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FIRMS' EARNINGS MANAGEMENT AND LOAN OUTCOMES

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Abstract

This dissertation builds up on the literature analysing the relation between earnings management and debt contracting, more specifically bank loan contracting. The focus is on the analysis of whether banks provide loans to firms using their discretion over financial and accounting reporting. I analyse accruals-based earnings management, a measure that only affects the reporting of information, and so is marginal to economic decisions affecting firms' business activities. Using Portuguese Credit Register data, I identify new loans and examine how earnings management affects the probability of the firm obtaining a loan and, conditional on getting a new loan, which contractual terms are offered. The contract terms under analysis in this study are loan amount, maturity structure and collateral requirements. Overall, the main results indicate that banks provide funding to firms that engage in earnings management, and provide higher amounts, but tend to penalize these firm by imposing shorter maturities and higher collateral requirements. The effect is economically significant: a one-standard deviation increase in earnings management leads to a 3.77% increase on the probability of the firm getting a new loan, all else equal. The period of analysis is from 2009 to 2017, which comprises the Portuguese sovereign debt crisis. So, after the main analysis, I split the sample into crisis and non-crisis years. The results of the subsample analysis for crisis years suggest that banks reduce the amount of loan granted to firms engaging more in earnings management practices but relax on collateral requirements instead.

JEL-codes: D86; F34; G21; M48; M41.

Keywords: Debt Contracting; Bank Lending; Earnings Management; Financial Reporting Standards; Sovereign Debt Crisis.

Resumo

A presente dissertação desenvolve-se no âmbito da literatura que se dedica ao estudo da relação entre gestão de resultados e contratação de dívida, mais especificamente contratação de empréstimos ao setor bancário. A análise foca-se em torno da decisão dos bancos em conceder crédito a empresas cujos administradores usam a sua discrição na preparação dos relatórios contabilísticos e financeiros. A variável que capta a componente de gestão de resultados baseia-se em acréscimos e diferimentos, que apenas influenciam o reporte da informação, sendo marginais a decisões que afetam diretamente a atividade da empresa. Com base em dados Portugueses da Central de Responsabilidades de Crédito, foi possível identificar novos empréstimos e examinar de que modo práticas de gestão de resultados afetam a probabilidade de uma empresa receber um empréstimo e, caso seja concedido, quais as condições contratuais oferecidas. Os termos contratuais em análise são o montante do empréstimo, a maturidade e os requisitos de colateral. Os resultados obtidos indicam que o setor bancário concede crédito a empresas que recorrem a práticas de gestão de resultados, mas tendem a penalizar estas empresas impondo maturidades mais curtas e aumentando os requisitos de colateral. O efeito económico pode ser quantificado: um aumento de um desvio-padrão na variável de gestão de resultados leva a um incremento de 3,77% na probabilidade de uma empresa obter um novo empréstimo, tudo o resto constante. O período sob análise compreende os anos de 2009 a 2017, o que inclui a crise de dívida soberana Portuguesa. Assim sendo, após a análise principal, a amostra foi separada em dois grupos, um contendo os anos de crise e o outro os restantes anos. Os resultados da análise para a subamostra da crise sugerem que, durante este período, os bancos reduzem o montante concedido a empresas que recorrem a práticas de gestão de resultados, mas relaxam os requisitos de colateral.

Códigos-JEL: D86; F34; G21; M48; M41.

Palavras-chave: Contratação de dívida; Empréstimos bancários; Gestão de resultados; Normas de Relato Financeiro; Crise de dívida Soberana.

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1. Introduction

Earnings management have long been catching the interest of researchers. Ranging from the accounting to the finance research field, many studies are dedicated to explaining corporate and market decisions in the light of earnings management practices, for instance, managers' compensation plans (Bergstresser & Philippon, 2006; Healy, 1985), pressure to meet market's and analysts' expectations (Bhojraj *et al.*, 2009; Cohen & Zarowin, 2010) and debt contracting (Bharath *et al.*, 2008; Francis *et al.*, 2005; Pappas *et al.*, 2019). This study builds up on the literature analysing the relation between earnings management and debt contracting (Bharath *et al.*, 2008; Pappas *et al.*, 2019), by addressing the following research question: "What is the impact of earnings management on bank loan outcomes?".

The main measure of earnings management under scrutiny here is accruals-based, since I am more interested in studying the impact of discretionary accounting choices rather than real decisions affecting firms' business activity. In particular, I investigate whether and how the reporting of accruals affects loan outcomes. Accruals are used by firms to report incurred expenses that are not paid and earned revenues that are not received; thus, the reporting does not impact the contemporary cash flow of the firm. Some typical examples are accounts payable, accounts receivable and future tax liabilities. So, accruals consist of the difference between earnings and cash flows, and as accruals increase so does the difference between earnings and cash flows. Big deviations between earnings and cash flows raise a problem of uncertainty regarding future cash flows (Sloan, 1996). Higher accruals, particularly discretionary accruals, are typically associated with lower accounting quality (Dechow *et al.*, 2010). Francis *et al.* (2005) explain the importance of accruals quality from the perspective of information risk. They argue that the fundamental problem associated with accruals in a contracting relation is: "Accruals quality tells investors about the mapping of accounting earnings into cash flows. Relatively poor accruals quality weakens this mapping and, therefore, increases information risk" (*Ibid*, pg. 296). However, in an attempt to get the most favourable loan conditions, managers may choose to exercise their discretion on certain accounting and real decisions in order to improve the firm's reported performance. By managing earnings upwards before loan application, managers portray a better picture of the firm's prospect. By exercising their discretion, managers engage in what is typically called earnings management. This behaviour may distort the information provided to the

contracting counterparty, increasing the information risk. As the gap between earnings and cash flows increases, so does the uncertainty about cash inflows from the business operations, which increases banks' concern of firms' ability of paying down the debt according to the pre-determined payment schedule.

The current thesis considers firms' incentive to manage its accruals as a relevant risk factor in banks' lending decisions. Specifically, I expect this effect to be reflected in banks' decision to provide a loan and, conditional on the acceptance, in the loan conditions offered. Francis *et al.* (2005) find that poorer accounting quality is associated with larger costs of debt (proxied by interest expense), but the discretionary component of accruals plays a smaller role when compared to the other component of accruals directly related to the business activities and economic conditions. This comes as no surprise, since the component subject to discretion should be relatively small to still be within GAAP rules, otherwise considered fraud. This current work more closely resembles Bharath *et al.* (2008) in that both explore the effects of accounting quality on price and non-price terms of private debt. Bharath *et al.* (2008) find that firms that engage in higher earnings management are penalized through higher interest spreads, shorter maturities and higher collateral requirements. Although using a different measure of earnings management, now related with real economic decisions affecting the business activities of the firm, Pappas *et al.* (2019) reach the same conclusion: banks penalize firms engaging in manipulative practices.

This study focuses on the impact of pre-issuance earnings management on the probability of a firm obtaining a loan and on the offered loan terms conditional upon the loan being granted. To address my research question, I focus on three core loan conditions – 1) loan amount, 2) maturity structure and 3) collateral requirements. The explanatory variable of interest captures accruals-based earnings management, more specifically, performance-matched discretionary accruals. This measure contains the component of accruals that cannot be explained by the normal business activities, capturing the reporting that is more susceptible to discretion when comparing two otherwise similar firms. In addition to the main analysis, I further analyse if the effect of earnings management on loan outcomes is differential for crisis and non-crisis years, given that the period under analysis in this study - 2009 to 2017 - comprises a crisis period for Portugal.

My study brings new evidence to the line of literature that examines the relation between earnings management and debt contracting. Previous studies (Bharath *et al.*, 2008; Pappas *et*

al., 2019) typically focus on large syndicated loans which are issued by large firms who often have access to alternative funding sources, such as stocks and bonds. In particular, it is likely that firm's decision to launch a syndicated loan is jointly determined with the decision to issue public bonds or obtain a private credit (Bharath *et al.*, 2008). Focusing on a single funding source which possibly only captures a one-shot issuance decision of firms can lead to biased estimates for the effect of earnings management. To be able to obtain more generalized results, I employ the Portuguese Credit Register which covers all the firms operating in Portugal and all bank loans that a firm obtains in Portugal as long as the amounts exceed the reporting threshold of 50 euros. By including all loans of a firm, my analyses allow to gauge the impact of earnings management on more general loan outcomes, *i.e.*, from the propensity to obtain new loans to the design of loan contracts - maturity structure and collateral requirement to be more specific. Thus, this study provides a more complete picture of debt decisions. Moreover, by covering a wider range of firms in an economy, my findings provide insights for research on medium, small and micro enterprises, given that the Portuguese financial system is bank-based and small businesses are an important component of the economy. To the best of my knowledge, such study has not been conducted before. Hence, with this dissertation, I try to disentangle the effect of earnings management on loan outcomes, under possibly high information asymmetries between lender and borrower.

2. Literature Review

2.1. Earnings Management

Earnings management, as defined in Healy and Wahlen (1999), "occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (*Ibid*, p. 368). Hence, even though earnings management practices may be done within the accounting rules defined by the Generally Accepted Accounting Principles (GAAP), the exercise of discretion for this type of choices is not aligned with transparency fundamentals.[1] Given the practical implications earnings management can have at various levels, it is a subject that has been widely explored in the literature from various perspectives, ranging from accounting to finance (Healy & Wahlen, 1999; Walker, 2013).

There are many reasons why managers may feel incentivised to engage in earnings management practices to inflate or reduce reported numbers. Some of the most addressed motivations are CEO compensation plans (Bergstresser & Philippon, 2006; Dechow & Sloan, 1991; Healy, 1985; Marinovic & Varas, 2019), meeting market's and analysts' expectations (Bhojraj *et al.*, 2009; Burgstahler & Eames, 2006; Degeorge *et al.*, 1999; Matsumoto, 2002), or debt contracting (Bharath *et al.*, 2008; Francis *et al.*, 2005; Liu *et al.*, 2010; Pappas *et al.*, 2019). Income smoothing is also a topic directly related with earnings management (Bao & Bao, 2004), and which is proven to have a connection with the motivations just mentioned (Goel & Thakor, 2003; Moses, 1987).

From the survey conducted by Graham *et al.* (2005), it is possible to conclude that managers engage in these kinds of practices conscious that most of the times they are sacrificing long-term value in favour of short-term benefits. This phenomenon, commonly designated managerial short-termism or manager myopia, has been subject to increasing attention, especially after the recent financial crisis. Kolasinski and Yang (2018) find evidence

[1] In the case of the European Union, and particularly Portugal, the International Accounting Rules (IAS) regulation applies. For listed companies (compulsory) and non-listed firms (as an optional choice), the International Financial Reporting Standards (IFRS) apply.
https://www.iasplus.com/en/jurisdictions/europe/portugal (last accessed on: 13/08/2019).

supporting the allegations in the 2001 Financial Crisis Inquiry Report, which states that one of the factors that led to the crisis was the big incentive to look at the short-term payoffs without considering the long-term consequences of those actions.[2] Thus, myopic practices, *i.e.* oriented to the short-term, as can be earnings management, can have real consequences on the financial system and ultimately on the economy. Having said this, besides being potentially harmful for third parties - notably, in the case of debt lenders, creating uncertainty about future cash flows -, earnings management can be detrimental for the company itself (Bhojraj & Libby, 2005). And if firms' managers deserve their fair share of blame for putting a disproportionate weight on short-term benefits, they are not the only ones to blame. Capital markets, shareholders and regulators' pressure is also responsible for allowing short-term interests overshadow potential long-term sustainable profits.

The literature has been evolving and there is now a better understanding of this phenomenon and its implication, which is an important step to develop mechanisms to address it. There is a stream of literature analysing solutions to overcome myopic managerial behaviour. Reduction of uncertainty about the manager's future in the company through contractual protection seems to lessen the pressure for short-term results and encourage the manager to opt for projects oriented to long-term value (Chen *et al.*, 2015). Aligning managers decision horizon with a long-term vision for the company seems to be beneficial for all parties. Di Meo *et al.* (2017) find that even though entrenched managers still manage earnings, that is not detrimental to the firm future value. Instead, and citing their words, earnings management are used "to inform stakeholders about future performance, and not to obfuscate current performance at the expense of decreasing firm value" (*Ibid*, p. 400). Hence, earnings management have a two-sided nature dependent on the objective with which it is used. If, on the one hand, earnings manipulation can be conducted to mislead third parties about the true performance of the firm - opportunistic earnings management; on the other hand, earnings management can be used as a signal indicating optimistic prospects - informational earnings management.

