EARNINGS MANAGEMENT AND CORPORATE BOND PRICING

EVIDENCE FROM THE EUROPEAN CORPORATE BOND MARKET

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Abstract

This study examines whether European firms engage in earnings management prior to bond issuance and whether income-increasing earnings management result in a lower yield spread. We base our analysis on 1,802 firm-year observations from 471 individual firms across 16 European countries between 1994 and 2022 and employ both accrual-based and real earnings management models. Using univariate tests to evaluate the presence of earnings management, we find indications of firms intensifying earnings management prior to bond issuance followed by subsequent reversals post-issue. Further, our results suggest that some earnings management strategies are utilized more than others to inflate earnings. Subsequently, we estimate multiple regression models to assess the effect of income-increasing earnings management on at issue yield spreads. The results indicate that higher levels of real earnings management, specifically through abnormal cash flow from operations and production costs, are associated with higher bond yield spreads. This relationship is concentrated among smaller firms, larger bond issues, and bonds with longer maturities. In contrast, no significant associations are observed for other real activities or for accrual-based earnings management. The findings are robust to alternative measures of earnings management, sample restrictions and control variable specifications. This study contributes to the literature with novel European evidence on earnings management around bond issuance and its impact on bond yields and offers insight into which forms of manipulation investors appear to price.

Keywords: Accrual earnings management, Real earnings management, European corporate bond market, Bond pricing, Yield spread.

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1. Introduction

This thesis investigates whether European firms engage in earnings management (EM) prior to bond issuance, and whether income-increasing EM prior to bond issue results in a lower cost of the bond. In general, EM refers to the intentional manipulation of reported earnings through accounting choices or operational decisions to influence financial outcomes. The former being accrual-based EM and the latter real EM. Such practices can be either income-increasing or income-decreasing, depending on the firm's objectives[1]. Scholars have consistently documented that external financing events create a setting in which firms engage in EM (Dechow et al., 1996; Ericson & Wang; 1999; Jiambalvo, 1996; Kothari et al., 2016; Teoh et al., 1998a; Teoh et al., 1998b). Incentives include, but are not limited to, increasing the offering price in an initial public offering (IPO), boosting the stock price to minimize the number of shares needed in a stock-for-stock acquisition, and enhancing investor optimism ahead of a seasoned equity offering (SEO) to secure more favourable financing conditions. While much of this research has focused on equity markets, more recent studies have begun to examine similar incentives in the context of debt financing (Ater & Hansen, 2020; Caton et al., 2011; Crabtree et al., 2014; Liu et al., 2010). Specifically, our study builds on compelling evidence brought forward in prior literature that finds significant income-increasing EM in U.S. firms prior to bond offerings and a corresponding reduction in the cost of debt (Liu et al., 2010; Mellado-Cid et al., 2017). Given the consistent evidence for both accrual-based and real EM in the U.S., and the limited research in a European context, we include both forms to provide a comprehensive analysis.

The motivation for the research questions is threefold. First, although this topic has been extensively studied in the U.S., to the best of our knowledge limited research has been conducted within the European corporate bond market. Notably, the European context differs from the U.S. in several distinct ways, including market structure, liquidity, and regulatory frameworks. In contrast to the U.S. market, a considerable share of new issuers in Europe are either unrated or situated near the investment-grade threshold (Darmouni & Papoutsi, 2025). These issuers are often less monitored and receive less analyst coverage, increasing investors' reliance on firm-issued financial reports. The higher information asymmetry may strengthen

[1]Income-increasing earnings management refers to the practice of inflating reported earnings to present stronger financial performance, while income decreasing earnings management involves taking actions to understate earnings.

both managers' incentives to engage in EM and investors' incentives to scrutinize reported earnings. For example, Liu et al. (2010) find that EM is more prevalent among non-investment grade firms, and Yu (2008) shows that firms with greater equity analyst coverage engage in less EM. Moreover, the European corporate bond market is less liquid, which may affect investor behaviour and bond pricing (European Commission, 2017). Higher exit costs may increase investors' incentives to scrutinize firm disclosures more carefully. Lastly, since EM inherently relies on exploiting flexibility within accounting standards, differences in the regulatory environment suggest potential variation in EM practices. For example, the principle-based nature of IFRS offers greater managerial discretion compared to the rule-based U.S. GAAP. Consistent with this, Barth (2008) and Evans et al. (2015) find that firms reporting under IFRS engage in more accrual-based EM than their U.S. counterparts. Given these structural differences, we find no compelling reason to automatically assume that findings from the U.S. corporate bond market apply to the European context.

Second, the European bond market has undergone significant growth over the past decade. In the aftermath of the 2008 financial crisis, there has been a growing emphasis on diversifying debt financing, shifting reliance away from traditional bank lending toward broader access to capital markets (Darmouni & Papoutsi, 2025). This structural shift has elevated the role of bond financing for European firms, creating a growing need to better understand the dynamics of this market and the factors influencing market outcomes. As Bhojraj (2003) and Jiang (2008) notes in the context of the U.S. market, even small changes in debt yields can lead to substantial shifts in capital allocation, making factors influencing bond prices of great economic importance. The growing need to better understand the European bond market is also recognized by regulators, who have responded to its increasing use by proposing policies aimed at enhancing market transparency, improving financial disclosures, and strengthening investor protection (European Commission, 2017). These developments underscore the importance of understanding how EM affects bond pricing in Europe's evolving market.

Third, while most prior literature agrees that firms engage in EM prior to bond issuance, there is no unified conclusion regarding its impact on bond yields. In theory, the high presence of institutional investors in bond markets should make it more likely that EM is detected and priced accordingly. As Jiang (2008) notes, institutional investors have greater resources and access to information, suggesting that their presence should reduce the effectiveness of EM compared to equity markets. However, empirical findings from U.S. studies remain mixed. Some studies find that EM is associated with lower bond yields, suggesting that investors are

misled, while others report higher yields, indicating that investors detect and price such behaviour (Caton et al., 2011; Crabtree et al., 2014; Ge & Kim, 2014; Jiang, 2008; Liu et al., 2010; Mellado-Cid et al., 2017). By examining the European corporate bond market, we seek to provide further evidence on how investors react to EM around bond issuance and whether earnings manipulation is fully incorporated into bond pricing. Taken together, these considerations give rise to two central empirical questions: whether European firms engage in EM prior to bond issuance, and whether income-increasing EM leads to lower bond yield spreads.

We base our analysis on 1,802 firm-year observations from 471 individual firms across 16 European countries between 1994 and 2022, using data from the SDC New Issues database and Compustat Global. Accrual EM is proxied by current discretionary accruals (DCA), estimated using the modified Jones (1991) model as specified by Teoh et al. (1998b), and real activities manipulation measures include abnormal sales levels (CFO), abnormal production (PROD), abnormal discretionary expenses (DISEXP), and the aggregate measure of all real activities (REM), following Roychowdhury (2006). Using univariate tests, we find evidence of EM in the five years surrounding bond issuance, characterised by a rise in unexpected EM measures prior to the issue and a subsequent reversal in the years that follow. This is particularly evident among income-increasing firms.

Having documented the prevalence of EM around bond issuance, we proceed to examine whether such behaviour is reflected in bond yield spreads. Following the dominant empirical approach in existing literature we examine the relationship between accrual-based and real EM, measured one year prior to issuance, and bond yield spreads using a multiple regression model. We find that firms with higher levels of real activities manipulation receive a higher bond yield spread, evidenced by a positive relationship between CFO, PROD, and partly REM. In line with previous studies the results exist mainly for small firms, larger issues and bonds with longer maturities (Liu et al., 2010). This suggests that investors are able to detect real activities manipulation and interpret it as a negative signal, warranting a higher risk premium. In contrast to prior research, we find no evidence that DCA is associated with bond yield spreads, and this non-relationship result persists across all subsamples and alternative specifications.

Given the limited findings on the relationship between DCA and yield spreads in our main analysis, we extend the analysis beyond the conventional approach by conducting additional tests. A dummy-variable regression analysis provides no evidence that firms engaging more aggressively in accrual-based EM prior to bond issuance receive systematically

different yield spreads than their peers. The absence of findings for DCA indicates that bond investors may either view such accrual-based adjustments as transitory and less informative for credit risk assessment, or are able to detect and discount them, resulting in no observable effect on yield spreads (Crabtree et al., 2014). Nevertheless, the additional analysis support previous findings, more aggressive income-increasing real EM, through CFO and PROD, is associated with higher yield spreads, suggesting that the intensity of manipulation influences investor bond pricing.

We contribute to the existing literature in two important ways. First, we provide the first European evidence of both accrual-based EM and real EM prior to bond issuance and its impact on bond yields. This is particularly important in light of the growing significance of the European bond market, increased attention from policymakers seeking to improve its functioning, and the substantial economic impact that even small changes in yield spreads can generate. Second, our analysis suggests that the relationship between EM and bond yields in the European market is nuanced, with certain techniques having more adverse bond pricing effects than others. These findings offer insights into how bond investors price credit risk, highlighting which forms of EM are most consequential. The findings also carry practical implications for firms, as certain techniques may be less costly when EM is pursued for strategic reasons unrelated to the bond issuance.

The remainder of the paper is organized as follows. Section 2 outlines the theoretical basis for EM using agency theory, information asymmetry, and signalling theory, and reviews central literature on accrual-based and real EM, with a focus on capital market transactions and bond issuance, and the European regulatory context. Section 3 describes the sample selection process and presents the research design. Section 4 presents the main empirical analysis, examining the presence of EM prior to bond issuance and its impact on bond yield spreads, and includes additional tests across different firm and bond characteristics, as well as a series of sensitivity analyses and robustness checks. Section 5 discusses the findings, and Section 6 concludes, outlines the limitations and gives suggestions for future research.

2. Literature review

This section develops the theoretical and empirical foundation for our analysis. We begin by reviewing the role of agency conflicts, information asymmetry, and signalling in shaping managerial incentives around financial reporting. We then summarise findings from the earnings management literature, focusing on accrual-based and real activities manipulation,

their differences and similarities. We review prior research on earnings management in the context of capital market transactions, with a focus on debt issuance. Finally, we consider institutional features of the European corporate bond market and formally state our hypotheses.

2.1. Agency theory, asymmetric information and signalling

Agency theory examines the optimal mechanisms for controlling relationships in which a principal delegates work to an agent, who acts on their behalf (Eisenhardt, 1985). A fundamental challenge in these relationships arises when the agent possesses more or better information that the principal lacks, leading to information asymmetry. This asymmetry creates inefficiencies, as the agent may prioritize self-interest over the principal's objectives, giving rise to two core issues: the agency problem, where conflicting incentives and costly monitoring hinder alignment, and risk-sharing, where differences in risk preferences lead to divergent decision-making (Eisenhardt, 1989). When information asymmetry is high, it can also lead to moral hazard, where the agent takes hidden actions that increase risk for the principal, or adverse selection, as principals cannot distinguish between high- and low-quality agents before engaging in a contract, resulting in suboptimal decision-making (Akerlof, 1970; Holmström, 1979; Stiglitz, 2000). Jensen and Meckling (1976) define these inefficiencies as agency costs, which stem from monitoring expenditures by the principal, bonding costs incurred by the agent, and residual losses from misaligned incentives. These agency dynamics are present in all cooperative relationships, but they have been particularly well studied in the conflict between managers (agent) and stakeholders (principal(s)), such as shareholders and creditors (Eisenhardt, 1989; Jensen & Meckling, 1976; Shleifer & Vishny, 1997). In such relationships, managers may have the incentive to strategically disclose or withhold information, affecting investor perceptions, capital allocation, and overall market efficiency. At the same time, if investors recognize management's informational advantage, they may demand higher returns to compensate for the increased uncertainty, creating incentives for management to reduce information asymmetry (Healy & Palepu, 2001; Stiglitz, 2000).

To mitigate the effects of information asymmetry, firms may engage in signalling, using observable actions to convey information to stakeholders (Spence, 2002). Signals influence the beliefs of others, with the sender selecting which information to disclose and the receiver interpreting it to make decisions (Drover, 2018; Spence 1973). In order for signals to be credible they must be costly and difficult for others to mimic (Conelly et al, 2010). In capital markets, accounting and accounting choices provide an avenue through which management

may signal and communicate privately held information (Fields et al., 2001). Earnings are typically regarded as a value-relevant indicator of firm performance, making it a key signal in capital markets (Healy & Palepu, 2001). Given the importance of earnings, Dechow (1994) suggests that earnings may be used by management to either signal private information or to opportunistically manipulate financial performance.

Dye (1988) as well as Trueman and Titman (1988) propose two distinct theories as to why firms would choose to strategically disclose earnings based on agency-principal relationships and signalling. Dye (1988) argues that managing earnings may be a rational response to agency conflicts, serving both as a tool to align managerial incentives and as a strategy for current shareholders to influence firm valuation. Trueman and Titman (1988) instead suggest that firms engage in earnings management to smooth income, reducing perceived earnings volatility and bankruptcy risk, signalling financial stability, thereby lowering borrowing costs and enhancing firm value. Both theorise that information asymmetry is a necessary condition for earnings management, a claim later supported by Richardson (2000), who provides empirical evidence that EM increases with higher levels of information asymmetry.

Agency theory and signalling theory explain how information asymmetry affects managerial behaviour and stakeholder perceptions. Managers influence capital markets by using discretion in financial reporting, with earnings management as a key mechanism.

2.2. Earnings management

As defined by Healy & Wahlen (1999), "earnings management occurs when managers use judgement 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" (p. 368). In accordance with this definition, earnings management is distinguished from fraudulent accounting in that it focuses on managerial discretion within the boundaries of the legal framework. Such discretion may be exercised over revenue recognition, fair value measurements, depreciation and impairments, provisions and real activities. However, this definition also implies that managers may use their informational advantage to shape financial outcomes in ways that could mislead stakeholders (Lo, 2008). Graham et al. (2005) find that CFOs generally recognise earnings as a key metric considered by outsiders. Prior studies identify several contexts in which management may use discretion to affect earnings, such as

when meeting earnings benchmarks or raising capital (Dechow et al., 2010; Jiang, 2008). For example, Myers et al., (2007) find that firms which consistently increase earnings per share (EPS) are rewarded with higher valuation, even when EM is used to attain these increases. Thus, understanding the origin, extent and result of EM is of interest to academics, regulators and practitioners (Dechow & Skinner, 2000; Stubben, 2010).

It is commonly believed that EM does exist, however, it is exceptionally hard to prove. The reason is that one must first have a measure of earnings without the effects of EM before it is possible to establish whether management of earnings has occurred (Healy & Wahlen, 1999). Lo (2008) argues that EM is inherently difficult to detect, as its effectiveness in achieving its intended benefits would be compromised if it were easily identifiable. Scholars have made several attempts at finding reliable estimates of earnings management (DeAngelo, 1986; Dechow et al., 1995; Dechow & Dichev, 2002; Jones, 1991; Kothari, 2005; Roychowdhury, 2006). These models typically fall into one of two categories: accrual-based EM or real EM (Lo, 2008).

2.2.1. Accrual based earnings management

Accrual based earnings management originates from the processes of accrual accounting. The purpose of accrual accounting is to produce a measure that better reflects the performance of a firm by changing the timing of recognising cash flows (Dechow & Dichev, 2002). Realised cash flows exhibit inherent matching and timing issues contributing to larger variation making it less informative at a specific point in time and an inadequate representation of firm performance (Dechow, 1994). Accruals often require assumptions and estimates (Dechow & Dichev, 2002), and management must apply a certain level of judgement over recognising accruals (Dechow, 1994). Management can use the judgement to increase the usefulness of earnings as a measure of firm performance, or opportunistically manipulate accruals (Dechow, 1994). One important characteristic of accruals is the reversal effect. Meaning that income increasing accruals will in a later period be realised and if the accrual level is abnormal an income decreasing effect will appear (DeFond & Park, 2001). Sloan (1996) articulates that the judgement used over accruals suffers from subjectivity as opposed to that of cash flow and finds evidence that the accrual portion of earnings is less likely to persist into the future. Richardson et al. (2005) extends Sloan's (1996) work by constructing a more comprehensive measure of accruals where different components are ranked according to reliability. Their findings show that accruals that are less reliable result in earnings that experience lower persistence.

Measures of accrual EM are often decomposed to nondiscretionary accruals (NDA) and discretionary accruals (DA) (Dechow et al, 1995), where the latter represent management discretion and is a proxy for EM. Subsequently a regression model is used to estimate the normal level of accruals, NDA, and abnormal levels of accruals, DA. Although models incorporating this proxy for EM have been widely utilised in the accounting literature, they have also faced criticism.

