
# EARNINGS MANAGEMENT DYNAMICS IN PORTUGUESE LISTED FIRMS

por

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Tese de Mestrado em Finanças e Fiscalidade

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2016

**Biographical note**

Diogo Fernando Batista da Silva finished his bachelor's degree in Economics in the school of Management and Economics of the University of Porto in 2014, joining thereafter the Master in Finance and Taxation of the same institution. He worked in the Bank of Portugal as well as in the Ministry of Finance. At a research level, Diogo Silva developed analysis focusing on Portugal: *"Can inventories predict production?"; "A survey-based measure of output gap for Portugal"; Qualitative Indicators of the Portuguese Financial Sector";*

**Abstract:** This study examines earnings management dynamics in Portuguese listed firms. It provides evidence consistent with firms using accrual and real management as substitutes. Besides, the use of each strategy appears to depend on its relative cost. This investigation also points to the existence of a trade-off between derivatives use and the magnitude of earnings management. Furthermore, the impact of both earnings management and derivatives use on effective tax rates is examined. The results indicate that, if the tax function is convex, firms can reduce tax expenses by hedging with derivatives. This research also explores how earnings management practices are related with a set of market and financial incentives, while controlling for earnings management constraints. Meeting dividend thresholds seems to be the most relevant incentive for firms to manage earnings upward.

Keywords: Earnings management; Derivatives;

JEL classification: G32; M48;

**Resumo:** Este trabalho analisa dinâmicas no âmbito da gestão de resultados nas empresas cotadas na bolsa de valores de Lisboa. Fornece evidência consistente com a existência de um efeito substituição entre 2 métodos alternativos, utilizados no âmbito da gestão de resultados: um baseado na flexibilidade das normas de relato financeiro e um outro relacionado com a estruturação da atividade da empresa. O recurso a cada um destes métodos está relacionado com o seu custo relativo. Adicionalmente, esta investigação aponta para a existência de uma relação inversa entre a utilização de produtos derivados e a magnitude da gestão de resultados. É ainda analisado o impacto destas práticas, bem como da utilização de derivados, nas taxas de imposto efetivas. Os resultados indicam que no contexto de convexidade fiscal, as empresas podem amenizar os encargos fiscais com recurso a derivados. Este estudo integra igualmente uma análise que visa examinar como é que a gestão de resultados está relacionada com incentivos financeiros e de mercado. De acordo com a análise empírica realizada, alcançar os resultados que permitem o pagamento do valor esperado de dividendos, é a motivação mais relevante neste contexto.

Palavras-chave: Gestão de resultados; Derivados;

Classificação JEL: G32; M48;

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## 1. Introduction

If the main objective of financial reporting is to enlighten stakeholders so they can make efficient economic decisions, it is essential to assess the quality of financial information. Addressing earrings management practices is relevant in order to how the quality of information that is linked with executive discretionary options. Nowadays, given the complex context in which firms operate, earnings management may be seen has a continuous and iterative process characterized by a mixture of incentives and practices. There are several incentives to engage in earnings management, which managers need to weight. Likewise, there are different ways to drive earnings and cash flows in a certain direction. The choices between diverse types of earnings management are certainly not independent. Furthermore, puzzling earnings management gives the chance to anticipate the risk of a companies' underlying information, given the presence of certain motivations and constraints. Therefore, this study is important to investors in general, borrowing institutions when assessing credit characteristics and auditors while evaluating audit-risk. It is also relevant to Portuguese market regulators, mainly CMVM[1], but also ASF[2] and Bank of Portugal since financial institutions are usually relevant stakeholders[3] of Portuguese listed firms. In addition, it is pertinent for the Portuguese Tax Authorities given that this research addresses how earnings management and derivatives use are associated with effective tax rates.

This study has increased relevance given that, regarding earnings management, literature that focused on Portuguese context is minor. Aiming Portuguese listed firms, it is possible to point the work of Mendes and Rodrigues (2006) that have analyzed earnings smoothing practices using Eckel approach (1981) and Alves (2011, 2012) that related discretionary accruals with board characteristics and ownership structure, respectively. An overall measure of real activities-based management have never been developed for Portugal and consequently never associated with accrual-based management. In a first stage of this research, it is tested the existence of a trade-off between the two strategies. Moreover, one tries to understand what drives the

[1] Portuguese Securities Market Commission.
[2] Insurance and Pension Funds Supervisory Authority.
[3] They are usually both borrowers and shareholders of those firms.

preferences of the decision makers towards each earnings management scheme. Thereafter, a total measure of earnings management, that is, one that accounts for both strategies is applied in the examinations that follow. Then, it is analyzed how derivatives use may relate with earnings management decisions, because firms may smooth earnings by managing them (whether through accrual or real management strategies) or by hedging with derivatives. Furthermore, three kinds of earnings management drivers are studied, namely tax, financial and market incentives. Tax incentives are analyzed separately for methodological reasons. For that matter, effective tax rates are regressed in a set of determinants (firm specific and non-firm specific characteristics) to which proxies of earnings management, as well as a variable that captures the use of derivatives are added. Empirical literature analyzing hedging policies in Portuguese listed firms is also scarce. This study presents an empirically examination that clarifies why Portuguese listed firms hedge with derivatives. The main purpose of this analysis is to understand if tax convexity influence firms probability to use derivatives. In a final stage, it is investigated how earnings management are related with financial and market incentives. Specifically, it is tested if firms manage earnings upward to: report positive earnings (instead of losses); present increases in reported income (and not declines); diminish the cost of capital when contracting high amounts of long-term debt; meet dividend thresholds.

This research contributes to the literature by computing both accrual and real activities-based management proxies at firm level. The typical industry-year estimations were not employed due to a small number of observations per industry. Besides, this is the first research in which a total measure of earnings management is related with derivatives use. Moreover, it is the first to present evidence that hedging policies and earnings management practices may be defined sequentially. It also contributes to the literature related with taxation by demonstrating empirically that firms can reduce tax expenses through the use of derivatives if the tax function is convex. Furthermore, this is the first investigation to provide empirical proof that firms' hedging policies are influenced by tax convexity. In addition, this study looks at the impact of firms' ability to manage earnings on effective tax rates, both through accruals and real activities. One methodological contribution of this research is the proxy for the cost of capital. It has never been used in corporate finance literature; however, it is a complete measure of the

costs of financing because it captures not only interest rates but also other credit characteristics, such as covenants and collateral requirements. Finally, when studying firms' financial and market incentives to manage earnings, this study differentiates from other researches because both kinds of earnings management are considered, a reliable variable to control for earnings management constraints is used and the various motivations are tested at the same time, so that one can understand the relative importance of each one.

To develop the analysis mentioned a panel data set with 38 non-financial Portuguese listed firms was used. The time period starts with the adoption of International Financial Reporting Standards (IFRS) and ends in 2014.

This study is organized as follows: section 2 presents the literature review as well as the research hypothesis; in section 3 the methodology is described; section 4 provides the results and its analysis; per last, section 5 presents the concluding remarks.

## 2. Literature review and hypothesis development

### 2.1. Definition

Watts and Zimmerman (1990) related earrings management with managers' discretionary decisions that impact on financial reports. Healy and Wahlen (1999) stated that *"Management's use of judgement (also) creates opportunities for earnings management, in which managers choose reporting methods and estimates that do not adequately reflect their firms' underlying economics"*.

It is important to highlight that earnings management does not imply fraudulent behavior. Accounting principles generally have some flexibility embedded, which is important, in the context of dynamic, innovative and sometimes considerably specific business environments. Nonetheless, the flexibility of General Accepted Accounting Principles (GAAPs) may also lead to discretionary options motivated by incentives that do not match the purpose of presenting a truthful picture of firms' situation. Still, discretionary choices that explore GAAPs' flexibility are not necessarily fraudulent. Using accrual management, managers are able to increase reported earnings by aggressively diminishing provisions. When using real management managers may slow R&D or advertisement expenses. They violate GAAPs, incurring in fraudulent behavior, when recording fictional sales or by recording them before they are realizable (Dechow and Skinner, 2000)[1]. This study does not entail that firms adopt fraudulent practices.

### 2.2. Accrual-based management vs real activities-based management

When studying the relation between executive bonus schemes and accounting decisions, Healy (1985) planted the seeds to a string of literature that tries to measure the magnitude of earnings management through abnormal accruals. The most remarkable feature in Healy approach was the use of a proxy that captures overall accounting options and not just particular decisions, as in prior studies (Biddle, 1980; Bowen *et al.*,

[1] See Dechow and Skinner (2000) for a discussion of earnings management views.

1981). Indeed, Watts and Zimmerman (1990) pointed that "*focusing on one accounting method reduces the power of the tests"*. Since then, the literature has been developing models to extract the abnormal component of total accruals (Jones, 1991; Dechow *et al.*, 1995; Dechow and Dichev, 2002; Kothari *et al.*, 2005; Ball and Shivakumar, 2006; Dechow *et al.*, 2012).

The main alternative to proxy for earnings management is real activity-based management[2]. Although the analysis of this dimension of earnings management is more recent, it may be the main earnings management strategy, given managers' responses on Graham *et al.* (2005) conducted inquiry. Managers can choose to adjust earnings through both processes therefore, it is important to account for both. Moreover, recently Zang (2011) has illustrated a trade-off between the two kinds of earnings management, in the context of a sequential decision, while using firms-years observations in which earnings are supposed to be managed so that firms can report small earnings (instead of earnings below 0) and avoid earnings decline[3]. As in Zang (2011), firms are expected to firstly decide on the amount of real management and then adjust the magnitude of accrual management, mainly, at the end of the year (or at least to adjust earnings using accounting flexibility to compensate unanticipated developments that affected cash flows). Thus, the following hypothesis is tested:

*H1: Portuguese listed firms use real activities-based management and accrual-based management as substitutes, in the context of a sequential decision.*

### 2.3. Tax incentives and derivatives

The tax avoidance related literature is vast[4] (Stickney and McGee, 1983; Gupta and Newberry, 1997; Dyreng *et al.*, 2008; Dyreng *et al*., 2010; Kraft, 2014). Graham (2003) mentioned hedging policies when reporting some decisions that can be influenced by

[2] Roychowdhury (2006), Cohen *et al.* (2008), Cohen and Zarowin (2008) and Kothari *et al.* (2012) analyze empirically these strategies;
[3] Zang (2011), whenever possible, also includes firms just beating analysts' forecasts. See Burgstahler and Dichev (1997), Degeorge *et al.* (1997) or Dechow *et al.* (2003) for an analysis of market incentives.
[4] Dyreng *et al.* (2008) defined tax avoidance as anything that reduces taxes. Other lexicons may also be used (Minick and Noga, 2010; Armstrong *et al.*, 2012).

taxation. The use of derivatives to minimize tax expenses if the tax function is convex[5] was proposed by Smith and Stulz (1985). Meanwhile, several researchers gave attention to the use of derivatives with the objective of reducing tax expenses (Alworth, 1998; Graham and Rodgers, 2002; Warren, 2004). Recently, Dohone (2015) was able to quantify the tax savings related with hedging strategies. Indeed, some literature related firm value with the use of derivatives (Bartram *et al.,* 2011; Allayannis*et al.*, 2012; Ahmed *et al.,* 2013; Nova *et al.,* 2015), which may at least partly, be explained by tax savings, as predicted by Smith and Stulz in 1985. Nevertheless, researchers were not able to document empirically a strong association between derivatives use and tax convexity (Nance *et al.*, 1993; Tufano, 1996; Géczy *et al.*, 1997; Allayanis and Ofek, 2001; Graham and Rodgers, 2002).