Up to this point, the motivations underlying earnings management and its main inherent characteristics have been explored, but which tools do managers have to engage in earnings management practices? There are various ways of managing earnings, the most common examples are changes in accounting methods, use of accruals or intervention in the business

[2] https://www.govinfo.gov/content/pkg/GPO-FCIC/pdf/GPO-FCIC.pdf (last accessed on: 13/08/2019).

activities (Healy & Wahlen, 1999). In what concerns changes in accounting methods, choice of depreciation methods or inventory valuation methods are examples that immediately come to mind. These changes are indeed relevant and affect the reporting of information, however, adjustments in accounting methods are visible and subject to more rigidity. Therefore, most of the studies choose to focus on other types of earnings manipulation.

The use of accruals as a means to manage earnings has long been studied in the literature and is the most widely analysed method (DeAngelo, 1986; Dechow *et al.*, 1995; Healy, 1985; Hribar & Collins, 2002; Jones, 1991; Kothari *et al.*, 2005). These are typically called accruals-based earnings management. Accruals are the component that results from the difference between the recognized earnings and the cash flows from the operations. But it is not the accruals total that is used as a proxy for earnings management. There is a part of accruals – the so-called non-discretionary accruals – which, naturally, is part of the normal course of activities of any business, credit sales or trade credit are good examples of these. Therefore, what is considered earnings management is the abnormal component of accruals, which cannot be explained from a firm's regular activities.

In addition to accounting choices and accruals, other types of discretionary choices, particularly investment decisions, have been investigated as instruments to manipulate reported performance towards pre-established income objectives. The main differentiating feature between these economic choices and accruals choices is that the former has consequences that go far beyond the numbers on the financial statements - real economic decisions are affected and with them the cash flows. In the early literature, R&D expense was one of the main measures used (Baber *et al.*, 1991; Bushee, 1998; Dechow & Sloan, 1991). Graham *et al.* (2005) survey was an important milestone to the development of the literature on real earnings management. The survey revealed evidence on managers preference for economic decisions affecting real business activities rather than using discretion to alter reported information. Such a choice was justified by auditors, regulators and shareholders' attentive eye on accounting choices, in a constant attempt to identify earnings management, which has led firms' managers to opt for real economic actions. Despite the impact on the business operations, real earnings management are less likely to be scrutinized and questioned. Based on this evidence, real earnings management measures emerge as a solid alternative approach to study earnings management. However, given the implications it has for the business activities, a clear distinction between these and accruals-based earnings

management exists, and such a difference should be borne in mind. Roychowdhury (2006) is the most cited paper on real earnings management measures, since it provides a comprehensive framework which allows to study different components that can be manipulated to influence a firm's reported status: discretionary expenses (where R&D expenses are included), production costs, and operational cash flows. Alike accruals-based earnings management, it is the abnormal component of these measures that is used as a proxy for real earnings management, since it represents a deviation from what can be explained by a firm's regular activities.

Even though accruals-based and real earnings management have long been studied separately, the evidence of firms using both has motivated recent papers to try to understand the relation between both measures under various circumstances. Both Cohen and Zarowin (2010) and Zang (2012) find proof of a trade-off between the two methods, which is in line with the findings of Graham *et al.* (2005). Contingent upon the tightness of accounting scrutiny, to achieve certain reporting objectives, managers choose to conduct more of one and less of the other, *i.e.* they are substitutes – the tighter the scrutiny the greater (lesser) the use of real (accruals) earnings management.

2.2. Borrower-lender Relationship

When managers decide to invest in a business opportunity, they do not always have enough resources to fund those projects. Funding is, therefore, not only important for any business to pursue the normal business activities, but particularly for the business to grow through investment in business opportunities. Firms can resort to different sources of funding, internally or externally, ranging from debt or equity issuance to loans from financial institutions or commercial credit. One characteristic common to all these contracting relationships is the intrinsic information asymmetry (Baxamusa *et al.,* 2015). The firm – the borrower – possesses private information that may never be available to the lender. Hence, the firm has an informational advantage relative to its financing counterparty. Naturally, whoever the lender might be, she is always aware of this informational gap and requires a premium that tries to incorporate that informational risk (Duffie & Lando, 2001). The more transparent the firm, the lower should be the premium, since the lender has more complete information about the borrower.

Over the years, efforts have been put on trying to mitigate informational discrepancies. Stricter regulatory environment for financial reporting is an example.[3] Firms' financial statements are, for most lenders, the only source of accounting and financial data available to support an investment decision. Hence, the regulators' work to make the borrower-lender relation as levelled as possible is of great importance. Publicly traded companies have to follow a series of requirements regarding information disclosure, so they are typically considered informationally transparent. For private medium, small and micro-enterprises, even though rules and requirements exist, these firms are allowed to report information under less strict rules, to reduce the bureaucratic burden for them (Accounting rules – Directive 2013/34/EU).[4] This, however, results in a relatively higher information gap between borrowers and lenders when comparing to larger firms. Thus, for micro, small and some medium enterprises access to the capital markets is limited.

Banks are, then, an alternative reliable source of funding, available even for these smaller firms. But this is due to the singularity of banks as lenders. One characteristic that has historically distinguished banks from other lenders, for instance those participating in the capital markets, is the fact that banks not only have access to hard information, typically financial statements, but also have, over the years, collected detailed information on other characteristics of borrowers, the denominated soft information. This information collection process is done through long-standing personal contact with firms, the so-called relationship lending (Berger & Udell, 1995). As Liberti and Petersen (2019) put it, "Over time, the banks built up a more complete picture of the borrower than was available from public records. This private information—most of it soft information—is valuable to the bank. The value arose not only from its ability to inform the bank's lending decisions but also because of the difficulty of replicating and transmitting the information outside the bank" (*Ibid*, p. 2). A study conducted by Lee and Sharpe (2009) also supports this idea. They find evidence, even if small in effect, that when a firm announces a bank loan, that triggers a positive market reaction. This is precisely due to the recognized superior information banks can collect from the borrower, not only at an initial stage, but through time by loan screening and monitoring.

[3] https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/financial-reporting_en (last accessed on: 23/08/2019)

[4] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013L0034 (last accessed on: 23/08/2019)

Relationship lending is definitely one of the major strengths of banks. Nonetheless, on a first contact between a firm and a bank, there is no prior knowledge. Still, banks benefit from other advantages when compared to other lenders. There are two aspects worth highlighting. First, banks permitted access to information on the debt history of the firm - and even on the firm's owner, when such information may be relevant (Berger & Udell, 2005) - is important to get additional data on the firm and considerably reduce the asymmetry of information (Bonfim *et al.*, 2018). Second, banks have the flexibility to fine-tune contract terms and do amendments to the original contract. Despite the monitoring costs, this is a valuable feature, since banks have the possibility to adjust loan terms when the circumstances change (Nikolaev, 2018). The tools banks have available to customize a loan contract range from price terms, as is the interest rate - or, more accurate, the interest spread -, to non-price conditions, as are maturity, guarantees, covenants or even loan amount. Else equal, the higher the overall perceived risk of the firm, the higher should be the interest spread, shorter the maturity, higher the probability of requesting collateral and more strict covenants. The non-price terms are of great importance for banks, which use them to better design loan contracts. Bharath *et al.* (2008) show that this is one of the main differentiating features between private and public debt contracts, with the latter only making use of interest spreads.

Thus, there is a wide range of resources available to banks and which help them reduce the information gap in the borrower-lender relationship. Nevertheless, information asymmetries may never be completely overcome. Based on a set of hard and soft information obtained about a firm, the bank tries to draw the risk profile to decide whether to provide the loan, and if yes, under which conditions. Such conditions try to reflect as best as possible the risk associated with the firm, for instance, default risk or information risk, knowing that there is possibly important information kept private. Naturally, there is a range of other factors which were not mentioned and that enter in the equation, for example, managerial ability (Bui *et al.,* 2018). Earnings management is also an example of how the way information is presented to the bank can bring uncertainty into the equation. High accruals increase the discrepancy between cash flows and reported earnings, sometimes with little assurance that accruals will materialise into cash flows in the future. This can affect a firm's ability to pay down the debt, hence posing risk to the bank.

3. Hypotheses Development

In this study, I try to uncover the impact of firms' earnings management on bank loan outcomes for the Portuguese context. The important role that financial accounting information has to the lender in a debt contracting relation is widely documented (Armstrong *et al.,* 2010). When engaging in earnings management, firms' managers ultimately have the intention of influencing the information in their financial reports, which are then provided to debt counterparties. Hence, the relevance of studying how earnings management affects lenders' interpretation of the information received when deciding whether to provide a loan. Looking at the existing literature, some studies have investigated how different types of lenders perceive accounting information, in particular earnings management, around corporate financing operations, by analysing how lenders translate that into financing terms. However, there is not a consensus. For instance, regarding seasoned bond offering, views seem to diverge. Caton et *al.* (2011) findings indicate that offered yields tend to be higher with more aggressive accruals earnings management, Liu *et al.* (2010) state that "bondholders are unable to unravel the inflated earnings numbers in pricing new debt" (*Ibid*, pg. 679).

In what concerns banks, there are a lot of studies analysing different aspects that can influence bank debt contracting, some examples are financial restatement (Graham *et al.*, 2008), earnings predictability (Hasan *et al.*, 2012) or internal control weakness (Costello & Wittenberg-Moerman, 2011). But only few exactly relate earnings management with loan terms. Bharath *et al.* (2008) or the recently published Pappas *et al.* (2019) are two papers that explicitly analyse this relation. Bharath *et al.* (2008) explore the effects of accounting quality on price and non-price terms of private debt. They compare public and private debt terms to better understand the role of information in determining such conditions. Banks not only have access to more information than arm's-length lenders, but also benefit from greater flexibility when it comes to renegotiating contracting terms. Non-price loan terms as are maturity and collateral are important tools that banks have available to customize debt contracts to better reflect the firm's risk. They find that firms that engage in higher accruals earnings management are penalized through higher interest spreads, shorter maturities and higher collateral requirements. Pappas *et al.* (2019) also find that banks penalize firms engaging in manipulative practices, although they use real earnings management as their main variable of analysis. These results, pointing to the same direction, come as no surprise if one considers the superior information collection and processing capacity banks have.

An interesting question which, to the best of my knowledge, has not been explored in the existing literature is how earnings management influences, on a first instance, the probability of a firm obtaining a loan. If firms subject themselves to more stricter conditions when engaging more in earnings management practices, as the previous papers suggest, then it should be because firms, having complete information about their true situation, believe they would not be able to obtain that loan with better contracting terms anywhere else. So, managers manage earnings upwards to increase the chances of being granted that bank loan. Hence, I test the following hypothesis:

H1: The probability of a firm obtaining a new loan increases with earnings management.

The setting in which this analysis is conducted is different from the ones in the aforementioned papers. Nonetheless, not having evidence for the Portuguese context, their results provide important hints about what to expect from this study. The loan terms here considered are maturity, collateral and amount. Hence, based on previously found evidence, it is expected that with higher earnings management, loan maturity shortens and collateral requirements increase. As for amount, it seems reasonable to assume that firms have more incentives to manage earnings when applying for loans of higher amount. Hence, either the bank accepts to provide a loan for the total amount requested and penalizes the firm with stricter maturity and collateral terms, or the bank chooses to penalize firms also using amount and provides smaller amounts. In the first case, one would see a positive relation between earnings management and amount, and in the second scenario, that relation would be negative. Since banks have the flexibility to work with other loan conditions - interest, maturity and collateral -, as Bharath *et al.* (2008) highlights, it would be reasonable to expect a positive relation.

Based on the exposed arguments, I formulate the following testable hypotheses:

H2a: Banks provide loans with higher amount to firms engaging more in EM.

H2b: Banks provide loans with shorter maturities to firms engaging more in EM.

H2c: Banks are more likely to increase collateral requirements for firms engaging more in EM.

4. Methodology

4.1. Sample Selection

To perform this empirical study, I use data for Portugal obtained from the databases provided by Banco de Portugal. The Central Balance Sheet Database (CB) has annual data on firms' financial statements, namely the balance sheet, the income statement and the cash flow statement. It is from this database that I get firms' financial information and the necessary data to compute the earnings management variables and proxies for firms' characteristics. For bank loans and respective conditions, I use the Central Credit Responsibility Database (CCR), with data aggregated at the firm level. For some important variables, namely collateral and maturity, there is only information available from 2009 onwards, which determines the period of analysis, which is from 2009 to 2017.

I start with 3 476 773 observations corresponding to 620 233 firms in CB. I eliminate very small firms, with less than 5 employees or total turnover smaller than 1000 euros or assets totalling less than 10 000 euros, due to poor quality of the information reported by very small firms. I further eliminate firms belonging to the financial sector, corresponding to section K of NACE (Revision 2), the EU classification of economic activities. The reason for dropping these firms is that the capital structure of financial firms differs substantially from that of non-financial firms (Fang *et al.*, 2016). Finally, I require that firms included in my analyses have valid information for the main variables, i.e. have all the information necessary both from the CB and the CCR databases. My final sample contains a total of 49 890 firms.