2.2.2. Criticism of accrual-based earnings management models

EM measures, especially accrual EM, have received critique. Jackson (2018) and Christodoulou et al. (2018) criticise accrual EM models for being noisy, not providing plausible detection of EM, and suffering from biases. Jackson (2018) emphasizes that poor caution is taken in the application of the accrual EM models. The magnitude of discretionary accruals is not economically plausible as they are larger than the return on assets. The models are also econometrically insufficient and fail to detect known cases of earnings manipulation. Christodoulou et al. (2018) directs similar critique and mean that the inference-in-residual approach used in both accrual EM and real EM is inefficient and suffers systematic biases. The authors test both simulated data and known cases of manipulation, and the accrual EM models fail to classify suspects of EM and known cases of EM. McNichols and Stubben (2018) discusses the critique of the EM models and offer suggestions for improvement. Generally, researchers should apply the models with more caution and, for instance, choose a suitable version of the accrual EM model, articulate the economic story, use a control group that is as similar as possible, offer additional evidence, such as accrual reversals or the alignment with EM consequences, and perform checks for reasonability of the results. The authors also provide a discussion on aspects of the former studies that could influence their results, for instance " ... ex post cases of manipulation does not necessarily imply that accrual EM models are noisy. It may be that the noise is in the ex post measures" as the databases used " … are likely to exclude relevant cases and include irrelevant cases that are not associated with financial misreporting" (p. 230). Another point made is that since discretionary accruals estimates are noisy they are better suited for detecting the average amount of EM across a portfolio of firms opposed to the magnitude of EM in an individual firm. Jackson (2018) states that discretionary accruals are merely deviations from industry averages and if defined as such there is no problem. In many situations this is also the appropriate definition (McNichols & Stubben, 2018).

Although accrual-based EM models have faced criticism, the general consensus is not to abandon them entirely. Instead, researchers are advised to exercise caution when adopting

discretionary accrual models and to design their research in a way that minimizes bias (McNicholas & Stubben, 2018). While discretionary accrual models remain dominant in earnings management literature, researchers have also identified other methods through which management may influence earnings, such as real earnings management.

2.2.3. Real earnings management

Real activities manipulation, or real earnings management, entails changing normal business practices to reach certain earnings levels. This can be achieved by increasing production to decrease the cost of goods sold, aggressively decreasing discretionary expenses to increase margins or providing price discounts to inflate sales (Roychowdhury, 2006). The common denominator between accrual EM and real EM is misleading stakeholders (Healy & Wahlen., 1999; Roychowdhury, 2006). The most important difference is that real EM, opposed to accrual EM, can destroy firm value when the underlying structure of cash flows is altered. Similar to accrual EM, real EM is estimated by first establishing the "normal" level of business activities for firms within a comparable industry (Roychowdhury, 2006). Any deviations from the industry average are then classified as EM.

In a seminal study, Graham et al. (2005) find that CFOs acknowledge engaging in real activities manipulation, whereas the support for altering accruals is statistically lower. Cohen et al. (2008) find supporting evidence, documenting that after the passing of the Sarbanes - Oxley Act (SOX), managers have shifted away from accrual-based EM towards real EM. Subsequent research suggests that this may be a result of managers substituting different forms of EM based on the given setting (Cohen & Zarowin, 2010; Zang, 2012). Based on these findings, Cohen and Zarowin (2010) argue that, to provide the most comprehensive picture of EM, research should incorporate both methods.

EM is generally a widely researched area. Common themes covered in previous studies are EM in relation to corporate events, for instance SEOs and IPOs, CEO incentives, corporate social responsibility, the influence of auditors, and the effect of regulatory changes, such as the SOX and the International Financial Reporting Standards (IFRS). The results of previous EM literature exhibit varying and uncertain outcomes, which mean that the field is not yet mature (Bansal, 2023).

2.2.4. Earnings management in capital market transactions

Earnings management has been studied in various contexts of capital market transactions. SEOs is a popular branch of research in relation to EM, where EM prior to SEOs is found to

have a negative effect with subsequent declines in earnings and stock price returns (Cohen & Zarowin, 2010; Kothari et al., 2016; Rangan, 1998; Shivakumar, 2000; Teoh et al., 1998b). Further evidence suggests that investors cannot see through EM activities prior to SEOs (Rangan, 1998; Teoh et al., 1998b). Other studies mean that these findings depend on the model of choice (Shivakumar, 2000). More recent studies show that firms engage in both real EM and accrual EM prior to SEOs, and that there is a trade-off between the two approaches (Cohen & Zarowin, 2010; Kothari et al., 2016).

Another branch of research is EM in relation to IPOs. Research shows that firms manage earnings during IPOs in the form of abnormal accruals (Teoh et al., 1998a; Teoh, Wong, et al., 1998), and real activities manipulation (Alhadab et al., 2015), which subsequently can explain the underperformance of IPO firms. Other studies show that abnormal accruals of IPO firms are the result of economic activity and working capital investments rather than manipulation (Armstrong et al., 2016), and that earnings quality increases around IPOs (Ball & Shivakumar, 2008). Evidence is also found for the importance of timing, where abnormal accruals are primarily related to the lockup expiration for pre-IPO shareholders (Sletten et al., 2018).

Prior studies also examine EM in the context of mergers and acquisitions (M&A), focusing on both acquiring firms and targets. In general, EM strategies vary between acquirers and targets and are influenced by the transaction's financing structure. In stock-for-stock transactions, acquirers engage in income-increasing EM to inflate their stock price, thereby lowering the exchange ratio and minimising share dilution (Botsari & Meeks, 2008; Erickson & Wang, 1999; Louis, 2004). However, empirical evidence on EM by target firms remains mixed (Campa & Hajbaba, 2016; Elrazaz, et al., 2021; Erickson & Wang, 1999; Missioner & Spadetti, 2023).

2.2.5. Earnings management around debt issuance

A less researched field of EM around capital market transactions is the relationship between EM and corporate bond issues (Dechow et al., 2010). Scholars of the EM literature around bond offerings mean that incentives to manage earnings can be extended to issuance of bonds, since it can potentially lower the cost of borrowing (Crabtree et al., 2014; Liu et al., 2010; Mellado-Cid et al., 2017). Liu et al. (2010) and Caton et al. (2011) focus on accrual EM, their results are aligned in that both find evidence of issuers managing earnings prior to bond offerings. However, while the former study shows that EM leads to lower yield spreads, i.e., a lower cost of the bond, the latter finds no such evidence. On the contrary, evidence is found in

support of that investors are not fooled by EM activities, and that EM leads to higher yields and lower bond ratings. Their methods are similar, however, Caton et al. (2011) differentiate between initial bond offerings and seasoned bond offerings, while Liu et al. (2010) makes no such distinction. Additionally, Liu et al. (2010) utilises yield spread rather than yield as a dependent variable. Other researchers focus on real EM around bond issues, while also controlling for accrual EM (Crabtree et al., 2014; Ge & Kim., 2014; Mellado-Cid et al., 2017). Real EM is often decomposed to sales manipulation, overproduction and abnormal reduction of discretionary expenditure. Crabtree et al. (2014) show that all three measures of real EM are positively related to yield spread, Ge and Kim (2014) show that all but discretionary expenditure is positively related with yield spread and associate the results with that bondholders demand risk premiums that are higher for firms that employ real EM. Mellado-Cid et al. (2017), however, document contradicting evidence. Opposed to the two former studies Mellado-Cid et al. (2017) uses quarterly figures and excludes the sales associated measure of real EM and evidence a negative relationship between real EM and yield spread. Less attention is given to the question of the existence of EM behaviour prior to testing the relationship to yield spread and Mellado-Cid et al. (2017) is the only study on real EM that documents the change in real EM proxies around bond issues. Other related research to the EM literature finds that firms exceeding earnings forecasts benefit from lower initial bond yield spreads and higher credit ratings. However, this effect is weaker for firms that achieve the benchmark through EM, suggesting that market participants partially see through such practices (Jiang, 2008).

While nearly all prior research has been conducted in a U.S. setting, we identify one study that examines bond issuance in an international context (Kim et al., 2020). They find a positive relationship between real EM and the cost of debt capital across 18 different countries. However, while the study does incorporate international firms, more than 93% of the sample size consists of US firms, with only 3% being European. The authors acknowledge this limitation and note that the validity of their findings may be constrained by the small size of the non-U.S. sample, with the observed effects largely driven by U.S. firms (Kim et al., 2020).

Scholars have also explored the relationship between EM and new debt issuance by examining its impact on credit ratings as well as by incorporating other types of debt instruments (Ater & Hansen, 2020; Beck, 2018; Caton et al., 2011; Crabtree et al., 2014). Caton et al. (2011) find that accrual EM leads to a subsequent decrease in credit rating, suggesting that market participants are not misled by such efforts. The authors complement their findings by examining whether firms that engage in aggressive EM eventually face rating downgrades

as credit agencies uncover their true earnings. However, they find no evidence of such downgrades, supporting the notion that rating agencies were never misled in the first place. Crabtree et al. (2014) find similar results when investigating real EM while also controlling for accrual EM. Other researchers have specifically examined firms' propensity to engage in EM as a tool for influencing credit ratings, finding that it serves as a means for management to affect their ratings (Alissa et al., 2013; Demirtas & Cornaggia, 2013; Kim et al., 2013).

Given the inconsistencies in previous findings on EM around bond issuance and its impact on bond yields, along with the limited coverage of European firms, a gap remains in the EM literature.

2.6. The European setting

This study explores earnings management before bond issuance within a European context. Unlike the U.S., the European market comprises multiple countries with varying regulatory frameworks that may impact earnings management practices. Therefore, this section examines both differences and similarities among European countries from two key perspectives: the corporate bond market and accounting regulations.

2.6.1. The European corporate bond market

Corporate bonds have historically played a minor role in the overall funding of European businesses, but this has changed in recent years. Issuance in the European bond market has grown substantially, reaching more than twice the level of 2007 by 2017 (European Commission, 2017). As of Q2 2024, debt securities issued by non-financial corporations amounted to EUR 2 trillion[2], representing 8% of the total European debt securities market (Deutsche Bank, 2024). Despite the growth of the European bond market, the US bond market remains nearly four times larger, which may explain why the EM literature has primarily focused on the US while giving less attention to the European bond market. However, we believe the European market to be particularly pertinent due to some of its unique market characteristics and regulatory nuances. This relevance is underscored by previous research that suggests that EM prior to bond issues is more prevalent among smaller issuers and non-investment grade bonds, which represent a significantly growing segment of the European bond market (Darmouni & Papoutsi, 2025; Liu et al., 2010).

[2] Excluding Norway and the United Kingdom

In order to examine EM in the European bond market, it is critical that bond regulations and market structures are homogeneous across countries to ensure comparability and consistency in the data. In general, bond markets across the European Union (EU) exhibit great similarities due to the harmonising effect of EU regulations. This alignment is largely driven by regulatory initiatives aimed at enhancing the functionality, transparency and integration of the European bond market, such as the Capital Markets Union, MiFID II, and MiFIR (European Commission, n.d.b.; OECD, 2025). However, as the EU primarily relies on directives to harmonise financial instruments, their implementation has historically varied across member states, leading to some regulatory divergences (European Commission, 2017).

Previous literature distinguishes between Eastern and Western Europe, as these regions are generally viewed as distinct from one another in the debt market (Krebbers et al., 2022). This distinction likely stems from significant differences in the current use and development of corporate bond markets. For example, the share of outstanding debt securities issued by non-financial corporations as a percentage of GDP ranges from 30% to 5% across Western European countries, whereas in Eastern Europe, it typically remains below 5% (Deutsche Bank, 2024). In this study, we focus on Western European countries, which, largely following Krebbers et al. (2022), are identified as Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK. These countries exhibit strong regulatory alignment, particularly within the European Economic Area (EEA), where directives, like the Prospectus Directive, provide a harmonised framework for EU-listed bond securities (Krebbers et al., 2022). Following Brexit, the UK has established its own regulatory framework, which, although independent, remains closely aligned with similar EU regulations (Financial Conduct Authority, n.d.).

2.6.2. European Accounting regulations

Since EM arises from the inherent subjectivity in accounting, the prevailing regulatory framework plays a critical role in its detection. Prior to the adoption of IFRS, accounting regulations varied across countries, resulting in limited comparability. While some followed national Generally Accepted Accounting Principles (GAAP), others voluntarily adopted International Accounting Standards (IAS). In 2002, all EEA member states agreed to adopt IFRS for publicly listed firms starting in 2005 (IFRS Foundation, 2025). The primary objective of IFRS implementation is to promote consistent and comparable financial reporting throughout the EU (European Commission, n.d.a.). Since its adoption, researchers have

extensively examined its impact on accounting quality, accrual aggressiveness and EM, yielding mixed results (Achleitner et al., 2014; Ahmed et al., 2013; Bansal, 2023; Barth et al., 2008; Capkun et al., 2016; Christensen et al., 2015).

Previous research has shown inconsistent findings on whether IFRS adoption has increased or decreased EM, more importantly, studies suggest that regardless of the accounting regime in use, firms tend to shift between accrual EM and real EM (Evans et al., 2015). This aligns with previous evidence showing that managers use real EM and accrual EM as substitutes (Zang, 2012). Thus, by incorporating both real EM and accrual EM, we aim to comprehensively study EM patterns before bond issuance over time, regardless of the accounting regime.

2.7. Summary of literature review

Research on earnings management prior to capital market transactions generally finds that managerial discretion over reported earnings can distort investors perception, potentially influencing investment decisions. While this phenomenon is well explored in equity capital markets, such as SEOs, IPOs, and M&As, its impact on debt capital markets remains overall inconclusive. While Liu et al. (2010) find that income-increasing earnings management prior to a bond offering causes a reduction in yield spread, Caton el al. (2011) find the complete opposite, suggesting that investors not only detect earnings management but also interpret it as a sign of increased financial risk. Similar conflicting results are found when examining the impact of real EM before bond issuance on bond yields (Crabtree et al., 2014; Ge & Kim., 2014; Mellado-Cid et al., 2017).

In conclusion, this study seeks to enhance the current understanding of whether firms engage in earnings management before bond issuance and how investors respond to such attempts by examining a previously understudied context, the European market.

2.8. Hypothesis development

Motivated by compelling evidence from the U.S. market, this study explores two research questions. First, it examines whether firms engage in income-increasing earnings management before bond issuance. Several studies report an increase in earnings management before bond offerings, compared to non-issuing industry peers (Caton et al. 2011; Liu et al., 2010; Mellado-Cid., 2017). Firms may have several incentives to manage earnings prior to bond issue. Dye (1988) argues that earnings management is often a rational response to agency conflicts

inherent in the relationship between managers and shareholders. Shareholders may tolerate or even encourage earnings management when it aligns with shareholder gains, such as issuing debt at a lower cost. Prior research has found managers to substitute between accrual-based EM and real EM, reducing accrual-based methods when under heightened scrutiny, such as prior to a bond issue, while increasing reliance on real activities manipulation (Cohen & Zarowin, 2010). At the same time IFRS reporting firms are evidenced to more heavily utilise accruals earnings management. To provide a comprehensive analysis of how firms engage in earnings management, this study incorporates both approaches. Considering the characteristics of bond issuing firms in the EU, evidenced in prior research to be the same firms that manage earnings, in combination with the incentives to manage earnings prior to bond issue, we make the following hypothesis:

H1: Firms engage in income-increasing accrual (real) earnings management prior to bond issue.

Secondly, this thesis aims to investigate whether an increase in earnings management before bond issuance subsequently leads to an impact on the bond yield spread. While much of the existing literature agrees that firms to some extent manipulate earnings before bond issuance, the evidence on its impact on yield spreads remains mixed. Liu et al. (2010) hypothesise that the positive effects of earnings management may be more pronounced in equity markets, where the presence of less-informed retail investors is greater, whereas bond markets, dominated by institutional investors, are more likely to reflect informed scrutiny and detection of such practices. Considering the limited evidence in the European setting and the mixed results in the US, the impact of earnings management on bond yield spreads is not evident and ultimately a question for empirical analysis.

Liu et al. (2010) argue that a decline in yield spreads following an increase in accrual-based earnings management suggests that investors are unable to distinguish between high- and low-quality earnings, indicating a failure to see through managed financial performance. Crabtree et al. (2014) extend this reasoning, suggesting that if investors detect inflated earnings and interpret them as a signal of weaker future performance, yield spreads should increase. However, if such earnings are viewed as a one-time adjustment with no implications for future cash flows, yield spreads may remain unaffected. Real EM on the other hand can be interpreted both positively and negatively. Abnormal sales, overproduction, and reductions in discretionary expenditures may indicate opportunistic manipulation, but may also reflect

legitimate improvements in customer demand or operational efficiency. Accordingly, we formulate the following hypothesis:

H2: Income-increasing accrual (real) earnings management leads to a reduction in at-issue bond yield spreads if undetected (viewed as a positive signal) by the market.

3. Methodology

This chapter begins by outlining the sample selection process and describing the distribution of observations across time and countries. It then introduces the models used to estimate the earnings management measures. Finally, it presents the empirical specification and defines the associated variables.