From 2010 onwards, a marginal state tax was applied for Portuguese firms. In 2010, to the component of taxable income above €2 million corresponded an additional tax rate of 2.5%. In almost a year basis the state tax was being adjusted, in a way that the marginal state tax applied started to be divided in various categories of taxable income. In 2014 the state marginal tax rate was 3%, 5% and 7%, if taxable income was higher than €1.5 million, €7.5 million and €35 million, respectively. Besides, state tax was applied, independently of the existence of net operating losses. This created a worthy studying scenario to test for the responsiveness of hedging policies to tax convexity. Therefore the following two hypotheses are tested:

*H2: In the presence of a convexity tax function, hedging firms have lower effective tax rates.*

*H3: Derivatives use is positively related with convexity.*

Furthermore, firms might manage earnings to decrease tax expenses by reducing earnings volatility (same effect of derivatives) or just by simply decreasing reported earnings. Firms with more incentives to reduce earnings are big firms, as usually are the

[5] Tax function is convex when successive increases in pre-tax income lead to each time smaller increases in after-tax income. See Smith and Stulz (1985) or Graham and Smith (1999) for a more developed description of tax convexity.

listed ones, to reduce political costs (Zimmerman, 1983), that could be reflected through the tax system. However, tax savings may not be the primary motivations of firms when they engage in earnings management. Firms that manage earnings in response to market incentives may have higher effective tax rates. Still, as pointed by Desai (2005), because financial and tax reports follow different rules, managers may manage book profits upward, and the same time manage profits that are reported to the tax authorities downwardly. This way, firms may send positive signs to the markets and still diminish tax expenses. Accordingly, in this study, the influence of earnings management practices on effective tax rates are verified, nevertheless no anticipation about the direction of the relation is done. Therefore, the following hypotheses are tested:

*H4: Accrual-based management practices impact on firms' effective tax rates.*

*H5: Real activity-based management practices impact on firms' effective tax rates.*

### 2.4. Derivatives and earnings management

There is extensive literature that examines firms' earnings smoothing practices (Kirscheheiter and Melumad, 2002; Shaw, 2003; Bhattacharya *et al.*, 2003; Gao and Zhang, 2015). Using GAAPs' flexibility or operational decisions, firms may be able to smooth earnings. Jung *et al.* (2013) is a recent example of studies that relate earnings smoothing with accruals-based approach, while Roychowdhury (2006) also considered real management strategies. Derivatives are also supposed to be used to reduce earnings volatility. Hence, firms may choose to smooth earnings, through earnings management or with derivatives. Barton (2001) and Pincus and Rajgopal (2002) presented evidence consistent with derivatives and discretionary accruals being used as substitutes. Nonetheless, those researchers related discretionary accruals with derivatives notional amounts, in the case of a simultaneous decision. The hypothesis developed in this study is different in two ways. It is predicted the existence of a sequential decision (1), which means that firms firstly decide on the use or non-use of derivatives. Then, firms that hedge will have smoother earnings, therefore they will probably rely to a lesser extent in earnings management strategies to smooth earnings. In addition, this investigation

associates the use of derivatives with a measure of total earnings management (2), since it considers real activities-based management and not only the accrual-based component.

*H6: Portuguese listed firms use derivatives and earnings management schemes has substitutes, in the context of a sequential decision.*

### 2.5. Financial and market incentives

The purpose of analyzing financial and market incentives is to understand the main motivations for Portuguese listed firms to manage earnings. Portugal is a code-law country in which firms usually rely on bank debt. Christensen *et al.* (2015) acknowledged that firms which had closer connections with banks had fewer incentives to adopt more comprehensive accounting standards. Firms might manage earnings upward to reduce the cost of capital when borrowing from banks. To capture not only interest costs, but also conditions related with covenants and collaterals, qualitative data on bank lending survey is used to proxy for credit availability. Swiston (2008) and Angelopoulou *et al.* (2014) showed the importance of the survey data when examining credit availability. The following hypothesis is tested:

*H7: Firms manage earnings upward if they contract large amounts of debt in a year of financial tightening.*

The literature usually defines that firms reporting small positive earnings or just beating previous years' earnings are more likely to be managing earnings (Roychowdhury, 2006; Zang, 2011). Burgstahler and Dichev (1997) suggested that firms managed earrings in those cases because the authors detected unusually low frequencies in firms reporting small decreases in earnings or small losses; and unusually high frequencies of small positive earnings or small earnings increases. However, Dechow *et al.* (2003) could not confirm those firms boosted discretionary accruals to report small positive earnings. In this study, it is investigated if those are relevant thresholds for Portuguese listed firms, when managing earnings. The following hypotheses are tested:

*H8: Portuguese listed firms manage earnings upward to avoid earnings losses.*

*H9: Portuguese listed firms manage earnings upward to beet previous years' earnings.*

The literature demonstrated managers' aversion to apply dividend cuts (Lintner, 1956; Brav *et al.*, 2005). This is because dividends are of first order factors for investors (DeAngelo *et al.*, 2006; DeAngelo and DeAngelo, 2006). As a result, dividend cuts may have significant downward effects on stock prices (Grullon *et al.*, 2002). This motivation is consistent with the pecking order theory that suggests dividends are sticky (Donaldson, 1961; Myers, 1984; Myers and Majluf, 1984). Naveen *et al.* (2008) presented evidence that firms manage earnings through discretionary accruals to be able to pay expected dividends, given the existence of dividend covenants. This kind of covenants is usually applied[6] to minimize agency conflicts (Jensen and Meckling, 1976) between firms (managers and shareholders) and creditors (Easterbrook, 1984; Brockman and Unlu, 2009).Therefore, the following hypothesis is tested:

*H10: Portuguese listed firms manage earnings upward to meet expected dividends.*

[6] See, for example, Kalay (1982) or Bradley and Roberts (2004).

## 3. Methodology and sample selection

### 3.1. Sample selection

This study focuses on firms listed on Lisbon stock exchange in the year of 2014. The sample starts in 2004 and ends in 2014[1]. Observations for 2004 are used only when data available is based IFRS[2]. Firms excluded from the study are: (1) financial institutions (sic code 60-67); (2) firms in which the main activity is related with services-membership sports and recreation clubs (sic code 7997); (3) firms with no available information in Datastream[3]; (4) Firms listed during only 1 year. As a result, this analysis uses 38 non-financial Portuguese firms listed in the Lisbon stock exchange in 2014.

### 3.2. Estimations at firm-level

The abnormal component of both the accruals and the cash-flow from operations are used to proxy accrual and real management, respectively. Regarding this approach, this study has two limitations, which are immediate constraints of focusing the study on Portuguese listed firms. Firstly, there is a reduced number of firms, when compared with other studies, such as the ones of Roychowdhury (2006) and of Zang (2011), which were important benchmarks for this research. Secondly, the models used to calculate abnormal accruals (or abnormal cash-flows) are usually estimated for each industry-year. However, the number of listed firms for each industry is usually very small. Hence, the usual methodology cannot be employed, given the common five to twenty minimum observations threshold is not met. In fact, the industries with more observations are composed by 3 firms (when defining industries with 2 digits sic codes). These are two structural characteristics of the Portuguese capital markets. Thus, to study earnings management dynamics in Portugal, the usual approaches need to be adjusted. In order to surpass the constraints related with Portuguese environment, firm specific estimations are applied. Firms' specific samples start when financial reporting based on

[1] Variables definition, measurement and sources are available in the Annex (Table 7-10).
[2] Indeed, the sample start is predetermined by the adoption of IFRS.
[3] Datastream is the main data source of this study.

IFRS is available, which for most firms is 2005 (the year of mandatory adoption[4]). The sample ends in 2014, which implies 10/11 observations for most firms. Both firm and industry specific attributes play an important role in abnormal accrual estimations. There is a component of accruals that relates with firm characteristics, such as operations volatility (Dechow and Dichev, 2002), uncertainty (Palepu *et al.*, 2000), internal control characteristics (Kinney and McDaniel, 1989) and other factors that may lead to misjudgments. Only a second component of abnormal accruals relates with possible opportunistic use of accounting rules. For example, omitted variables bias is an important issue in accrual-based estimations (Dechow *et al*., 2010). Therefore, there is value added in the use of firm specific estimations. The trade-off behind firm-level estimations relates with difficulties in capturing industry shocks. For example, if there is a relevant increase in a production input for a certain industry, the typical industry-year approach to estimate discretionary accruals, are more likely to be unresponsive to it. A firm specific procedure is probably weaker in this scenario, and would most likely predict abnormal accruals, which weakens the robustness of the estimations that use abnormal accruals to proxy for earnings management. Dechow *et al*. (2010) have also discussed this approach and stated: "*We emphasize that all of the accruals models can be estimated at the firm level"*. According to the authors, estimations at firm level have the advantage of allowing for variation in the coefficients of the determinants of the normal levels of accruals within firms, however, those models have invariant time parameters and possibly survivorship bias. They also highlight that, in the case of the usual industry-level estimations, some firms may be associated with higher residuals because of industry classification and not because of earnings management practices or errors. In addition, listed firms usually play a role in different sectors. Therefore, the use of industry classifications may also soften the power of the tests.

A brief discussion of alternatives: (1) a possible substitute procedure to the firm specific approach would be to make industry-year estimations using 1 digit sic codes, which does not solve the usual observations threshold and still some firms need to be dropped. Moreover, it upturns industry-level estimations weaknesses, because one would have

[4] In 2005 firms had to present financial reports based on IFRS, not only for 2005 but also for 2004, so that comparison with the previous year could be made. Nonetheless, Datastream does not have data for the year of 2004 for all firms.

considerably different firms with the same coefficients for the determinants of both normal accruals and cash-flow from operations. (2) Estimating the models cross-sectionally using the whole sample should boost to the same bias, since listed firms are significantly heterogeneous, which is clear when considering the distribution of firms by industries. Therefore, this procedure does not yield any of the advantages mentioned before. Nonetheless it can capture shocks that affect most firms, but this can also be achieved through time effects in the models that follow. Specifically, in this study, estimations of earnings management are used has inputs in other models, in which is possible to account for dynamics such as time related effects. (3) Another alternative is to include public firms from other European countries in the estimations of both abnormal accruals and cash-flows, in order to achieve the minimum number of observations. This way, the usual methods could be applied. Nonetheless, firms from other countries may operate in a very a different context due to economic, institutional and regulatory differences. Moreover, one of the main purposes of this study is to understand the Portuguese specific environment, providing insights that yield value for Portuguese researchers and policy makers, given the scarcity of empirically robust investigations regarding earnings management. (4) Another option corresponds to the use of the biggest non-listed Portuguese firms for each industry and apply industry-year estimations. Nevertheless, the differences among listed and non-listed are probably significant. Most financial reports of non-listed firms are based on Portuguese GAAPs, while listed firms use IFRS. Overall, none of the alternative options are expected to produce more robust estimates. The use of firm specific estimations has highlighted has both advantages and disadvantages when compared to the usual industry level analysis. Since recent literature that uses this approach is slight, a contribution is made, by presenting evidence on the use of firm-level estimations.

### 3.3. Accrual-based management

Since Healy (1985), models to estimate the normal level of accruals have been developed. The Jones model (1991), extracts the abnormal component of accruals, using both changes in sales and property, plant and equipment. Later, the model was adjusted by Dechow *et al.* (1995), so that credit sales are not included as a determinant of normal

accruals, since credit sales may be related with earnings management. This is the model applied in this study. Other models have built on the modified version of the Jones model, such as the procedure presented in Kothari *et al.* (2005), which is not used in this analysis, mainly because it is not possible, given the heterogeneity between the firms under analysis, to identify a similar firm in the same industry with the closest return on assets. The Modified Jones with control variables concerning the asymmetric recognition of gains and losses (Ball and Shivakumar, 2006) is not applied since it leads, in some cases, to multicollinearity, if a firm-level approach is employed. The modified Jones model merged with the Dechow and Dichev (2002) methodology, as suggested by McNichols (2002), can only be used to compute normal current accruals. Moreover, it consumes more grades of freedom and implies that accruals must revert in the following year, which may not always be the case. Likewise, the estimations of abnormal accruals are used to regress in other variables, which gives the opportunity to account for measurement error with adequate controls later[5].

Discretionary accruals are proxied by the residuals of the following model, which is based on the modified version (Dechow *et al.*, 1995) of Jones (1991) model:

$$TAC_t = \beta_0 + \beta_1 * (\Delta REV_t - (1-k) * \Delta AR_t) + \beta_2 * PPE_t + \varepsilon_t \qquad (3.1)$$

Where for each year *t*, $TAC$ corresponds to total accruals[6], $\Delta REV$ refers to the change in revenue between *t-1* and *t*, $\Delta AR$ is the change in accounts receivable, $PPE$ corresponds to the value of property, plant and equipment. The error term is represented by $\varepsilon_t$. All variables are scaled by lagged total assets. *K* corresponds to the slope coefficient of a regression of $\Delta AR$ on $\Delta REV$, when the p-value of the coefficient is lower than 25% (0 otherwise)[7]. Thus, only a portion of credit sales are related to earnings management, but

[5] This is not the case when researchers use abnormal accruals has an immediate measure of earnings quality.