4.2. Earnings Management Measurement

Regarding the earnings management measure, I use **accruals-based earnings management**. Even though the existing literature clearly indicates that firm managers resort both to accruals-based and real earnings management, I focus on the analysis of accruals earnings management for the following reasons. Real economic decisions have implications on the investment level and, overall, on the business activity. And funding decisions, as are applications to bank loans, are likely related with investment decisions of the firm. Hence, I choose to study earnings management using a measure marginal to real economic decisions

and that mainly affects the reporting of information. Here, what I am interested in capturing is whether banks discern and incorporate information that is subject to accounting discretion, namely discretion over accruals, on their lending decisions.

Regarding the computation of my main explanatory variable, I opt for the commonly used **balance sheet approach** for the definition of total accruals, employed in papers widely cited in the earnings management literature, such as Jones (1991) or Dechow *et al.* (1995). I choose this approach rather than a cash flow approach, because the information available on the firms' cash flow statements is very incomplete. A big part of our sample is constituted by smaller firms, for which reporting of such information does not have a compulsory character. Hence, the measure of accruals is constructed using the changes in the non-cash working capital accounts and depreciation expenses, taken from the balance sheet, as follows:

$$TAbs_{i,t} = \frac{\Delta CA_{i,t} - \Delta Cash_{it} - \Delta CL_{i,t} + \Delta STD_{i,t} - DEP_{i,t}}{A_{i,t-1}} \quad \textbf{(1)}$$

Where $TAbs$ = Total accruals according to the balance sheet approach, ΔCA = Change in current assets, ΔCL = Change in current liabilities, $\Delta Cash$ = Change in cash and cash equivalents, ΔSTD = Change in debt included in current liabilities, DEP = Depreciation and amortization expense and A_{t-1}= Lagged total assets.

Having the measure of total accruals, I then estimate the Discretionary Accruals (DA). This is the component of accruals that is not a direct consequence of the normal business events, but rather, subject to manager discretion. I followed the model of Kothari *et al.* (2005) and computed the **performance-matched DA** using the **Modified-Jones model** (Dechow *et al.*, 1995). The Modified-Jones model uses property, plant and equipment (PPE) and change in revenues subtracted by change in receivables to explain the non-discretionary component of accruals, i.e. the part that is related with the business activity. Hence, the DA correspond to the difference between the total accruals as calculated in **(1)** and the fitted normal accruals obtained from estimating the non-discretionary accruals.

What is especial about the performance-matched DA is that it is obtained by comparing the discretionary accruals of a firm with those of the most similar firm in terms of performance – in this case, using the return on assets as the measure of performance – for each year and industry. Therefore, the obtained measure of DA for a certain firm is the difference between its DA and the DA of the most similar firm in terms of performance among the firms in the

same industry and year. Hence, this measure only captures the surplus relative to the normal practise of an otherwise similar firm. A detailed explanation of the computation of this measure is provided in **Appendix 2**: Earnings Management variables .

4.3. Bank Loan Outcomes

The analysis of bank loan terms focuses on three variables: amount, maturity and collateral. The CCR dataset used in this study contains information on firms' outstanding bank debt position each month. Hence, given the original structure of this dataset, I perform a twofold analysis to test the hypotheses formulated above.

First, I analyse firms' **outstanding debt information** in December to match the timing of financial statements' information - for more than 99% of the sample firms, the end of the fiscal year is in December. The outstanding amount measure corresponds to the total amount, in euros, a firm has in debt.[5] For maturity, I use two measures. One is the proportion of short-term residual debt, which is computed dividing the amount due in less than one year by the total outstanding debt amount. Additionally, I have the weighted-average residual debt maturity category, ranging from 1 (shorter than 1 year) to 5 (longer than 20 years). Regarding collateral, alike the first measure for maturity, I divide the total amount of collateral by the total outstanding debt amount to obtain the proportion of secured credit.

For the main analysis, I **identify new loans based on monthly differences** and from changes try to isolate the respective loan conditions in terms of amount, maturity and collateral requirements. The measure for the amount of new loan corresponds to the monthly increase in outstanding amount. I consider that there is a new loan when there is an increase no smaller than 50€ in the outstanding amount. This is the lower threshold used because 50€ is the minimum amount for which credit reporting in CCR starts to be mandatory. Regarding maturity, alike the previous approach, I use two variables: one capturing the change in the proportion of short-term debt out of the total outstanding amount, and the other containing

[5] In fact, to be more precise, the outstanding amount measure corresponds to the total regular outstanding amount. So, the amount of credit which is actually in debt. Potential credit, i.e. credit that was contracted but not used (very frequent for credit cards, overdrafts or credit lines) is excluded from this analysis.

information on the weighted-average debt maturity.[6] Regarding collateral, I create a dummy variable which takes the value of one when the collateral amount increased from the previous month to the month of new loan obtention, and zero otherwise.

4.4. Research Design

The papers I have as reference for this study, Bharath *et al.* (2008) and Pappas *et al.* (2019), use contract-level data to conduct their analysis. In this study, I use firm-level data which allows to examine, on a first instance, the general relation between earnings management and a firm's debt position, and then to dive into the analysis of new loans. These two approaches allow to explore this topic from two complementary perspectives. Considering the structure of the available CCR dataset, with firm-level data, I try to capture the effect of earnings management on average levels of the three loan conditions under analysis.

First, I analyse the general relation between earnings management and the outstanding loan position of the firm, in terms of debt amount, proportion of short-term debt, residual maturity and collateral amount, using yearly frequency data. Second, at a monthly level, I implement my main analysis, identifying the occurrence of new loans and from there study how earnings management influence the probability of obtaining a new loan and the terms of those new loans. With this second approach, I seek to approximate to the papers previously mentioned, which use contract-level data to study how earnings management influence loan contracting terms.

Regarding the econometric design used to test my two hypotheses. First, to examine hypothesis **H1**, I run the following **logistic regression** for a dummy variable for new loans, assuming value one when there is a new loan that month and a zero otherwise:

$$Prob(New\ Loan_{i,t} = 1) = \tau_0 + \tau_1 EM_{i,t-1} + \sum_{j=2}^{7} \tau_j\ Firm\ Controls_{i,t-1} + \rho_i + \pi_t \qquad \textbf{(2)}$$

[6] Here, since I am trying to identify the contractual conditions, I use short-term debt with **original** maturity shorter than one year and the weighted-average **original** maturity of the debt.

Where $\boldsymbol{Prob(New\ Loan_{i,t} = 1)}$ represents the probability of obtaining a new loan. $\boldsymbol{EM_{i,t-1}}$ is the measure of earnings management with one-year lag.[7] $\boldsymbol{Firm\ Controls_{i,t-1}}$ represents a set of variables for firm characteristics at time *t-1*. $\boldsymbol{Loan\ Controls_{i,t}}$ accounts for loan characteristics. And $\boldsymbol{\rho_i}$ and $\boldsymbol{\pi_t}$ represent, respectively, firm and time fixed effects, accounting for unobserved specific effects.

Additionally, to test hypotheses **H2**, I follow a methodology close to Pappas *et al.* (2019), by estimating the regressions specified below for firm *i* and time *t* (where *t* can have a monthly or yearly frequency, according to the approach used):

$$\ln(\boldsymbol{Amount_{i,t}}) = \alpha_0 + \alpha_1 EM_{i,t-1} + \sum_{j=2}^{7} \alpha_j\ Firm\ Controls_{i,t-1} + \sum_{j=8}^{10} \alpha_j\ Loan\ Controls_{i,t} + \rho_i + \pi_t + \varepsilon_{i,t} \quad \textbf{(3)}$$

$$(\Delta)\ \boldsymbol{Proportion\ Short-term\ debt_{i,t}} = \beta_0 + \beta_1 EM_{i,t-1} + \sum_{j=2}^{7} \beta_j\ Firm\ Controls_{i,t-1} + \sum_{j=8}^{9} \beta_j\ Loan\ Controls_{i,t} + \rho_i + \pi_t + \vartheta_{i,t} \quad \textbf{(4.1)}$$

$$\ln(\boldsymbol{Maturity_{i,t}}) = \gamma_0 + \gamma_1 EM_{i,t-1} + \sum_{j=2}^{7} \gamma_j\ Firm\ Controls_{i,t-1} + \sum_{j=8}^{9} \gamma_j\ Loan\ Controls_{i,t} + \rho_i + \pi_t + \omega_{i,t} \quad \textbf{(4.2)}$$

$$\boldsymbol{Proportion\ of\ Secured\ Debt_{i,t}} = \delta_0 + \delta_1 EM_{i,t-1} + \sum_{j=2}^{7} \delta_j\ Firm\ Controls_{i,t-1} + \sum_{j=8}^{10} \delta_j\ Loan\ Controls_{i,t} + \rho_i + \pi_t + \mu_{i,t} \quad \textbf{(5.1)}$$

[7] Note that firm-related variables, computed from the firm's financial statements, always have annual information.

$$\boldsymbol{Prob}(\boldsymbol{Collateral_{i,t}} = \mathbf{1}) = \lambda_0 + \lambda_1 EM_{i,t-1} + \sum_{j=2}^{7} \lambda_j \; Firm\ Controls_{i,t-1} + \sum_{j=8}^{10} \lambda_j \; Loan\ Controls_{i,t} + \rho_i + \pi_t \quad \textbf{(5.2)}$$

Where $\mathbf{ln}(\boldsymbol{Amount_{i,t}})$ is the natural logarithm of amount, either outstanding debt amount or amount of the new loan, depending on the analysis. (Δ) $\boldsymbol{Proportion\ Short-term\ debt_{i,t}}$ represents the proportion of short-term debt or change in proportion of short-term debt, for the outstanding and new loan analyses, respectively. $\mathbf{ln}(\boldsymbol{Maturity_{i,t}})$ is the natural logarithm of the variable with information on the weighted-average maturity of debt. $\boldsymbol{Proportion\ of\ Secured\ Debt_{i,t}}$ contains the proportion of secured debt and is used in the analysis of the outstanding debt position. And $\boldsymbol{Prob}(\boldsymbol{Collateral_{i,t}} = \mathbf{1})$ represents the probability of being requested collateral when granted a new loan. The remaining variables are as explained for specification **(2)**. All these specifications are estimated using an OLS method, except for **(5.2)** which is estimated using a logistic model. I estimate the models using an unbalanced panel data sample, using *Stata 15*, a data analysis and statistical software.

Note that to avoid potential endogeneity induced by reverse causality (Fung & Goodwin, 2013), I measure earnings management and firm characteristics at time *t - 1*, while the left-hand side is measured at time *t*. I introduce firm and time fixed effects to account for unobservable firm-specific effects and impacts of economic cycles. Firm fixed effects are important because there might be time-invariant characteristics intrinsic to each firm. The reputation of managers is an example of a characteristic that may influence loan conditions. Time fixed effects are especially relevant in this study as the period under analysis - 2009 to 2017 - comprises the Portuguese Sovereign Debt Crisis.

Earnings management and firm control variables were winsorized at 1% and 99%, to assure that extreme values do not drive the results. The winsorization should not affect the robustness of the results since I am not interested in analysing extreme earnings management events, but rather an average effect of earnings management on loan outcomes. Regarding firm control variables, I control for the size of the borrower firm, by taking the logarithm of the firm's total assets. Smaller firms have characteristics inherently different from larger ones, not only concerning information, but also in terms of vulnerability to situations of distress. Hence, the smaller the firm size, the tighter are the loan terms expected to be. I also control for default risk, calculating for the firms in my sample the Altman Z-score for private firms

(Altman, 2003).[8] Additionally, I include other proxies for financial risk, such as leverage, current ratio, return on assets and asset tangibility. The lower the Z-score, the current ratio and return on assets, and the higher the leverage, the higher is the default risk, thus, one would expect terms to be stricter. Regarding tangibility, it relates very closely with the ability of providing collateral. In this study, the measure of tangibility not only includes the net property, plant and equipment but also adds the inventory, as do Pappas *et al.* (2019). Berger and Udell (2005) analyse different types of lending technologies and show that assets like the inventory can be very important for smaller firms to secure their loans. So, the lower the tangibility, more likely is the bank to impose tighter loan terms, since it can be harder to recover the loan amount by selling these tangible assets in the event of default. In what concerns loan control variables, when running the specification for a certain loan condition as dependent variable, I control for the two other loan characteristics. The decision of the bank to grant a loan is conditional upon a set of loan terms taken together, thus the importance of including the other loan conditions as control variables.

4.5. Summary Statistics and Correlations

In this section, I present some statistics and correlations on the variables used in the analysis, to provide a better idea of the data used in the estimated regressions. Note that a tabulated definition of all the variables is provided in **Appendix 1**: Variables definition.