3.1. Sample selection

The sample consists of all nonconvertible bonds issued by European[3] firms from 1994 to 2022 from the SDC New Issues Database. The SDC database offers comprehensive data from 1970 and onwards on new issuances, M&A, syndicated loans, and private equity across global financial markets. We include a broad time period to enable additional insights into earnings management across different contexts, such as before and after the implementation of IFRS. We analyse earnings management over a five-year period around bond issuances and require fundamentals data up to two years post-issuance, therefore the final year of available data is 2022. Each bond issuance is matched with the issuing firm's fundamental and stock price data, obtained from Compustat Global and accessed via Wharton Research Data Services (WRDS).

As is common in the literature, we exclude regulated utility firms and financial institutions (Standard Industry Classification (SIC) codes 6000–6999 and 4900–4999) due to differences of their financial reporting incentives (Cheng et al., 2016). Additionally, to be included in the sample, an issue must have a non-missing yield spread from SDC[4]. Firms must

[3] The study includes firms from the following European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Ireland, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the UK. This selection follows Krebbers et al. (2022) and primarily includes countries where outstanding debt issued by non-financial corporations' accounts for at least 5% of GDP, reflecting the development and utilization of corporate bond markets.

[4] In cases where the SDC database provides a non-missing yield to maturity but lacks a benchmark treasury yield, we have manually added the corresponding treasury yield to calculate the yield spread. We apply the same approach as SDC, such that e.g., the yield spread of a UK bond with a maturity of 11 years is calculated using the yield of a 10-year government bond.

also be listed in the Compustat tapes to be included in the sample. Applying these criteria, we arrive at a sample of 7,531 firm-year observations from 779 firms.

Following previous literature and to avoid spurious correlations, we aggregate multiple bond issues from the same issuing firm within a given year into a single observation, using issue proceeds as the weighting factor (Anderson et al., 2004; Liu et al., 2010; Klock et al., 2005; Mansi et al., 2011). Combining bonds gives a sample of 3,563 firm-year observations from 779 firms.

Following Liu et al. (2010) and Caton et al. (2011) we analyse firms' use of EM in the years surrounding bond issue in order to observe changes in the magnitude of EM. This means that firms need to have data available two years prior and two years after bond issue. Additionally, we require that each industry-year grouping in the cross-sectional estimation must have at least ten non-sample firm observations to estimate the EM measures of in-sample firms (Cheng et al., 2016). With these criteria, the final sample consists of 1,802 firm year observations from 471 individual firms.

During our sample period, 164 firms had 1 bond offering, 84 firms had 2 bond offerings, 54 firms had 3 bond offerings, 45 firms had 4 bond offering, 18 firms had 5 bond offerings, 25 firms had 6 bond offerings, 15 firms had 7 bond offerings, 11 firms had 8 bonds offerings, and 55 firms had more than 8 bond offerings. The average number of observations per industry is approximately 44, although it varies across industries, ranging from 2 to 272. Table 1 gives an overview of the sample selection process.

Table 1. Sample selection

This table present an overview of the sample selection process.

Criteria	No. of obs (No. of firms)
All non-convertible bonds by non-financial and non-utility firms in SDC with non-missing yield spread and listed in Compustat Global	7,531 (779)
Combined by issue proceeds	3,563 (779)
Observations with sufficient data for all measures and time-periods (+/- 2 years)	1,802 (471)

Table 2 presents the distribution of our sample over time and across countries. The majority of bonds are issued during the 2000s, with a notable increase in issuance following 2008. Switzerland, Germany, France, and the UK are the most active bond issuers in the European market, collectively accounting for just over 60% of the sample.

Table 2. Sample distribution

This table presents the distribution of our sample by year and country. Year is the issue year of the bond. Panel A presents the distribution of observations over years. Panel B present the distribution of observations by country.

Panel A: Year distribution			Panel B: Country distribution		
Issue year	No. of obs	% of sample	Country code (ISO)	No. of obs	% of sample
1994	1	0.06%	AUT	49	2.72%
1995	1	0.06%	BEL	61	3.39%
1996	7	0.39%	CHE	216	11.99%
1997	10	0.55%	DEU	282	15.65%
1998	7	0.39%	DNK	26	1.44%
1999	10	0.55%	ESP	76	4.22%
2000	20	1.11%	FIN	68	3.77%
2001	31	1.72%	FRA	418	23.20%
2002	24	1.33%	GBR	240	13.32%
2003	26	1.44%	IRL	18	1.00%
2004	17	0.94%	ITA	57	3.16%
2005	32	1.78%	LUX	25	1.39%
2006	28	1.55%	NLD	76	4.22%
2007	44	2.44%	NOR	26	1.44%
2008	42	2.33%	PRT	4	0.22%
2009	93	5.16%	SWE	160	8.88%
2010	72	4.00%			
2011	79	4.38%			
2012	129	7.16%			
2013	112	6.22%			
2014	124	6.88%			
2015	101	5.60%			
2016	94	5.22%			
2017	127	7.05%			
2018	113	6.27%			
2019	113	6.27%			
2020	146	8.10%			
2021	117	6.49%			
2022	82	4.55%			
Total	1,802	100%	Total	1,802	100%

3.2. Earnings management model specifications

This study examines whether firms engage in earnings management before bond issuance through two distinct methods: accrual-based earnings management and real earnings management. Specifically, the accrual-based earnings management model used in the main analysis is a version of the modified Jones (1991) model, as specified by Teoh et al. (1998b). The real earnings management model employed is the Roychowdhury (2006) real earnings management model. Subsequently, a regression model is used to test whether an increase in

earnings management results in a lower yield spread. Lastly, we discuss the method of measuring yield spread (dependent variable) and other control variables used in the regression.

3.2.1. Accruals earnings management model

Accrual-based earnings management is typically identified through abnormal discretionary accruals (DA), which represent the portion of accruals influenced by managerial discretion. DA, together with non-discretionary accruals (NDA) represents a firm's total accruals (TA). However, as these measures cannot be directly observed, they must be estimated. Existing accrual-based models begin by estimating the non-discretionary component of TA by establishing an expected normal level based on out-sample firms. Deviations from the expected normal level is then attributed to the discretionary component.

To calculate a proxy for accrual-based EM, we employ the modified Jones model, which is an extension of the original Jones model (Jones, 1991; Dechow et al., 1995). In contrast to the original Jones model, the modified Jones model adjusts the change in sales for changes in accounts receivable, removing the inherent assumption that sales are entirely non-discretionary. Instead, it recognises that credit sales are subject to managerial discretion, as management can increase sales through for example premature revenue recognition (Dechow et al., 1995). We apply the model cross-sectionally and estimate DA for each firm by year and industry, classified by the two-digit SIC code. This approach controls for industry-wide economic changes while allowing the coefficients to vary over time (Cohen et al., 2008). An alternative approach would be a time-series model, which estimates “normal” accruals for each firm using an estimation period, a method common in earlier studies (Dechow et al., 1995; Guay et al., 1996; Jones, 1991). However, this method typically requires at least 10 prior observations, meaning that firms must have at least 11 years of data, which introduces survivorship bias (Bartov et al., 2000; Jeter & Shivakumar, 1999). Moreover, the cross-sectional approach yields a larger sample and more observations per model, enhancing the precision of the estimates (Subramanyam, 1996).

We follow previous literature and focus on current discretionary accruals (DCA) (Caton et al., 2011; Liu et al., 2010; Teoh et al., 1998b). We prioritise current over long-term DA, as previous scholars argue that managers have greater flexibility and control over short-term accrual adjustments. Our results do not change when using versions of the modified Jones (1991) model, incorporating both short-term and long-term accruals.

Following previous literature (Caton et al., 2011; Liu et al., 2010; Teoh et al., 1998b), we calculate total current accruals (CA) using the balance sheet approach, where CA is defined

as the change in non-cash current assets minus the change in operating current liabilities for firm i in year t.

$$CA_{it} = \Delta(\text{Current assets}_{it} - \text{Cash}_{it}) - \Delta(\text{Current liabilities}_{it} - \text{Current maturity of long-term debt}_{it}) \quad (1)$$

To identify the non-discretionary portion of total current accruals, CA is regressed cross-sectionally on the change in sales for each non-sample firm within the same industry, j, and year, t.

$$\frac{CA_{jt}}{TA_{j,\,t-1}} = \beta_0 \frac{1}{TA_{j,t-1}} + \beta_1 \frac{\Delta Sales_{jt}}{TA_{j,t-1}} + \varepsilon_t \quad (2)$$

Where CA_t is total current accruals, $\Delta Sales_t$ is the change in sales from year t-1 to year t, TA_{t-1}, is lagged total assets, and ε_t is the error term.

Using the estimated coefficients from (2), non-discretionary current accruals is predicted for every sample firm, i, at time t using the model below.

$$NDCA_{it} = \hat{\beta}_0 \frac{1}{TA_{i,t-1}} + \hat{\beta}_1 \frac{\Delta Sales_{it} - \Delta AR_{it}}{TA_{i,t-1}} \quad (3)$$

Where $NDCA_t$ is non-discretionary current accruals expressed as a percentage of lagged total assets, $\Delta Sales_t$ is the change in sales from year t-1 to year t, ΔAR_t is the change in accounts receivable from year t-1 to year t, and TA_{t-1} is lagged total assets.

Lastly, current discretionary accruals, is calculated by subtracting NDCA from CA, and represents the portion of total accruals subject to managerial discretion.

$$DCA_{it} = \frac{CA_{it}}{TA_{i,t-1}} - NDCA_{it} \quad (4)$$

Where DCA_t is discretionary current accruals expressed as a percentage of lagged total assets, CA_t is total current accruals, $NDCA_t$ is non-discretionary current accruals, and TA_{t-1} is lagged total assets. Positive DCA is indicative of income-increasing earnings management, while negative DCA is indicative of income-decreasing earnings management. All variables in the

equations above are scaled by the lagged book value of total assets to reduce heteroscedasticity (Teoh et al., 1998b).

Generally total accruals can be calculated using two methods: the balance sheet approach, which derives total accruals as the change in balance sheet working capital minus depreciation and amortisation expenses if one includes long-term accruals, or the cash flow approach, which calculates total accruals as the difference between net income and cash flow from operations taken directly from the cash flow statement (Larson et al., 2018). Following Liu et al. (2010), we employ the balance sheet approach, as the cash flow approach has been criticised for introducing bias into the accruals measure (Ball & Shivakumar, 2006; Larson et al., 2018). The balance sheet approach has also been criticised for introducing bias in accrual estimates and increasing Type I errors, particularly in cases involving non-operating events such as M&A (Hribar & Collins, 2002). Nonetheless, we adopt this approach to enhance comparability with prior studies examining earnings management around bond issuance.

3.2.2. Real earnings management models

Following previous literature, we derive three specific measures of real earnings management, abnormal levels of cash flow from operations (CFO), production costs (PROD), and discretionary expenses (DISEXP), as well as one aggregate metric (REM) which is the sum of the former three measures (Roychowdhury, 2006; Cohen & Zarowin, 2008). Abnormal levels of cash flow from operations arise when firms accelerate sales by offering aggressive price discounts and/or more lenient credit terms. This will cause an increase in the current period earnings, assuming positive margins, but a reduction in cash flow from operations. Abnormal levels of production costs arise when firms overproduce in order to spread fixed overhead costs across a larger number of units, thereby reducing the fixed cost per unit and lowering cost of goods sold (COGS). While this strategy can temporarily reduce COGS and inflate reported earnings, it results in higher total production costs and an accumulation of inventory. Given unchanged sales levels, this also leads to lower cash flow from operations. Lastly, abnormally low discretionary expenses reflect managerial reductions in advertising, research and development (R&D), and selling, general, and administrative (SG&A) expenditures, undertaken to temporarily boost reported earnings.

Similar to the accruals model, we estimate the real activities regression models cross-sectionally for each industry-year group to obtain the expected normal levels of CFO, PROD, and DISEXP. Abnormal levels of CFO, PROD, and DISEXP are then computed as the difference between the actual firm-year values and the corresponding expected normal levels

predicted using the estimated coefficients from equations (5), (6), and (7), or put differently the residual from the firm-specific regression.

CFO is modelled as a linear function of sales and change in sales and is estimated using the following regression.

$$\frac{CFO_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{Sales_t}{TA_{t-1}} + \beta_3 \frac{\Delta Sales_t}{TA_{t-1}} + \varepsilon_t \quad (5)$$

Where CFO_t denotes cash flow from operations, $Sales_t$ is sales in year t, $\Delta Sales_t$ is the change in sales from year t-1 and year t, TA_{t-1} is lagged total assets, and ε_t is the error term.

Production costs is estimated as a function of sales, the change in sales, and the prior year change in sales.

$$\frac{PROD_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{Sales_t}{TA_{t-1}} + \beta_3 \frac{\Delta Sales_t}{TA_{t-1}} + \beta_4 \frac{\Delta Sales_{t-1}}{TA_{t-1}} + \varepsilon_t \quad (6)$$

Where $PROD_t$ is the production cost and defined as the sum of cost of goods sold and the change in inventory (PROD = COGS + ΔINV), $Sales_t$ is sales in year t, $\Delta Sales_t$ is the change in sales from year t-1 and year t, $\Delta Sales_{t-1}$ is the change in sales from year t-2 to year t-1, TA_{t-1} is lagged total assets, and ε_t is the error term.

Lastly, discretionary expenses are modelled as a function of the previous year sales.

$$\frac{DISEXP_t}{TA_{t-1}} = \alpha + \beta_1 \frac{1}{TA_{t-1}} + \beta_2 \frac{Sales_{t-1}}{TA_{t-1}} + \varepsilon_t \quad (7)$$

Where $DISEXP_t$ is the discretionary expenses which is equal to the sum of advertising expenses, R&D expenses, and SG&A expenditures (DISEXP = advertising + SG&A + R&D). Following prior literature, we include observations of discretionary expenses as long as SG&A is available, setting advertising expenses and R&D expenses to zero if missing (Cohen et al., 2008; Roychowdhury, 2006).

All variables in the equations above are scaled by the lagged book value of total assets to mitigate heteroscedasticity. Following Roychowdhury (2006) we include an intercept scaled by the lagged book value of total assets and an unscaled intercept in all models above. Including a scaled intercept helps eliminate spurious correlation between scaled variables that share a

denominator (Roychowdhury, 2006). While accrual-based models typically include only a scaled intercept to control for spurious correlation, we follow Roychowdhury (2006) in including both a scaled and an unscaled intercept in the real earnings management models. The unscaled intercept captures baseline levels of the dependent variable when explanatory variables are zero and ensures that the mean of the residual (abnormal component) is centred within each industry-year. However, Roychowdhury (2006) acknowledges that results remain robust regardless of whether the unscaled or scaled intercept is included in the model.

Overall, lower abnormal CFO, lower abnormal DISEXP, and higher abnormal PROD are indicative of income-increasing real earnings management practices. To ensure that all three proxies are directionally aligned, such that higher values uniformly reflect greater use of real earnings management, both abnormal CFO and DISEXP are multiplied by –1 (Zang, 2006).

Following previous literature, we also include an aggregated measure of real activities, REM, by combining the standardised variables of all three individual proxies, capturing the total extent of real earnings management (Cohen et al., 2008; Ge & Kim, 2014). However, as suggested by prior scholars, we also acknowledge that combining the three measures may introduce measurement errors (Cheng et al., 2016 Cohen & Zarowin, 2010). Specifically, combining CFO and PROD may result in double accounting as some activities that lead to abnormally high production costs also cause abnormally low cash flow from operations. Therefore, our main analysis includes both the aggregate measure and the three individual proxies of real earnings management.

3.2.3. Empirical model

To analyse the impact of EM on bond yield spreads, we employ a multiple ordinary least square regression model incorporating our proxy for accrual-based earnings management, our three proxies for specific real earnings management, and one aggregate measure of real earnings management, separately. The multiple regression models are structured as follows.

$$YS = \alpha+\beta_1 EM+\beta_2 Assets+\beta_3 ROA+\beta_4 TotalLev+\beta_5 M\_B+\beta_6 RetVar +\beta_7 Collateral+\beta_8 Proceeds+\beta_9 Maturity+\beta_{10} Rating+\varepsilon \quad (8)$$

Where YS is yield spread, and EM is one of the EM measures as defined previously. The below two sections describe both the dependent variable and the control variables in more detail.

3.3. Measuring yield spread

Following prior literature, the yield spread is defined as the difference, in basis points, between a bond's at-issue yield and the yield of a comparable Treasury security (Bhojraj, 2003; Crabtree et al., 2014; Jiang, 2008; Ge & Kim, 2014; Liu et al., 2010). The yield spread at issuance reflects the risk premium firms incur when raising capital in the bond market, serving as a direct measure of their incremental cost of debt (Jiang, 2008). The yield spread is obtained directly from the SDC New Issues Database, which calculates the spread by comparing the bond's yield to that of the nearest on-the-run Treasury security with a similar maturity. For example, if a corporate bond matures in seven years, the yield on a seven-year Treasury bond is used as the benchmark. Consistent with previous literature, if a firm issues multiple bonds within a given year, we aggregate them into a single observation, weighted by issue proceeds to avoid spurious correlations (Anderson et al., 2004; Crabtree et al., 2014; Liu et al., 2010; Klock et al., 2005; Mansi et al., 2011).