[6] Total accruals are computed as the difference between net income and cash-flow from operations. Alternatively they can be calculated as the change in net current assets minus change in cash plus change in current portion of long term debt minus depreciations. However, not all firms disclose information about the current portion of long term debt, hence, it cannot be computed.

[7] The purpose is to include a component of credit sales as a determinant of normal accruals, but only if credit sales are explained by changes in sales. Because the regressions are control lacking, the significance level defined is softer.

only if there is some evidence that changes in sales explain the change in credit sales. The residual of equation (3.1) is used to proxy for accrual management.

### 3.4. Real activities-based management

It is usually proxied by overproduction, abnormal discretionary expenses or abnormal cash-flows from operations (Roychowdhury, 2006; Zang, 2011; Cohen and Zarowin, 2008; Cohen *et al.*, 2008), even so, some researchers only use abnormal research and development expenses (Baber *et al.*, 1991; Dechow and Sloan, 1991; Bushee, 1998; Bens, 2002; Kothari *et al.*, 2012). Overproduction may not be adequate to compute for some firms in the services sector. One alternative is to drop firms from these industries, which is not possible given the number of firms under analysis is not vast. Likewise, in these circumstances, the conclusions of this research would yield lesser value. Discretionary expenses are commonly defined as the sum of research and development expenses, selling and general administrative expenses and advertisement expenses. Nonetheless, one factor that distinguishes Portuguese firms from others is the propensity to present the income statement in a nature based and not in a functional form. Therefore, the components of discretionary expenses, including selling and general administrative expenses, are generally not disclosed and consequently not available in Datastream. As a result, in this study, real management is proxied by abnormal cash-flow from operations.

The normal level of cash-flow from operations is estimated with the following model (Roychowdhury, 2006):

$$CFO_t = \beta_0 + \beta_1 * REV_t + \beta_2 * \Delta REV_t + \varepsilon_t \quad (3.2)$$

Where for year *t*, *CFO* corresponds to cash-flow from operations, *REV* refers to revenue and $\Delta REV$ is the change in revenue from the previous year. All variables are scaled by lagged total assets. The residual of equation (3.2) equals the abnormal cash-flow from operations.

### 3.5. Accrual-based management vs real activities-based management

The dynamics between both kinds of earnings management are studied using Zang (2011) setting as baseline. Specifically, the following regressions are applied:

$$RM_t = \beta_0 + \beta_{1,k} * EM\_D_{x,t} + \beta_{2,y} * CONTROLS_{y,t} + \varepsilon_t \quad (3.3)$$

$$AM_t = \delta_0 + \delta_{1,k} * EM\_D_{x,t} + \delta_{2,y} CONTROLS_{y,t} + \delta_3 * RM_t + \varepsilon_t \quad (3.4)$$

Where for year *t* and firm *i*, *RM* corresponds to real management and is proxied by the residual of equation (3.2). *AM* refers to the amount of accrual management and is quantified by the residual of equation (3.1). *EM_D* are a set of determinants of each type of earnings management. *CONTROLS* are control variables.

Zang (2011) only included suspect firms-years, that is, the ones most likely to be managing earnings, while controlling for non-random sample bias with Heckman two step procedure. The author defined suspect as firm-years in which earnings are barely above last year reported income, just beating the null benchmark or the analysts' consensus forecasts. Indeed, many researchers have found indications of discontinuity in the distribution of earnings, especially in firm-years with zero to small earnings (Hayn, 1995; Burgstahler and Dichev, 1997). Even so, studies such as the one of Dechow *et al.* (2003) were not able to provide reliable evidence that firms manage earnings to avoid losses. Therefore this *"a priori"* hypothesis of Zang (2011) may also be costly, mainly if firms just beating zero earnings benchmarks are firms managing earnings downwardly, in order to, for example, minimize tax expenses. Likewise, in the presented analysis, observations cannot restrict to firm years in these circumstances, given in this case the sample would be reduced to 64 observations[8].

[8] 64 observations equals the sum of 35 firm-years in which the change in earnings per share are between 0 and 2 cents and 29 firm-years in which return-on-assets is between 0 and half percent.

The earnings management determinants considered are:

i. The marginal tax rate (*MTR*) is assumed to restrict real management because those practices are more likely to lead to higher costs related with taxation. When managing income upward through accounting-based methods, firms are able to increase earnings but not necessarily taxable income (*TI*). In addition, firms are able to defer possible additional tax expenses. Evidence of that is the study of Philips *et al.* (2003, 2004) which hints deferred tax expenses can be used to detect earnings management. *MTR* is set to zero if the firms' pre-tax income is non-positive. In other cases, *MTR* equals the nominal tax rate (*TR*) plus the state tax rate (*STR*).

**Table 1: The nominal tax rate and the marginal state tax rate by year (%)**

| Year | TR | STR |
|---|---|---|
| 2005 | 27.5 | 0 |
| 2006 | 27.5 | 0 |
| 2007 | 25 | 0 |
| 2008 | 25 | 0 |
| 2009 | 25 | 0 |
| 2010 | 25 | 2.5 if TI ϵ ]2M, ∞[, 0 otherwise. |
| 2011 | 25 | 2.5 if TI ϵ ]2M, ∞[, 0 otherwise. |
| 2012 | 25 | 3 if TI ϵ ]1.5M, 10M], 5 if TI ϵ ]10M, ∞[, 0 otherwise. |
| 2013 | 25 | 3 if TI ϵ ]1.5M, 7.5M], 5 if TI ϵ ]7.5M, ∞[, 0 otherwise. |
| 2014 | 23 | 3 if TI ϵ ]1.5M, 7.5M], 5 if TI ϵ ]7.5M, 35M], 7 if TI ϵ ]35M, ∞[, 0 otherwise. |

M=€Millions;

ii. Insider ownership (*INSIDER*) equals 1 if the ratio between the shares owned by insiders and common shares outstanding are above sample median (0 otherwise). The literature usually indicates that insider ownership restricts earnings management because it may reduce agency conflicts (Jensen and Meckling, 1976) and opportunistic behavior (Warfield *et al.*, 1995). In practice, the process in which managers maximize their wealth is less likely to be costly to shareholders if managers' incentives are aligned with shareholders' interests. For example, Healy (1985) suggested that managers with low ownership may be more disposed to manage earnings upward to increase compensation (if compensation is a function of earnings). Nevertheless, the entrenchment hypothesis signals that insider ownership may also prompt self-interested actions (Cornett *et al.*, 2008). In this analysis, the purpose is to understand how insider ownership relates with

each kind of earnings management. It is expected that higher insider ownership biases the preferences of managers towards accrual management, because real management are more likely to negatively impact on operational efficiency and future competitiveness, affecting managers that are relevant shareholders. Accrual management is a more fictitious approach to drive earnings. As enhanced, even its impact on tax expenses can be more easily dispatched or postponed. Since *RM* occurs during the year, insider ownership is lagged in equation (3.3). In equation (3.4), the contemporaneous value is included, since *AM* is expected to take place mainly at the end of the year or to be responsive to *RM* intensity.

iii. Financial health (*HEALTH*) is projected to be related with higher operational flexibility (while the inverse also applies), therefore, low *HEALTH* should act as a real management constraint. In addition, firms closer to bankruptcy have more incentives to manage earnings upward, since they are trying to stay alive (although, in the sample used, there are not a large number of firms in a position of significant financial distress). Those firms are expected to use accrual management to increase reported earnings. This premise is consistent with evidence presented by Roychowdhury (2006) and Zang (2011). The variable is lagged in equation (3.3) and contemporaneous in equation (3.4). *HEALTH* is computed by the *ZSCORE* of Altman modified model (1968, 2000):

$$Z_{it} = 0.3 * \frac{NI_{it}}{TA_{it}} + 1.0 * \frac{REV_{it}}{TA_{it}} + 1.4 * \frac{R\_EAR_{it}}{TA_{it}} + 1.2 * \frac{WC_{it}}{TA_{it}} + 0.6 * \frac{MCAP_{it}}{TL_{it}} \qquad (3.5)$$

Where for each year *t* and firm *i, TA* is total assets, *NI* corresponds to net income, *REV* refers to revenue, *R_EAR* represents retained earnings, *WC* is working capital, *MCAP* denotes market capitalization and *TL* designates total liabilities;

iv. The effect of board size (*BOARD*) on earnings management is rather unclear. Nevertheless, it is important to understand the outcome of the resources that are applied with the enlargement of the board. Bigger boards are supposed to sum more experience and knowledge. However, crowded boards may lead to inefficiencies related with difficulties of communication and coordination (Jensen, 1993). Mather and Ramsay

(2006) and Ching *et al.* (2006) concluded that board size is positively related with accrual management. It is expected that directors are particularly concerned about strategic decisions and less with accounting issues. As a result, they should more easily detect real management. In this study board size is the ratio between the number of directors and lagged total assets.

v. In order to proxy for higher quality auditing a dummy variable (*BIG4*) that equals 1 if the firm is audited by a Big4 (0 otherwise) is employed. The literature has shown that Big4 auditing relates with lesser accrual management (Becker *et al.*, 1998; Francis *et al*., 1999), even though, Lawrence *et al.* (2011) presented indications that differences in accrual management estimations of Big4 and non-Big4 clients are related with clients' characteristics. Zang (2011) concluded that Big4 auditing is negatively related with real management and positively with accrual management and those results are expected to hold for Portuguese listed firms. Overall, *BOARD* is projected to be positively associated with accrual management.

vi. Firms with lengthier operational cycles (*CYCLE*) should more easily rely on accrual management strategies since they will have both larger accrual accounts and longer periods for accruals to reverse[9] (Zang, 2011). This variable is first quantified as in Dechow (1994)[10] and then transformed into a dummy variable[11] that equals 1 if a firm has an operational cycle above the whole sample median and 0 otherwise. The variable is lagged in equation (3.3) and contemporaneous in equation (3.4).

vii. Barton and Simko (2002) indicated that net operating assets (*NOA*) incorporate previous accounting decisions, such as earnings management practices that rely on accounting principles' flexibility. If a firm managed earnings upward in the past, current net

[9] One must also highlight that firms with lengthier operational cycles may be more exposed to shocks, which may lead to higher volatility in cash-flow from operations and in the accruals. Therefore, firms with lengthier operational cycles may be related with more abnormal accruals (or cash-flow from operations) not because of earnings management.

[10] The length of the operational cycle equals the days receivables are outstanding plus the number days products stay in stocks minus the number of days accounts payable are outstanding.

[11] The use of dummy variables incorporates important advantages by automatically accounting for outliers and non-linear relations between the variables.

operating assets will be overstated. It is expected that overstated net operating assets act as a constraint on current accrual management strategies. It is measured as total assets minus cash minus total liabilities plus total debt. This measure is then scaled by lagged sales. *NOA* is a dummy variable that equals 1 if net operating assets are above sample median at the beginning of the period (0 otherwise).

viii. *CONC* is a dummy variable that equals 1 if no shareholder owns more 25% of firms' shares (0 otherwise). It is used to proxy for ownership concentration. Although large shareholders are the ones with more incentives to monitor managers (Dechow *et al*., 1995), which should constrain earnings management, the literature has usually found an empirical positive relationship between accrual management and ownership concentration (Choi *et al*., 2004; Alves, 2012; Rad *et al*., 2016). This is consistent with large shareholders pressuring managers to maximise their wealth, which may be translated in a higher magnitude of earnings management (Jaggi and Tsui, 2007). As a result, *CONC* is expected to be negatively related with accrual management. The variable is lagged in equation (3.3) and contemporaneous in equation (3.4)

Per last, the *CONTROLS* considered are: the lagged market-to-book (*MTB*) ratio to contemplate firms' growth opportunities; the natural logarithm of the sum of market capitalization with preferred stock, minority interests and total debt minus cash, at the beginning of the year, proxies for size (*SIZE*); Return-on-assets is included but it is net of accrual management in equation (3.4) and net of total earnings management in equation (3.3) (*ROA_AM*, *ROA_EM*); cash flow from operations scaled by lagged total assets is included in equation (3.3) to address possible measurement errors. In addition, both equations include year indicators and computed are with generalized least squares cross-section weights.

