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Inventories Discretionary Management through Real Activities

The case of small and medium-sized Portuguese companies in commercial sector

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Abstract: This study focuses on the discretionary management of inventories based on real activity and the repercussions on the financial statements. We show the evidence of the discretionary management of real activity on inventories in 30,797 Portuguese Small and Medium-sized Enterprises (SME) from the commercial sector and its influence on financial information, using the adaptation of the quantitative methodology used by Roychowdhury (2006). Managers have the power to choose real activities to achieve their objectives. These discretion cause changes in the value of financial reporting of companies, which can be stimulating for managers who want to present financial statements that meet the requirements of stakeholders and their own interests. The results obtained allowed for the verification that the discretion included in inventory management is related to commercial management, and confirmed that managers seek to act in a way that maximizes their welfare by using discretion. The discretion causes deliberate changes in the economic and financial conditions of companies and, consequently, in the financial statements that are the element of support for decision making, for this reason it is deliberately caused asymmetry of information between the owner and other stakeholders in the information as is assumed in the agency theory and positive accounting theory.

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1 Introduction

Earnings management is a line of research where many works have been developed, given that the occurrence of such phenomenon calls into question the efficiency of accounting as a contracting mechanism. In this sense, a wide range of literature investigates the incentives and acts of managers for earnings management (Allee et al., 2021; Dechow et al., 2012; Dechow & Skinner, 2000; Francis et al., 2016; Frankel et al., 2018; Healy & Wahlen, 1999; Jones et al., 2008; Kothari et al., 2016; Nguyen et al., 2022; Song & Wang, 2022). The first studies addressed the practice of discretion over accruals, that is, they studied discretion based on change/election of accounting policies. However, more recent studies deal with the discretion based on the management of real activities, i.e., the discretion of management acts to achieve objectives, such as sales promotions, maintaining large volumes of inventories or decreasing the volume of inventories that impact on their book value (Cohen et al., 2020; Gunny et al., 2013; Roychowdhury, 2006) and, consequently, on earnings. The strategy of managing earnings through the discretion of real activities has been used by companies because it allows them to manage earnings without incurring in violations of legal regulations (Cohen et al., 2020; Cohen & Frazzini, 2008; Cook et al., 2020; Graham et al., 2005; Gunny, 2005; Roychowdhury, 2006; Zang, 2012).

Inventories, especially in companies in the commercial sector, have a great financial and strategic weight and can occupy a very high percentage of the assets. Discretionary inventory management can be considered attractive if there is an intention to achieve specific income and tax value (in the interest of the company and/or the manager). Thus, managers may engage in acts that allow them to change the value of assets (where inventories are included), liabilities, income, and expenses to achieve the desired asset value and earning. Research on this topic allows verifying the use of discretion in inventory management and the consequences that arise from it, deepening the knowledge about: the distribution channel (Afrifa et al., 2021; Opoku et al., 2021; Wang et al., 2015; Yan et al., 2019); inventory turnover (Cordeiro, 2003; Feng et al., 2015; Ferrer & Ferrer, 2016; Gołaś, 2020; Hançerlioğulları et al., 2016); and the link between inventory turnover fluctuation and earnings in manufacturing firms (Basu & Wang, 2011; Capkun et al., 2009; Cook et al., 2012, 2020; Isaksson & Seifert, 2014; Kosorukov et al., 2020; Yan et al., 2019). However, to the best of our knowledge, there are no known studies on the effect of real activity discretion on the volume of inventories and its influence on firms earnings in the commercial sector nor on small and medium-sized firms.