3.4. Control variables

The multiple regression model incorporates both firm- and bond-specific variables to account for potential confounding factors. First, we include firm size, measured as book value of total assets, as larger firms generally carry lower risk and are rewarded with a lower cost of debt (Nikolaev & Van Lent, 2005). Secondly, to control for firms default risk we use the accounting-based ratios of return to assets (ROA) calculated as income before extraordinary items divided by total assets, and debt-to-assets (TotalLev) calculated as total book value of debt over total assets (Liu et al., 2010). In prior literature, researchers have also used other leverage ratios, such as long-term debt to total assets (LtLev) (Ater & Hansen, 2020; Crabtree et al., 2014; Jiang, 2008). When substituting TotalLev with LtLev, we obtain similar results. To control for a firm's systematic risk, we follow previous literature and include return variance (RetVar), defined as the variance of stock returns over the year preceding the bond issuance (Bhojraj, 2003; Crabtree et al., 2014; Jiang, 2008; Liu et al., 2010). As higher return volatility signals greater risk, RetVar is expected to correlate positively with the cost of debt, reflecting investors' demand for a higher risk premium. Furthermore, we include the market-to-book ratio (M_B) to control for firm performance, as prior research suggests that growth prospects are negatively correlated with the cost of debt (Ater & Hansen, 2020; Bhojraj & Sengupta, 2003; Jiang, 2008; Nikolaev & Van Lent, 2005). Following Liu et al. (2010), M_B is calculated as the market value of assets divided by the book value of assets, where the market value of assets is the sum

of the market value of equity and the book value of debt. Some previous studies use market value of equity over book value of equity as the market-to-book ratio (Bhojraj & Sengupta, 2003; Jiang, 2008; Nikolaev & Van Lent, 2005). However, we argue that the ratio of market value of assets to book value of assets provides a more comprehensive measure, as it captures both the market's expectations of future growth (through equity valuation) and the firm's ability to meet its obligations (through the inclusion of debt), making it particularly relevant in the context of credit risk and bond yields. To account for differences in firms' asset structures, we incorporate capital intensity (Collateral) as a control variable. Firms with higher capital intensity pose lower risk to debt providers and are therefore expected to have a lower cost of debt (Ashbaugh et al., 2006; Liu et al., 2010). Capital intensity is measured as the ratio of gross property, plant, and equipment to total assets. All firm-specific variables are measured in the year preceding the bond issuance to ensure that the financial information is publicly available at the time of issuance.

Bond-specific variables, shown in prior research to impact yield spreads, are also included in the multiple regression model. We include the total proceeds, as economies of scale in underwriting suggest that underwriting fees decrease with larger bond issues, reducing issuance costs and ultimately leading to lower bond yields (Bhojraj & Sengupta, 2003, Liu et al., 2010; 2003; Sengupta, 1998). Bond maturity is included to account for the greater interest rate risk exposure associated with longer durations (Ge & Kim, 2014; Sengupta, 1998). Bonds with longer maturities have cash flows occurring further in the future, making their present value more sensitive to interest rate fluctuations. As a result, time to maturity is expected to be positively correlated with yield spreads. Rating is Moody's debt rating and if missing it is replaced with Fitch debt rating. Ratings are assigned numerical values such that Aaa = 22, Aa1 = 21 and so on in descending order. For issues that do not have a debt rating we follow Zhang (2008) and construct imputed debt ratings by estimating a regression of available ratings on leverage, firm size, ROA, loan maturity, and loan size[5]. Imputed ratings are measured directly preceding issuance to reflect available information and the perceived risk of the loan. Following prior literature, we winsorize all firm- and bond-specific variables at the 1st and 99th percentiles to mitigate the influence of outliers (Liu et al., 2010).

Lastly, we control for time using decade-specific dummy variables (e.g., 1990s, 2000s, etc.), industry using two-digit SIC code dummies, and country effects with country-specific dummy variables. Entity fixed effects control for variables that are constant across time but

[5] Specifically, the model is 7.75–5.40*leverage+0.88*firm size+21.76*ROA–0.24*loan maturity–4.30*loan size

vary between entities, and time fixed effects control for variables that are constant between entities but differ across time (Stock & Watson, 2020). As such, country fixed effects control for differences between countries that are constant over time, industry fixed effects control for differences between industries that are constant over time, and time fixed effects control for differences over time that are constant between entities. Although the countries in our sample are homogenous the bond market is not unified and unobservable differences may exist that could explain the relationship between yield spread and EM.

The information contained in our control variables are likely already incorporated in the rating variable and can cause multicollinearity issues. To avoid such problems, we model a regression of Rating on Assets, ROA, TotalLev, RetVar, Maturity, M_B, Collateral, and Proceeds, and let the residual from this regression be the rating variable. This variable contains rating information above that of the already included control variables and is used in all regressions (Liu et al., 2010; Mellado-Cid et al., 2017).

4. Results

In this section, the empirical results are presented. First, we present the descriptive statistics and Pearson correlations for all variables included in our multiple regression analysis. Next, we conduct univariate tests to examine the presence of earnings management prior to bond issuance and to provide initial evidence of its association with bond yield spreads. We then formally assess this relationship using multiple regression models and additional specifications. Finally, we evaluate the robustness of our findings and discuss potential endogeneity concerns.

4.1. Descriptive statistics

Summary statistics are reported in Table 3, reflecting the full sample consisting of 1,802 firm-year observations. On average (median), sample firms report net sales of USD 19.5 (10.1) billion, and a total book value of assets of 33.5 (13.7) billion[6]. Thus, the average firm in the sample is larger than those examined in comparable U.S. studies (Crabtree et al., 2014; Liu et al., 2010). Simultaneously, similar to prior literature we find large variations in size across the sample. Apart from that, our findings are largely in line with previous research. The average firm is profitable, has relatively low leverage, and relies primarily on long-term debt financing, as indicated by a mean (median) ROA of 3.86% (3.88%), a book debt-to-asset ratio of 0.29

[6] All financial items are converted to USD. This is because the euro was not implemented until 1999 (European Union, n.d.), and to increase comparability with studies in the US. As almost all of our measures are ratios, we expect currency effects to be minimal.

(0.28), and a long-term debt-to-assets ratio of 0.22 (0.21). The mean (median) market-to-book ratio is 1.54 (1.30), return variance one year pre-issue is 6.39 (3.68), and capital intensity (collateral), measured as gross property, plant, and equipment to total assets, is 0.57 (0.48).

The average yield spread of 206 basis points is in line with prior literature, with Liu et al. (2010) and Ge and Kim (2014) documenting spreads of 224 and 226 basis points, respectively. However, our sample differs in terms of both total proceeds and maturity. Given that our sample comprises larger firms, it is unsurprising that average total proceeds are generally higher with a mean (median) value of 870.5 (576.7). As discussed, this may reflect the historical dominance of larger issuers in European bond markets. A comparison with comparable U.S. studies also indicates that European bonds tend to have shorter maturities, with an average (median) of 10.2 (7.1) years. This is consistent with the findings presented in the OECD's Global Debt Report (Global debt report OECD, 2024).

Table 3 also reports summary statistics for all EM proxies (DCA, CFO, PROD, DISEXP and REM), displayed in percentage form of lagged total assets one year prior to bond issuance. A positive (negative) mean value suggests that, on average, firms engage in income increasing (decreasing) EM. The average firm does not appear to engage uniformly in the different earnings management methods prior to bond issuance, as shown by the variation in direction and magnitude across the individual proxies. Real EM proxies exhibit larger absolute mean values and higher variability compared to DCAs, -5.26% to 8.53% versus -0.14%. The spread in 25th to 75th percentile range for the aggregated REM measure (-10.10% to 17.84%) underscores significant firm-level heterogeneity in real earnings management behaviour.

4.2. Pearson correlations

Table 4 presents correlations between our proxies of earnings management, our dependent variable (yield spread) and our control variables. If higher EM were to lead to lower yield spread, we would expect each individual EM proxy to exhibit a statistically significant negative correlation with yield spread. However, to the contrary, there is a statistically significant positive correlation between CFO, PROD, and REM and yield spread. On the other hand, both DISEXP and DCA shows a negative correlation with yield spread, though the magnitude is small and not statistically significant.

By construction, the individual real EM measures (CFO, PROD and DISEXP) are all highly correlated with the aggregated REM measure. Analysing the correlation among the individual EM proxies, we find a statistically significant positive correlation between CFO and

Table 3. Descriptive statistics

This table present descriptive statistics of the sample, containing 1,802 firm-year observations. Sales is net sales in million dollars, Assets is total book value of assets in million dollars, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, LtLev is long-term debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Maturity is the number of years to maturity, Proceeds is the proceeds of the bond in million dollars. Bond characteristics are proceeds weighted. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue.

Variable	Mean	SD	p25	p50	p75
Firm characteristics					
Sales	19,499.62	23,126.39	3,565.17	10,104.58	25,879.84
Assets	33,543.82	45,063.95	4,991.12	13,735.83	40,513.71
ROA (%)	3.86	4.90	1.86	3.88	6.36
TotalLev	0.29	0.13	0.20	0.28	0.38
LtLev	0.22	0.12	0.14	0.21	0.29
M_B	1.54	0.78	1.06	1.30	1.73
RetVar(%)	6.39	6.89	2.18	3.68	7.23
Collateral	0.57	0.37	0.26	0.48	0.84
Bond characteristics					
Yield spread	206.10	175.28	80.00	147.41	280.00
Rating	14.01	2.60	13.00	14.00	16.00
Maturity	10.16	14.54	5.09	7.10	9.39
Proceeds	870.45	1014.50	290.20	576.69	1017.38
Earnings management measures					
DCA (%)	-0.14	4.73	-1.85	-0.10	1.61
CFO (%)	-5.26	7.38	-9.28	-4.49	-0.51
PROD (%)	0.33	13.85	-7.47	0.50	8.32
DISEXP (%)	8.53	12.78	0.48	8.51	17.52
REM (%)	3.54	25.50	-10.10	3.35	17.84

PROD, DISEXP and PROD, and DCA and CFO respectively[7]. This suggests that firms either (a) employ multiple income-increasing earnings management strategies simultaneously to enhance reported performance, or (b) rely on specific EM strategies that affect other proxies, such as overproduction, which concurrently reduce abnormal cash flows from operations while increasing discretionary accruals (Cohen & Zarowin, 2010; Roychowdhury, 2006). The

[7] Note that both CFO and DISEXP have been multiplied by –1 to ensure that higher values consistently reflect income-increasing earnings management. As a result, a positive correlation between, for example, CFO and DCA indicates that higher discretionary accruals are associated with lower (i.e., more negative) abnormal CFO — both reflecting increased earnings management activity.

positive correlation between CFO and PROD is consistent with the notion that overproduction reduces contemporaneous abnormal CFO (Cohen & Zarowin, 2010).

Similar to prior literature, yield spread is positively correlated with total debt over total assets (TotalLev), long term debt over total assets (LtLev), and return variance (RetVar), suggesting that higher leverage and stock return volatility are associated with a higher yield spread. Unexpectedly, we find a small but statistically significant positive correlation between capital intensity (Collateral) and yield spread, which is inconsistent with theoretical predictions suggesting that higher collateral reduces credit risk and borrowing costs (Ashbaugh et al., 2006; Liu et al., 2010). Additionally, yield spread is negatively correlated with firm size, measured by both Sales and Assets, profitability (ROA), market-to-book (M_B), Rating and Proceeds. No significant correlation is observed between yield spread and bond maturity.

Lastly, we expect correlations among the control variables included in our regression models to be limited, as substantial correlations could indicate potential multicollinearity issues. Given that Sales and Assets, as well as Total Leverage and Long-Term Debt Leverage, are used interchangeably in different model specifications to test robustness, significant correlations between these variables are expected. Nevertheless, our results reveal correlations among certain control variables, and we therefore explicitly assess the presence of multicollinearity in our models, as discussed in Section 4.6.2 Statistical robustness.

4.3. Univariate tests

To examine earnings management behaviour around bond issuance, we conduct univariate tests comparing mean and median values of each EM proxy over the five-year window surrounding issuance. This approach allows us to assess whether EM varies systematically around bond issues before proceeding to the main regression analysis. We also provide preliminary evidence on the variation in yield spread based on the magnitude of EM.

4.3.1. Earnings management surrounding bond issue

In Table 5 we report firms' EM activities over the five-year window surrounding corporate bond issues, from two years before to two years after issuance. Year 0 is the year of the bond issue. Panel A reports mean values and Panel B median values to capture both the average level of EM and the typical firm behaviour. The similarity between mean and median values across most EM measures suggests a rather symmetric distribution. We further analyse changes in the individual EM proxies in the years leading up to bond issuance by calculating year-over-year differences.

Table 4. Pearson correlations.

This table present correlation coefficients between all variables in our models. The sample contains 1802 firm-year observations. Log Sales is the logarithm of sales, Log Assets is the logarithm of assets, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, LtLev is long-term debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Log Maturity is the number of years to maturity, Log Proceeds is the logarithm of proceeds. Bond characteristics are proceeds weighted. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue.

	Yield spread	CFO		DISEXP		Log Assets	ROA		LtLev		RetVar		Log Proceeds		Rating	
		DCA	PROD		REM		Log Sales		TotalLev	M_B		Collateral		Log Maturity		
Yield spread	1.00															
DCA	-0.04	1.00														
CFO	0.24*	0.11*	1.00													
PROD	0.15*	0.04	0.35*	1.00												
DISEXP	-0.01	-0.02	-0.22*	0.58*	1.00											
REM	0.15*	0.04	0.37*	0.94*	0.75*	1.00										
Log Assets	-0.39*	-0.02	-0.17*	-0.06*	0.09*	-0.03	1.00									
Log Sales	-0.41*	-0.01	-0.11*	-0.01	0.07*	0.00	0.93*	1.00								
ROA	-0.42*	0.06*	-0.37*	-0.21*	-0.04	-0.24*	0.02	0.10*	1.00							
TotalLev	0.26*	0.04	0.06*	-0.06*	0.00	-0.01	-0.01	-0.14*	-0.26*	1.00						
LtLev	0.25*	0.00	0.03	-0.05*	0.04	0.01	-0.03	-0.16*	-0.23*	0.87*	1.00					
M_B	-0.27*	0.01	-0.36*	-0.24*	0.00	-0.24*	-0.14*	-0.11*	0.50*	-0.07*	-0.02	1.00				
RetVar	0.30*	0.01	0.12*	0.03	-0.04	0.04	-0.07*	-0.07*	-0.26*	0.10*	0.06*	-0.14*	1.00			
Collateral	0.06*	-0.04	0.03	0.04	0.05*	0.06*	-0.09*	-0.08*	-0.10*	0.10*	0.12*	-0.19*	0.06*	1.00		
Log Proceeds	-0.24*	-0.03	-0.20*	-0.04	0.13*	-0.01	0.67*	0.62*	0.06*	0.00	0.07*	0.01	-0.04	-0.07*	1.00	
Log Maturity	0.03	-0.02	-0.03	0.03	0.08*	0.05*	0.18*	0.16*	0.00	0.03	0.12*	-0.07*	-0.13*	0.12*	0.23*	1.00
Rating	-0.38*	0.02	-0.04	-0.10*	-0.03	-0.08*	0.00	0.03	0.00	0.00	-0.10*	0.00	0.00	0.00	0.00	0.00

* $p<0.05$, indicates statistical significance at the five percent level or higher

If firms engage in income-increasing (income-decreasing) earnings management prior to bond issuance, we expect to observe significant and positive (negative) mean and median values that increase in magnitude as the issuance year approaches.[8] Consistent with the accrual reversal effect documented by DeFond and Park (2001), and the value-destructive nature of real earnings management practices (Roychowdhury, 2006), we also expect subsequent reversals in mean and median values in the years following bond issue.

When analysing DCAs around bond offerings, we find statistically significant evidence of income-decreasing earnings management two years prior to issuance, with a mean (median) of –0.32% (–0.21%). This pattern persists one year before issuance, indicating continued use of income-decreasing accruals. While both years preceding bond issuance exhibit signs of income-decreasing DCA, the magnitude of this activity appears to diminish as the issuance year approaches, reflecting relative earnings increases. Although only marginally significant at the 10% level, this is reflected in a positive mean change of 0.31% between year –1 and year 0. Additionally, highly significant small median increases of 0.25% and 0.21% is observed for both years prior to bond issue. This is followed by significant and negative mean and median values in the subsequent year, consistent with a reversal effect.