### 3.6. Tax incentives

To investigate how both kinds of earnings management and derivatives use impact on tax expenses, the following models are applied:

$$ETR1_{it} = \beta_0 + \beta_1 * DERIV_{it} * CONVEX_{it} + \beta_2 * AMFLEX_i + \beta_3 * RMFLEX_i + \beta_{4,x} * CONTROLS_{x,it} + \varepsilon_{it} \quad (3.6)$$

$$ETR2_{it} = \delta_0 + \delta_1 * DERIV_{it} * CONVEX_{it} + \delta_2 * AMFLEX_i + \delta_3 * RMFLEX_i + \delta_{4,x} * CONTROLS_{x,it} + \varepsilon_{it} \quad (3.7)$$

Where for year *t*, and firm *i*, *ETR1* and *ETR2* is the ratio between tax expenses and pre-tax income [12] or cash flow from operations, respectively. Both variables are windsorized at 0. *DERIV* corresponds to a dummy variable that equals 1 if a firm is using derivatives and 0 otherwise. *CONVEX* is the excess of the nominal marginal tax rate over the effective tax rate. As a result, *DERIV*CONVEX* equals *CONVEX* if firms hedge and 0 otherwise. *AMFLEX* is firms' flexibility to use accrual management and *RMFLEX* is firms' operational flexibility, which reflects how easily real management strategies may be applied. Those variables are measured by the sum squared residuals of equations (3.1) and (3.2), respectively. The *CONTROLS* are mostly based on the study of Ribeiro *et al.* (2015), which is an analysis of the determinants of the effective tax rates of non-financial firms, listed on London stock exchange. Two sets of variables are employed, namely firm specific as well as non-firm specific characteristics, such as governance variables. In the first set, the variables included are capital intensity (*CAP_INT*) that is measured by the ratio between the value of property, plant and equipment and total assets and is expected to be negatively associated with effective tax rates due to amortizations. In opposite, inventories intensity (*INV_INT*), measured by inventories divided by total assets, is predicted to be positively related with *ETRs*. A dummy variable (*LEV_D*) that equals 1 if total debt divided by total assets is above sample median is incorporated to capture the effect of tax savings related with debt. This variable is considered at the beginning of the year. *ROA* is used to control for firm performance, while *SIZE* and *MTB* are considered at the beginning of the period to control for firm size and growth opportunities, respectively. R&D intensity is probably an important determinant, nonetheless, has already highlighted, this information is not quantitatively disclosed by most firms. In the second set the variables used insider

[12] The ratio between tax expenses and taxable income is not used because then both the numerator and the denominator would be net of the tax adjustments. Thus, the impact of tax preferences on *ETRs* would have been omitted.

ownership (*INSIDER*) and ownership concentration (*CONC*), both at the beginning of the year, and also board size (*BOARD*). No predictions are done for the impact of these variables. *BIG4* is included since their clients can also contract non-audit services, such as, tax services. Big4 are expected to have extensive knowledge of the tax system and induce relevant tax savings. Therefore, this variable is projected to be negatively associated with *ETR*s. The model is estimated with generalized least squares cross-section weights and time fixed effects.

To understand if convexity is relevant when firms consider the use of derivatives, the following model is applied:

$$\begin{aligned} DERIV_{it} &= \beta_0 + \beta_1 * CONVEX_{it-1} + \beta_2 * LTDEBT_{it} + \beta_3 * STDEBT_{it} \\ &+ \beta_4 * LEV\_D + \beta_5 * ISALES_{it} + \beta_6 * DY_{it-1} + \beta_7 * CYCLE_{it-1} + \beta_8 * HEALTH_{it-1} \\ &+ \beta_9 * BOARD_{it} + \beta_{10,x} * CONTROLS_{x,it} + \varepsilon_{it} \end{aligned} \quad (3.8)$$

Where for each year *t* and firm *i*, *DERIV* and *CONVEX* are as defined in equation (3.6) and (3.7), *TLDEBT* and *STDEBT* correspond to long term debt and short term debt, respectively. Both variables are scaled by the logarithm of lagged total assets. They capture interest rate risk and should be positively associated with hedging. *ISALES* is international sales divided by lagged total sales. It proxies for exchange rate risk and is expected to be positively related with derivatives use[13]. *DY* corresponds to dividend yield which is computed as dividends divided by market capitalization. This variable is considered at the beginning of the year. Firms that pay higher amounts of dividends, have greater needs for cash, hence, they have additional incentives to use derivatives (Graham and Rodgers, 2002). Firms with a lengthier operational cycle, have their receivables outstanding for longer periods, which means they are more exposed, for example, to market prices variations (Barton, 2001). Therefore, *CYCLE* (lagged) is predicted to be positively associated with hedging. *HEALTH* (at the beginning of the year) is anticipated to be negatively related with hedging, since distressed firms may be more sensible to shocks, which encourages the use of derivatives. In addition, according

[13] Portuguese firms are exposed to exchange risk when they make transactions with non-Euro Area (EA) countries. Most firms do not disclose sales at a country-level. *ISALES* are sales from production made abroad which should be more closely related with sales to non-EA countries.

to Smith and Stulz (1985) firms may hedge to smooth earnings and consequently ease creditors' perception of risk. Bigger boards are supposed to concentrate more knowledge and experience, which may ease the use of more complex strategies and products. Thus, *BOARD* is projected to be positively associated with derivatives use. Additional controls are *MTB* and *SIZE* at the beginning of the year and contemporaneous *ROA*. Those variables account for growth opportunities, firm size and performance, respectively. Coefficients are estimated using a Logit with year indicators.

### 3.7. Derivatives and earnings management

The study of how derivatives use influence earnings management decisions is based on Barton (2001) and Pincus and Rajgopal (2002). However, these researches use derivatives notional amounts and study the existence of a simultaneous decision to use derivatives and accrual management. The current study differs from these researches given the hypothesis presented is that firms make a sequential decision. Firstly, they decide about the use of derivatives and secondly on the magnitude of earnings management (accrual and real management). It is expected that firms that rely on hedging will have smoother earnings and consequently will need to engage in earnings management practices to smooth earnings to a lesser extent. To test this hypothesis the following model is used:

$$|EM_{it}| = \beta_0 + \beta_1 * DERIV_{it} + \beta_{2,x} * CONTROLS_{x,it} + \varepsilon_{it} \quad (3.9)$$

Where for each year *t* and firm *i*, |*EM*| denotes the absolute value of the sum between *AM* and *RM*. Hence, only the magnitude of earnings management is considered, given the theory of earnings management practices and derivatives only holds amid of firms with incentives to reduce earnings volatility. All the other variables considered are *CONTROLS*. Lagged *HEALTH* is included to control for financial distress and lagged *CYCLE* to consider operational risks. If a bigger *BOARD* eases the use of derivatives, then this variable should be negatively related with the absolute value of total earnings management. *CONVEX* is included to control for tax incentives to smooth earnings. According to Barton (2001), managers can maintain firms' dividend payout rates and

still pay fewer dividends by reducing earnings. Thus, dividend payout (*PAYOUT*), measured by the ratio between dividends and pre-managed earnings, is anticipated to be negatively related with absolute earnings management. Investors would probably require a risk premium if leveraged firms do not formally manage interest risk, even if firms present relatively stable earnings, as a result of earnings management schemes. Therefore, leveraged firms (*LEV_D*) should rely more on derivatives and less on earnings management. *AM_FLEX* and *RM_FLEX* are included because these variables control for measurement error in earnings management estimations, incorporate firm specific characteristics and proxy for operational flexibility to use each kind of earnings management. The absolute value of *CFO* (|*CFO*|) is used to control for measurement error. *ROA_EM* controls for firm performance whereas *MTB* and *SIZE*, at the beginning of the year, are considered to incorporate firms' growth opportunities and size, respectively. The model is estimated with generalized least squares cross-section weights and time fixed effects.

### 3.8. Financial and market Incentives

To test if firms manage earnings in response to financial and market incentives, the following model is employed:

$$EM_{it} = \beta_0 + \beta_1 * BORROWERS_{it} * CREDIT_{it} + \beta_2 * SMOTHERS_{it} + \beta_3 * BEATERS_{it} + \beta_4 * DIVID_{it} + \beta_5 * CONTRAINTS_{it} + \beta_{6,x} * CONTROLS_{x,it} + \varepsilon_{it} \quad (3.10)$$

Where for year *t* and firm *i*, *EM* is the sum of *AM* and *RM*. This variable equals 1 if an observation is on the top quartile of a sample that includes only firm-years with positive values in *LTDEBT* and 0 in all other cases. *CREDIT* is the first difference of an index of banks terms and conditions when lending to enterprises in Portugal. It is based on the qualitative data from Bank Lending Survey. To construct the index, the series are rescaled to set mean equal to zero and standard deviation equal to 1[14]. Then, principal components analysis is used to construct a single series that summarizes the information content. Subsequently, this single series is rescaled so that its mean equals 100 and the

[14] This is to ensure that principal components outcome is not influenced by measurement units.

standard deviation equals 10. Since the frequency of the data is quarterly, 4 quarters moving averages are applied and the value obtained for the last quarter of each year is used. The series included in the index refer to the balance of responses of Portuguese main banks on the following questions regarding banks' terms and conditions: Your bank's loan margin on average loans; Your bank's loan margin on riskier loans; Non-interest rate charges; Size of the loan or credit line; Collateral requirements; Loan covenants; Maturity. Overall, *BORROWERS*CREDIT* equals the evolution of banks terms and conditions if there is a relevant increase in long term debt and 0 otherwise. *SMOOTHERS* correspond to a dummy variable that equals 1 if firms' return on assets is between 0 and 0.01 (0 otherwise), which happens for 53 observations. *BEATERS* equals 1 if change in earnings per share is between 0 and 2 cents (0 otherwise) and this occurs for 35 firm-years. *DIVID* equals 1 if pre-managed earnings are below dividends payed in the previous year and the firm pays dividends in the current year, 0 otherwise. *CONTRAINTS* corresponds to a variable that ranges from 0 to 6, and is the sum of 6 dummy variables that are supposed to capture circumstances in which it is harder for firms to manage earnings. Thus, *CONTRAINTS* sums 1 if the length of the operational cycle, or the *ZSCORE* from Altman modified model (1968, 2000), are in the first quartile of the sample. *CONTRAINTS* also sums 1 if insider ownership and net operating assets are in the top quartile in the beginning of the year. The other criteria equal *BIG4* and *CONC*. A top/bottom quartile approach is used, since firm-years observations in the top/bottom quartiles are the ones expected to be significantly and effectively restricted. *CONTROLS* are *ROA_EM*, *MTB*, *LEV* (total debt divided by total assets) and *SIZE* to account for firms' performance, growth opportunities, leverage, and size, respectively. The model is estimated with generalized least squares cross-section weights and time fixed effects.

## 4. Results

### 4.1. Accrual-based management vs real activities-based management

**Table 2: Estimation results of equations (3.3) and (3.4)**

| | **Predicted sign** | ***RM*** | **Predicted sign** | ***AM*** |
|---|---|---|---|---|
| *CONSTANT* | | 0.0993*** | | -0.1234*** |
| $INSIDER_{t-1/t}$ | - | -0.0055** | + | 0.0014 |
| $MTR_t$ | - | -0.0028*** | + | 0.0035*** |
| $HEALTH_{t-1/t}$ | + | -0.0121*** | - | 0.0081*** |
| $BOARD_t$ | - | -6.7272 | + | 160.0484* |
| $BIG4_t$ | + | 0.0014 | - | -0.0048* |
| $CYCLE_{t-1/t}$ | - | 0.0084*** | + | 0.0026 |
| $NOA_t$ | + | 0.0017 | - | 0.0012 |
| $CONC_{t-1/t}$ | + | -0.0023 | - | -0.0025 |
| $SIZE_{t-1}$ | ? | -0.0029*** | ? | 0.0017* |
| $MTB_{t-1}$ | ? | -0.0018*** | ? | 0.0013** |
| $ROA\_EM_t$ | - | -0.1051*** | | |
| $ROA\_AM_t$ | | | - | -0.1784*** |
| $CFO_t$ | + | 0.4354*** | | |
| $\boldsymbol{RM_t}$ | | | **-** | **-0.6185*** ** |
| Year dummies | | Yes | | Yes |
| Adjusted R-squared | | 0.5281 | | 0.5941 |
| Prob (F-stat) | | 0.0000 | | 0.0000 |
| DW Stat | | 1.8894 | | 1.8634 |
| Total panel obs. | | 307 | | 306 |

*, **, and *** indicate significance at the 10%, 5% and 1% level, respectively;