Considering this gap and the fact that, in Portugal, the business fabric is composed of 99.9% small and medium-sized companies, without listed values, in which those of the commercial sector contribute to 36.9% of the turnover (Instituto Nacional de Estatística, 2020: p 26), it is justified to study whether these companies practice earnings s management through the discretionary nature of the real activity on inventories, assuming that these

companies have the possibility of managing earnings using the volume of inventories with consequences on the cost of goods sold (COGS), as well as on the cash flow. Thus, this study aims to contribute to the literature on the discretionary management of the real activity related to inventory management and the reality of small and medium sized companies. Therefore, the aim of this study is to answer the following questions: are the companies' inventories subject to discretionary management? is this type of management used in companies in the commercial sector? if discretionary inventory management occurs, does it affect the value of the companies? if the value of the companies changes, can studies based on this value obtain biased income? if the value of the companies changes, does the information conveyed and transmitted to stakeholders not convey a true image of the companies?

Discretionarity is investigated through regression models proposed by Dechow et al. (1998) and applied by Zang (2012); Cohen & Zarowin (2010) and Roychowdhury (2006) that allow ascertaining expected or normal values of variables as well as discretionary values such as discretionary cash flows (*CFOD*), discretionary cost of goods sold (*COGSD*), discretionary inventory volume variation (*ΔINVD*) and discretionary trading/commercialization (*CommercD*) as a function of firms' sales volume (Cohen et al., 2020; Gunny, 2010; Roychowdhury, 2006). After verifying the existence of discretionary trading, it is possible to ascertain its connection with several items of the financial statements in order to understand its degree of influence on them, having for this purpose been mainly used the methodology of Roychowdhury (2006), which is also based on regression models.

In this study, the models of Cohen & Zarowin (2010), Roychowdhury (2006) and Zang (2012) were used with the adaptations to the commercial sector in which variables were included that allow recognising the discretionary nature included in inventory management (sales and cost of goods sold) and its relationship with the fluctuation of cash flows. The causality relationship between the variables allows interpreting and explaining the change in asset value through inventory management and thus contributing to clarify the interpretation of the relationship between inventories and discretion.

The results obtained allow us to conclude that managers of small and medium sized Portuguese firms use the increase or decrease in the volume of inventory to change the cost of goods sold and, consequently, the earnings value and the value of the firm. The results also indicate that the discretionary nature of inventory management is related with commercial management. In this sense, the results seem to confirm the opportunistic performance of the manager, postulated by the agency theory, which deliberately generates asymmetry of information in relation to other stakeholders as well as the increase in contracting costs that result from this asymmetry.

The remaining paper is organised as follows: in section 2, which follows, the literature on discretionary management through real activities is identified and the research hypotheses are put forward. Section 3 presents the methodology and describes the data used. Section 4 presents the results obtained and discusses them and, finally, section 5 presents the final conclusions and proposals for future research.

2 Earnings management

Financial information is used by stakeholders to make forecasts about the company's activity and for decision making, being its usefulness and timeliness considered essential for both internal and external stakeholders (Pereira, 2006; Nardi et al., 2019; Steiberg, 2022). Users of financial information need information on: business risk and return on investments (investors); assessment of the investment risk of the amounts borrowed (lenders); assessment of the risk and degree of recovery of loans granted as well as the time of debt recovery (suppliers and other trade creditors); assessment of the continuity of the company over time (employees and customers); assessment of the allocation of resources and regulate tax policies (government) (VanAuken et al., 2016).

Due to the importance of the information, over time there has been a constant concern about the measurement of its quality (Licerán-Gutiérrez & Cano-Rodríguez, 2019) and it has been studied by applying different methodologies; nevertheless, the studies focused on cash flows or accruals, were and still are, the most common and focus on verifying the relationship of economic transactions with the respective payments or receipts (Licerán-Gutiérrez & Cano-Rodríguez, 2019). Barth et al. (2001); Dechow et al. (1998) and Dechow & Skinner (2000) state that accruals are generated by normal activity, but can also be generated by the discretion of managers in taking advantage of the flexibility of accounting standards (Stolowy & Breton, 2003) or the use of real management activities (Commerford et al., 2014; Kothari et al., 2016) which can result in earnings management, which can be defined as the discretion that managers use to make accounting choices or design transactions to affect the transfer of wealth between the company and society, between the company and investors and lenders or between the company and managers (Roychowdhury, 2006; Stolowy & Breton, 2003).