Overall, real earnings management appears more pronounced, with mean and median values across CFO, DISEXP, and the aggregated REM measure all highly statistically significant at the 1% level. A similar pattern to DCAs, where income-decreasing EM diminishes as the bond issuance approaches, can be observed for CFOs, with mean (median) values of -5.44% (-4.66%) and -5.26% (-4.49%) in the years prior to bond issue, although the change is not statistically significant. A weak shift occurs between year -1 and 0, with a statistically significant decline in income decreasing EM through CFO as reflected in a median change of 0.15%, significant at the 10% level. Furthermore, it is worth noting that real earnings management does not appear to reverse as quickly as accrual-based measures[9].

The most pronounced earnings management activity is observed in real EM via cuts to discretionary expenses, with mean (median) values of 8.28% (8.33%) two years prior to issuance and 8.53% (8.51%) one year prior. Only a weak median increase from year -1 to 0 of 0.15% is observed. Notably, high levels of income-increasing EM via DISEXP offset income-

[8] Income-decreasing earnings management involves the deliberate understatement of reported earnings, often to smooth perceived risk or create reserves for future periods. As this study focuses on income-increasing behaviour and its implications for bond yields, results related to income-decreasing activity are reported for completeness but are not central to the analysis.

[9] For instance, PROD even intensifies in the year following bond issuance. While Teoh et al. (1998b) document delayed reversals in accruals following equity offerings, a similar interpretation may apply here, where delayed reversals in real activities management could reflect firms' efforts to sustain performance post-issuance.

decreasing EM via CFO, resulting in a net income-increasing REM, with mean (median) values of 2.67% (2.83%) and 3.54% (3.35%) two and one years before issuance, respectively. Highly significant mean (median) pre-issue REM increases of 0.83% (0.47%) indicate EM manipulation. These findings suggest that on average firms employ multiple real EM methods simultaneously, but in opposing directions. However, as the analysis is based on aggregate data, interpretations at the firm level should be made with caution. PROD is not statistically distinguishable from zero in the pre-issue years, nevertheless significant mean (median) increases of 0.43% (0.25%) from year -2 to year -1 also indicates EM manipulation.

Comparing the magnitude of DCAs around bond offerings to prior U.S. studies, we similarly find lower levels, with Liu et al. (2010), for example, reporting mean DCAs of 0.98% and 1.18% at the year of issuance and one year prior, respectively. Similarly, comparing mean PROD and DISEXP to Mellado-Cid et al. (2017), who report PROD of 1.2% and –0.8% and DISEXP of 12.9% and 13.7% one and two quarters prior to bond issuance, we also find lower levels of real earnings management[10].

Similair to Liu et al. (2010), we investigate whether patterns of earnings management vary systematically with profitability, firm size, and credit rating (Appendix B). Similar patterns as observed in the full sample are evident across subsamples, with diminishing income-decreasing earnings management for some proxies and increasing income-increasing behaviour for others. For accrual-based earnings management, results are broadly consistent across subsamples, with the largest shifts in income-increasing behaviour observed among high-ROA and small firms, consistent with Liu et al. (2010). For real EM, we primarily find patterns of intensifying income increasing EM, and relatively higher EM levels, prior to bond issuance for less profitable, lower rated and smaller firms.

We do not observe uniform patterns of income-increasing earnings management followed by reversals across all measures for the average firm. Nonetheless, the results consistently indicate the presence of earnings management surrounding bond issuance. While some proxies indicate income-decreasing behaviour prior to issuance, all measures across but the full sample and subsamples consistently suggest a shift toward either intensifying income-increasing practices or moderating income-decreasing ones, both indicative of efforts to improve reported performance relative to surrounding periods. Given our primary focus on

[10] As Mellado-Cid et al. (2017) do not report CFO-based measures of real earnings management, no direct comparison for CFO can be made.

firms exhibiting income-increasing earnings management prior to bond issuance, the next section extends the analysis by examining this subset in greater detail.

Table 5. EM around bond issue

This table present mean and median levels of EM around bond issue. The number of observations is 1802. Year 0 is the year of the bond issue. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). Panel A present the mean of EM measures around bond issue. Panel B presents the median of EM measures around bond issue. EM measures are expressed in percentage form of lagged total assets. t-statistics, based on a two-tailed t-test, and z-statistic, based on Wilcoxon signed rank test, are in parenthesis.

Year	-2	-1	0	1	2	1 vs. 2	0 vs. 1
Panel A: Mean							
DCA	-0.32***	-0.14	0.15	-0.29***	-0.03	0.22	0.31*
	(-2.77)	(-1.29)	(1.38)	(-2.72)	(-0.33)	(1.27)	(1.79)
CFO	-5.44***	-5.26***	-5.07***	-5.18***	-4.98***	0.18	0.16
	(-30.68)	(-30.23)	(-29.06)	(-30.83)	(-28.97)	(1.53)	(1.40)
PROD	-0.14	0.33	0.18	0.42	0.46	0.43**	-0.13
	(-0.41)	(1.01)	(0.57)	(1.39)	(1.51)	(2.51)	(-0.81)
DISEXP	8.28***	8.53***	8.35***	8.75***	8.69***	0.21	-0.23*
	(27.02)	(28.34)	(28.00)	(30.61)	(30.39)	(1.52)	(-1.79)
REM	2.67***	3.54***	3.43***	3.98***	4.19***	0.83***	-0.25
	(4.40)	(5.89)	(5.87)	(7.21)	(7.56)	(2.93)	(-0.93)
Panel B: Median							
DCA	-0.21***	-0.10	0.07	-0.19***	-0.08	0.25***	0.21***
	(-3.28)	(-1.63)	(1.02)	(-3.48)	(-0.65)	(2.59)	(2.63)
CFO	-4.66***	-4.49***	-4.24***	-4.39***	-4.16***	0.09	0.15*
	(-26.06)	(-25.81)	(-25.18)	(-26.16)	(-25.29)	(1.28)	(1.76)
PROD	0.27	0.50	0.54	0.62*	0.55**	0.25**	0.04
	(0.02)	(1.21)	(1.13)	(1.65)	(1.99)	(2.08)	(-0.56)
DISEXP	8.33***	8.51***	8.35***	8.31***	8.46***	0.23	-0.16
	(23.71)	(24.62)	(24.33)	(25.71)	(25.66)	(1.18)	(-1.29)
REM	2.83***	3.35***	3.67***	3.73***	3.74***	0.47***	-0.29
	(5.47)	(6.80)	(6.84)	(7.77)	(7.99)	(2.65)	(-0.76)

* p<0.10, ** p<0.05, *** p<0.01

4.3.2. Earnings management surrounding bond issues by income increasing firms

To examine how income-increasing EM firms behave around bond issuance, we restrict the analysis to observations with positive abnormal accruals or real activities one year prior to issuance. This allows us to isolate patterns relevant to our main research interest, without obscuring the analysis with income-decreasing behaviour. Mean and median levels of abnormal accruals and abnormal real activities for income-increasing firms are reported in Table 6. We also report the number of bond issues associated with firms exhibiting income-

increasing EM one year prior to issuance. Income-increasing earnings management via DCA, PROD, and REM is observed in approximately half of all issues, whereas CFO appears less frequently, with only 407 of 1,802 issues. DISEXP is the most commonly utilised strategy, with 1377 issuances showing income-increasing activity.

The results show that all measures increase significantly from year –2 to year –1, followed by significant declines during and after the issuance year. The most notable change is observed in DCA, with a mean (median) increase of 3.76% (2.34%) from year –2 to year –1, significant at the 1% level, followed by a reversion towards zero in the year after issuance. Abnormal CFO displays a similar pattern, with a mean (median) increase of 2.43% (1.55%) one year prior to issuance, also significant at the 1% level. Abnormal PROD, DISEXP, and REM likewise show significant increases, with varying magnitudes, prior to issuance, followed by declines post-issuance. Real EM activities do not appear to revert to zero but instead tend to return to pre-issuance levels.

The results display distinct increases in income-increasing earnings management in the year prior to bond issuance, relative to both two years before and the years that follow. Suggesting that firms manage earnings upwards. The results may reflect one of two possibilities: either firms strategically engage in income increasing earnings management prior to bond issuance in an attempt to influence bond pricing, or, if no such relationship exists, the findings may simply indicate that aggressive earnings management is inherently difficult to sustain over time. To test whether earnings management behaviour is reflected in bond pricing, the next section examines whether the magnitude of income-increasing EM is associated with differences in yield spreads.

As income-increasing and income-decreasing earnings management may reflect distinct motivations and outcomes, all subsequent analyses are restricted to income-increasing firms. This ensures consistency with our directional approach and that our tests do not conflate potentially nonlinear effects or differing market interpretations of opposing earnings management strategies.

4.3.3. Bond yield spreads by levels of earnings management

As a first test of the relationship between EM and yield spread, we examine mean and median levels of yield spread, in basis points, by different levels of EM. Income-increasing firms are divided into four quantiles based on the level of EM one year prior to bond issuance. The "Conservative" quantile represents firms with the least income increasing EM, and the "Aggressive" quantile represent firms exhibiting the highest magnitude of income-increasing

Table 6. EM around bond issue by earnings increasing firms.

This table present mean and median levels of EM around bond issue for income-increasing firms. N is the number of observations. Year 0 is the year of the bond issue. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). Panel A present the mean of EM measures around bond issue by earnings increasing firms. Panel B presents the median of EM measures around bond issue by earning increasing firms. EM measures are expressed in percentage form of lagged total assets. t-statistics, based on a two-tailed t-test, and z-statistic, based on Wilcoxon signed rank test, are in parenthesis.

Year	-2	-1	0	1	2	1 vs. 2	0 vs. 1	N
Panel A: Mean								
DCA	-0.69***	3.02***	-0.27*	-0.47***	-0.13	3.76***	-3.31***	868
	(-4.27)	(24.16)	(-1.69)	(-2.87)	(-0.86)	(17.92)	(-14.63)	
CFO	1.27***	3.76***	1.33***	0.60**	0.54*	2.43***	-2.45***	407
	(4.62)	(23.77)	(4.81)	(2.44)	(1.96)	(8.61)	(-8.79)	
PROD	8.60***	10.46***	8.72***	7.99***	7.73***	1.65***	-1.60***	931
	(24.76)	(35.40)	(27.27)	(23.99)	(23.01)	(6.74)	(-6.97)	
DISEXP	12.81***	13.66***	12.89***	12.86***	12.68***	0.71***	-0.70***	1377
	(46.69)	(55.92)	(49.06)	(48.82)	(47.34)	(4.75)	(-4.89)	
REM	17.14***	20.03***	17.77***	16.59***	16.46***	2.64***	-2.17***	1027
	(28.52)	(38.77)	(32.01)	(29.14)	(27.75)	(7.46)	(-6.50)	
Panel B: Median								
DCA	-0.27***	1.76***	-0.12	-0.26***	-0.15	2.34***	-2.00***	868
	(-3.58)	(25.52)	(-1.61)	(-3.47)	(-0.92)	(18.15)	(-15.82)	
CFO	1.46***	2.93***	1.22***	0.58**	0.44**	1.55***	-1.80***	407
	(5.40)	(5.40)	(5.31)	(2.47)	(2.06)	(8.33)	(-8.41)	
PROD	7.17***	7.86***	7.15***	6.85***	6.86***	1.15***	-0.78***	931
	(21.57)	(26.43)	(22.52)	(20.78)	(20.12)	(6.73)	(-6.54)	
DISEXP	12.28***	12.72***	12.35***	12.37***	12.31***	0.57***	-0.61***	1377
	(30.15)	(32.14)	(30.71)	(30.67)	(30.43)	(4.20)	(-4.38)	
REM	14.61***	15.45***	14.74***	14.16***	14.01***	1.39***	-1.84***	1027
	(23.50)	(27.76)	(24.69)	(23.38)	(22.78)	(6.89)	(-6.22)	

* p<0.10, ** p<0.05, *** p<0.01

EM. If earnings management is undetected or perceived as a positive signal, more aggressive income-increasing behaviour is expected to be associated with lower bond yield spreads.

Overall, yield spreads appear to increase with the intensity of earnings management. With the exception of DISEXP, both mean and median yield spreads rise monotonically as manipulation becomes more aggressive. The most notable difference in yield spread is observed for CFO, with mean (median) values of 245.27 (219.00) for conservative firms and 341.97 (296.00) for aggressive firms, representing a difference in mean of around 100 basis points. In contrast, yield spread in relation to the magnitude of DISEXP shows little variation across quantiles and rather point towards a weak negative association. The univariate results

suggest that bondholders generally perceive earnings management as a negative signal and price it through higher yield spreads.

In the next sections, we formally test the relationship between bond yield spreads and earnings management by employing regression analysis.

Table 7. Yield spread by EM level

This table report mean and median yield spread by different levels of EM. Mean is the mean yield spread in basis points. Median is the median yield spread in basis points. Income-increasing firms are divided into four quantiles based on the level of the pre-issue EM measure, firms in the high (low) quantile are labelled aggressive (conservative).

	DCA		CFO		PROD		DISEXP		REM	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Conservative	180.39	125.00	245.27	219.00	191.78	142.74	220.43	159.50	202.21	144.76
2	188.50	120.22	260.36	187.32	210.88	161.10	227.82	190.00	203.57	156.00
3	207.06	170.00	261.38	230.59	209.59	157.65	184.02	125.13	217.98	171.67
Aggressive	215.52	165.00	341.97	296.00	278.00	216.23	202.22	130.00	268.47	211.00

4.4. Regression results

4.4.2. Main regression

Our results suggest that firms, in particular income-increasing firms, take accounting and operational measures to increase reported earnings prior to bond issuance. We next examine whether such income-increasing behaviour is reflected in the yield spread at issuance.

Table 8 presents the main regression results where yield spread is regressed on abnormal levels of DCA, CFO, PROD, DISEXP and REM, in model 1 to 5 respectively. We control for firm specific and bond specific variables. All EM measures and firm specific variables are measured in the year prior to bond issue. We find a significant and positive relationship between PROD and yield spread, with a coefficient of 147.29 (t = 2.52). Indicating that higher levels of PROD is associated with higher yield spreads. On average a one percentage point increase in abnormal production expenses relative to assets is equal to a 1.47 basis point (0.01*147.29) increase in the yield spread. We also find a weak positive relationship between CFO and yield spread, with a coefficient of 376.61 (t = 1.68), indicating that a one-percentage-point increase in abnormal CFO relative to assets is associated with an average increase of 3.77 basis points in the yield spread (0.01*376.61). This suggest that investors recognise firms employing abnormal PROD and abnormal CFO and assign a higher yield spread, indicating

that these activities are interpreted as negative signals. Moreover, we find no relationship between DCA, DISEXP or REM and yield spread[11].

Our results are in line with Crabtree et al. (2014), similarly demonstrating a positive relationship between real activities and yield spread on the U.S. market. In contrast to studies focusing on discretionary accruals, our results differ in that we find no significant relationship (Caton et al., 2011; Liu et al., 2010).

Additionally, results show that lower yield spreads are related to larger firms (LogAssets), firms with higher profitability (ROA), lower levels of leverage (TotalLev), higher ratios of market to book (M_B), lower levels of firms risk (RetVar), and higher levels of fixed assets to total assets (Collateral), lower yield spreads are also related to bonds with shorter maturities (Log Maturity) and higher debt ratings (Rating), largely in line with previous studies (Caton et al., 2011; Liu et al., 2010; Mellado-Cid et al, 2017). Issue size (LogProceeds) does not appear to explain variation in yield spreads.

4.4.3. Regression results by subgroups

Prior research suggests that the relationship between earnings management and bond pricing may vary systematically with firm- and issue-level characteristics. Larger issues and longer maturities may strengthen incentives to engage in earnings management given the scale of potential cost reductions, and smaller firms, facing greater information asymmetry and reduced analyst coverage, may have more discretion to manipulate reported performance (Liu et al., 2010; Mellado-Cid et al., 2017). To examine these possibilities, we re-estimate the regressions across subsamples defined by median partitions of issue size (proceeds-to-assets), firm size (market value of equity), and bond maturity. We also assess whether the observed relationships are sensitive to changes in financial reporting regimes by splitting the sample into pre- and post-IFRS periods, following evidence that regulatory changes influence the use of earnings management (Capkun et al., 2016; Cohen et al., 2008).

Regression results of the small and large issues partition is presented in Table 9. We find a significant and positive relationship between CFO, PROD, and REM and yield spread for large issues, significant at the 5 percent level. For small issues, there is no evidence of a significant association between any earnings management measure and yield spreads. Suggesting that it is more likely to see an effect of EM on yield spread for larger issues.

[11] Zang (2012) suggests that firms may substitute between accrual-based and real earnings management, implying that the magnitude of one may help explain the other. Following Crabtree et al. (2014), we test this and include DCA alongside each real EM measure. The results were largely unaffected, suggesting no material substitution effects.