Table 1 presents the summary statistics for each of the variables used in the main analysis. Note that the statistics are separately presented, corresponding to the two analyses mentioned earlier in this chapter – the outstanding debt position and the new loans. I would like to highlight two aspects about this table. First, the bank debt outstanding position is analysed at the yearly level, dataset which contains 327 440 observations. The analysis of new loans is done with monthly frequency data, which contains 3 840 598 observations in total. Based on the criteria previously specified, I identify 1 039 494 new loans, which corresponds to approximately 27% of the total number of observations. Second, the main explanatory variable, the performance-matched discretionary accruals (DA perf), has a distribution that

[8] Given that currently (August 2019), only 18 firms are listed on the Portuguese stock exchange, it seemed reasonable to use the Altman Z-score for private firms.

ranges from -0.128 (-0.127) to 0.126 (0.124), respectively for the outstanding and new loans datasets, with a negative mean of -0.001, very close to zero. The values are very small, around zero, what would be expected since this measure is only capturing the excess discretionary accruals relative to a similar performant firm in the same industry each year.

Table 1: Summary Statistics of main variables

Variables		N	Mean	Std Dev	P25	Median	P75
Number of firms		49890					
Outstanding debt position (Yearly frequency data)	Earnings management variable (DA perf)	327440	-0.001	0.273	-0.128	-0.002	0.126
	ln(amount)	327440	11.626	2.255	10.330	11.784	13.103
	Proportion of Short-term Debt (Ptc STD_r)	327440	0.461	0.386	0.065	0.400	0.882
	Maturity category (ln(maturity))	327440	1.039	0.248	0.693	1.099	1.099
	Proportion of Secured debt (Ptc secured)	327440	0.923	0.591	0.564	0.996	1.215
	Firm size	327440	13.820	1.484	12.810	13.688	14.693
	Leverage	327440	0.149	0.184	0	0.084	0.230
	Current ratio	327440	1.994	2.089	0.990	1.422	2.210
	ROA	327440	0.007	0.127	0.001	0.013	0.047
	Tangibility	327440	0.165	0.198	0.007	0.089	0.253
	Z-score	327440	2.026	1.679	1.100	1.797	2.692
New loans (Monthly frequency data)	Earnings management variable (DA perf)	3840598	-0.001	0.269	-0.127	-0.002	0.124
	New loan	3840598	0.271	0.444	0	0	1
	ln(amount)	1039494	9.355	2.135	7.997	9.503	10.769

	Change in proportion of short-term debt (Delta STD_o)	1039494	0.028	0.151	0	0.012	0.050
	Maturity category (ln(maturity))	1039494	1.093	0.272	1.099	1.099	1.386
	Collateral	1039494	0.610	0.488	0	1	1
	Firm size	3840598	13.841	1.475	12.837	13.706	14.708
	Leverage	3840598	0.150	0.184	0	0.086	0.231
	Current ratio	3840598	1.992	2.074	0.993	1.425	2.212
	ROA	3840598	0.006	0.125	0.001	0.013	0.046
	Tangibility	3840598	0.165	0.198	0.008	0.090	0.254
	Z-score	3840598	2.000	1.653	1.092	1.783	2.662

Notes: The variables on loans were computed using data from the Central Credit Responsibility Database (CCR), with exposure data on the firm level for Portuguese firms. The variables for the outstanding debt position have information for December each year. The variables related with new loans have monthly frequency. I consider that there is a new loan when there is an increase no smaller than 50€ in the outstanding amount. The variables proxy the loan contractual terms for the new loans identified from monthly changes. The earnings management variable and the firm controls are computed based on the Central Balance Sheet Database (CB), which contains yearly frequency data. For a detailed description of the variables, refer to **Appendix 1**: Variables definition**.**

Next, **Table 2** and **Table 3** present the Pearson correlations for the main variables used in each of the analysis. Note that not all the variables presented in the summary statistics table are included in the correlation matrix, given that Pearson correlations are only adequate for continuous variables. I, therefore, exclude binary variables from the tables. Note that the correlations in **Table 3** are calculated only for the observations correspondent to new loans, given that it is not correct to include loan terms when no new loan is identified. Overall, the correlation magnitudes are relatively modest, so multicollinearity issues are unlikely to appear. There are only two cases I would like to highlight, even though they do not seem to pose a problem in terms of multicollinearity. For the Z-score, the Pearson correlations indicate that it co-moves with the current ratio and the return on assets. The Z-score is calculated using a formula that tries to predict the probability of bankruptcy based on five financial components. One of those components is precisely the return on assets and the other is related with working capital, which uses the same two accounts as the current ratio - current assets and current liabilities. This explains why there is a considerable correlation between the Z-score and those two variables.

Table 2: Pearson Correlation matrix - Outstanding debt position

Correlation	DA perf	ln(amount)	Ptc STD_r	ln(maturity)	Ptc secured	Firm size	Leverage	Current ratio	ROA	Tangibility	Z-score
DA perf	**1.000**										
ln(amount)	0.004**	**1.000**									
Ptc STD_r	0.022**	-0.253**	**1.000**								
ln(maturity)	-0.008**	0.421**	-0.803**	**1.000**							
Ptc secured	0.007**	0.343**	-0.317**	0.322**	**1.000**						
Firm size	-0.018**	0.572**	0.039**	0.059**	-0.027**	**1.000**					
Leverage	0.037**	0.272**	-0.261**	0.331**	0.232**	0.007**	**1.000**				
Current ratio	0.067**	-0.178**	-0.000	-0.068**	-0.043**	-0.019**	0.038**	**1.000**			
ROA	-0.000	0.009**	-0.064**	0.029**	-0.030**	0.137**	-0.173**	0.143**	**1.000**		
Tangibility	0.040**	0.028**	0.117**	-0.090**	0.050**	0.029**	-0.019**	0.059**	-0.095**	**1.000**	
Z-score	0.012**	-0.263**	0.044**	-0.148**	-0.135**	-0.112**	-0.279**	0.407**	0.454**	-0.065**	**1.000**

Notes: Significance levels: ** $p < 0.05$. The variables on loans were computed using data from the Central Credit Responsibility Database (CCR), with exposure data on the firm level for Portuguese firms. The variables have information on the outstanding debt position of the firm in December each year. The earnings management variable and the firm controls are computed based on the Central Balance Sheet Database (CB), which contains yearly frequency data. For a detailed description of the variables, refer to **Appendix 1**: Variables definition**.**

Table 3: Pearson Correlation matrix - New loans

Correlation	DA perf	ln(amount)	Delta STD_o	ln(maturity)	Firm size	Leverage	Current ratio	ROA	Tangibility	Z-score
DA perf	**1.000**									
ln(amount)	-0.002**	**1.000**								
Delta STD_o	-0.010**	0.026**	**1.000**							
ln(maturity)	-0.018**	0.179**	-0.039**	**1.000**						
Firm size	-0.023**	0.479**	-0.008**	0.048**	**1.000**					
Leverage	0.037**	0.085**	-0.001	0.350**	0.024**	**1.000**				
Current ratio	0.062**	-0.135**	0.003**	-0.094**	-0.021**	0.061**	**1.000**			
ROA	-0.012**	0.058**	0.014**	0.023**	0.138**	-0.139**	0.127**	**1.000**		
Tangibility	0.039**	0.026**	-0.018**	-0.053**	0.012**	0.006**	0.078**	-0.095**	**1.000**	
Z-score	0.005**	-0.097**	0.025**	-0.171**	-0.100**	-0.251**	0.405**	0.421**	-0.071**	**1.000**

Notes: Significance levels: ** $p < 0.05$. Pearson correlations calculated for the 1039494 observations correspondent to new loans. The variables on loans were computed using data from the Central Credit Responsibility Database (CCR), with exposure data on the firm level for Portuguese firms. I consider that there is a new loan when there is an increase no smaller than 50€ in the outstanding amount. The variables proxy the loan contractual terms for the new loans identified from monthly changes. The earnings management variable and the firm controls are computed based on the Central Balance Sheet Database (CB), which contains yearly frequency data. For a detailed description of the variables, refer to **Appendix 1**: Variables definition.

5. Results

In this chapter, I conduct the empirical analyses in two steps. I start by presenting the results for the main analysis and afterwards I implement a subsample analysis for crisis and non-crisis years to test if the results hold for the two subperiods.

5.1. Earnings Management and Loan Outcomes

This section presents the results obtained from the estimation of the regressions presented in the methodology chapter. First, the results are presented for the outstanding debt position of the firm and next for new loans. To corroborate hypothesis H1, I expect the relation between earnings management and probability of obtaining a new loan to be positive. To corroborate hypotheses H2, I expect higher earnings management to be associated with higher loan amount, shorter maturity and higher collateral requirements.

Table 4 presents the regression results when considering the general debt position of the firm. For the regressions of loan outcomes - amount, proportion of short-term debt, maturity structure and proportion of secured debt -, I apply two specifications. First, I regress the loan variable on the measure of earnings management and a set of firm and loan-specific variables. Second, I introduce firm and year fixed effects.

In what concerns amount, the relation with the performance-matched discretionary accruals is positive and statistically significant at 1%. This indicates that the amount of debt increases with earnings management, suggesting a higher propensity to obtain new loans. So, this result provides a hint on the probability of obtaining a new loan. Additionally, I find that the proportion of short-term debt is positively correlated with the variable of discretionary accruals, and that the relation with term-to-maturity is negative, both statistically significant at 1% level. This indicates that when firms engage in earnings management practices, the maturity of the outstanding debt in the next period reduces and the proportion of short-term debt increases. As for collateral, the results are not statistically significant. Overall, these results on the general loan position of the firm shed some light on the impact of earnings management on the dynamics of bank loans. Banks seem to provide loans to firms that engage in earnings management but penalise them by imposing shorter maturities. With

shorter maturities banks monitor the firms more frequently, allowing for a regular assessment of risk. The results are inconclusive on the relation between earnings management and collateral requirements.

Moving on to the analysis of new loans, first I present the results for the relation between earnings management and the probability of obtaining a new loan, in **Table 5**. The relationship is positive and statistically significant at 1%, supporting the findings in the outstanding debt analysis, which shows a higher amount of credit outstanding when earnings management are higher. So, the results corroborate hypothesis H1 by showing that as earnings management increases so does the likelihood of a firm getting a new loan. This is an economically significant effect, which can be interpreted as: a one-standard deviation increase in the earnings management variable, leads to an approximate 3.92% increase in the odds of obtaining a new loan when holding all the other variables constant, which translates to a 3.77% increase in the probability of getting a new loan.[9]

Table 6 continues with the analysis of the loan terms of the identified new loans. The structure of the table is very similar to what was described before for **Table 4** except for the dependent variables and the frequency of the data, now on a monthly basis. In what concerns amount, the respective variable is positively related with earnings management and significant at 1%. So, firms not only are granted the loan, but also, when engaging more in earnings management to increase the chances of being granted the loan, they get higher amounts. This supports hypothesis H2a, but the sign for collateral and maturity needs to be analysed to understand if the reasoning underlying H2a is validated. The results on maturity provide new insights. On the one side, the change in the proportion of short-term debt is negatively related with the main explanatory variables, suggesting that high earnings management is related with a lower proportion of short-term debt for which the one-year maturity cut-off is used. On the other side, the coefficient for the weighted maturity structure is negative, suggesting that the maturity of the new loan is shorter for higher levels of earnings

[9] I first calculate the log odds using the mean of the earnings management variable and also using the mean plus one standard deviation of the mentioned variable. Then, I compute the difference in the log odds, which corresponds to 0.038467. Afterwards, I exponentiate this value to obtain the odds, giving me the value 1.03922. To translate the 0.03922 increase in the odds into probability, I use the formula $\text{odds} = \frac{p}{1-p}$, which leads to the final value of 0.03774 increase in probability.

management. What one can infer from these results is that, even though banks provide loans with maturities longer than one year, they tend to reduce the term-to-maturity for these loans.

Regarding collateral, the results now become statistically significant at 1% for the two specifications, indicating a positive relation between earnings management and collateral requirements.[10] Hence, this confirms the initial expectations about banks' reaction to the uncertainty introduced by positive discretionary accruals. Banks increase collateral requirements to protect themselves from downside risk.

Therefore, the results for maturity and collateral in addition to corroborating hypotheses H2b and H2c, confirm the intuition behind hypothesis H2a. When discretionary accruals are higher, banks decide to accept a loan and provide a high amount but penalize firms by increasing the strictness of other contract terms, namely by reducing loan maturity and increasing collateral requirements. Overall, the results for the analysis at the loan level support hypotheses H2 and reinforce the interpretation of what might happen on the bank-borrower debt contracting relationships. Banks seem to be aware of firms' earnings management practices and while still granting loans to these firms, banks reduce the maturity and reinforce collateral requirements, showing that they are cautious. These findings are in line with the evidence found in the literature discussed before in this dissertation.