The results (Table 2) point that insider ownership (*INSIDER*) acts mostly as a real management constraint, still it is positively related with accrual management. This indicates that when executives have a relevant fraction of the firms' stock, they prefer not to engage in practices that may affect their future wealth and is in accordance with the agency theory. The signal and significance of the coefficients for *MTR* are consistent with accrual management being more desirable from a tax-based standpoint. When managing earnings upward, through accrual management, firms may not affect tax expenses or be able to defer additional costs. The results point that firms with lower *HEALTH* are more likely to use real management stratagems, which is the opposite to the predictions presented. Firstly, it is important enhance that the variable *HEALTH* does not differentiate firms in financial distress from others. It actually compares the 50% better with the 50% worst. The outcome hints that firms with lower *HEALTH* are more motivated to increase cash resources than just to report higher earnings. For example, if a firm is closer to be in distress, then it may be more interested in making sales in which receivables will be outstanding for shorter periods, giving its clients less time to pay, at the cost of a lower turnover. Interestingly, boards with more directors (*BOARD*) are associated with accrual-based strategies. This hints that an increase in the number of directors may lead to an increase in bureaucracy, which diminishes directors' monitoring abilities, generating space for accrual-based approaches. One should highlight that more directors do not meaningfully imply less real management, just more accrual management. Thus, the evidence suggests that from an earnings management perspective, on average, more directors do not entail better monitoring. It was projected that firms with lengthier operational cycles (*CYCLE*) would have more space to engage in accrual management. Nonetheless, it also stimulates real management, according to the results obtained. Still, firms with lengthier operational cycles, such as firms from the real-estate sector, may have more volatile cash-flows and as a result, being associated with higher levels of earnings management[1]. As expected Big4' clients have lower levels of discretionary accruals, that is, rely more in accounting-based strategies. Moreover, this variable relates positively with real management. Net operating assets (*NOA*), does not relate with earnings management in the way it was anticipated. Nevertheless, the variable is not statistically relevant in both

[1] This highlights the relevance of Dechow *et al.* (2012) methodology to assess earnings quality.

equations, amid of the specification design presented[2]. Per last, the purpose of equations (3.3) and (3.4) was to test the existence of a trade-off between accrual and real activities-based management (*H1*). In fact, the coefficient of *RM* in equation (3.4) is negative, which confirms *H1*, at 99% confidence level. As a robustness check, *AM* and *RM* were transformed in dummy variables (*AM_D* and *RM_D*) that equal 1 if accrual or real management are positive (0 otherwise), respectively. In this scenario, *H1* is still confirmed. The model was also re-estimated with robust least squares to check if measurement errors in the endogenous variables could be driving the main results. The conclusions hold both qualitatively and quantitatively. Tough, these results do not imply that there is not also a simultaneous decision process. Probably, both dynamics play a role. However, managers are likely to prefer to firstly use real management while being able to apply accrual management strategies if necessary. Overall, the results show the relevance of considering both strategies in subsequent researches. Moreover, regulation that restrains accounting-based strategies may be compensated for more intensive real-management strategies.

### 4.2. Tax incentives

**Table 3: Estimation results of equations (3.6) and (3.7)**

| | **Predicted sign** | ***ETR1*** | ***ETR2*** |
|---|---|---|---|
| *CONSTANT* | | 0.1695*** | 0.0006 |
| $CAP\_INT_t$ | - | -0.0793*** | -0.0598* |
| $INV\_INT_t$ | + | -0.0584 | 0.0604 |
| $LEV\_D_{t-1}$ | - | -0.0219*** | -0.0329*** |
| $INSIDER_{t-1}$ | + | 0.0004 | -0.0283** |
| $CONC_{t-1}$ | + | 0.0063 | 0.0348*** |
| $BOARD_t$ | - | -361.22 | -1227.1*** |
| $BIG4_t$ | - | 0.0109 | -0.0452*** |
| $ROA_t$ | + | 0.1864** | 0.4596*** |

[2] In untabulated results, it was possible to confirm EM is negatively related with a dummy variable that equals 1 if net operating assets are on the top quartile (0 otherwise). This implies that net operating assets acts as an earnings management constraint only when net operating assets are significantly overvalued.

| | | | |
|---|---|---|---|
| $SIZE_{t-1}$ | + | 0.0059** | 0.0129*** |
| $MTB_{t-1}$ | + | 0.0021 | $7.32E^{-5}$ |
| ***$AM\_FLEX_t$*** | **?** | **-0.6959*** ** | **0.6422** ** |
| ***$RM\_FLEX_t$*** | **?** | **1.3171*** ** | **0.5878** |
| ***$CONVEX_t$*$DERIV_t$*** | **-** | **-0.0080*** ** | **-0.0034*** ** |
| | | | |
| Year dummies | | Yes | Yes |
| Adjusted R-squared | | 0.8146 | 0.2189 |
| Prob (F-stat) | | 0.0000 | 0.0000 |
| DW Stat | | 1.2234 | 1.3319 |
| Total panel obs. | | 342 | 342 |

*, **, and *** indicate significance at the 10%, 5% and 1% level, respectively;

According to the results presented in Table 4, capital intensive (*CAP_INT*) firms have lower effective tax rates. Nevertheless, this variable is less relevant when tax expenses are consider as proportion of cash-flow from operations. *INV_INT* relates differently in the two equations, while not statistically significant in none of them. This outcome may be the result of not considering expenses related with research and development. Leverage (*LEV_D*) is negatively associated with effective tax rates in both equations, which translates tax savings related with indebtedness. As expected, profitability (*ROA*) relates positively with *ETR*s. These results are also consistent with bigger firms facing political costs that can be perceived through the tax system, since *SIZE*'s coefficient is positive and statistically significant in both equations. Interestingly, it is possible to verify that when tax expenses are measured as a proportion of pre-tax income, non-firm specific characteristics (*BOARD*, *CONC*, *INSIDER*, and *BIG4*) are not statistically relevant. However, they appear to play an important role when cash *ETR* is used (*ETR2*)[3]. This may be indicating that firms are primarily concerned with the impact of taxation on their cash resources. The results point that, at 99% confidence level, boards with more directors are able to soft cash *ETRs*. In addition, firms in which no shareholder has a large influence (*CONC*), tend to have higher cash *ETRs*. This suggests that in those circumstances, managers are less likely to be compelled by shareholders to

[3] By using the cash-flow from operations as denominator when computing *ETRs*, one can control for differences that arise from the use of different accounting methods.

engage in tax management or that minority shareholders have less incentives to monitor management's efficiency. In opposite, firms in which insiders have higher ownership (*INSIDER*) have lower cash *ETR*s (*ETR2*). This is consistent with managers being motivated to reduce taxation impact on firms' cash when they are more relevant owners, directly benefiting from the reduction of tax expenses. Overall, the impact of *BOARD*, *CONC* and *INSIDER* on cash *ETR* is in line with the results of Ribeiro *et al.* (2015) when studying firms listed on the London stock exchange. As projected, by providing tax services, Big4s can induce relevant tax savings. On average, Big4s are able to reduce their clients cash *ETR*s by 4.5%. It could be important for the Tax Authority to understand how this is achieved, that is, how *BIG4*' clients were being benefited. *RM_FLEX* is positively related with both measures of effective tax rates, which points that when managing earnings through real activities, firms are usually not motivated by tax incentives. The interpretation of the coefficient of *AM_FLEX* is not that clear, since the variable is statistically significant in both equations but with opposite signs. Therefore, it is not possible to conclude if firms engage in accrual management strategies with the purpose of paying fewer taxes. Per last, the coefficient of *CONVEX*DERIV* is negative and statistically significant (99% confidence level) in both equations. This shows that as the tax function becomes more convex, tax savings related with the use of derivatives increase, as suggested by Smith and Stulz (1985). If *DERIV* and *CONVEX* are included in the equation separately, that is, by not making an interaction between them, none of the two has a statistical relevant explanatory power. In other words, according to the results, firms can directly[4] reduce tax expenses by hedging, if the tax function is convex (*H2*).

[4] As an example, firms can indirectly reduce tax expenses with derivatives by reducing risk due to the reduction in the volatility of cash-flows. This way, firms are able to reduce the probability of bankruptcy. As a result, firms may reduce the cost of capital and increase debt capacity, generating tax savings related with indebtedness (Graham, and Rodgers, 2002).

**Table 4: Estimation results of equation (3.8)**

| | **Predicted sign** | ***DERIV*** | |
|---|---|---|---|
| | | Coefficients | Marginal effects |
| *CONSTANT* | | -4.9852 | -1.9888 |
| $LTDEBT_t$ | + | $2.45E^{-5}$*** | $9.76E^{-6}$ |
| $STDEBT_t$ | - | $-2.24E^{-5}$ | $8.94E^{-6}$ |
| $ISALES_t$ | + | 0.9719* | 0.3874 |
| $HEALTH_{t-1}$ | - | 1.1060*** | 0.4412 |
| $CYCLE_{t-1}$ | + | 0.8474** | 0.3381 |
| $BOARD_t$ | + | -30190* | -12044 |
| $DY_{t-1}$ | + | 9.8936** | 3.9470 |
| $ROA_t$ | ? | 3.6622 | 1.4610 |
| $SIZE_{t-1}$ | ? | 0.1525 | 0.0609 |
| $MTB_{t-1}$ | ? | 0.1710** | 0.0682 |
| ***$CONVEX_{t-1}$*** | **+** | **0.0204**** | **0.0082** |
| Year dummies | | Yes | |
| McFadden R-squared | | 0.3982 | |
| Prob (LR stat) | | 0.0000 | |
| Obs. correctly predicted | | 83.11% | |
| Total panel obs. | | 296 | |

*, **, and *** indicate significance at the 10%, 5% and 1% level, respectively;

If firms can reduce tax expenses by hedging with derivatives, when the tax function is convex, one shall analyse if firms hedge due to tax convexity. That is the purpose of estimating equation (3.8). Table 5 shows firms' probability to use derivatives increases with long term debt (*LTDEBT*). This implies that firms', during the sample period, have been concerned with interest rate risk. In addition, international sales (*ISALES*) are positively related with hedging, which is consistent with firms managing exchange rate risk. Strangely, healthier firms are the ones more likely to hedge with derivatives and *HEALTH*'s coefficient is statistically significant at 99% confidence level. From a theoretically point of view, the more distressed firms would be the ones expected to

hedge, because they are more sensible to shocks and by hedging, they could diminish bankruptcy probability. In addition, by hedging those firms could smooth earnings and consequently creditors' perception of risk. The results may, however, be linked with transaction costs associated with these instruments and with the existence of alternative strategies to smooth earnings, which might be less costly. Indeed, firms may smooth earnings through earnings management strategies (this will be discussed later, Table 5). As projected, firms with lengthier operational cycles (*CYCLE*), face more risks, thus, hedge more. The variable *BOARD* relates negatively with hedging, which is opposite to the predictions. That implies that the effect of additional experience and knowledge on the board is more than compensated by the increase in bureaucracy and in difficulties to approve complex decisions. Nonetheless, once more, one should highlight that there may be other procedures to reduce earnings volatility. The results presented in Table 2, indicated that firms with more directors on the boards tend to use more accrual management. Besides, the correlation between *BOARD* and both *AM_FLEX* and *RM_FLEX*, is significant and positive (see Annex, Table 11). Overall, the signal of the coefficients of the variables *HEALTH* and *BOARD* demonstrate the importance of studying the existence of a trade-off between earnings management and hedging policies. The results obtained show firms that pay higher dividends (*DY*), tend to use derivatives. Those firms need to maintain higher levels of cash, so they can pay higher dividends. They are probably hedging to safeguard that their cash resources do not fall short of dividend payments. The importance of paying expected dividends is also discussed later (Table 6). Finally, the main purpose of the regression was to understand if hedging policies were responsive to tax convexity. At 95% confidence level, *H3* is confirmed. An increase of one percentage point in convexity increases the probability of derivatives use by 0.8%[5]. Overall, the results point that firms consider tax convexity when deciding to hedge. Furthermore, the model appears to be reliable given it correctly classifies firms-years as hedgers or non-hedgers 83.11% of the time.

[5] Marginal effects are computed at the mean.