2.1 Earnings management through real activities and discretionary accruals

Discretionary management through real activities is based on day-to-day activities, motivated by the manager's desire to make users of financial information believe that earnings have been achieved through operational performance (Kothari et al., 2016) and, when the intention is to achieve short-term objectives, it can take various forms such as reducing investment in research and development, advertising and training (Graham et al., 2004; Roychowdhury, 2006). This type of management can also be based on sales, using the anticipation of the moment of sale and or the increase of discounts in sales price and or improvement of credit conditions to customers (Roychowdhury, 2006); therefore, as stated by Allee et al. (2021); Francis et al. (2016); Kothari et al. (2016); Roychowdhury (2006); Song & Wang (2022) management acts cause changes in financial statements, and decisions related to the volume and timing of buying and selling (timeliness) are one of the predominant factors in discretion. Changing operating practices can lead to changes in financial statement values that influence users' judgement (Roychowdhury, 2006). Thus, decisions about the process of acquisition and sale of goods and services, as is the case of inventories, may be discretionary with consequences on the information disclosed.

Discretionary accruals are used to detect discretion in the application of accounting standards. To calculate discretionary accruals, models that include a set of independent variables that explain a dependent variable are used (Dechow et al., 1995; Dechow & Dichev, 2002; Frankel & Sun, 2018; Hribar & Collins, 2002; Jones et al., 2008; Marquardt & Wiedman, 2004; Nguyen et al., 2022). One of the components of the accrual's estimation models is the inventory variable. This variable, as well as the variables accounts receivable and accounts payable have been underestimated in the study of discretionary accruals; however, the unexpected or sudden changes in these accounts reflect the possibility of occurrence of discretionary earnings management of results (Ferrer & Ferrer, 2016).

Roychowdhury (2004) states that there is a motivation to manage real activities on a discretionary basis because, contrary to what happens in accrual management, this type of management takes place during a single financial year and discretionary management can be included before the calculation and presentation of accounting incomes. Discretionary management through real activities has been calculated using the model proposed by Dechow et al. (1998), which is based on the cash flow indicator. In this model the dependent variable discretionary cash flows is explained by independent variables related to sales. The discretionary cash flows are explained by variables such as inventories, accounts receivable and accounts payable (Roychowdhury, 2004). Several authors have focused their study, related to inventories, on deepening the knowledge about the distribution channel (Afrifa et al., 2021; Opoku et al., 2021; Wang et al., 2015; Yan et al., 2019), inventory turnover (Cordeiro, 2003; Feng et al., 2015; Ferrer & Ferrer, 2016; Gołaś, 2020; Hançerlioğulları et al., 2016) and on the link between inventory turnover fluctuation and business outcomes in manufacturing firms (Basu & Wang, 2011; Capkun et al., 2009; Cook et al., 2012, 2020; Isaksson & Seifert, 2014; Kosorukov et al., 2020; Yan et al., 2019). **However**, to the best of our knowledge, **there are no known studies on the effect of discretion on the volume of inventories and its influence on the incomes of firms in the trading sector**.

2.2 Impact of inventories on income

The research on the management of income that addresses the real activity has been focused on the study of changes in variables of real activity that allow obtaining the income that interest the manager, as is the example of the research of Dichev et al. (2012) which was based on interviews with executive managers of companies, and obtained results indicating that managers are concerned with maintaining profits, and thus make choices that allow the stability and sustainability of earnings. This concern of managers with profits is consistent with the valuation assigned by investors who want the firm to be a profit-generating entity throughout its life. Dichev et al. (2012) also consider that management uses income smoothing to respond to debt contracts and manager compensation contracts and concluded that managers undertake financial reporting to respond to a legal requirement rather than as a means of making the best possible information available to stakeholders. Associated with this view is Kesavan & Mani (2010) consideration that inventories have a strong impact on the formation of corporate earnings, and it is therefore possible to use them, in a discretionary manner. Managers of trading firms pay much attention to the volume of their inventories because they can have a strong impact on the income (Kesavan