[10] When applying firm fixed effects to estimate the logistic regression for the collateral variable, no convergence was achieved. Hence, I simplified and used industry fixed effects, accounting for industry-specific effects.

Table 4: Main results - Outstanding debt analysis

	(1) ln(amount)	(2) ln(amount)	(3) Ptc STD_r	(4) Ptc STD_r	(5) ln(maturity)	(6) ln(maturity)	(7) Ptc secured	(8) Ptc secured
DA perf	0.131***	0.056***	0.044***	0.015***	-0.017***	-0.005***	-0.004	0.004
	(0.009)	(0.006)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)	(0.003)
Firm size	0.830***	0.708***	0.051***	0.026***	-0.034***	-0.006***	-0.111***	-0.049***
	(0.002)	(0.006)	(0.001)	(0.002)	(0.000)	(0.001)	(0.001)	(0.003)
Leverage	1.468***	0.615***	-0.339***	-0.147***	0.253***	0.085***	0.196***	0.077***
	(0.016)	(0.014)	(0.004)	(0.004)	(0.002)	(0.003)	(0.006)	(0.006)
Current ratio	-0.136***	-0.036***	-0.007***	-0.003***	0.002***	0.001***	0.011***	0.002***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
ROA	-0.099***	-0.185***	-0.315***	-0.101***	0.192***	0.048***	0.127***	0.053***
	(0.023)	(0.020)	(0.005)	(0.006)	(0.003)	(0.004)	(0.008)	(0.009)
Tangibility	0.279***	0.148***	0.228***	0.105***	-0.116***	-0.062***	0.197***	0.005
	(0.013)	(0.023)	(0.003)	(0.007)	(0.002)	(0.004)	(0.005)	(0.010)
Z-score	-0.044***	-0.019***	-0.001***	0.001	-0.006***	-0.005***	-0.019***	-0.010***
	(0.002)	(0.003)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Ptc STD	0.672***	-0.334***					-0.327***	-0.271***
	(0.011)	(0.009)					(0.004)	(0.004)
ln(maturity)	3.206***	1.243***					-0.091***	-0.064***
	(0.018)	(0.015)					(0.007)	(0.006)
Ptc secured	0.922***	0.577***	-0.127***	-0.123***	0.053***	0.048***		
	(0.005)	(0.004)	(0.001)	(0.001)	(0.001)	(0.001)		
ln(amount)			-0.045***	-0.080***	0.048***	0.055***	0.115***	0.104***
			(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Constant	-4.241***		0.432***		0.894***		1.317***	
	(0.033)		(0.006)		(0.004)		(0.012)	
Firm fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	327440	324247	327440	324247	327440	324247	327440	324247
R^2	0.579	0.873	0.199	0.607	0.291	0.649	0.236	0.671

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All the regressions were estimated using an OLS method. The variables on loans were computed using data from the Central Credit Responsibility Database (CCR), with exposure data on the firm level for Portuguese firms. The variables have information on outstanding debt position for December each year. **ln(amount)** corresponds to the corresponds to the logarithm of the outstanding amount in euros. **Ptc STD_r** is the proportion of short-term residual debt, which is computed dividing the amount due in less than one year by the total outstanding debt amount. **ln(maturity)** corresponds to the natural logarithm of the weighted-average residual debt maturity. **Ptc secured** represents the proportion of secured credit, computed by dividing the total amount of collateral by the total outstanding debt amount. The earnings management variable and the firm controls are computed based on the Central Balance Sheet Database (CB), which contains yearly frequency data. **DA perf** is the main explanatory variable, proxying earnings management by performance-matched discretionary accruals**. Firm size** is defined as the natural logarithm of the firm's total assets. **Leverage** is ratio of long-term debt to total assets. **Current ratio** is obtained by dividing current assets by current liabilities. **ROA** is the return of assets, calculated as the ratio of net income to total assets. **Tangibility** corresponds to the ratio of net property, plant and equipment (PPE) plus inventory to total assets. **Z-score** corresponds to the calculation of the Altman Z-score for Private firms as in Altman (2003).

Table 5: Main results - New loans analysis - Probability of obtaining a loan

	(1) New loan	(2) New loan
DA perf	0.146***	0.143***
	(0.004)	(0.004)
Firm size	0.142***	0.137***
	(0.001)	(0.001)
Leverage	-0.526***	-0.416***
	(0.007)	(0.007)
Current ratio	-0.054***	-0.053***
	(0.001)	(0.001)
ROA	-0.020*	-0.092***
	(0.011)	(0.012)
Tangibility	0.547***	0.482***
	(0.006)	(0.006)
Z-score	0.068***	0.072***
	(0.001)	(0.001)
Constant	-3.012***	
	(0.012)	
Industry fixed effects	No	Yes
Time fixed effects	No	Yes
Observations	3840598	3840598

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A logistic model was the estimation method used to obtain the results in the table. The dependent variable, **New loan**, was computed using data from the Central Credit Responsibility Database (CCR), with exposure data on the firm level for Portuguese firms. This variable is a binary one acquiring value 1 when there is a new loan, and 0 otherwise. A new loan is considered when there is a monthly increase in the outstanding amount no smaller than 50€. The earnings management variable and the firm controls are computed based on the Central Balance Sheet Database (CB), which contains yearly frequency data. **DA perf** is the main explanatory variable, proxying earnings management by performance-matched discretionary accruals. **Firm size** is defined as the natural logarithm of the firm's total assets. **Leverage** is ratio of long-term debt to total assets. **Current ratio** is obtained by dividing current assets by current liabilities. **ROA** is the return of assets, calculated as the ratio of net income to total assets. **Tangibility** corresponds to the ratio of net property, plant and equipment (PPE) plus inventory to total assets. **Z-score** corresponds to the calculation of the Altman Z-score for Private firms as in Altman (2003).

Table 6: Main results - New loans analysis - Loan terms

	(1) ln(amount)	(2) ln(amount)	(3) Delta STD_o	(4) Delta STD_o	(5) ln(maturity)	(6) ln(maturity)	(7) Collateral	(8) Collateral
DA perf	0.105***	0.020***	-0.006***	-0.006***	-0.025***	-0.011***	0.057***	0.066***
	(0.006)	(0.006)	(0.001)	(0.001)	(0.001)	(0.001)	(0.009)	(0.009)
Firm size	0.695***	0.403***	-0.004***	0.004***	-0.008***	0.045***	-0.381***	-0.413***
	(0.001)	(0.006)	(0.000)	(0.001)	(0.000)	(0.001)	(0.002)	(0.002)
Leverage	0.231***	-0.130***	0.007***	0.045***	0.534***	0.224***	0.907***	0.816***
	(0.011)	(0.014)	(0.001)	(0.001)	(0.002)	(0.002)	(0.016)	(0.016)
Current ratio	-0.125***	-0.039***	-0.000***	-0.000**	-0.009***	-0.002***	-0.041***	-0.045***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
ROA	-0.201***	-0.114***	0.007***	0.006***	0.278***	0.061***	0.620***	0.756***
	(0.017)	(0.021)	(0.002)	(0.002)	(0.002)	(0.002)	(0.023)	(0.024)
Tangibility	0.160***	0.195***	-0.010***	-0.014***	-0.074***	-0.070***	0.764***	0.623***
	(0.008)	(0.021)	(0.001)	(0.002)	(0.001)	(0.002)	(0.011)	(0.013)
Z-score	0.083***	0.093***	0.002***	0.001***	-0.017***	-0.012***	-0.117***	-0.137***
	(0.001)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)
ln(maturity)	0.729***	0.289***					0.809***	0.801***
	(0.007)	(0.009)					(0.009)	(0.009)
Delta STD_o	0.583***	0.287***					-0.665***	-0.748***
	(0.011)	(0.010)					(0.016)	(0.017)
Collateral	1.394***	1.059***	-0.014***	-0.021***	0.051***	0.008***		
	(0.004)	(0.004)	(0.000)	(0.000)	(0.001)	(0.000)		
ln(amount)			0.004***	0.003***	0.015***	0.003***	0.468***	0.502***
			(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Constant	-2.073***		0.045***		1.021***		0.657***	
	(0.018)		(0.002)		(0.002)		(0.025)	
Firm fixed effects	No	Yes	No	Yes	No	Yes	No	No
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Industry fixed effects	No	No	No	No	No	No	No	Yes
Observations	1039494	1036954	1039494	1036954	1039494	1036954	1039494	1025755
R^2	0.367	0.593	0.004	0.122	0.179	0.677	-	-

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Regressions (1) to (6) were estimated using an OLS method, while specifications (7) and (8) were estimated using a logistic model The variables were computed using data from the Central Credit Responsibility Database (CCR), with exposure data on the firm level for Portuguese firms. These variables proxy the loan contractual terms for the new loans identified previously from monthly changes. **ln(amount)** corresponds to the natural logarithm of the amount of the new loan computed from the monthly increase in outstanding amount. **Delta STD_o** captures the change in the proportion of originally short-term debt out of the total outstanding amount. **ln(maturity)** is the natural logarithm of the weighted-average original debt maturity. **Collateral** is a dummy variable which value 1 when there is an increase in collateral amount with of a new loan, and 0 otherwise. The remaining variables are computed based on the Central Balance Sheet Database (CB), which contains yearly frequency data. **DA perf** is the main explanatory variable, proxying earnings management by performance-matched discretionary accruals. The remaining variables are controls for firm characteristics. For a detailed description of the variables, refer to **Appendix 1**: Variables definition.

5.2. Sub-sample Analysis for Crisis and Non-crisis years

In this section, I perform a subsample analysis for crisis and non-crisis years, in order to verify if there is a considerable difference on how earnings management impacts loan outcomes and if the effect differs between crisis and non-crisis years. First of all, for this analysis, I consider crisis years those corresponding to the period Portugal was under the Financial Assistance Programme of the European Union and the International Monetary Fund (IMF), so from 2011 to 2014 inclusive. I consider this period because, in addition to a formal delimitation, there are studies indicating that the reduction in provided credit was around 2011 with slow recovery after 2014.[11] I conduct this sub-sample analysis only for the new loan approach. Recall that the outstanding position analysis was implemented to have a general overview on the relation between earnings management and loan outcomes, providing hints for the new loan analysis.

Table 7 presents the results for the sub-sample analysis testing whether the relation between earnings management and the probability of obtaining a new loan is statistically different between crisis and non-crisis years. In all specifications firm characteristics and industry and time fixed effected were included. Specification **(1)** presents the estimated coefficients for all years, which are the same as those presented in column **(2)** of **Table 5**. Specification **(2)** only presents the coefficients' estimation for the crisis years - 2011, 2012, 2013 and 2014 - and specification **(3)** shows the results for the sub-sample analysis conducted for non-crisis years - 2009, 2010, 2015, 2016 and 2017. Column **(4)** examines if any difference is found in the coefficients and whether the difference is statistically significant.

The coefficients for the main explanatory variable - performance-matched discretionary accruals - are positive and statistically significant at 1% for all the specifications. However, the difference between the coefficients for crisis and non-crisis years is not statistically significant. Hence, the positive relation between earnings management and probability of obtaining a loan is robust to estimating the regression separately for crisis and non-crisis periods.

11 The following report from Associação Portuguesa de Bancos provides evidence on the evolution of credit and the effect of economic conditions on banks: http://www.apb.pt/content/files/2015.01_-_Overview_do_Sistema_Bancrio_Portugus.pdf

Table 8 and **Table 9** present the sub-sample analysis results for the different loan conditions under study, first for loan amount and collateral, and then for maturity. Regarding amount the results diverge. For non-crisis years, the coefficient is positive while for crisis years the coefficient is negative, with both coefficients statistically significant at 10%. The difference is also statistically significant when considering a 5% significance level. This indicates that during more difficult economic and financial conditions banks reduce the loan amount for firms engaging more in earnings management practices, probably because banks suffer more from capital constraints and are more cautious when dealing with firms that exercise accounting discretion. In normal times, the results are similar to those found for the whole sample. The positive relation between earnings management and collateral requirements holds for the two sub-samples, but there is a statistical difference when comparing the coefficients. During periods with an adverse conjuncture, as were the crisis years in Portugal, banks seem more lenient with collateral requirements for firms using earnings management practices. The probability of banks asking for collateral decreases when comparing to non-crisis periods. This could be explained by firms' difficulties in providing additional assets as collateral for new loans during recession periods. Note that the dummy variable for collateral requirements is constructed from the increase in collateral amount, and not exactly the requirements of collateral for the new loan.

For the two variables related with maturity in **Table 9**, the results are very similar to the ones obtained in **Table 6**. For each of the two variables, the coefficients present the same sign and are all statistically significant at 1%. In both cases, there is no statistical difference between the coefficients for the two sub-samples.