Table 8. Regressions of yield spread on EM

This table present regression results of yield spread on different EM measures. EM reflect the earnings management measure of the model. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue. Log Assets is the logarithm of total assets, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Log Maturity is the logarithm of the number of years to maturity, Log Proceeds is the logarithm of proceeds. Bond characteristics are proceeds weighted. t-statistics based on cluster-robust standard errors are in parenthesis.

	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM
Intercept	680.04***	816.07***	744.87***	726.43***	758.87***
	(7.69)	(6.39)	(11.37)	(12.01)	(12.20)
EM	-59.75	376.61*	147.29**	1.07	38.68
	(-0.53)	(1.68)	(2.52)	(0.02)	(1.22)
Log Assets	-54.65***	-78.70***	-59.33***	-59.45***	-54.31***
	(-8.74)	(-8.39)	(-11.01)	(-13.73)	(-10.53)
ROA	-848.77***	-761.76***	-861.99***	-829.78***	-824.81***
	(-6.09)	(-4.03)	(-6.94)	(-7.47)	(-6.67)
TotalLev	234.44***	210.80***	280.73***	216.84***	249.38***
	(5.69)	(3.09)	(6.59)	(6.41)	(6.37)
M_B	-30.05***	-76.79***	-58.52***	-40.97***	-55.34***
	(-4.08)	(-4.18)	(-5.88)	(-5.94)	(-6.08)
RetVar	35899.17***	34595.62***	45036.63***	43649.84***	41846.89***
	(4.42)	(3.11)	(6.38)	(6.82)	(6.11)
Collateral	-21.88	-79.33**	-78.68***	-46.97***	-50.64***
	(-1.10)	(-2.58)	(-4.37)	(-3.16)	(-2.96)
Log Proceeds	8.28	7.69	5.90	7.57*	-3.57
	(1.31)	(0.65)	(0.98)	(1.66)	(-0.57)
Log Maturity	27.67**	50.96***	40.98***	32.60***	32.39***
	(2.27)	(2.61)	(3.90)	(3.89)	(3.43)
Rating	-38.34***	-44.02***	-36.11***	-36.23***	-35.80***
	(-11.98)	(-8.37)	(-11.08)	(-13.02)	(-11.81)
Industry, country & time dummies	YES	YES	YES	YES	YES
Adj R2	0.57	0.62	0.61	0.61	0.61
N	868	407	931	1377	1027

* p<0.10, ** p<0.05, *** p<0.01

Consistent with prior results, neither DCA nor DISEXP is significantly associated with yield spreads in either the large or small issue subsamples. Our findings stand in contrast to those reported by Mellado-Cid et al. (2014). However, similar to Liu et al. (2010), we find that

the effect of earnings management on bond yields is limited to larger issues. While their results are related to accrual-based manipulation and show a negative relationship, the incentive to lower borrowing costs apply to both types of earnings management.

Table 10 presents regression results by issuer size. For small issuers, we observe a significant positive relationship between PROD and yield spreads, and a weaker positive association for CFO. For large issuers, no significant relationship is observed between any earnings management measure and yield spreads, suggesting that the results are primarily driven by small issuers. This is in contrast to Mellado-Cid et al. (2014) who reports a negative relationship for large issuers. Once again, the results are consistent with Liu et al. (2010) in terms of where the effect occurs, though the direction of the relationship differs.

The results of the regression of the short and long maturity bonds subsamples are reported in Table 11. We find significant positive relationships between CFO, PROD, and REM and yield spreads. Simultaneously, no significant relationship is observed for short-maturity bonds. This suggest that the results are driven by the relationship of EM and yield spread for long maturity bonds, where the incentive for EM is larger. Again, the results are consistent with Liu et al. (2010) in terms of where the effect arises, though the direction differs. In contrast, Mellado-Cid et al. (2014) report a negative relationship between real activities and yield spreads for both short- and long-maturity bonds. The overall results of the aggregate measure REM and yield spread, in this and previous partitions, is likely driven by CFO and PROD solely, since DISEXP is consistently insignificant for all subgroups.

Table 12 reports the regression results for the pre- and post-IFRS subsamples. The results are weak but suggest that EM through CFO and PROD mainly exist in the post IFRS period. However, due to the low sample size pre IFRS we cannot exclude any EM activities in the pre IFRS period, and advice caution in the interpretation of the results[12]. Nonetheless, the results are consistent with Capkun et al. (2016) evidencing that real activities are more frequent in the post IFRS era.

In essence results suggest that the relationship between real activities is driven by firm and bond characteristics that presumably create more incentive to manage earnings prior to bond issue, specifically larger bond issues, smaller firms and bonds with longer maturities. While we with our main regression (Table 8) find that on average higher levels of PROD and CFO leads to a higher yield spread, this seems to not apply to all types of firms and bonds. Moreover, the results suggest that firms that do manage earnings do not enjoy a lower yield

[12] Pre-IFRS model 2 displays some degree of multicollinearity, which may affect coefficient precision.

Table 9. Regressions of yield spread on EM by small and large issues

This table present regression results by small and large issues, partitioned on median proceeds relative to assets. EM reflect the earnings management measure of the model. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue. Log Assets is the logarithm of total assets, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Log Maturity is the logarithm of the number of years to maturity, Log Proceeds is the logarithm of proceeds. Bond characteristics are proceeds weighted. t-statistics based on cluster-robust standard errors are in parenthesis.

	Small issues					Large issues				
	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM
Intercept	475.07***	712.58***	496.05***	509.83***	536.99***	624.11***	837.82***	775.41***	852.72***	808.60***
	(5.03)	(4.09)	(5.25)	(6.79)	(6.15)	(4.29)	(3.45)	(7.66)	(9.59)	(8.29)
EM	-74.51	126.82	67.61	-7.21	-58.88	132.43	666.88**	183.17**	7.93	100.56**
	(-0.45)	(0.36)	(0.79)	(-0.10)	(-1.14)	(0.85)	(2.06)	(2.39)	(0.11)	(2.55)
Log Assets	-35.31***	-56.06***	-35.98***	-38.05***	-38.12***	-48.31***	-67.83**	-48.39***	-62.45***	-49.21***
	(-3.77)	(-2.96)	(-3.53)	(-5.20)	(-4.00)	(-3.18)	(-2.08)	(-3.31)	(-5.93)	(-3.77)
ROA	-662.61***	-1171.15***	-481.83***	-679.25***	-786.06***	-1013.13***	-526.49**	-970.19***	-986.13***	-774.26***
	(-3.71)	(-3.01)	(-3.41)	(-4.35)	(-4.16)	(-5.20)	(-2.06)	(-5.35)	(-6.43)	(-4.58)
TotalLev	145.00***	294.81***	230.20***	175.11***	207.90***	278.79***	243.08*	286.51***	205.32***	250.55***
	(3.32)	(2.90)	(4.01)	(4.62)	(4.10)	(4.52)	(1.96)	(4.60)	(4.28)	(4.37)
M_B	-25.43***	-64.11***	-44.64***	-36.26***	-34.23***	-32.88***	-95.67***	-68.01***	-39.01***	-75.47***
	(-3.40)	(-2.77)	(-3.81)	(-4.45)	(-3.67)	(-2.88)	(-3.12)	(-4.79)	(-4.08)	(-5.49)
RetVar	29368.88***	24581.53	51157.74***	49683.85***	59382.32***	47465.77***	28816.43	31628.35***	41221.28***	25155.43***
	(3.64)	(1.37)	(5.98)	(5.14)	(5.65)	(3.43)	(1.55)	(2.96)	(4.44)	(2.96)
Collateral	-54.19***	-132.60***	-94.73***	-56.17***	-62.92**	13.00	-54.74	-50.46**	-15.93	-2.76
	(-2.78)	(-2.69)	(-3.63)	(-2.65)	(-2.31)	(0.47)	(-1.13)	(-2.14)	(-0.81)	(-0.12)
Log Proceeds	13.16*	-4.10	0.39	4.84	-2.26	-6.10	-4.86	-16.54	-1.11	-18.39
	(1.97)	(-0.21)	(0.04)	(0.71)	(-0.27)	(-0.34)	(-0.14)	(-0.96)	(-0.09)	(-1.15)
Log Maturity	11.97	54.47	36.19***	26.19***	21.96**	60.75***	61.11**	56.36***	45.84***	47.81***
	(1.41)	(1.48)	(2.77)	(2.85)	(2.42)	(2.89)	(2.26)	(3.90)	(3.60)	(3.68)
Rating	-31.07***	-42.83***	-24.75***	-27.49***	-27.29***	-45.91***	-53.89***	-48.27***	-44.19***	-44.71***
	(-7.67)	(-5.18)	(-5.65)	(-6.94)	(-7.07)	(-9.14)	(-5.95)	(-9.28)	(-10.87)	(-9.86)
Industry, country & time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj R2	0.59	0.57	0.63	0.62	0.65	0.55	0.62	0.60	0.60	0.60
N	434	203	465	688	513	434	203	465	688	513

* p<0.10, ** p<0.05, *** p<0.01

Table 10. Regressions of yield spread on EM by small and large issuer

This table present regression results by small and large issuers, partitioned on median market value of equity. EM reflect the earnings management measure of the model. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue. Log Assets is the logarithm of total assets, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Log Maturity is the logarithm of the number of years to maturity, Log Proceeds is the logarithm of proceeds. Bond characteristics are proceeds weighted. t-statistics based on cluster-robust standard errors are in parenthesis.

	Small issuer					Large issuer				
	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM
Intercept	738.63***	1006.80***	810.70***	901.57***	793.29***	324.14***	547.11***	445.21***	417.58***	569.08***
	(4.96)	(4.94)	(6.14)	(9.96)	(6.34)	(3.26)	(2.81)	(4.12)	(4.37)	(5.58)
EM	-96.74	539.05*	175.39**	-0.72	62.93	-56.58	167.60	93.69	14.96	22.57
	(-0.57)	(1.67)	(2.15)	(-0.01)	(1.55)	(-0.44)	(0.43)	(0.99)	(0.27)	(0.44)
Log Assets	-71.31***	-96.30***	-62.72***	-73.25***	-54.29***	-28.84***	-61.71***	-46.89***	-42.99***	-44.80***
	(-7.31)	(-4.79)	(-6.46)	(-9.73)	(-5.41)	(-3.52)	(-3.16)	(-4.90)	(-5.45)	(-4.77)
ROA	-1023.22***	-732.07***	-739.39***	-913.24***	-689.37***	-253.92**	-830.38*	-687.24***	-538.80***	-684.96***
	(-5.35)	(-2.99)	(-4.13)	(-6.09)	(-3.94)	(-2.10)	(-1.87)	(-4.06)	(-3.23)	(-3.60)
TotalLev	285.63***	171.95*	308.46***	234.76***	280.11***	102.83**	215.58**	302.25***	170.12***	243.91***
	(4.65)	(1.91)	(4.59)	(4.51)	(4.48)	(2.20)	(2.08)	(4.51)	(3.95)	(4.06)
M_B	-63.39***	-137.21***	-131.15***	-72.02***	-146.06***	-16.00***	-46.75***	-20.97**	-21.19***	-18.72**
	(-3.84)	(-2.63)	(-4.93)	(-4.85)	(-5.89)	(-2.75)	(-3.33)	(-2.26)	(-3.58)	(-2.34)
RetVar	43346.22***	4499.16	41395.02***	46995.43***	40747.15***	22748.18***	40411.32**	43861.90***	38038.13***	39765.07***
	(3.51)	(0.30)	(3.90)	(5.45)	(4.41)	(3.21)	(2.39)	(4.25)	(4.06)	(3.52)
Collateral	-14.45	-72.99	-77.48***	-43.11**	-30.50	-31.63*	-19.75	-59.47***	-42.50***	-53.38***
	(-0.51)	(-1.51)	(-3.11)	(-2.04)	(-1.33)	(-1.83)	(-0.37)	(-2.84)	(-2.87)	(-2.91)
Log Proceeds	14.02	9.22	4.41	7.28	-8.62	12.29***	23.56	10.89	13.89**	6.29
	(1.22)	(0.52)	(0.44)	(0.96)	(-0.83)	(2.64)	(1.48)	(1.48)	(2.53)	(0.94)
Log Maturity	48.92*	53.58**	49.43***	41.54***	43.28***	29.19***	51.73*	34.80***	32.12***	28.48***
	(1.88)	(2.31)	(2.91)	(2.96)	(2.99)	(3.49)	(1.80)	(2.88)	(5.25)	(4.04)
Rating	-51.18***	-55.67***	-46.35***	-44.57***	-43.88***	-28.48***	-36.92***	-26.83***	-29.29***	-27.11***
	(-9.33)	(-7.43)	(-7.88)	(-9.90)	(-8.58)	(-6.86)	(-3.94)	(-7.52)	(-9.16)	(-7.84)
Industry, country & time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj R2	0.56	0.65	0.60	0.58	0.59	0.48	0.39	0.46	0.51	0.50
N	434	203	465	688	513	434	203	465	688	513

* p<0.10, ** p<0.05, *** p<0.01

Table 11. Regressions of yield spread on EM by short and long maturity bonds

This table present regression results by short and long maturity bonds, partitioned on median maturity. EM reflect the earnings management measure of the model. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue. Log Assets is the logarithm of total assets, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Log Maturity is the logarithm of the number of years to maturity, Log Proceeds is the logarithm of proceeds. Bond characteristics are proceeds weighted. t-statistics based on cluster-robust standard errors are in parenthesis

	Short maturity					Long maturity				
	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM
Intercept	709.80***	986.55***	894.20***	863.68***	921.51***	902.05***	774.87***	517.22***	695.70***	680.06***
	(5.44)	(4.10)	(7.40)	(8.47)	(6.85)	(5.63)	(5.46)	(6.39)	(6.44)	(6.09)
EM	-233.79	284.89	105.66	24.67	-7.97	-109.70	758.54**	208.07***	-53.25	86.02*
	(-1.49)	(0.88)	(1.38)	(0.34)	(-0.18)	(-0.74)	(2.27)	(3.05)	(-0.70)	(1.74)
Log Assets	-59.13***	-85.04***	-67.66***	-64.40***	-59.41***	-61.98***	-77.85***	-48.53***	-57.04***	-55.80***
	(-6.85)	(-5.26)	(-8.40)	(-9.95)	(-8.06)	(-8.01)	(-5.91)	(-8.45)	(-10.01)	(-8.21)
ROA	-717.65***	-576.56**	-675.62***	-759.77***	-701.09***	-659.78***	-979.49***	-971.46***	-728.12***	-773.23***
	(-3.64)	(-2.12)	(-3.83)	(-4.84)	(-3.92)	(-4.56)	(-3.28)	(-5.45)	(-5.21)	(-4.73)
TotalLev	259.33***	180.26*	282.33***	213.35***	276.56***	170.36**	212.27**	239.54***	208.07***	222.19***
	(4.91)	(1.75)	(5.01)	(4.51)	(5.29)	(2.48)	(2.06)	(4.03)	(4.38)	(3.59)
M_B	-43.13***	-58.33***	-80.77***	-55.49***	-68.06***	-13.81	-94.22***	-27.30**	-24.39***	-34.79***
	(-4.09)	(-2.63)	(-5.44)	(-5.53)	(-4.84)	(-1.48)	(-4.32)	(-2.56)	(-2.76)	(-3.32)
RetVar	40097.16***	39027.07**	52014.12***	50587.96***	50402.65***	18890.52**	14569.44	20383.77*	27822.19***	23674.68**
	(3.56)	(2.18)	(5.37)	(5.55)	(5.19)	(2.08)	(0.81)	(1.91)	(3.51)	(2.55)
Collateral	-5.96	-12.29	-94.21***	-42.24*	-62.20**	-65.08***	-94.99***	-44.29*	-47.57**	-43.53*
	(-0.19)	(-0.26)	(-3.49)	(-1.81)	(-2.22)	(-2.78)	(-2.62)	(-1.92)	(-2.60)	(-1.86)
Log Proceeds	8.23	9.19	14.93*	8.49	0.13	19.35***	17.63	17.75***	16.41***	17.83***
	(0.83)	(0.48)	(1.68)	(1.13)	(0.01)	(2.83)	(1.33)	(2.69)	(2.93)	(2.63)
Log Maturity	-8.84	-55.67	-45.20	-33.78	-52.62*	63.74***	92.12***	73.11***	61.80***	60.07***
	(-0.32)	(-0.87)	(-1.49)	(-1.32)	(-1.96)	(4.54)	(3.92)	(6.35)	(6.44)	(5.70)
Rating	-37.41***	-42.05***	-39.74***	-37.67***	-39.90***	-39.13***	-36.53***	-32.22***	-35.02***	-32.70***
	(-7.50)	(-4.77)	(-8.70)	(-9.58)	(-9.08)	(-8.53)	(-4.45)	(-7.80)	(-9.93)	(-8.01)
Industry, country & time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj R2	0.62	0.61	0.65	0.64	0.602	0.61	0.68	0.64	0.62	0.65
N	426	202	460	643	388	386	195	461	638	443

* p<0.10, ** p<0.05, *** p<0.01

Table 12. Regressions of yield spread on EM pre and post IFRS.