### 4.3. Derivatives and earnings management

**Table 5: Estimation results of equation (3.9)**

| | **Predicted sign** | **$\|EM\|$** |
|---|---|---|
| $C$ | | 0.0261** |
| $HEALTH_{t-1}$ | - | -0.0025 |
| $CYCLE_{t-1}$ | - | -0.0017 |
| $BOARD_t$ | - | -201.8** |
| $PAYOUT_t$ | - | -0.0002 |
| $CONVEX_t$ | + | 8.58E-5* |
| $LEV\_D_{t-1}$ | - | -0.0029** |
| $AM\_FLEX_t$ | + | 0.3324*** |
| $RM\_FLEX_t$ | + | 0.2161** |
| $ROA\_EM_t$ | - | -0.0566*** |
| $MTB_{t-1}$ | ? | 0.0004 |
| $SIZE_{t-1}$ | - | -0.0003 |
| $\|CFO\|_t$ | + | 0.0036 |
| $\boldsymbol{DERIV_t}$ | **-** | **-0.0076*****|
| Year dummies | | Yes |
| Adjusted R-squared | | 0.5256 |
| Prob (F-stat) | | 0.0000 |
| DW Stat | | 2.0317 |
| Total panel obs. | | 299 |

*, **, and *** indicate significance at the 10%, 5% and 1% level, respectively;

Table 6 should be examined together with Table 5, because it is expected that firms first decide on the use of derivatives and then adjust earnings management strategies to smooth earnings. Therefore, equation (3.8) (Table 5) represents the first step of the decision making process and equation (3.9) (Table 6) the second one. If taken together, the results in Table 5 and 6 suggest the more distressed firms are more likely to manage earnings to smooth reported income than to use derivatives, which may be explained,

for example, by distressed firms' disability to pay transaction costs. *BOARD* is statistically relevant, but negatively associated with smoothing practices, whether based on earnings management or derivatives, that is, crowded *BOARDs* are less likely to use strategies to smooth earnings, whether through earnings management engagements or by hedging with derivatives. This hints the existence of limitations related with more populated boards. Furthermore, this does not appear to be the result of better monitoring because *BOARD* is positively associated with accrual management practices to increase earnings (Table 2). The more leveraged firms *(LEV_D)* hedge more. As a result, they rely less in earnings management practices to reduce earnings volatility. In addition, as expected, tax convexity (*CONVEX*) is positively associated with earnings management practices to smooth earnings. Intuitively, firms able to manage earnings, whether through accruals (*AM_FLEX*) or real activities (*RM_FLEX*), tend to use more these strategies to smooth reported income. The main purpose of this analysis was to test the hypothesis that when firms use derivatives, they are likely to have smoother earnings, and consequently, will need to manage earnings to a lesser extent, with the objective of smoothing reported income *(H6)*. *DERIV* is statistically relevant (at 99% confidence level), which implies that, when firms use derivatives, on average, total absolute earnings management, measured as a proportion of total assets (at the beginning of the year), decline by 0.7 percent. Still, it would be rather normal that, due to higher volatility, non-hedging firms have more abnormal accruals or cash-flows. Nevertheless, in the estimations, |*CFO*| and *ROA_EM* should already be controlling for that. Likewise, if a dynamic approach is employed, that is, when the lagged value of |*EM*| is included as an explanatory variable the results do not change meaningfully.

### 4.4. Financial and market incentives

**Table 6: Estimation results of equation (3.10)**

| | Predicted Sign | EM |
|---|---|---|
| *CONSTANT* | | -0.0028* |
| $ROA\_EM_t$ | - | -0.3079*** |
| $CFO\_RM_t$ | - | 0.0505 |
| $LEV_{t-1}$ | - | -0.0262*** |
| $SIZE_{t-1}$ | - | 0.0017** |
| $MTB_{t-1}$ | ? | 0.0008 |
| $CONSTRAINTS_t$ | - | -0.0032*** |
| $BEATERS_t$ | + | -0.0016 |
| $SMOTHERS_t$ | + | -0.0055* |
| $BORROWERS_t*CREDIT_t$ | + | 0.0006** |
| $DIVID_t$ | + | 0.0108*** |
| Year dummies | | Yes |
| Adj. R-squared | | 0.2808 |
| Prob (F-stat) | | 0.0000 |
| DW Statistic | | 1.7789 |
| Total panel obs. | | 300 |

*, **, and *** indicate significance at the 10%, 5% and 1% level, respectively;

Equation (3.10) was estimated (Table 6) with the purpose of answering the question: why firms manage earnings upward? First of all, the variable *CONSTRAINTS* appears to be effectively capturing earnings management restrictions. Its coefficient is negative and the variable is statistically significant at 99% confidence level. *Ceteirs paribus*, the difference in total earnings management between a non-constrained and a full constrained firm equals on average, 1.92% of total assets. Controlling for earnings management constraints is of first importance, since firms with specific motivations to manage earnings may not be able to do it because they are in some way restrained. This should increase the power of the tests. The most typical market incentives to manage

earnings, proxied in this case by *BEATERS* and *SMOOTHERS* appear not to be of first relevance for Portuguese listed firms. This study does not present evidence of firms managing earnings to avoid losses or earnings decreases[6]. The results presented show that firms with higher increases in long term debt, manage earnings upward in response to an increase in banks terms and conditions. This is consistent with firms minimizing the cost of capital through earnings management. On average, when those firms celebrate new debt contracts, an increase of one standard deviation in banks terms and conditions leads to an increase in earnings management of 0.6% of total assets. If the variables *BORROWERS* and *CREDIT* are included separately, they do not appear to be important from a statistical point of view. In other words, firms manage earnings to increase the cost of capital if financial conditions get worse, that is, when the marginal benefit of managing earnings increases. The variable *BORROWERS* equals 1 if the increase in long-term debt is on the top quartile (within firms with increases in long-term debt) and 0 otherwise. If the observations on the third quartile are also set to equal one, then the coefficient of the variable *BORROWERS*CREDIT* becomes less significant. In this sense, the results are methodology sensitive. Theoretically, this may just be pointing, again, to the idea that firms risk to manage earnings upward only when they can significantly benefit from it, in this case, when the amount of credit obtained is high enough. Still, the main incentive for firms to manage earnings seems to be the payment of expected dividends, since *DIVID* is statistically significant at 99% confidence level. The results suggest that when earnings are falling short of the dividends payed in the previous year, firms on average manage earnings upward by 1.08% of total assets. This outcome is in accordance with the literature that highlights the importance of dividends to shareholders. This is also consistent with the results of Naveen *et al*. (2008) when studying Standard & Poor's 1500 firms. Overall, the results presented are robust because both kinds of earnings management are considered; most studies focus only in only one incentive while this investigation incorporates different ones; this study has a complete measure of earnings management constraints, whereas

[6] As a robustness check, the variable beaters was set to equal to 1 if the variation in earnings per share is between 0 and 1 cent while smoothers was computed to equal 1 if return on assets was above 0 and lower than half percent. Both variables were set to 0 in all other cases. In this scenario, the signal of the coefficient of those variables is still negative, even if not statistically significant.

other researches do not control for this restrictions or just use a reduced number of specific control variables as robustness checks.

## 5. Conclusion

This research aims at filling a gap in the literature for Portugal, concerning earnings management, by providing a comprehensive and wide study. In fact, focusing the research in Portugal brought some difficulties that needed to be addressed. A relevant issue was the existence of a reduced number of firms. Moreover, those firms are scattered by different industries. These are structural characteristic of Portuguese capital markets. Hence, firm-level estimations were applied, which was possible because there was for most firms ten years of data since the adoption of IFRS. Overall, firm-level estimations have advantages and disadvantages and researchers might consider a procedure that incorporates the benefits of both industry-year and firm-level estimations. Still, the most important point may be that, from now on, there is a defensible standard framework that Portuguese institutions and researchers may use and develop.

This study provided evidence that accrual and real management strategies are substitutes, which is in line with the results obtained by Zang (2011). The underlying implication of this is that proxying earnings management exclusively with abnormal accruals is likely to weaken the power of tests. Therefore, researchers should use a more complete measure of earnings management. The results presented also suggest that as the marginal tax rate increases, managers prefer to trade real for accrual management. This hints that when managing earnings upward through accrual management, firms can more easily soft the increase in the tax expenses. Healthier firms also appear to prefer to rely on accrual management, whereas firms with lengthier operational cycles use more real management.

Using the work of Barton (2001) and Pincus and Rajgopal (2002) as benchmarks, it was possible to present evidence consistent with firms that use financial derivatives managing earnings, to smooth reported income, in lesser magnitudes. Moreover, if increases in pre-tax income lead to each time smaller increases in net income firms can reduce tax expenses if they hedge with derivatives. This is the first research to validate this empirically. Theoretically, they would also be able to do this with earnings management approaches; even so, this research fails to provide evidence of that.

Per last, it was presented evidence that firms manage earnings upward to meet dividend thresholds, as in Naveen *et al.* (2008). The results also suggested, though not so meaningfully, that firms manage earnings upward to decrease the cost of capital.

This investigation was designed to test a total of ten hypotheses. It was not possible to confirm four of them (*H4*, *H5*, *H7*, *H8*). Indeed, this study does to confirm that firms reporting low earnings (*H7*) and small earnings increases (*H8*) are more likely to be managing earnings upward, even after an alternative specification for the proxies used. Nevertheless, the literature concerning earnings management, assumed frequently that those were primary motivations for firms to manage earnings upward. This underlines the importance of focusing the study in Portugal, providing a better understanding of the specific drivers of Portuguese listed firms regarding earrings management.

In *H4* and *H5* it was suggested that accrual and real management practices had an impact on effective tax rates. Although, some indications that earnings management relates with *ETRs* were provided, this relation was not meaningfully clarified. Hence, there is clearly space for improvements in future researches, mainly in the methodology. Still, this is one more step to comprehend this dimension of earnings management and researchers can benefit from it in future studies.

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## 7. Annex

**Table 7: Variables measurement and sources (part 1)**

| Variables | Measurement | Source |
|---|---|---|
| *AM* | Residual of equation (3.1) for each firm and year | Datastream, |
| *AM_FLEX* | Sum squared residuals of equation (3.1) for each firm | Datastream, |
| *BEATERS* | 1 if the change in earnings per share is between 0 and 2 cents, 0 otherwise. | Datastream |
| *BIG4* | 1 if the firm audited by a Big4, 0 otherwise | Amadeus, financial reports |
| *BOARD* | Directors on the board / lagged total assets | Amadeus, financial reports |
| *BORROWERS *CREDIT* | *CREDIT* equals the change in the first principal component of the qualitative data of Bank Lending Survey about Portuguese banks' terms and conditions regarding firms' credit, after recalling it to have mean 100 and standard deviation 10. *BORROWERS* equals 1 if *LTDEBT* is on the top quartile (among firms with increases in long-term debt), 0 otherwise. | Bank of Portugal, Datastream, Financial reports |
| *CAP_INT* | Net property, plant and equipment / total assets | Datastream |
| *CFO* | Cash-flow from operations / lagged total assets | Datastream |
| *CFO_RM* | *CFO - RM* | Datastream |
| *CONC* | 1 if no shareholder holds more than 25% of outstanding shares, 0 otherwise | Amadeus, financial reports |

**Table 8: Variables measurement and sources (part 2)**

| Variables | Measurement | Source |
|---|---|---|
| *CONSTRAINTS* | Sums 1 in each of these circumstances: if firms' operational cycle or Z-score (Altman, 2000) is in the first quartile of the sample; if insider ownership (closely held shares / common shares outstanding) and net operating assets (scaled by lagged total sales) are in the top quartile in the beginning of the year; if the firm is audited by a Big4 or if *CONC* equals 1. | Datastream, financial reports, Amadeus |
| *CONVEX* | Nominal marginal tax rate - effective tax rate | Datastream, Tax authority |
| *CYCLE* | Average days receivables are outstanding + average days stocks are held – average days payables are outstanding | Datastream |
| *DERIV* | 1 if the firm uses derivatives, 0 otherwise | Financial reports |
| *DIVID* | 1 if net income net of earnings management are above dividends paid in the previous year and the firm pays dividends in the current year, 0 otherwise | Datastream |
| *DY* | Dividends / market capitalization | Datastream |
| *EM* | *AM + RM* | Datastream |
| *ETR1* | Tax expenses / pre-tax income | Datastream |
| *ETR2* | Tax expenses / cash-flow from operations | Datastream |
| *HEALTH* | 1 if the Z-score, calculated as in Altman (2000), is above sample median, 0 otherwise | Datastream |