& Mani, 2010). Considering that incomes are the mirror of the business activity and are a function of the Sales, the cost of goods sold (COGS), the expenses with External Supplies and Services, the expenses with Personnel, among others, the volume of inventories held becomes fundamental to determine the value of the companies. Kesavan & Mani (2010) state that the impact of inventories on business earnings is common knowledge as it causes capital cost related to the amount invested in inventories and physical cost of having inventories (costs of warehouse space, storage taxes, insurance, handling, breakage, deterioration, etc.). In addition, there are indirect costs associated with inventories that are also important in the earnings of trading firms such as: the risk of low gross margins and the risk of diminishing value through inventory write-downs, for example due to obsolete inventories (Kesavan & Mani, 2010). There are recent papers on inventory management related to logistics, to production processes, to stock policy, but we did not find recent papers relating inventory management with the accounting value of firms, which reinforces the relevance and opportunity of this research. Additionally, although there are current articles on real earning management (REM), as Galdi & Johnson (2021); Hwang et al. (2021); Yuan et al. (2022) they do not make specific reference to inventories.

An abnormal increase in the volume of inventories can mean lower total profits, through a decrease in the unit selling price, and signal lower earnings with lower gross margins. This implies a decrease in the value of sales and, consequently, a decrease in the gross margin on sales and a decrease in earnings. An increase in the volume of inventories can also signal the presence of obsolete inventories. When obsolete inventories are settled, COGS increases and earnings decrease (Kesavan & Mani, 2010). The abnormal decrease in the volume of inventories may be a result of the decision to reduce the variety of products or to have lower service levels or even due to replenishment problems, signalling decrease in income. Such a decline may cause problems in customer satisfaction, resulting in lower sales in the period and reduced demand in future periods. Companies can try to reverse this situation by lowering the selling price of products, but this leads to lower profit margins. The decrease in the volume of inventories can also be the result of financial difficulties or the increase in the volume of obsolete inventories; either of the two, causes an increase in expenses and, consequently, decrease in earnings (Kesavan & Mani, 2010). Discretionary management through real activities is based on information held by management and decisions made by managers and is therefore difficult to detect. Capkun et al. (2009) and Isaksson & Seifert (2014) collected empirical evidence of the relationship between inventory management and firms' financial income. Since inventories are the basis of the activity of commercial companies, there is an incentive to manage them in order to achieve the objectives of company managers (Parte-Esteban & Ferrer García, 2014).

Portugal is a country, in which the business fabric is made up of 99.9% SMEs. Companies belonging to the commercial sector contribute to 36.9% of the turnover (Instituto Nacional de Estatística, 2020: p 26). Najera Ruiz & Collazzo (2021) state that SMEs have specific characteristics, so management models, accounting systems and business analysis are not always suitable for this type of companies. SMEs rarely have explicit strategies, and when a strategy exists, it is usually informal; they use mainly historical

measurements reflecting their primarily short-term approach; performance measurement systems should measure non-financial aspects such as quality, flexibility, customer satisfaction and internal business performance as well as financial performance (Najera Ruiz & Collazzo, 2021; Wang et al., 2015). SMEs tend to focus on financial aspects, because the managers' main concern is the short-term cash flow (Najera Ruiz & Collazzo, 2021), these authors conclude that there are few studies on this type of company and state that the SMEs managers are focused on the financial information they have to provide, based on accounting, only to meet the tax requirements.