This table present regression results pre and post IFRS. EM reflect the earnings management measure of the model. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue. Log Assets is the logarithm of total assets, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Log Maturity is the logarithm of the number of years to maturity, Log Proceeds is the logarithm of proceeds. Bond characteristics are proceeds weighted. t-statistics based on cluster-robust standard errors are in parenthesis.

	Pre IFRS					Post IFRS				
	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM
Intercept	152.16	-533.06	449.13*	750.13**	819.98***	721.29***	962.93***	831.03***	785.85***	844.80***
	(0.75)	(-0.23)	(1.82)	(2.40)	(3.01)	(8.02)	(7.38)	(11.62)	(12.99)	(13.05)
EM	69.75	-801.09	200.26	-246.76	43.96	72.47	470.40*	113.67*	-10.31	18.24
	(0.30)	(-0.15)	(1.43)	(-1.22)	(0.37)	(0.57)	(1.97)	(1.90)	(-0.19)	(0.55)
Log Assets	-46.98***	-43.55	-73.55***	-81.92***	-82.37***	-54.74***	-78.75***	-56.79***	-57.77***	-53.05***
	(-3.14)	(-0.20)	(-4.14)	(-4.25)	(-3.35)	(-8.14)	(-7.68)	(-9.84)	(-12.55)	(-9.69)
ROA	-1433.67***	1930.22	-1586.03***	-1630.11***	-1789.78***	-845.75***	-710.56***	-784.86***	-752.51***	-728.84***
	(-3.58)	(0.89)	(-5.55)	(-6.32)	(-5.30)	(-5.33)	(-3.46)	(-5.74)	(-6.42)	(-5.50)
TotalLev	134.19	12.61	153.60	-21.36	-97.09	264.03***	193.32***	263.72***	228.79***	254.82***
	(1.39)	(0.01)	(1.10)	(-0.16)	(-0.76)	(5.89)	(2.62)	(5.81)	(6.44)	(6.19)
M_B	49.19***	46.92	38.34	23.06	53.51	-35.28***	-93.92***	-67.76***	-46.45***	-63.31***
	(3.34)	(0.76)	(1.15)	(1.25)	(1.60)	(-4.80)	(-3.80)	(-5.55)	(-6.43)	(-5.91)
RetVar	10951.47	-53676.13	54607.19***	37239.57*	47068.37*	39120.14***	27618.52**	47230.79***	45393.16***	43978.32***
	(1.04)	(-0.11)	(3.38)	(1.68)	(1.78)	(4.43)	(2.54)	(6.33)	(6.55)	(6.27)
Collateral	25.95	338.59	-37.26	-21.08	-4.80	-28.02	-66.38**	-83.33***	-47.96***	-53.09***
	(0.37)	(0.66)	(-0.57)	(-0.51)	(-0.07)	(-1.36)	(-2.07)	(-4.40)	(-3.11)	(-2.99)
Log Proceeds	32.77**	31.67	42.32**	17.11	22.57	7.90	3.28	1.76	4.94	-7.01
	(2.31)	(0.13)	(2.17)	(1.03)	(0.80)	(1.14)	(0.27)	(0.28)	(1.01)	(-1.08)
Log Maturity	34.52	23.47	109.95**	25.44	27.52	28.56**	51.69***	41.85***	33.36***	34.60***
	(1.08)	(0.11)	(2.23)	(0.51)	(0.52)	(2.20)	(2.65)	(3.87)	(3.89)	(3.58)
Rating	-32.93***	37.68	-42.22***	-47.90***	-50.03***	-38.71***	-44.56***	-35.55***	-34.68***	-35.43***
	(-3.56)	(0.42)	(-4.65)	(-4.86)	(-4.52)	(-11.67)	(-8.06)	(-10.26)	(-11.81)	(-11.30)
Industry, country & time dummies	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Adj R2	0.76	0.94	0.84	0.80	0.79	0.57	0.61	0.60	0.60	0.60
N	80	29	69	93	75	788	378	862	1284	952

* p<0.10, ** p<0.05, *** p<0.01

spread, on the contrary they receive a higher yield spread. Consistent with the notion that investors recognise EM activities, interpret it as a negative signal and deem it necessary with an additional premium. This aligns with the findings that distinct firm and bond characteristics have larger magnitudes of EM, which may be more easily detectable.

4.5. Additional test

As our main analysis reveals no significant relationship between DCA and bond yield spreads, we extend the analysis by adopting a dummy-variable approach to provide supplementary evidence. This method, as employed in prior literature, relaxes the assumption of linearity in regression models (Teoh et al., 1998a). Consistent with the univariate analysis, firms are divided into four quantiles based on their pre-issue level of EM. The most extreme group is labelled aggressive and represent the quarter of firms with the highest levels of EM. Next, a dummy variable is assigned the value of one if the firm is in the aggressive group. Formally this type of division and dummy approach tests the difference in averages between sub-samples (Stock & Watson, 2020), in our case, the difference in average yield spread between the aggressive firms and all the other income increasing EM firms.

Table 13 presents the results from the dummy-variable regressions based on the aggressive earnings management classification. We find significant evidence that aggressive abnormal CFO and abnormal PROD firms receive a yield spread that on average is 31.27 ($t = 2.07$) and 31.17 ($t = 2.86$) basis points higher than the other firms. The remaining EM measures exhibit smaller coefficients with varying signs, none of which are statistically significant. We find no evidence that firms engaging in aggressive abnormal DCA, DISEXP, or REM receive yield spreads that differ from those of less aggressive firms. This result is consistent with the findings from our main analysis.

4.6. Robustness checks

4.6.1. Results robustness

Robustness tests were conducted using alternative specifications of the Jones model, including the modified Jones (1991) model (Dechow et al., 1995), as implemented by Teoh et al. (1998b) to capture long-term discretionary accruals, and the Kothari model (Kothari et al., 2005), which also incorporates a control for return on assets (ROA). The magnitude of discretionary accruals around bond issue shows the same tendencies as previously. Both discretionary accrual specifications display the same overall regression results of no statistically significant relation

Table 13. Regressions of difference in mean yield spread of aggressive EM firms

This table present regression results of difference in mean yield spread of aggressive EM firms. Income-increasing firms are divided into four quantiles based on the level of the pre-issue EM measure, firms in the high (low) quantile are labelled aggressive (conservative). EM is a dummy variable equal to one if the firm aggressively manage earnings upwards prior to bond issue. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). All EM variables are measured in the year prior to bond issue. Log Assets is the logarithm of total assets, ROA is income before extraordinary items over total assets, TotalLev is total debt over total assets, M_B is market value of assets over book value of assets, RetVar is variance of the stock price return one year prior to bond issue, Collateral is property, plant and equipment over total assets. All firm specific variables are measured in the year prior to bond issue. Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points, Rating is the numerical value of the bonds credit rating, Log Maturity is the logarithm of the number of years to maturity, Log Proceeds is the logarithm of proceeds. Bond characteristics are proceeds weighted. t-statistics based on cluster-robust standard errors are in parenthesis.

	Model 1 DCA	Model 2 CFO	Model 3 PROD	Model 4 DISEXP	Model 5 REM
Intercept	679.73***	830.26***	753.83***	725.57***	763.52***
	(7.79)	(6.63)	(11.42)	(12.02)	(12.29)
EM	-7.76	31.27**	31.17***	-4.85	14.86
	(-0.78)	(2.07)	(2.86)	(-0.48)	(1.28)
Log Assets	-54.75***	-79.03***	-59.51***	-59.42***	-54.46***
	(-8.78)	(-8.75)	(-11.13)	(-13.72)	(-10.52)
ROA	-846.54***	-760.19***	-857.34***	-834.28***	-827.34***
	(-6.06)	(-4.04)	(-6.82)	(-7.56)	(-6.71)
TotalLev	234.51***	207.10***	278.24***	216.41***	250.02***
	(5.68)	(3.04)	(6.54)	(6.42)	(6.41)
M_B	-30.25***	-77.10***	-58.31***	-40.84***	-55.85***
	(-4.09)	(-4.32)	(-5.74)	(-5.94)	(-6.11)
RetVar	35968.79***	35283.99***	45458.39***	43616.47***	41662.87***
	(4.44)	(3.22)	(6.43)	(6.81)	(6.12)
Collateral	-21.32	-77.44**	-79.85***	-46.20***	-50.81***
	(-1.07)	(-2.53)	(-4.43)	(-3.12)	(-2.98)
Log Proceeds	8.32	8.05	5.67	7.52*	-3.44
	(1.32)	(0.68)	(0.94)	(1.65)	(-0.56)
Log Maturity	27.52**	49.46**	41.47***	32.55***	32.24***
	(2.27)	(2.57)	(3.96)	(3.91)	(3.43)
Rating	-38.31***	-44.27***	-36.20***	-36.27***	-35.98***
	(-12.00)	(-8.40)	(-11.14)	(-12.98)	(-11.88)
Industry, country & time dummies	YES	YES	YES	YES	YES
Adj R2	0.57	0.62	0.61	0.61	0.61
N	868	407	931	1377	1027

* p<0.10, ** p<0.05, *** p<0.01

to bond yield spreads. Important to note, our main measure of abnormal discretionary accruals, DCA, is constructed to capture current discretionary accruals, while both the modified Jones (1991) model and the Kothari model includes long-term discretionary accruals.

Additional tests are conducted using an alternative sample. In our main analysis, we follow previous studies and do not make a specific sample selection, utilising all available firm-year observations (e.g., Caton et al., 2011; Crabtree et al., 2014; Mellado-Cid et al., 2017). However, to mitigate the influence of potential reversal effects among firms issuing multiple bonds in close succession, we follow Liu et al. (2010) and restrict the sample to only the first bond issuance within any five-year period. This sample specification yields 799 firm-year observations from 460 individual firms. The magnitude of EM around bond issue displays the same tendencies as previously and the overall findings are unchanged. A positive relationship between income-increasing EM, through real activities of CFO and PROD, and yield spread is found, driven by small firms, issuing larger bonds with longer maturities. No relationship is found between DCA and yield spread.

Lastly, the sensitivity of the results due to variable and model specification is evaluated. Proceeds appear to not explain the variation in yield spread in our main regression. Results are not sensitive to omitting proceeds from the model[13]. Moreover, substituting long-term leverage for total leverage and using sales as an alternative proxy for firm size produces similarly consistent results.

4.6.2. Statistical robustness

To ensure the reliability of the regression results, we employ tests to address potential issues related to the specification of the models. First, multicollinearity between two or more variables would make the estimates of the coefficients imprecise (Stock & Watson, 2020). To address this, we compute variance inflation factors (VIF) to assess the degree of multicollinearity. For the most part, variables in our models have a VIF below the value of 5. In a few models' certain control variables exhibited elevated VIFs (around 10). Omitting one of the collinear variables resolved the issue and the regression results remained unchanged. Overall, unless otherwise stated, we found no issues of multicollinearity in our models. Second, we test whether the error terms exhibit heteroskedasticity. If the variance of the error term is not constant homoscedastic standard errors are incorrect (Stock & Watson, 2020). The evaluation affirms heteroskedasticity. To mitigate this problem, we estimate robust standard errors that account

[13] Proceeds is kept in the model to avoid omitted variable bias.

for heteroskedasticity in the error term. Lastly, a concern common in panel data and inherent in our sample is that error terms may be correlated within entities (Stock & Watson, 2020). Firms in our sample can have several bond issues, which are not necessarily independent of each other. To ensure that any inference is not driven by correlated error terms we also cluster standard errors at the firm level.

4.7. Endogeneity concerns

We acknowledge that our analysis may be subject to endogeneity concerns, which could affect the interpretation of our estimates. Endogeneity problems arise primarily from three sources: omitted variables, measurement error and simultaneity (Wooldridge, 2010).

While we include an extensive set of controls and test alternative specifications to mitigate omitted variable bias, unobserved factors related to managerial discretion or firm-specific risk may still influence both earnings management and bond pricing. One approach to mitigate this effect is incorporating fixed effects (Stock & Watson, 2020). Including fixed effects for time, industry, and country in our analysis helps control for unobserved heterogeneity across different industries, over time, and by country, allowing us to more accurately isolate the impact of the variables under study.

To the extent that earnings manipulation is not fully captured by our EM proxies, the estimated effects may be biased. While we utilise various alternative measures of EM commonly used in research, it is important to acknowledge that any proxy of EM may inherently be subject to measurement error.

Finally, simultaneity may arise if yield spread, and any accrual or real activities manipulation are simultaneously determined. Constructing EM measures based on financial statement information from the fiscal year preceding bond issuance, ensures that the accounting information is available to investors at the time of pricing, and partially mitigate this concern (Ge & Kim, 2014).

5. Discussion

Although extensively studied in the U.S., income-increasing earnings management prior to bond issuance and its effect on yield spreads has received limited attention in the European context. This study addresses this gap by providing evidence from the European bond market, where institutional, regulatory, and market differences may influence the results. Previous U.S. studies provide evidence of income-increasing behaviour prior to bond issuance, though the

observed effects on bond yields remain mixed. While some studies find that increased earnings management goes undetected by investors, thereby leading to lower yield spreads, others find that investors detect and interpret such behaviour negatively and required of higher yield spreads.

In contrast, although we find evidence of both accrual-based and real earnings management prior to bond issuance, our analysis reveals inconsistent effects on bond yield spreads. For accrual-based earnings management, measured by DCA, we find no statistically significant effect on yield spreads, suggesting that bond investors perceive such practices as less informative for assessing credit risk. The results remain statistically insignificant when the sample is segmented by firm and bond characteristics such as firm size, issue size, or bond maturity, dimensions in which prior U.S. studies have documented significant effects (Liu et al., 2010, Mellado-Cid et al., 2017). Additional tests further indicate that even the most aggressive forms of accrual-based earnings management have no significant impact on bond yield spreads. For real earnings management, the results are more varied, with the analysis indicating that manipulation through CFO and PROD is associated with higher yield spreads. This suggests that bond investors are able to detect such real earnings management behaviour and respond by requiring a risk premium in the form of higher yield spreads. Consistent results are observed when dividing the sample into subgroups, with significant effects of real earnings management through CFO and PROD for small issuers, large issues, long-maturity bonds, and the post-IFRS period, although the significance and magnitude of these effects vary somewhat across subsamples. The results are robust to alternative measures of abnormal discretionary accruals and different bond selection criteria. As such, the evidence supports H1, indicating that firms engage in accrual-based and/or real earnings management prior to bond issuance. In contrast, regarding H2, we find no effect of accrual-based earnings management on bond yield spreads, suggesting that investor do not view the behaviour in a negative light, undetected or not. On the other hand, real earnings management through CFO and PROD is linked to higher yield spreads, providing partial support against H2, and indicate that investor detect and view real EM as negative signals.

This raises the question of what drives the discrepancy between real and accrual-based earnings management in their effects on bond yield spreads. A key distinction between accrual-based and real earnings management is that real earnings management directly affects cash flows and is more likely to influence future firm performance (Cohen & Zarowin, 2010; Roychowdhury, 2006). Accrual-based earnings management may temporarily inflate reported earnings by shifting income across periods, but it does not affect underlying cash flows, as the

adjustments are purely accounting-based. Thus, a possible explanation of our results is that bond investors look beyond earnings fluctuations and place greater emphasis on underlying cash flows when assessing credit risk.

Moreover, as highlighted by Roychowdhury (2006), different real earnings management methods have varying effects on contemporaneous cash flows. Practices such as excessive price discounts, channel stuffing, and overproduction, all reflected in the CFO and PROD proxies, negatively impact cash inflows in the current period. In contrast, although cutting discretionary expenses may adversely affect future cash inflows, it primarily reduces cash outflows in the current period, thereby increasing contemporaneous cash inflows. Taken together, our findings that higher levels of income-increasing CFO and PROD are associated with higher yield spreads may suggest that investors primarily respond to practices perceived to reduce a firm's cash flows. This interpretation is consistent with the incentive structure of bondholders, who are chiefly concerned with managing downside risk and ensuring the firm's ability to meet interest and principal obligations (Ge and Kim, 2014).