Overall, the results for the subsample analysis suggest that, during more difficult periods in terms of economic and financial conditions, banks use amount as an additional criterium to penalize earnings management practices. On the contrary, given the difficulties firms face during these times, the relation between earnings management and collateral requirements is relaxed. For normal times, i.e. outside of periods of adverse conditions, the results approximate to those found in the main analyses. This indicates that the conclusions from the main analysis are prevalent for periods when the conjuncture is not adverse: there is an increase in the probability of obtaining a new loan and in the amount granted when firms engage in earnings management, but banks reduce the loan maturity and reinforce collateral

requirements. Banks use these two contractual terms to protect themselves from the risk associated with firms' cash flow uncertainty.

Table 7: Sub-sample analysis crisis vs non-crisis years - Probability of obtaining a loan

	(1) New loan All years	(2) New loan Crisis	(3) New loan Non-crisis	(4) New loan (2) - (3)
DA perf	0.143***	0.140***	0.145***	**-0.005**
	(0.004)	(0.007)	(0.006)	**(0.009)**
Firm size	0.137***	0.128***	0.144***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.002)
Leverage	-0.416***	-0.548***	-0.325***	-0.223***
	(0.007)	(0.011)	(0.010)	(0.015)
Current ratio	-0.053***	-0.063***	-0.048***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.001)
ROA	-0.092***	-0.001	-0.153***	0.153***
	(0.012)	(0.018)	(0.015)	(0.023)
Tangibility	0.482***	0.449***	0.499***	-0.050***
	(0.006)	(0.010)	(0.009)	(0.013)
Z-score	0.072***	0.077***	0.068***	0.009***
	(0.001)	(0.001)	(0.001)	(0.002)
Industry fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	3840598	1715167	2125407	3840574

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
This table presents the results for the logistic estimation of the regressions ran for different samples: **All years** corresponds to the whole period under analysis - 2009 to 2017. **Crisis years** indicates for the period between 2011 and 2014 inclusive, corresponding to the Portuguese sovereign debt crisis. **Non-crisis years** comprises the remaining years, so 2009, 2010, 2015, 2016 and 2017. The column for **Crisis-Non-crisis years** presents the difference in the coefficients found for each of the subperiods, by subtracting the coefficients found for the non-crisis years from the coefficients obtained for the crisis years. All the variables were computed as in **Table 5**, since this is a subsample analysis of the main results, presented in that table. For a detailed description of the variables, it is also possible to refer to **Appendix 1**: Variables definition.

Table 8: Sub-sample analysis crisis vs non-crisis years - Loan terms: amount and collateral requirements

	(1) ln(amount) All years	(2) ln(amount) Crisis	(3) ln(amount) Non-crisis	(4) ln(amount) (2) - (3)	(5) Collateral All years	(6) Collateral Crisis	(7) Collateral Non-crisis	(8) Collateral (6) - (7)
DA perf	0.020***	-0.016*	0.016*	-0.032**	0.066***	0.022*	0.099***	-0.077***
	(0.006)	(0.009)	(0.009)	(0.013)	(0.009)	(0.013)	(0.012)	(0.018)
Firm size	0.403***	0.288***	0.460***	-0.173***	-0.413***	-0.425***	-0.405***	-0.020***
	(0.006)	(0.014)	(0.008)	(0.016)	(0.002)	(0.003)	(0.003)	(0.004)
Leverage	-0.130***	-0.458***	0.062***	-0.520***	0.816***	0.866***	0.791***	0.074**
	(0.014)	(0.028)	(0.020)	(0.035)	(0.016)	(0.026)	(0.021)	(0.033)
Current ratio	-0.039***	-0.016***	-0.052***	0.037***	-0.045***	-0.054***	-0.039***	-0.015***
	(0.001)	(0.003)	(0.002)	(0.004)	(0.001)	(0.002)	(0.002)	(0.003)
ROA	-0.114***	-0.125***	-0.096***	-0.028	0.756***	0.895***	0.658***	0.237***
	(0.021)	(0.039)	(0.031)	(0.050)	(0.024)	(0.036)	(0.031)	(0.048)
Tangibility	0.195***	0.155***	0.244***	-0.089	0.623***	0.695***	0.568***	0.128***
	(0.021)	(0.045)	(0.030)	(0.054)	(0.013)	(0.020)	(0.017)	(0.026)
Z-score	0.093***	0.097***	0.097***	-0.000	-0.137***	-0.139***	-0.135***	-0.004
	(0.003)	(0.005)	(0.004)	(0.007)	(0.002)	(0.003)	(0.003)	(0.004)
ln(maturity)	0.289***	0.052***	0.400***	-0.348***	0.801***	0.738***	0.849***	-0.111***
	(0.009)	(0.016)	(0.012)	(0.020)	(0.009)	(0.015)	(0.012)	(0.019)
Delta STD_o	0.287***	0.626***	0.076***	0.550***	-0.748***	-1.045***	-0.549***	-0.496***
	(0.010)	(0.016)	(0.013)	(0.021)	(0.017)	(0.027)	(0.021)	(0.034)
Collateral	1.059***	1.026***	1.063***	-0.037***				
	(0.004)	(0.006)	(0.005)	(0.008)				
ln(amount)					0.502***	0.516***	0.492***	0.024***
					(0.001)	(0.002)	(0.002)	(0.003)
Firm fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
Observations	1039494	449898	589596	1039494	1025755	449898	575857	1025755
R^2	0.367	0.332	0.371	0.186	-	-	-	-

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table presents the results for a subsample analysis where: **All years** corresponds to the whole period under analysis - 2009 to 2017. **Crisis years** indicates for the period between 2011 and 2014 inclusive, corresponding to the Portuguese sovereign debt crisis. **Non-crisis years** comprises the remaining years, so 2009, 2010, 2015, 2016 and 2017. The column for **Crisis-Non-crisis years** presents the difference in the coefficients found for each of the subperiods, by subtracting the coefficients found for the non-crisis years from the coefficients obtained for the crisis years. Note that regressions (1) to (4) were estimated using an OLS method, while specifications (5) to (8) were estimated using a logistic model. The variables in this table were computed as in **Table 6**, since this is a subsample analysis of the main results, presented in that table. For a detailed description of the variables, it is also possible to refer to **Appendix 1**: Variables definition.

Table 9: Sub-sample analysis crisis vs non-crisis years - Loan terms: maturity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Delta STD_o All years	Delta STD_o Crisis	Delta STD_o Non-crisis	Delta STD_o (2)-(3)	ln(maturity) All years	ln(maturity) Crisis	ln(maturity) Non-crisis	ln(maturity) (6)-(7)
DA perf	-0.006***	-0.005***	-0.005***	-0.001	-0.011***	-0.008***	-0.010***	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Firm size	0.004***	0.007***	0.004***	0.004**	0.045***	0.040***	0.045***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Leverage	0.045***	0.078***	0.035***	0.043***	0.224***	0.242***	0.198***	0.043***
	(0.001)	(0.003)	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)	(0.004)
Current ratio	-0.000**	-0.000	-0.001***	0.000	-0.002***	-0.002***	-0.003***	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.006***	0.006	0.006*	0.001	0.061***	0.033***	0.072***	-0.039***
	(0.002)	(0.004)	(0.003)	(0.005)	(0.002)	(0.004)	(0.004)	(0.005)
Tangibility	-0.014***	-0.016***	-0.016***	-0.000	-0.070***	-0.043***	-0.078***	0.035***
	(0.002)	(0.004)	(0.003)	(0.006)	(0.002)	(0.004)	(0.003)	(0.006)
Z-score	0.001***	0.002***	0.000	0.001**	-0.012***	-0.005***	-0.014***	0.009***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)
ln(maturity)								
Delta STD_o								
Collateral	-0.021***	-0.023***	-0.020***	-0.003***	0.008***	0.006***	0.009***	-0.003***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
ln(amount)	0.003***	0.006***	0.000**	0.006***	0.003***	-0.000	0.005***	-0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1039494	449898	589596	1039494	1039494	449898	589596	1039494
R^2	0.006	0.002	0.007	0.002	0.068	0.102	0.052	0.038

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

This table presents the results of the OLS estimates of the regressions ran for different samples: **All years** corresponds to the whole period under analysis - 2009 to 2017. **Crisis years** indicates for the period between 2011 and 2014 inclusive, corresponding to the Portuguese sovereign debt crisis. **Non-crisis years** comprises the remaining years, so 2009, 2010, 2015, 2016 and 2017. The column for **Crisis-Non-crisis years** presents the difference in the coefficients found for each of the subperiods, by subtracting the coefficients found for the non-crisis years from the coefficients obtained for the crisis years. The variables in this table were computed as in **Table 6**, since this is a subsample analysis of the main results, presented in that table. For a detailed description of the variables, it is also possible to refer to **Appendix 1**: Variables definition.

6. Robustness Checks

In addition to the main analysis, I run robustness checks to test if the results are robust when using alternative measures for loan outcomes and earnings management. The tabulated results are not presented in this chapter but are provided in Annex.

6.1. New Loans Identification

In the main analysis, I identify new loans and their characteristics from monthly changes in credit outstanding. I consider new loans when the monthly increase in amount is no smaller than 50€ - the minimum reporting threshold. Now, I replicate the test by focusing on big loans in terms of amount.

Small increases, higher than 50€ but still relatively small, could be driven by commissions or fees. Additionally, with debt repayments, there could be an underestimation of the amount of the identified loans, which can also have an influence on the remaining loan terms. These issues can potentially influence the results because observations which do not truly correspond to a new loan or imprecise values for loan terms will be included in the estimation of the regressions, introducing noise on the results.

To mitigate such problems, I define as big loans the top three loans in terms of monthly amount increases for each firm. This way, I reduce the mentioned issues, by excluding increases due to other sources. After re-running the main regressions using this strategy, I confirm that the results still hold for the loan terms. Both the sign and the magnitude of the coefficients for the performance-matched discretionary accruals are similar to the ones found for the main results. Regarding the probability of obtaining a big new loan, the coefficient is still positive but presents a smaller magnitude when compared to the correspondent coefficient in the main analysis. When providing a new loan with a large amount, banks conduct a more comprehensive screening process in order to make a decision, which can explain this reduction. Therefore, these results suggest that the main results are solid and reliable.

6.2. Different Measures of Accruals-based Earnings Management

The main explanatory variable in this study captures accruals-based earnings management, the phenomenon here under scrutiny. Hence, choices regarding its measurement are of relevance. I use performance-matched discretionary accruals in the main analyses because it is more conservative in measuring discretionary accruals. To estimate this measure, I used the Modified-Jones Model (Dechow *et al.*, 1995). However, I could have implemented the Jones model (Jones, 1991) when calculating the performance-matched discretionary accruals, as Kothari *et al.* (2005) suggests, or I could have also opted for a cash flow approach for the definition of total accruals. The latter addresses some of the issues of the balance-sheet approach, particularly when firms undergo some events, such as merges and acquisitions or divestitures (Hribar and Collins, 2002).

To test if the main results are robust to various measurements of earnings management, I re-run the main regressions for the loan terms under analysis with the performance-matched discretionary accruals estimated using 1) the Jones model[12] and 2) a cash flow approach. The results are robust to variations in the calculation of the earnings management variables. Collateral requirements is the only contract term for which the coefficient of interest varies more in terms of magnitude, but still indicating a positive and statistically significant relation.

6.3. Real Earnings Management

The attention of this study is focused on accruals-based earnings management, but there is also an increasingly large literature on real earnings management which may also be relevant in the debt contracting context. Managers' option to engage in this type of strategy to manage earnings can be justified by auditors, regulators and shareholders' attentive eye on accounting choices, which has led firms' managers to opt for real economic actions. These are less scrutinized and subject to more subjective interpretation. Nonetheless, the fact that it directly affects business activities - and, hence, the cash flows - can have implications for future performance. There is evidence on the trade-off between accruals-based and real earnings management (Cohen & Zarowin, 2010; Zang, 2012), hence it is interesting to examine if the

12 Even though Jones (1991) implements a time-series regression analysis, in this case the model is estimated cross-sectionally as do DeFond and Jiambalvo (1994).

results found in the main analysis for accruals-based earnings management still hold when introducing both measures as explanatory variables. Nevertheless, I would like to reinforce that the main focus of the analysis conducted in this study is on the impact of reporting decisions - which do not have implications on cash flows - on loan outcomes, and not on the effect of real economic decisions on loan terms.