**Table 9: Variables measurement and sources (part 3)**

| Variables | Measurement | Source |
|---|---|---|
| *INSIDER* | 1 if the ratio between closely held shares and common shares outstanding is above sample median, 0 otherwise; Closely held shares denotes shares owned by insiders which implies officers, directors and their families, shares held in trust, shares of the company held by another corporation (except shares held in a fiduciary capacity by financial institutions), shares held by pension/benefit plans and shares held by individuals who hold 5% or more of the outstanding shares | Datastream |
| *INV_INT* | Inventories / total assets | Datastream |
| *ISALES* | sales from production made abroad scaled by lagged total sales | Datastream |
| *LEV* | Total debt / total assets | Datastream |
| *LEV_D* | Equals 1 if *LEV* is above sample median, 0 otherwise | Datastream |
| *LTDEBT* | Long term debt / logarithm of lagged total assets | Datastream |
| *MTB* | Market capitalization / shareholders' funds | Datastream |
| *MTR* | Nominal marginal tax rate (includes marginal state tax) | Tax authority |
| *NOA* | 1 if net operating assets (scaled by lagged total sales) are above sample median, 0 otherwise; Net operating assets equals: (total assets - cash - total liabilities + total debt) | Datastream |
| *PAYOUT* | Dividends / net income net of earnings management | Datastream |

**Table 10: Variables measurement and sources (part 4)**

| Variables | Measurement | Source |
|---|---|---|
| *RM* | Residual of equation (3.2) for each firm and year. | Datastream |
| *RM_FLEX* | Sum of squared residuals from equation (3.2) for each firm | Datastream |
| *ROA* | Net income / total assets | Datastream |
| *ROA_AM* | Net income net of accrual management / total assets | Datastream |
| *ROA_EM* | Net income net of earnings management / total assets | Datastream |
| *SIZE* | The natural logarithm of the sum of market capitalization with preferred stock, minority interests and total debt minus cash | Datastream |
| *SMOOTHERS* | 1 if *ROA* is between 0 and 0.01, 0 otherwise | Datastream |
| *STDEBT* | Short term debt / logarithm of lagged total assets | Datastream |

**Table 11: Descriptive statistics (part 1)**

| | Mean | Std. Dev. | Qaurtile 1 | Median | Q3 |
|---|---|---|---|---|---|
| $AM_t$ | 0.0000 | 0.0529 | -0.0225 | 0.0016 | 0.0217 |
| $AM\_FLEX_t$ | 0.0291 | 0.0512 | 0.0036 | 0.0150 | 0.0296 |
| $BEATERS_t$ | 0.0933 | 0.2913 | 0.0000 | 0.0000 | 0.0000 |
| $BIG4_t$ | 0.6021 | 0.4901 | 0.0000 | 1.0000 | 1.0000 |
| $BOARD_t$ | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $BORROWERS_t$ | -0.1564 | 4.2662 | 0.0000 | 0.0000 | 0.0000 |
| $CAP\_INT_t$ | 0.3237 | 0.1959 | 0.1403 | 0.3390 | 0.4807 |
| $CFO_t$ | 0.0503 | 0.0787 | 0.0103 | 0.0529 | 0.0950 |
| $\|CFO\|_t$ | 0.0503 | 0.0787 | 0.0103 | 0.0529 | 0.0950 |
| $CFO\_RM_t$ | 0.0471 | 0.0627 | 0.0058 | 0.0502 | 0.0789 |
| $CONC_t$ | 0.3037 | 0.4604 | 0.0000 | 0.0000 | 1.0000 |
| $CONC_{t-1}$ | 0.3120 | 0.4640 | 0.0000 | 0.0000 | 1.0000 |
| $CONSTRAINTS_t$ | 1.9455 | 1.1026 | 1.0000 | 2.0000 | 3.0000 |
| $CONVEX_t$ | 5.2290 | 18.644 | -6.3195 | 4.1956 | 21.743 |
| $CONVEX_{t-1}$ | 4.6768 | 18.522 | -6.8788 | 3.7352 | 20.229 |
| $CYCLE_t$ | 0.5000 | 0.5007 | 0.0000 | 0.5000 | 1.0000 |
| $CYCLE_{t-1}$ | 0.5061 | 0.5007 | 0.0000 | 1.0000 | 1.0000 |
| $DERIV_t$ | 0.4429 | 0.4973 | 0.0000 | 0.0000 | 1.0000 |
| $DIVID_t$ | 0.1880 | 0.3913 | 0.0000 | 0.0000 | 0.0000 |
| $DY_{t-1}$ | 0.0303 | 0.0446 | 0.0000 | 0.0133 | 0.0467 |
| $EM_t$ | 0.0000 | 0.0427 | -0.0155 | 0.0002 | 0.0173 |
| $\|EM\|_t$ | 0.0276 | 0.0326 | 0.0075 | 0.0168 | 0.0361 |
| $ETR1_t$ | 0.2036 | 0.1550 | 0.0246 | 0.2107 | 0.3124 |
| $ETR2_t$ | 0.1369 | 0.1457 | 0.0036 | 0.0989 | 0.1991 |
| $HEALTH_t$ | 0.4987 | 0.5007 | 0.0000 | 0.0000 | 1.0000 |
| $HEALTH_{t-1}$ | 0.5029 | 0.5007 | 0.0000 | 1.0000 | 1.0000 |
| $INSIDER_t$ | 0.5000 | 0.5006 | 0.0000 | 0.5000 | 1.0000 |
| $INSIDER_{t-1}$ | 0.4879 | 0.5005 | 0.0000 | 0.0000 | 1.0000 |

**Table 12: Descriptive statistics (part 2)**

| | Mean | Std. dev. | Q1 | Median | Q3 |
|---|---|---|---|---|---|
| $INV\_INT_t$ | 0.0846 | 0.0959 | 0.0159 | 0.0580 | 0.1111 |
| $ISALES_t$ | 0.3062 | 0.3419 | 0.0000 | 0.1881 | 0.5493 |
| $LEV\_D_{t-1}$ | 0.4987 | 0.5007 | 0.0000 | 0.0000 | 1.0000 |
| $LEV_{t-1}$ | 0.4349 | 0.2019 | 0.2932 | 0.4245 | 0.5494 |
| $LTDEBT_t$ | 58462 | 138705 | 2468 | 12945 | 47161 |
| $MTB_{t-1}$ | 1.6201 | 3.6598 | 0.5722 | 1.1057 | 2.2630 |
| $MTR_t$ | 24.609 | 7.5762 | 25.000 | 27.500 | 27.500 |
| $NOA_{t-1}$ | 0.5179 | 0.5004 | 0.0000 | 1.0000 | 1.0000 |
| $PAYOUT_t$ | 0.4507 | 3.4401 | 0.0000 | 0.0679 | 0.5187 |
| $RM_t$ | 0.0000 | 0.0456 | -0.0181 | 0.0014 | 0.0201 |
| $RM\_FLEX_t$ | 0.0199 | 0.0320 | 0.0030 | 0.0088 | 0.0229 |
| $ROA_t$ | 0.0100 | 0.0644 | 0.0014 | 0.0214 | 0.0401 |
| $ROA\_AM_t$ | 0.0141 | 0.0931 | -0.0177 | 0.0197 | 0.0482 |
| $ROA\_EM_t$ | 0.0131 | 0.0834 | -0.0114 | 0.0195 | 0.0404 |
| $SIZE_{t-1}$ | 13.203 | 1.799 | 11.790 | 13.114 | 14.548 |
| $SMOOTHERS_t$ | 0.1280 | 0.3345 | 0.0000 | 0.0000 | 0.0000 |
| $STDEBT_t$ | 17655 | 33004 | 2004.9 | 6214.7 | 17167 |

**Table 13: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.3)**

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $BIG4_t$ *(1)* | | -33*** | 15*** | 16*** | -7 | 11* | 6 | 10* | 19*** | -6 | -4 | 22*** | 36*** |
| $BOARD_t$ *(2)* | -33*** | | -37*** | -7 | 16*** | -14** | -2 | -24*** | -27*** | -13** | 3 | -34*** | -95*** |
| $CFO_t$ *(3)* | 14** | -31*** | | 12** | -29*** | 37*** | 8 | 34*** | 27*** | -2 | 48*** | 49*** | 40*** |
| $CONC_{t-1}$ *(4)* | 16*** | -1 | 7 | | -1 | 4 | -24*** | 17*** | 9* | 16*** | -1 | 14** | 8 |
| $CYCLE_{t-1}$ *(5)* | -7 | 15*** | -24*** | -1 | | -11** | 18*** | -26*** | -3 | 8 | 1 | -18*** | -23*** |
| $HEALTH_{t-1}$ *(6)* | 11* | -22*** | 36*** | 4 | -11** | | 6 | 26*** | 2 | -29*** | 0 | 32*** | 16*** |
| $INSIDER_{t-1}$ *(7)* | 6 | -16*** | 7 | -24*** | 18*** | 6 | | 3 | 2 | 5 | 1 | 10* | 6 |
| $MTB_{t-1}$ *(8)* | 6 | 6 | 31*** | 16*** | -15*** | 7 | -1 | | -4 | -3 | -4 | 32*** | 36*** |
| *MTR (9)* | 19*** | -24*** | 23*** | 10* | -4 | 3 | 0 | -1 | | 9 | 2 | 31*** | 23*** |
| $NOA_{t-1}$ *(10)* | -6 | -12** | -1 | 16*** | 8 | -29*** | 5 | -2 | 9* | | 0 | -2 | 15*** |
| *RM (11)* | 0 | -2 | 56*** | -2 | 7 | 4 | 2 | 11** | 1 | 0 | | -10* | -5 |
| *ROA_EM (12)* | 15** | -6 | 21*** | 2 | -14** | 13** | 12** | 7 | 27*** | -2 | 0 | | 37*** |
| $SIZE_{t-1}$ *(13)* | 36*** | -65*** | 36*** | 10* | -23*** | 15*** | 4 | 13** | 28*** | 15*** | -2 | 15*** | |

*, **, and *** indicates significance at the 10, 5 and 1 % level, respectively.

**Table 14: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.4)**

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $AM_t$ *(1)* | | -2 | 2 | -3 | 2 | 1 | 1 | 12** | 12** | -1 | -57*** | -48*** | 0 |
| $BIG4_t$ *(2)* | -3 | | -33*** | 20*** | -6 | 17*** | 4 | 10* | 19*** | -6 | -4 | 16*** | 36*** |
| $BOARD_t$ *(3)* | 6 | -33*** | | -8 | 15*** | -13** | 4 | -24*** | -27*** | -13** | 3 | -28*** | -95*** |
| $CONC_t$ *(4)* | -2 | 20*** | 0 | | -2 | 6 | -24*** | 17*** | 10* | 15*** | 1 | 12** | 10* |
| $CYCLE_t$ *(5)* | 0 | -6 | 12** | -2 | | -9 | 21*** | -27*** | -10* | 8 | 5 | -9* | -21*** |
| $HEALTH_t$ *(6)* | 1 | 17*** | -20*** | 6 | -9 | | 3 | 18*** | 16*** | -27*** | 3 | 39*** | 13** |
| $INSIDER_t$ *(7)* | 1 | 4 | -8 | -24*** | 21*** | 3 | | 1 | -6 | 2 | -2 | 5 | -2 |
| $MTB_{t-1}$ *(8)* | 0 | 6 | 6 | 19*** | -20*** | 5 | 1 | | -4 | -3 | -4 | 17*** | 36*** |
| $MTR_t$ *(9)* | 13** | 19*** | -24*** | 11** | -11** | 17*** | -7 | -1 | | 9 | 2 | 29*** | 23*** |
| $NOA_{t-1}$ *(10)* | 1 | -6 | -12** | 15*** | 8 | -27*** | 2 | -2 | 9* | | 0 | -1 | 15*** |
| $RM_t$ *(11)* | -56*** | 0 | -2 | 0 | 7 | 6 | -1 | 11** | 1 | 0 | | 51*** | -5 |
| $ROA\_AM_t$ *(12)* | -10* | 14** | -7 | 2 | -6 | 19*** | 9* | 9 | 25*** | -2 | 39*** | | 28*** |
| $SIZE_{t-1}$ *(13)* | 2 | 36*** | -65*** | 12** | -21*** | 13** | -4 | 13** | 28*** | 15*** | -2 | 13** | |

*, **, and *** indicates significance at the 10, 5 and 1 % level, respectively.