2.3 Supporting theories and hypothesis

The Positive Accounting Theory (PAT) describes explanatory hypotheses for the opportunistic choices of managers, whose objectives encourage the maximization of their wealth or that of the companies they manage. Thus, managers' motivations are the driving force for the achievement of specific incomes (Watts & Zimmerman, 1978). PAT was formulated on the basis of the Agency Theory (Jensen & Meckling, 1976) and is based on the assumption that those involved in the discretionary earnings management act for their own benefit in an attempt to obtain political visibility, better remuneration (when contracts are indexed to an accounting benchmark), to present earnings that do not clash with restrictive clauses of existing contracts (as is the case of debt contracts). In addition to these motivations, there are others related to the ownership structure of the company. The theory developed by these authors is related to the agency contract and the management characteristics and the consequent asymmetry of information. It can be said that in the traditional management, made by the partners of the company, there are no conflicts of interest (conflicts of agency), because the owner of the company is the manager with privileged access to all information; however, there are other factors that can act as incentives for choices with influence on the financial information of companies, such as the compensation plan of managers, the amount of tax payable and the ability to pay to creditors. Incentives through the remuneration plan, which in SMEs is equivalent to the incentive of increasing the wealth of the owner who is simultaneously a manager, leads to discretionary management of an accounting period, as demonstrated by Gaver et al. (1995); Gunny (2005); Healy (1985); Healy & Wahlen (1999); Salikhov et al. (2017) who asserted that managers used accruals to control the timing of income and found evidence that managers strategically raise or lower earnings around predefined thresholds. Earnings are generated either by the application of accounting rules or by choices on adopted accounting policies or by discretionary management of real activity (Achleitner et al., 2014; Anton, 2020; Eilifsen et al., 2010; Huang & Sun, 2017; Yan et al., 2019).

In countries where there is a greater approximation between accounting and taxation, that is, between the net income and the taxes. Taxes arise as an incentive to earnings management, as is the case in Portugal where managers have a strong incentive to practice management of earnings downwards, with the aim of reducing the amount of tax payable (Ericson et al., 2004; Moreira, 2008; Eilifsen et al., 2010; Herusetya & Stefani, 2020; Sánchez-Ballesta & Yagüe, 2021) by increasing their wealth. Sánchez-Ballesta & Yagüe (2021), studied the Spanish reality which is quite similar to the Portuguese reality and

concluded that in SMEs there is a discretionary management of accounting policies and real activities to stabilize the value of earnings close to zero, to reduce the amount of tax payable and to avoid constraints and maintain the credibility and reputation of the companies. This discretionary management aims to: facilitate access to finance, minimise the decrease in cash value through tax payments and increase the possibility of increasing the wealth of the manager/owner. By observing the reality of SMEs in the Portuguese commercial sector, and because no studies were found that dealt with profit management through inventories, the need arises to know whether the inventory assets item is used for earnings management practices. This observation allows us to identify the influence that, in this way, managers have on the value of firms. Thus, the following **research question** is formulated: **what is the effect of the discretionary management of the volume of inventories, through real activities, on the financial information?**

Considering the assumption described in the Agency Theory of the existence of divergence of interest between the agent - in this case the company's manager - and the principal - in this case the tax authority or the creditors - it is possible to assume an opportunistic behaviour in the relationship between agent and principal. Thus, it will be possible that there is arbitrariness in the management of inventories by arbitrariness in the management of inventory volumes in companies in the commercial sector, with influence on financial information. Hence, the following **Hypothesis** is formulated:

H$_1$ - *There is a positive relationship between discretionary management of real activities and the volume of inventories*.

The discretionary management of activities using the adoption of discretion in inventory management causes changes in cash flow and this flow is dependent on the actions of managers (Roychowdhury, 2006). Allee et al. (2021); Francis et al. (2016); Kothari et al. (2016); Roychowdhury (2006); Song et al. (2022) state that decisions related to the volume and timing of buying and selling (timeliness) are one of the preponderant factors in discretion, and these actions have implications on cash flows. Considering that the application of discretion in actions such as the acquisition of inventories causes a decrease in discretionary cash flows, the following research sub-hypothesis is formulated:

H$_{1.1}$ - *There is a negative relationship between discretionary cash flows and the volume of inventories*.

Considering the influence of timeliness in the acquisition and sale of inventories, it can be assumed that the variation in the volume of inventories causes change in the discretionary COGS. Kesavan & Mani (2010) state that the existence of inventories causes costs related to investment in inventory and the physical cost of having inventories. Despite the existence of these additional costs, they are diluted over a larger number of units. Considering that discretionary buying and selling of inventories is applied and its consequences on the discretionary COGS, the following research sub-hypothesis is formulated:

H$_{1.2}$ - *There is a positive relationship between the discretionary cost of goods sold and the volume of inventories*.