Real earnings management is calculated in the same spirit of accruals, in the sense that only the abnormal component is captured. Roychowdhury (2006) investigates the abnormal patterns of three variables. Again, since the information we have on the cash flow statement is very incomplete, due to optional reporting by smaller firms - which are a big part of the sample - I follow Cohen and Zarowin (2010) and sum the obtained abnormal levels of discretionary expenses and production costs to generate a combined measure of real earnings management. This is an aggregated measure of real earnings management, indicating which firms engage more in such practices overall and not looking specifically at one of the methods. A more detailed explanation can be found on Appendix 2, under the section dedicated to **Real Earnings Management.**

After re-running the main regressions now including the two variables measuring different types of earnings management, the results obtained show very small changes in the coefficients relative to the variables of accruals-based earning management. This indicates that my measure of accruals earnings management is unlikely correlated with the measure for real earnings management, therefore unaffected by it. Interestingly enough, the coefficients for real earning management show opposite signs for loan probability and loan amount. First of all, while for accruals-based earnings management the probability of obtaining a new loan increased, now an increase in real earnings management leads to a decrease in the probability of being granted a new loan. Second, the relation between earning management and loan amount also has an opposite sign to the result for accruals earnings management. When influencing solely reported numbers, the relation is positive, however, when choices affect the business activity and ultimately the cash flows, the relation is negative. Additionally, similar to the main results, banks penalize firms engaging in real earnings management by imposing shorter maturities and increasing collateral requirements. These results suggest that banks are more cautious and, therefore, penalize more firms which engage in real earning management, probably because of the significant impact such choices can have on the firms' future performance.

7. Conclusion

This study focuses on the impact of firms' earnings management on loan outcomes. Using Portuguese data, I analyse accruals-based earnings management, a measure that only affects the reporting of information and is marginal to economic decisions affecting the business activities. This choice is in line with the aim of this study: understanding whether banks discern and incorporate information that is subject to managers' accounting discretion. Note that the gap between reported earnings and the cash flows increases with earnings management, which creates uncertainty about future cash flows. Yet, there are very few studies that explicitly examined how banks decide on providing loans and the respective contractual terms under this scenario of uncertainty.

More specifically, I investigate the impact of accruals-based earnings management, in particular performance-matched discretionary accruals, on loan outcomes by performing the analysis in several steps. First, I analysed the outstanding debt position of the firm to have a hint on the possible loan outcomes around earnings management. Second, I implemented my main analysis focusing on new loans in an attempt to understand how earnings management affects the probability of the firm obtaining a loan and, conditional on new loan obtention, which contractual terms are offered by banks. The loan terms subject to scrutiny here were 1) loan amount, 2) maturity structure and 3) collateral requirements. Overall, the main results indicate that banks provide funding to firms that engage in earnings management. I find that, *ceteris paribus*, a one-standard deviation increase in my measure of earnings management leads to a 3.77% increase on the probability of a firm getting a new loan. Moreover, even though banks grant more loans to firms that engage in these practices, they tend to penalize these firms, by imposing shorter maturities and higher collateral requirements.

Additionally, given that the period under analysis comprises crisis years, I analyse if my main results change when comparing crisis with non-crisis years. The crisis period corresponds to the duration of the Financial Assistance Programme of the European Union and the International Monetary Fund (IMF), so from 2011 to 2014 inclusive. The results from the subsampling provide some interesting insights. For non-crisis years, the results are very similar to the ones found in the main analysis. However, for the crisis period, the results suggest that banks reduce the amount of loan granted to firms engaging more in earnings

management practices, but relax on collateral requirements instead, with the results for maturity remaining practically unchanged.

In general, my results are in line with the evidence found in the previous related literature, *i.e.* banks tend to be stricter by imposing shorter maturities and more collateral when dealing with firms engaging in earnings management. Moreover, this study provides additional insights on the impact of earnings management on loan outcomes. The dataset used in this study, the Portuguese Credit Register covers all the firms operating in Portugal and all bank loans higher than 50 € that a firm obtains in Portugal. Previous literature, by focusing on a single funding source, namely syndicated loans, which likely only captures a one-shot issuance decision of firms can lead to biased estimates for the effect of earnings management. Hence, the dataset used in this dissertation allows to generalize the results on the impact of earnings management on loan outcomes by including more complete information on bank debt. Additionally, the data structure also allows to conduct a two-step analysis, first focusing on the propensity of obtaining new loans and only then analysing the design of loan contracts - maturity structure and collateral requirement to be more specific. Therefore, this study provides a more complete picture of debt decisions.

Despite the effort, this study may still suffer from a few limitations. In particular, my analyses may suffer from potential endogeneity problems given that loan conditions are jointly determined (Billett *et al.*, 2007). I am aware that a simultaneous determination model would have been a better fit to this type of analysis. However, identifying valid instrumental variables for the loan terms included on the right-hand side is still empirically challenging given the current development of the literature. Future extensions of this work could address this challenge. Additionally, in the current work, I identify new loans using firm-level data, meaning that bank identities are undistinguishable. It would be interesting to extend the study incorporating bank-firm level information and study potential differences in loan decisions of banks with different characteristics. Moreover, it would be interesting to test other contractual features, for instance interest spreads or covenants, which unfortunately are not available in the Portuguese Credit Register.

8. Appendices

8.1. Appendix 1: Variables definition

Variable Name	Definition
Earnings management measures	
DA perf	Accruals-based earnings management measure. Performance-matched discretionary accruals estimated according to Kothari et al. (2005), using the Modified-Jones Model (Dechow *et al.*, 1995). Total accruals are defined using a balance sheet approach.
DA perf Jones	Accruals-based earnings management measure. Performance-matched discretionary accruals estimated according to Kothari et al. (2005), using the Jones Model (Jones, 1991). Total accruals are defined using a balance sheet approach.
DA perf CF	Accruals-based earnings management measure. Performance-matched discretionary accruals estimated according to Kothari et al. (2005), using the Modified-Jones Model (Dechow *et al.*, 1995). Total accruals are defined using a cash flow approach.
REM	Real earnings management measure. Combined measure of Real Earning Management as in Cohen and Zarowin (2010), constructed from sum of the two obtained abnormal levels of Discretionary Expenses (AbDISEXP) and Production costs (AbPROD): REM = AbPROD + AbDISEXP * (-1)
Loan Outcome measures	
<u>Outstanding debt position</u>	
ln(amount)	Natural logarithm of the total regular outstanding debt amount. The amount of credit in debt, excluding potential credit.
Ptc STD_r	Proportion of short-term residual debt. Computed dividing the debt amount which is due in less than one year by the total regular outstanding debt amount.
ln(maturity)	Natural logarithm of the weighted-average residual debt maturity. Consists of the average residual debt maturity weighted by the

	corresponding credit outstanding. Variable values ranging from 1 to 5. Categories have the following meaning: **1:** ≤ 1 year; **2:** >1 year and ≤ 5 years; **3:** >5 years and ≤ 10 years; **4:** > 10 years and ≤ 20 years; and **5:** > 20 years.
Ptc secured	Proportion of secured credit. Computed dividing the total secured amount, i.e. amount of collateral provided, by the total regular outstanding debt amount.
<u>New loans</u>	
New loan	Dummy with value 1 when there is a new loan, and 0 otherwise. I consider a new loan when there is a monthly increase in the outstanding amount no smaller than 50€.
Big loan	Dummy with value 1 when there is a big new loan, and 0 otherwise. Big loans are the top 3 new loans (considering the definition of new loan provided) for each firm.
ln(amount)	Natural logarithm of the amount of the new loan. Amount corresponding to the monthly increase in total outstanding debt amount.
Delta STD_o	Change in the proportion of short-term debt, considering the original maturity. This variable is calculated from the difference in proportion of short-term debt when comparing the value in the month of new loan with the previous one. Delta STD_o = Ptc STD_o [t] - Ptc STD_o [t-1]
ln(maturity)	Natural logarithm of the weighted-average original debt maturity. Consists of the average original debt maturity weighted by the corresponding credit outstanding. Similar to *ln(maturity)* for the outstanding debt position approach, the values of this variable range from 1 to 5 and the categories have the same classification.
Collateral	Dummy indicating collateral requirements of new loan. This binary variable assumes value 1 if the amount of collateral increased from the previous month to the month when the loan was obtained, and zero otherwise.
Control variables	
Firm size	Natural logarithm of firm's total assets.

Leverage	Ratio of long-term debt to total assets.
Interest coverage	Ratio of the earnings before interest and tax (EBIT) to interest expenses.
Current ratio	Ratio of current assets to current liabilities.
ROA	Return on Assets, calculated as the ratio of net income to total assets.
Tangibility	Ratio of net Property, Plant and Equipment (PPE) plus inventory to total assets.
Z-score	Altman Z-score calculated for Private firms as in Altman (2003): 0.717*(Working Capital/Total Assets) + 0.847*(Retained Earnings/Total Assets) + 3.107*(EBIT/Total Assets) + 0.420*(Book value of Equity/Total Liabilities) + 0.998*(Sales/Total Assets)

8.2. Appendix 2: Earnings Management variables measurement

8.2.1. Accruals-based Earnings Management

Accruals-based Earnings Management (AEM) can be calculated using a Balance-sheet (BS) approach or a Cash-Flow (CF) approach. Accruals are the component that results from the difference between the recognized earnings and the actual cash flows from the operations. Hence, it is possible to calculate accruals resorting to both the balance sheet and/or the cash-flow statement. The main difference is in the calculation of accruals.

According to the BS approach, the formula to calculate accruals is, for firm *i* and year *t*, as follows:

$$TAbs_{i,t} = \frac{\Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{it} + \Delta STD_{i,t} - DEP_{i,t}}{A_{i,t-1}} \quad \textbf{(6)}$$

Where $TAbs$ = Total accruals according to the BS approach, ΔCA = Change in current assets, ΔCL = Change in current liabilities, $\Delta Cash$ = Change in cash and cash equivalents, ΔSTD = Change in debt included in current liabilities, DEP = Depreciation and amortization expense and A_{t-1}= Lagged total assets. This measure of accruals is constructed using the

changes in the non-cash working capital accounts plus depreciation expense, taken from the Balance Sheet.

Following the CF approach, the way to calculate accruals, for firm *i* and year *t*, is:

$$TAcf_{i,t} = \frac{E_{i,t} - CFO_{i,t}}{A_{i,t-1}} \quad (7)$$

Where $TAcf$ = Total accruals according to the CF approach, E = Net income, CFO = Operating cash flows taken directly from the Cash Flow Statement and A_{t-1}= Lagged total assets.[13] This is a broader measure of accruals when compared to the BS approach since it captures all types of accruals by taking the difference between the recognized earnings and the cash flows from the operations.

Having the measure of total accruals[14] - either of the 2 above -, Discretionary Accruals (DA), which is the component of accruals that is not a direct consequence of the normal business events, can now be estimated. Although there is not a unique way of choosing the variables used to capture the non-discretionary component of accruals, there are two main models prevalent in the existing literature: the Jones Model (Jones, 1991) and the Modified-Jones Model (Dechow *et al.*, 1995). Both agree on the component of Property, plant and equipment (PPE), to explain accruals related with the business activity. The difference between them is related with the Revenues component, which captures the business growth in terms of turnover. While Jones considers that turnover has to do with the normal business activity of the firm and not subject to discretion, Dechow and the co-authors consider that there is a component of turnover that can be subject to discretion – the credit sales.

[13] It is commonly used in the literature the variable earnings before extraordinary items and discontinued operations and the CFO adjusted for continuing operations. Since we are using a Portuguese database, which does not have the exact correspondent to the mentioned variables, we used an approximation: Net Income minus Operating Cash Flow.

[14] Note that all the variables are scaled by lagged total assets in an attempt to mitigate heteroskedasticity in residuals (White, 1980).

The model is estimated cross-sectionally each year using all firm-year observations in the same industry section according to NACE (rev.2) as:[15]

$$TA_{i,t} = \beta_0 + \beta_1 \left(\frac{1}{A_{i,t-1}}\right) + \beta_2 \left(\frac{Revenue_{i,t} - Revenue_{i,t-1}}{A_{i,t-1}}\right) + \beta_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_t \quad \textbf{(8)}$$

And it is when calculating the fitted normal accruals that the formula changes:

$$NDA_{i,t} = \widehat{\beta_0} + \widehat{\beta_1} \left(\frac{1}{A_{i,t-1}}\right) + \widehat{\beta_2}\, \boldsymbol{X_{i,t}} + \widehat{\beta_3} \left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) \quad \textbf{(9)}$$

Where $X_{i,t}$ can be one of the two variables below, according to Jones (1991) or Dechow *et al.* (1995), respectively:

$$X_{1,i,t} = \Delta REV_{i,t} = \frac{Revenue_{i,t} - Revenue_{i,t-1}}{A_{i,t-1}} \quad \textbf{(9.1.)}$$

$$X_{2,i,t} = \Delta REV_{i,t} - \frac{Net\ Accounts\ Receivable_{i,t} - Net\ Accounts\ Receivable_{i,t-1}}{A_{i,t-1}} \quad \textbf{(9.2.)}$$

Firm-year-specific discretionary accruals are, then, calculated as:

$$DA_{i,t} = TA_{i,t} - NDA_{i,t} \quad \textbf{(10)}$$

Performance-matched Discretionary Accruals

Following Kothari et al. (2005), I calculate the performance-matched DA, for each year and industry (NACE (rev. 2) classification), by comparing the DA of two similar firms in terms of performance. In this case, Return on Assets (ROA) is the measure of performance. The performance-matched DA consist of the difference between the DA of the two firms, *i.e.* the part of DA in excess when comparing to the normal practise for a similar performing firm for that industry in the same year. To be clear, the two measures of DA which are compared to obtain a measure of performance-matched DA are the outputs obtained from the process just described above, considering the Modified-Jones model.