**Table 15: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.6) and (3.7) (part 1)**

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* |
|---|---|---|---|---|---|---|---|---|
| *AM_FLEX$_t$ (1)* | | -19*** | 64*** | -39*** | -15*** | -4 | -31*** | 2 |
| *BIG4$_t$ (2)* | -16*** | | -33*** | 4 | 16*** | 1 | 26*** | 2 |
| *BOARD$_t$ (3)* | 46*** | -33*** | | -35*** | -7 | 1 | -57*** | -5 |
| *CAP_INT$_t$ (4)* | -7 | 5 | -20*** | | 2 | 23*** | 17*** | -25*** |
| *CONC$_{t-1}$ (5)* | -9 | 16*** | -1 | 1 | | 2 | 15*** | -1 |
| *CONVEX$_t$ (6)* | 9 | 0 | -10* | 21*** | 1 | | -3 | -98*** |
| *DERIV$_t$ (7)* | -27*** | 26*** | -38*** | 18*** | 15*** | -3 | | 6 |
| *ETR1$_t$ (8)* | -11** | 2 | 7 | -24*** | -1 | -98*** | 6 | |
| *ETR2$_t$ (9)* | -1 | 4 | -15** | -9* | 4 | -34*** | 15*** | 38*** |
| *INSIDER$_{t-1}$ (10)* | -5 | 6 | -16*** | 2 | -24*** | -10* | 10* | 10* |
| *INV_INT$_t$ (11)* | -9* | 4 | -4 | 8 | -14** | 2 | 4 | -3 |
| *LEV_D$_{t-1}$ (12)* | 19*** | 2 | 0 | -1 | 18*** | 22*** | -12** | -23*** |
| *MTB$_{t-1}$ (13)* | -18*** | 6 | 6 | -1 | 16*** | -12** | 9 | 13** |
| *RM_FLEX$_t$ (14)* | 52*** | -14** | 69*** | -31*** | -2 | -23*** | -24*** | 22*** |
| *ROA$_t$ (15)* | -52*** | 11* | -21*** | -2 | 6 | -28*** | 26*** | 32*** |
| *SIZE$_{t-1}$ (16)* | -45*** | 36*** | -65*** | 37*** | 10* | -3 | 53*** | 7 |

*, **, and *** indicates significance at the 10, 5 and 1% level, respectively.

**Table 16: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.6) and (3.7) (part 2)**

| | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* | *(14)* | *(15)* | *(16)* |
|---|---|---|---|---|---|---|---|---|
| *$AM\_FLEX_t$ (1)* | -12** | 3 | -1 | 15*** | -12** | 73*** | -25*** | -63*** |
| *$BIG4_t$ (2)* | 7 | 6 | 13** | 2 | 10* | -11* | 14** | 36*** |
| *$BOARD_t$ (3)* | -23*** | -2 | -7 | 4 | -24*** | 56*** | -34*** | -95*** |
| *$CAP\_INT_t$ (4)* | 0 | 3 | 23*** | -1 | 11* | -29*** | 8 | 36*** |
| *$CONC_{t-1}$ (5)* | 8 | -24*** | -6 | 18*** | 17*** | -10* | 17*** | 8 |
| *$CONVEX_t$ (6)* | -38*** | -10* | 8 | 23*** | -16*** | -13** | -20*** | -4 |
| *$DERIV_t$ (7)* | 21*** | 10* | 13** | -12** | 21*** | -24*** | 31*** | 54*** |
| *$ETR1_t$ (8)* | 40*** | 10* | -7 | -24*** | 17*** | 10* | 24*** | 8 |
| *$ETR2_t$ (9)* | | 2 | -5 | -11** | 6 | -7 | 29*** | 24*** |
| *$INSIDER_{t-1}$ (10)* | 5 | | 20*** | -17*** | 3 | 0 | 12** | 6 |
| *$INV\_INT_t$ (11)* | 1 | 21*** | | -5 | -2 | -1 | -5 | 6 |
| *$LEV\_D_{t-1}$ (12)* | -5 | -17*** | -7 | | -4 | 1 | -37*** | 0 |
| *$MTB_{t-1}$ (13)* | 0 | -1 | -5 | 0 | | -10* | 35*** | 36*** |
| *$RM\_FLEX_t$ (14)* | 1 | 2 | -8 | -2 | 2 | | -17*** | -55*** |
| *$ROA_t$ (15)* | 9 | 15*** | -1 | -35*** | 23*** | -10* | | 37*** |
| *$SIZE_{t-1}$ (16)* | 12** | 4 | -7 | 0 | 13** | -49*** | 35*** | |

*, **, and *** indicates significance at the 10, 5 and 1% level, respectively.

**Table 17: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.8)**

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $BOARD_t$ *(1)* | | 5 | 16*** | -57*** | -51*** | -14** | -30*** | -89*** | -24*** | -34*** | -95*** | -76*** |
| $CONVEX_{t-1}$ *(2)* | -3 | | -3 | 0 | -6 | -14** | -3 | -7 | -15*** | -22*** | -6 | 3 |
| $CYCLE_{t-1}$ *(3)* | 15*** | -4 | | 4 | 0 | -11** | 34*** | -13** | -26*** | -11* | -23*** | -14** |
| $DERIV_t$ *(4)* | -38*** | 0 | 4 | | 49*** | 19*** | 27*** | 51*** | 21*** | 31*** | 54*** | 42*** |
| $DY_{t-1}$ *(5)* | -22*** | -1 | 3 | 34*** | | 16*** | 12** | 46*** | 8 | 44*** | 50*** | 42*** |
| $HEALTH_{t-1}$ *(6)* | -22*** | -12** | -11** | 19*** | 6 | | 16*** | 0 | 26*** | 39*** | 16*** | -6 |
| $ISALES_t$ *(7)* | -22*** | 0 | 33*** | 28*** | 7 | 12** | | 30*** | 2 | 8 | 27*** | 28*** |
| $LTDEBT_t$ *(8)* | -23*** | -1 | -4 | 31*** | 31*** | -10* | 13** | | 23*** | 21*** | 91*** | 72*** |
| $MTB_{t-1}$ *(9)* | 6 | -16*** | -15*** | 9 | -5 | 7 | 0 | -1 | | 35*** | 36*** | 16*** |
| $ROA_t$ *(10)* | -21*** | -28*** | 0 | 26*** | 24*** | 31*** | 10* | 12** | 23*** | | 37*** | 13** |
| $SIZE_{t-1}$ *(11)* | -65*** | -6 | -23*** | 53*** | 33*** | 15*** | 26*** | 63*** | 13** | 35*** | | 76*** |
| $STDEBT_t$ *(12)* | -26*** | 1 | -5 | 29*** | 30*** | -9 | 16*** | 89*** | 1 | 12** | 63*** | |

*, **, and *** indicates significance at the 10, 5 and 1 % level, respectively.

**Table 18: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.9) (part 1)**

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* |
|---|---|---|---|---|---|---|---|
| $AM\_FLEX_t$ *(1)* | | 64*** | | -4 | 18*** | -31*** | 40*** |
| $BOARD_t$ *(2)* | 46*** | | | 1 | 16*** | -57*** | 29*** |
| $\|CFO\|_t$ *(3)* | -25*** | -23*** | | -16*** | -28*** | 31*** | -27*** |
| $CONVEX_t$ *(4)* | 9 | -10* | -14** | | -4 | -3 | 2 |
| $CYCLE_{t-1}$ *(5)* | 0 | 15*** | -28*** | -4 | | 4 | 2 |
| $DERIV_t$ *(6)* | -27*** | -38*** | 24*** | -3 | 4 | | -24*** |
| $\|EM\|_t$ *(7)* | 57*** | 29*** | -20*** | 2 | -4 | -25*** | |
| $HEALTH_{t-1}$ *(8)* | -23*** | -22*** | 39*** | -8 | -11** | 19*** | -15*** |
| $LEV\_D_{t-1}$ *(9)* | 19*** | 0 | -23*** | 22*** | -3 | -12** | 9* |
| $MTB_{t-1}$ *(10)* | -18*** | 6 | 31*** | -12** | -15*** | 9 | -9* |
| $PAYOUT_t$ *(11)* | -3 | -2 | 5 | 8 | 10* | 6 | -4 |
| $RM\_FLEX_t$ *(12)* | 52*** | 69*** | -15*** | -23*** | 20*** | -24*** | 39*** |
| $ROA\_EM_t$ *(13)* | -1 | -6 | 25*** | -12** | -14** | 11** | 4 |
| $SIZE_{t-1}$ *(14)* | -45*** | -65*** | 39*** | -3 | -23*** | 53*** | -32*** |

*, **, and *** indicates significance at the 10, 5 and 1% level, respectively.

**Table 19: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.9) (part 2)**

| | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* | *(13)* | *(14)* |
|---|---|---|---|---|---|---|---|
| $AM\_FLEX_t$ *(1)* | -21*** | 15*** | -12** | -32*** | 73*** | -28*** | -63*** |
| $BOARD_t$ *(2)* | -14** | 4 | -24*** | -41*** | 56*** | -34*** | -95*** |
| $\|CFO\|_t$ *(3)* | 38*** | -24*** | 42*** | 51*** | -28*** | 60*** | 48*** |
| $CONVEX_t$ *(4)* | -9 | 23*** | -16*** | -3 | -13** | -23*** | -4 |
| $CYCLE_{t-1}$ *(5)* | -11** | -3 | -26*** | -8 | 25*** | -18*** | -23*** |
| $DERIV_t$ *(6)* | 19*** | -12** | 21*** | 38*** | -24*** | 30*** | 54*** |
| $\|EM\|_t$ *(7)* | -11** | 7 | -5 | -31*** | 34*** | -24*** | -30*** |
| $HEALTH_{t-1}$ *(8)* | | -47*** | 26*** | 28*** | -3 | 32*** | 16*** |
| $LEV\_D_{t-1}$ *(9)* | -47*** | | -4 | -28*** | 1 | -37*** | 0 |
| $MTB_{t-1}$ *(10)* | 7 | 0 | | 18*** | -10* | 32*** | 36*** |
| $PAYOUT_t$ *(11)* | 10* | -12** | -6 | | -17*** | 55*** | 41*** |
| $RM\_FLEX_t$ *(12)* | -14** | -2 | 2 | 1 | | -12** | -55*** |
| $ROA\_EM_t$ *(13)* | 13** | -16*** | 7 | 2 | -1 | | 37*** |
| $SIZE_{t-1}$ *(14)* | 15*** | 0 | 13** | -2 | -49*** | 15*** | |

*, **, and *** indicates significance at the 10, 5 and 1% level, respectively.

**Table 20: Pearson (below diagonal) and Spearman (above diagonal) pairwise correlation coefficients in percentage - variables in equation (3.10)**

| | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* | *(12)* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *$BEATERS_t$ (1)* | | -5 | -8 | -3 | -4 | 4 | 7 | -7 | -7 | -3 | 14** | -3 |
| *$BORROWERS_t$ (2)* | -5 | | 0 | 0 | 4 | 1 | -8 | 16*** | 7 | 1 | 5 | 2 |
| *$CFO\_RM_t$ (3)* | -7 | 2 | | 19*** | 9* | -5 | -24*** | 39*** | 63*** | 50*** | -24*** | 26*** |
| *$CONSTRAINTS_t$ (4)* | -2 | 0 | 13** | | 6 | -12** | 33*** | 13** | 5 | 17*** | -11* | 12** |
| *$DIVID_t$ (5)* | -4 | 3 | 12** | 6 | | 25*** | 4 | 16*** | -18*** | 12** | -2 | 15*** |
| *$EM_t$ (6)* | 5 | 0 | -6 | -10* | 20*** | | -6 | 9* | -25*** | -3 | -2 | -8 |
| *$LEV_{t-1}$ (7)* | 4 | -8 | -26*** | 34*** | 0 | -4 | | -3 | -36*** | 4 | -2 | 26*** |
| *$MTB_{t-1}$ (8)* | -5 | 4 | 25*** | 12** | 14** | 11** | 2 | | 32*** | 36*** | -3 | 16*** |
| *$ROA\_EM_t$ (9)* | -4 | 3 | 27*** | 8 | -7 | 15*** | 4 | 7 | | 37*** | -13** | 15*** |
| *$SIZE_{t-1}$ (10)* | -3 | 0 | 46*** | 16*** | 11** | 0 | -1 | 13** | 15*** | | -12** | 76*** |
| *$SMOOTHERS_t$ (11)* | 14** | 10* | -21*** | -9* | -2 | 0 | -4 | 4 | -3 | -13** | | -6 |
| *$STDEBT_t$ (12)* | -1 | 4 | 12** | 10* | 6 | 0 | 6 | 1 | 5 | 63*** | -8 | |

*, **, and *** indicates significance at the 10, 5 and 1% level, respectively.