covenant hypothesis using real activities manipulation and accruals management methods of earnings management, future research should also test whether firms engage in classification shifting to avoid debt covenant violations. It could also examine whether firms use earnings management methods jointly or separately to remain within debt covenant limits.

Chapter 3 documents that SEO firms decrease managing earnings to avoid covenant violations in the post-issue period compared to the pre-issue period using a sample which is mainly based on private placements. Future research should also focus on the other types of SEOs such as rights issues to examine whether firms' earnings management practices change for this purpose in the post-issue period relative to the pre-issue period. In particular, it would be interesting to investigate which types of SEOs induce change in the use of earnings management to remain within covenant limits in the post-issue period.

Given that this thesis has examined revenue reclassification using a UK-based sample in Chapter 4, future research could analyze US firms to determine whether they engage in this earnings management method. Furthermore, this thesis calls for future research to test whether firms employ revenue reclassification and expense reclassification jointly or separately. Future research should also examine whether other factors such as strong corporate governance or the use of Big-4 audit firms deter the use of revenue reclassification.

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