Further, the more pronounced effects among smaller firms, larger bond issues, and longer maturities are consistent with the notion that bond investors place greater weight on downside risk when exposure is higher. Smaller firms typically face greater information asymmetry and financial constraints, possibly making investors more attentive to signals of weakened cash flows. Larger bond issues involve greater capital at risk, prompting more careful scrutiny of cash flow quality. Similarly, longer-maturity bonds expose investors to extended uncertainty, increasing sensitivity to practices that may compromise long-term cash flow stability. The higher scrutiny given to such firm and bond characteristics might lead to bond-investors detecting such EM practises and demand a risk premium. The results may thus indicate that these firm and bond characteristics prompt heightened investor scrutiny, increasing the likelihood that earnings management practices are identified and incorporated into bond pricing through a risk premium.

We also consider it noteworthy that, unlike prior studies in the U.S. context which document both positive and negative associations between accrual-based earnings management and bond yield spreads, our findings reveal no significant relationship between discretionary accruals and bond pricing in the European market. We recognise 4 important differences that could cause our results to differ. First, prior literature suggests that the effect of accrual-based earnings management is more pronounced among smaller issuers, likely due to higher information asymmetry and lower analyst coverage. In contrast, our sample is dominated by larger firms, reflecting structural differences in the European market, where smaller firms have traditionally

relied on bank financing (European Commission, 2017). As such, potential effects among smaller firms may not be fully captured in our analysis, and we cannot rule out the possibility that such an effect exists but is obscured by the size profile of our sample. Second, our sample includes several unrated firms, which also reflects structural features of the European bond market (European Commission, 2017). As credit ratings are generally expected to guide risk assessment, their absence may lead investors to either rely more heavily on alternative indicators beyond earnings or conduct more thorough analyses that uncover and adjust for accrual-based earnings management in bond pricing. This supports the view that European bond investors prioritise underlying cash flows and respond mainly to practices that appear to weaken them. Third, despite recent growth, the European bond market remains less liquid than its U.S. counterpart (European Commission, 2017). Lower market liquidity, characterised by fewer price signals, less frequent trading, and higher exit costs, may encourage more careful investor scrutiny, increasing the likelihood that earnings increases driven by accounting and operational choices are identified and discounted in bond pricing. Lastly, as discussed earlier, the principles-based nature of IFRS allows for greater managerial discretion in financial reporting. European bond investors, who are typically professional and informed, may recognise this flexibility and approach reported earnings with greater caution, placing more emphasis on alternative indicators when assessing credit risk.

6. Concluding remarks

This study investigates whether European firms engage in earnings management prior to bond issuance and whether income-increasing earnings management is associated with lower bond yield spreads. Given the increasing reliance on corporate bond markets as a source of financing in Europe, the mixed findings in the U.S. literature, and the, to the best of our knowledge, non-existing coverage of the phenomenon on the European bond markets our study fills this gap. Our analysis is based on 16 countries across Europe between the years of 1994 and 2022.

With a sample of 1,802 firm-year observations from 471 different firms we find indications of EM behaviour. We find positive and significant increases of all EM measures for income-increasing firms, followed by post-issue declines, suggesting that firms manage earnings upwards prior to bond issue. Our initial univariate test suggests that in general terms bond yield spreads increase with the magnitude of EM, excluding abnormal DISEXP. The effect of EM on bond pricing is formally evaluated with a regression model, controlling for firm- and bond-specific variables. Results show a positive and significant EM-yield spread

relationship pertaining primarily to the real earnings management measures of abnormal sales and abnormal production. Moreover, although evidence is found for the full sample, the relationship primarily exists for smaller firms, larger bond issues and for long maturity bonds. The same evidence is not found for abnormal discretionary current accruals or abnormal discretionary expenses. This suggest that investor detect and interpret real manipulation as negative signals, and do not necessarily care about accruals manipulation. Our results are strengthened by a dummy variable regression relaxing the linearity assumption, and are robust to the choice of accrual measure, sample selection and alternative control variables.

Our results are in line with previous studies that document a positive relationship between real earnings management and bond yield spreads (Crabtree et al, 2014; Ge & Kim, 2014). Contrary to previous studies we find no effect of accrual-based earnings management on bond pricing (Caton et al., 2011; Liu et al., 2010). The findings in this study are relevant to policymakers and regulators concerned with financial reporting transparency and market integrity, particularly given Europe's growing reliance on bond financing. Results may also be of interest to practitioners involved in bond pricing, risk assessment, and disclosure strategy, where aggressive earnings management may carry reputational or perceived risk costs.

6.2. Limitations

We recognise that this study is subject to several limitations. Our sample is constrained to non-financial and non-utility firms based in Europe, which are listed on European stock exchanges and for which data are available in the Compustat Global database. This introduces two primary limitations. First, our findings may not extend to regions with different accounting and market regulations or to non-public companies. However, given that similar results have been observed in the U.S., we see no reason to doubt that these phenomena can be generalised to other major markets. Second, it could be that data missing in the Compustat Global database may not be random, potentially leading to sample bias. For example, data availability may increase with firm size as larger firms could have more comprehensive data coverage, thus distorting our findings. Another important limitation is that our results cannot be generalisable beyond fixed rate bonds. The yield for notes with coupon rates that varies cannot be readily determined and is therefore not available from SDC.

Similar to much of the prior earnings management literature our study employs annual data. However, using quarterly data, Mellado-Cid et al. (2017) find that firms that engage in earnings management in the quarter prior to bond issuance receive a lower yield spread. Given

that firms frequently manage earnings quarterly and bond issuance is typically a short-term event, reliance on annual data could lead to Type II errors. For example, if a company issues a bond in the second quarter and engages in earnings management during the first quarter, then reverses these adjustments in the remainder of the year, annual data might fail to capture this transient manipulation due to its aggregation over the entire year.

6.3. Suggestions for future research

Based on our analysis and findings, we propose a number of suggestions for future research. As discussed in the limitations, the timing of accrual versus real EM is different. As explained by Zang (2012) real EM must occur during the year to be realised at year end, while the level of accrual EM can be determined at year end. This could have implications for what effects is observable in the long-term and in the short-term. One potential avenue is to examine quarterly data, which may better capture the timing and nature of earnings management around bond issuance in a European context (Jeter & Shivakumar, 1999).

Additionally, given the possibility that the traditional structure of the European bond market excludes or underrepresents firms with greater potential for earnings management, such as smaller issuers and non-investment grade firms, Darmouni and Papoutsi (2025) note that many of the new issuers with these characteristics are also private. Thus, investigating earnings management prior to bond issues among private firms may yield additional and complementary insights.

Lastly, McNichols and Stubben (2018) highlight several advantages of using specific accruals models over the aggregate models employed in this study. We suggest that future research incorporate these more comprehensive models to generate further insights within the European context. While our analysis, to the best of our knowledge, provides the first evidence of earnings management surrounding bond issuance in the EU, it is not exhaustive and should be viewed as a starting point for further investigation.

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Appendices

Appendix A. Variable description.

This table present a description of the variables used in the analysis.

Variable	Description
DCA	DCA is abnormal discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b).
CFO	CFO is abnormal sales levels and is calculated using the model as specified by Roychowdhury (2006).
PROD	PROD is abnormal production expenses and is calculated using the model as specified by Roychowdhury (2006).
DISEXP	DISEXP is abnormal discretionary expenses and is calculated using the model as specified by Roychowdhury (2006).
REM	REM is the aggregate measure of real activities equal to the sum for CFO, PROD, and DISEXP, as specified by Roychowdhury (2006).
Yield spread	Yield spread is the difference between the at issue yield and the yield of a comparable treasury in basis points.
Assets	Assets is the total book value of assets.
Sales	Sales is net sales.
ROA	ROA is return on assets and is calculated as income before extraordinary items over total assets.
TotalLev	TotalLev is total leverage and is calculated as total book value of debt over total book value of assets.
LtLev	LtLev is long-term leverage and is calculated as long-term debt over total assets.
M_B	M_B is the market to book ratio and is calculated as the sum of market value of equity and book value of debt over the book value of total assets.
RetVar	RetVar is the variance of the stock price return one year prior to bond issue.
Collateral	Collateral is calculated as gross property, plant, and equipment over total assets.
Rating	Rating is the numerical value of the firm's credit rating. The credit rating is assigned a numerical value such that Aaa = 22, Aa1 = 21 etc. The credit rating is essentially Moody's long-term debt rating, if missing it is replaced with Fitch long-term debt rating. Firms with a missing credit rating are assigned an imputed rating following Zhang (2008).
Maturity	Maturity is the length of the bond in number of years.
Proceeds	Proceeds is the proceeds of the bond issue.

Appendix B. Mean EM around bond issue by sub-groups

This table report mean values of EM by different sub-groups. Year 0 is the year of the bond issue. Panel A and B display high and low ROA firms, partitioned by the sample median ROA. Panel C and D display investment grade and non-investment grade bonds, investment grade bonds have a credit rating equal to Baa3 or higher. Panel E and F display large and small issuers, partitioned by the sample median market value of equity. EM measures are expressed in percentage form of lagged total assets. DCA is discretionary current accruals and is calculated by a version of the modified Jones (1991) model as specified by Teoh et al. (1998b). CFO is abnormal sales levels, PROD is abnormal production expenses, DISEXP is abnormal discretionary expenses, and REM is the aggregate measure of real activities, as specified by Roychowdhury (2006). t-statistics, based on a two-tailed t-test, is in parenthesis.

Year	-2	-1	0	1	2	1 vs. 2	0 vs. 1
Panel A: Low ROA							
DCA	-0.25	-0.42**	0.05	-0.42**	-0.08	-0.19	0.44*
	(-1.41)	(-2.56)	(0.29)	(-2.56)	(-0.58)	(-0.72)	(1.73)
CFO	-3.32***	-3.06***	-3.06***	-3.24***	-3.20***	0.31*	-0.11
	(-14.05)	(-13.70)	(-13.70)	(-14.97)	(-14.16)	(1.69)	(-0.62)
PROD	1.65***	2.26***	2.04***	1.85***	1.52***	0.58**	-0.24
	(3.53)	(5.05)	(4.56)	(4.24)	(3.48)	(2.16)	(-0.94)
DISEXP	7.98***	8.16***	8.15***	8.33***	8.27***	0.11	-0.12
	(18.43)	(19.25)	(19.55)	(20.80)	(20.70)	(0.54)	(-0.61)
REM	6.22***	7.28***	7.08***	6.88***	6.54***	1.01**	-0.45
	(7.25)	(8.77)	(8.71)	(8.94)	(8.49)	(2.36)	(-1.11)
Panel B. High ROA							
DCA	-0.40***	0.13	0.25*	-0.16	0.02	0.63***	0.18
	(-2.60)	(0.86)	(1.76)	(-1.18)	(0.15)	(2.75)	(0.76)
CFO	-7.57***	-7.46***	-7.08***	-7.12***	-6.76***	0.06	0.43***
	(-30.85)	(-30.32)	(-28.21)	(-29.63)	(-27.57)	(0.37)	(2.78)
PROD	-1.92***	-1.60***	-1.68***	-1.00**	-0.60	0.29	-0.03
	(-4.17)	(-3.44)	(-3.80)	(-2.38)	(-1.44)	(1.32)	(-0.14)
DISEXP	8.58***	8.90***	8.55***	9.16***	9.12***	0.30*	-0.35**
	(19.78)	(20.83)	(20.04)	(22.49)	(22.28)	(1.73)	(-2.03)
REM	-0.89	-0.20	-0.21	1.08	1.83**	0.65*	-0.05
	(-1.06)	(-0.24)	(-0.26)	(1.39)	(2.32)	(1.76)	(-0.14)
Panel C: Non investmentgrade							
DCA	-0.56**	-0.39	0.09	-0.71***	-0.17	0.13	0.40
	(-2.15)	(-1.62)	(0.35)	(-2.93)	(-0.79)	(0.35)	(1.04)
CFO	-2.75***	-2.57***	-2.73***	-2.63***	-2.71***	0.22	-0.35
	(-7.24)	(-7.10)	(-7.55)	(-7.91)	(-7.64)	(0.74)	(-1.27)
PROD	2.64***	3.21***	2.30***	2.73***	2.20***	0.68*	-0.89**
	(3.69)	(4.62)	(3.20)	(4.05)	(3.28)	(1.71)	(-2.36)
DISEXP	7.73***	8.07***	7.65***	8.00***	7.79***	0.33	-0.48*
	(12.43)	(12.85)	(12.33)	(13.97)	(13.08)	(1.08)	(-1.69)
REM	7.43***	8.59***	7.12***	8.07***	7.36***	1.40**	-1.61***
	(5.67)	(6.66)	(5.52)	(6.82)	(6.07)	(2.15)	(-2.63)

Appendix B. (continued)

Panel D: Investmentgrade							
DCA	-0.25*	-0.06	0.17	-0.15	0.01	0.25	0.28
	(-1.89)	(-0.50)	(1.45)	(-1.31)	(0.12)	(1.28)	(1.45)
CFO	-6.34***	-6.15***	-5.84***	-6.02***	-5.73***	0.17	0.33***
	(-32.64)	(-31.98)	(-30.04)	(-31.84)	(-29.83)	(1.35)	(2.71)
PROD	-1.06***	-0.62*	-0.52	-0.34	-0.12	0.35*	0.12
	(-2.87)	(-1.70)	(-1.50)	(-1.01)	(-0.35)	(1.87)	(0.64)
DISEXP	8.46***	8.68***	8.59***	8.99***	8.99***	0.17	-0.15
	(24.02)	(25.35)	(25.27)	(27.28)	(27.63)	(1.11)	(-1.04)
REM	1.09	1.87***	2.21***	2.63***	3.14***	0.65**	0.20
	(1.62)	(2.79)	(3.42)	(4.25)	(5.09)	(2.08)	(0.71)
Panel E: Small issuer							
DCA	-0.49***	-0.17	0.17	-0.44***	-0.15	0.37	0.33
	(-2.90)	(-1.06)	(1.00)	(-2.68)	(-1.01)	(1.52)	(1.33)
CFO	-3.54***	-3.25***	-3.35***	-3.45***	-3.36***	0.36*	-0.19
	(-14.62)	(-14.00)	(-14.14)	(-15.18)	(-14.18)	(1.90)	(-1.05)
PROD	1.83***	2.47***	1.97***	2.33***	2.10***	0.68***	-0.42
	(3.53)	(4.88)	(3.89)	(4.82)	(4.40)	(2.62)	(-1.65)
DISEXP	7.49***	7.77***	7.68***	8.34***	8.33***	0.24	-0.21
	(16.34)	(17.26)	(17.20)	(19.59)	(19.43)	(1.17)	(-1.03)
REM	5.70***	6.89***	6.22***	7.16***	7.10***	1.21***	-0.84**
	(6.02)	(7.43)	(6.85)	(8.38)	(8.25)	(2.79)	(-2.06)
Panel F: Large issuer							
DCA	-0.16	-0.12	0.14	-0.14	0.09	0.07	0.29
	(-0.98)	(-0.76)	(0.96)	(-1.04)	(0.72)	(0.27)	(1.20)
CFO	-7.35***	-7.27***	-6.79***	-6.90***	-6.60***	0.01	0.51***
	(-30.16)	(-30.11)	(-27.91)	(-29.56)	(-27.82)	(0.07)	(3.46)
PROD	-2.10***	-1.81***	-1.61***	-1.48***	-1.19***	0.19	0.15
	(-5.25)	(-4.55)	(-4.29)	(-4.11)	(-3.26)	(0.82)	(0.74)
DISEXP	9.07***	9.29***	9.03***	9.15***	9.05***	0.17	-0.26
	(22.36)	(23.32)	(22.87)	(24.02)	(23.92)	(0.98)	(-1.55)
REM	-0.37	0.19	0.65	0.80	1.27*	0.46	0.34
	(-0.50)	(0.26)	(0.89)	(1.17)	(1.86)	(1.25)	(1.01)

* p<0.10, ** p<0.05, *** p<0.01

Appendix C. The use of AI

Generative artificial intelligence ("generative AI"), in the form of ChatGPT, has been used during the process of this study for three sole purposes. First, as a support tool for learning and troubleshooting within the statistical software programme Stata. As novice users of Stata, we found ChatGPT helpful in facilitating the initial learning process and understanding how to navigate the software. However, we quickly realised its limitation, as we frequently received suggestions that was incorrect. Accordingly, we did not rely on suggestions from ChatGPT without first verifying them against Stata's official help function and documentation. Ultimately, the majority of our guidance came from Stata's own help function and guidelines. All Stata output was carefully reviewed and verified to ensure that the code executed as

intended. Second, ChatGPT was occasionally used to assist with spelling and grammar. However, the output often required modification, as it did not consistently produce satisfactory results. Nevertheless, we believe its use contributed to a more efficient writing process. We were very careful with letting ChatGPT rephrase our text. We are not concerned about possible negative effects since the work put into ChatGPT was our own, and the output was never left uncontrolled. As such, the final product is entirely and solely the work of the authors. Lastly, we used ChatGPT as a discussion partner, comparable to consulting publicly available sources such as any other google search or YouTube video. Written text does not offer alternative explanations, and we believe that this enabled us to learn and grasp certain complicated concepts more quickly.