[15] Similarly to what Kothari et al. (2005) do, I introduce a constant, since it provides an additional control for heteroskedasticity and may also reduce potential omitted variables issues. Also, note that it relaxes the assumption of mean-zero discretionary accruals.

8.2.2. Real Earnings Management

For real earnings management, it is also the abnormal component of real business activities that is of interest as a proxy for earnings management. Roychowdhury (2006) focuses on the abnormal patterns on three variables: (1) Cash Flows from Operations, (2) Discretionary Expenses and (3) Production Costs. Here, I focus on the last two measures, since the information available on cash flows is rather poor given the composition of the business structure of the Portuguese economy - micro, small and medium firms account for 98% of the firms.

The technique that is used to obtain the abnormal real activity levels is similar to the one just explained to obtain DA: Estimate a regression similar to **(8)**, with the appropriate explanatory variables, trying to capture the normal activities' component; Then use the estimates to calculate the normal levels, analogous to what is done in **(9)**; And finally subtract the obtained fitted normal values from the value of the measure as it is in the firm financial statements. The following specifications, which show the correspondent to equation **(8)** now applied for the discretionary expenses (DISEXP) and production costs (PROD), are estimated cross-sectionally each year using all firm-year observations in the same industry section according to NACE (rev.2): [16]

$$DISEXP_t = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \alpha_2 \left(\frac{Sales_{i,t-1}}{A_{i,t-1}}\right) + \vartheta_t \quad \textbf{(11)}$$

$$PROD_t = \alpha_0 + \alpha_1 \left(\frac{1}{A_{i,t-1}}\right) + \alpha_2 \left(\frac{Sales_{i,t}}{A_{i,t-1}}\right) + \alpha_3 \left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}}\right) + \alpha_4 \left(\frac{\Delta Sales_{i,t-1}}{A_{i,t-1}}\right) + \theta_t \quad \textbf{(12)}$$

Where $DISEXP$ = Level of discretionary expenses.[17] $PROD$ = Sum of the costs of goods sold with the change in inventory in period t. A_{t-1}= Lagged total assets, $Sales_t$ = Total

[16] Like for discretionary accruals, I winsorize the variables used in the estimation of abnormal real activities at 1% and 99% since reporting issues may be present and may bias the results.

[17] Since advertising and R&D expenses were not available, I compute an approximated measure of the Selling, General and Administrative (SG&A) expenses, summing the Supplies and External Services with the employee expenses. As mentioned in the Appendix A in Roychowdhury (2006) considering SG&A is enough.

turnover, $Sales_{t-1}$= Lagged total turnover and $\Delta Sales_t$ = Change in total turnover in the current period. $\Delta Sales_{t-1}$= Change in total turnover in period $t-1$.

The abnormal levels of discretionary expenses (AbDISEXP) and production costs (AbPROD) are calculated by subtracting the fitted normal values obtained from the estimation of equations **(11)** and **(12)**, respectively, from the values obtained in the income statement.

Finally, in order to get to an aggregated measure of real earnings management (REM), I follow Cohen and Zarowin (2010) and sum the obtained AbDISEXP and AbPROD to generate a combined measure as follows:

$$REM_t = \text{AbPROD} + \text{AbDISEXP} * (-1) \quad \textbf{(13)}$$

This aggregated measure of real earnings management indicates which firms engage in more in these kinds of practices overall, not looking specifically at any particular method.

9. References

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Annex

Table 10: Robustness tests - Big loans - Loan outcomes

	(1) Big loan	(2) ln(amount)	(3) Delta STD_o	(4) ln(maturity)	(5) Collateral
DA perf	0.090***	0.014**	-0.006***	-0.010***	0.065***
	(0.005)	(0.007)	(0.001)	(0.001)	(0.011)
Firm size	0.072***	0.382***	0.008***	0.044***	-0.479***
	(0.001)	(0.007)	(0.001)	(0.001)	(0.003)
Leverage	-0.301***	-0.322***	0.060***	0.221***	0.755***
	(0.008)	(0.016)	(0.002)	(0.002)	(0.020)
Current ratio	-0.030***	-0.038***	-0.001***	-0.002***	-0.031***
	(0.001)	(0.002)	(0.000)	(0.000)	(0.002)
ROA	-0.028**	-0.105***	0.006**	0.066***	0.775***
	(0.013)	(0.024)	(0.003)	(0.003)	(0.029)
Tangibility	0.279***	0.258***	-0.015***	-0.068***	0.620***
	(0.008)	(0.024)	(0.003)	(0.003)	(0.017)
Z-score	0.048***	0.120***	0.001***	-0.012***	-0.144***
	(0.001)	(0.003)	(0.000)	(0.000)	(0.002)
ln(maturity)		0.214***			0.806***
		(0.010)			(0.012)
Delta STD_o		-0.096***			-0.716***
		(0.010)			(0.018)
Collateral		1.055***	-0.031***	0.011***	
		(0.004)	(0.001)	(0.001)	
ln(amount)			-0.002***	0.003***	0.590***
			(0.000)	(0.000)	(0.002)
Firm fixed effects	No	Yes	Yes	Yes	No
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	No	No	No	Yes
Observations	3840598	665525	665525	665525	658024
R^2	-	0.668	0.150	0.679	-

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Regressions (2) to (4) were estimated using an OLS method, while specifications (1) and (5) were estimated using a logistic model. The variable **Big loan** is a binary one acquiring value 1 when there is a big loan, i.e. if its amount is among the top three loan amounts for a firm, and 0 otherwise. The remaining variables were computed as in **Table 6**.

Table 11: Robustness tests - Performance-matched discretionary accruals using the Jones model - Loan terms

	(1) ln(amount)	(2) Delta STD_o	(3) ln(maturity)	(4) Collateral
DA perf Jones	0.020***	-0.005***	-0.010***	0.062***
	(0.006)	(0.001)	(0.001)	(0.009)
Firm size	0.403***	0.004***	0.045***	-0.413***
	(0.006)	(0.001)	(0.001)	(0.002)
Leverage	-0.130***	0.045***	0.224***	0.816***
	(0.014)	(0.001)	(0.002)	(0.016)
Current ratio	-0.039***	-0.000**	-0.002***	-0.045***
	(0.001)	(0.000)	(0.000)	(0.001)
ROA	-0.114***	0.006**	0.061***	0.756***
	(0.021)	(0.002)	(0.002)	(0.024)
Tangibility	0.195***	-0.014***	-0.070***	0.624***
	(0.021)	(0.002)	(0.002)	(0.013)
Z-score	0.093***	0.001***	-0.012***	-0.137***
	(0.003)	(0.000)	(0.000)	(0.002)
ln(maturity)	0.289***			0.801***
	(0.009)			(0.009)
Delta STD_o	0.287***			-0.748***
	(0.010)			(0.017)
Collateral	1.059***	-0.021***	0.008***	
	(0.004)	(0.000)	(0.000)	
ln(amount)		0.003***	0.003***	0.502***
		(0.000)	(0.000)	(0.001)
Firm fixed effects	Yes	Yes	Yes	No
Time fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	No	Yes
Observations	1036954	1036954	1036954	1025755
R^2	0.593	0.122	0.677	-

Notes: Standard errors in parenthesis. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01 Regressions (1) to (3) were estimated using an OLS method, while specification (4) was estimated using a logistic model. **DA perf Jones** is the proxy used for earnings management, consisting of the performance-matched discretionary accruals estimated according to Kothari et al. (2005) and using the Jones Model (Jones, 1991). Total accruals are defined using a balance sheet approach. The remaining variables were computed as in **Table 6**. For a detailed description of the variables, it is also possible to refer to **Appendix 1**: Variables definition.

Table 12: Robustness tests - Performance-matched discretionary accruals using a cash flow approach - Loan terms

	(1) ln(amount)	(2) Delta STD_o	(3) ln(maturity)	(4) Collateral
DA perf CF	0.030**	-0.005***	-0.009***	0.134***
	(0.013)	(0.001)	(0.001)	(0.019)
Firm size	0.413***	0.001	0.037***	-0.469***
	(0.010)	(0.001)	(0.001)	(0.003)
Leverage	-0.350***	0.063***	0.309***	0.963***
	(0.024)	(0.002)	(0.003)	(0.023)
Current ratio	-0.035***	-0.000	-0.002***	-0.051***
	(0.002)	(0.000)	(0.000)	(0.002)
ROA	-0.151***	0.008**	0.062***	0.778***
	(0.032)	(0.003)	(0.003)	(0.033)
Tangibility	0.133***	-0.004	-0.059***	0.652***
	(0.035)	(0.003)	(0.004)	(0.019)
Z-score	0.085***	0.001***	-0.009***	-0.134***
	(0.004)	(0.000)	(0.000)	(0.003)
ln(maturity)	0.245***			0.893***
	(0.013)			(0.013)
Delta STD_o	0.527***			-0.765***
	(0.014)			(0.024)
Collateral	1.154***	-0.020***	0.005***	
	(0.005)	(0.001)	(0.001)	
ln(amount)		0.005***	0.002***	0.533***
		(0.000)	(0.000)	(0.002)
Firm fixed effects	Yes	Yes	Yes	No
Time fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	No	No	No	Yes
Observations	570598	570598	570598	573584
R^2	0.637	0.158	0.730	-

Notes: Standard errors in parenthesis. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01 Regressions (1) to (3) were estimated using an OLS method, while specification (4) was estimated using a logistic model. **DA perf CF** is the proxy used for earnings management, consisting of the performance-matched discretionary accruals estimated according to Kothari et al. (2005) and using the Modified-Jones Model (Dechow *et al.*, 1995). Total accruals are defined using a cash flow approach. The remaining variables were computed as in **Table 6**. For a detailed description of the variables, it is also possible to refer to **Appendix 1**: Variables definition.

Table 13: Robustness tests - Real earnings management - Loan outcomes

	(1) New loan	(2) ln(amount)	(3) Delta STD_o	(4) ln(maturity)	(5) Collateral
DA perf	0.145***	0.020***	-0.006***	-0.011***	0.065***
	(0.004)	(0.006)	(0.001)	(0.001)	(0.009)
REM	-0.037***	-0.017***	-0.001***	-0.002***	0.070***
	(0.002)	(0.005)	(0.000)	(0.001)	(0.003)
Firm size	0.138***	0.403***	0.004***	0.045***	-0.415***
	(0.001)	(0.006)	(0.001)	(0.001)	(0.002)
Leverage	-0.413***	-0.131***	0.045***	0.224***	0.816***
	(0.007)	(0.014)	(0.001)	(0.002)	(0.016)
Current ratio	-0.053***	-0.039***	-0.000*	-0.002***	-0.045***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)
ROA	-0.095***	-0.115***	0.006**	0.061***	0.765***
	(0.012)	(0.021)	(0.002)	(0.002)	(0.024)
Tangibility	0.502***	0.198***	-0.014***	-0.070***	0.581***
	(0.007)	(0.021)	(0.002)	(0.002)	(0.013)
Z-score	0.072***	0.092***	0.001***	-0.012***	-0.138***
	(0.001)	(0.003)	(0.000)	(0.000)	(0.002)
ln(maturity)		0.289***			0.794***
		(0.009)			(0.009)
Delta STD_o		0.287***			-0.745***
		(0.010)			(0.017)
Collateral		1.059***	-0.021***	0.008***	0.501***
		(0.004)	(0.000)	(0.000)	(0.001)
ln(amount)			0.003***	0.003***	0.501***
			(0.000)	(0.000)	(0.001)
Firm fixed effects	No	Yes	Yes	Yes	No
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	No	No	No	Yes
Observations	3840598	1036954	1036954	1036954	1025755
R^2	-	0.593	0.122	0.677	-

Notes: Standard errors in parenthesis. Significance levels: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Regressions (2) to (4) were estimated using an OLS method. Specifications (1) and (5) were estimated using a logistic model. **REM** is a combined measure of real earning management computed according to Cohen and Zarowin (2010). It is constructed from sum of the abnormal levels of Discretionary Expenses and Production costs. For a detailed description of the remaining variables, please refer to **Appendix 1**: Variables definition.