Kesavan & Mani (2010) state that the variation in the volume of inventories can mean a decrease in total earnings, through the decrease in the unit selling price, and signal lower earnings with lower gross margins and, consequently, a decrease in earnings. An abnormal decrease in the volume of inventories may signal diminishing returns causing constraints related to customer satisfaction management. Decrease in inventory volume may also be related to lack of financial liquidity resulting in decreased sales and decreased earnings (Kesavan & Mani, 2010). Based on these considerations the following research sub-hypothesis is formulated:

H$_{1.3}$ - *There is a negative relationship between the change in the volume of discretionary inventories and earnings before tax (EBT).*

3 Methodology

In carrying out the study of the relationship between the discretionary management of the real activities and the volume of inventories it is followed the study of the operating cash flow methodology proposed by Dechow et al. (1995), augmented by Dechow et al. (1998) associated with the methodology adopted by Roychowdhury (2006). Discretionary management and its effect on the discretionary levels of the variables operating cash flow, discretionary COGS, variation in the volume of discretionary inventories and trading expenses (TE) is studied.

3.1 Data

Data on the financial statements of Portuguese commercial companies were collected in the SABI database, version 91.00.

It was chosen to start the study in 2013 because it was the year of the beginning of Portugal's economic recovery. In the second half of 2013 the decline in Gross Domestic Product slowed down, considered the moment of the beginning of the economic recovery (Instituto Nacional de Estatistica, 2018). The last year of the study is 2019 because it is considered that the Covid-19 pandemic has changed the activity of companies, having effects on their financial statements.

The legal form chosen was private limited company and sole proprietorship by quotas to separate small companies and micro-entities and not to include listed companies or companies in the financial sector. Companies with activity codes CAE Rev3 for commerce were isolated: 46 - Wholesale trade (including agents), except of motor vehicles and motorbikes, 47 - Retail trade, except of motor vehicles and motorbikes. With this breakdown, we obtained data for 69 638 enterprises.

To ensure that the companies included are in operation and contribute to the effectiveness of the study, we included only companies that presented values, for all years, in the items tangible fixed assets, inventories, clients, other accounts receivable, cash and bank deposits, total current assets, total assets, suppliers, other current accounts payable, total liabilities, sales and services rendered, cost of goods sold and materials consumed, earnings before tax, income tax for the period and net profit for the period. The companies

that presented values in all the defined items were 38 824. It was also defined that companies with values in rotation of inventories would be included to ensure that they are companies that do not work with null stock and may have incentive to discretionary inventory management, which reduced the sample size to 31 901. Companies in mainland Portugal were also isolated because the rates and taxes levied in the autonomous regions are different from those in mainland Portugal, which could bias the study (by considering one of the incentives to discretionary management - the achievement of specific income that may be influenced by the amount of tax payable). Finally, the database provided figures for 30 797 companies between the years 2013 and 2019.

3.2 Estimation models

Following the methodology adopted by Cohen & Zarowin (2010), Roychowdhury (2006) and Zang (2012) based on Dechow et al. (1998), adapted to the commercial sector we studied, in a first stage, the influence of sales on cash flows. In all models, the variables are divided by total assets at the beginning of the year to cancel out the effect of the different sizes of the companies, allowing for comparability.

To understand the discretion included the following equation from Dechow et al. (1998) is estimated:

$$\frac{CFO_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{S_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \varepsilon_{it} \quad (1)$$

Where:

CFO_{it}: operating cash flow of company i in period t;
A_{it-1}: total assets of company i at the end of period $t-1$;
S_{it}: sales of company i in period t;
ΔS_{it}: change in sales of company i between period $t-1$ and period t.

For each company/year the discretionary CFO_{it} ($CFOD_{it}$) corresponds to the current CFO_{it} minus the estimated CFO_{it} calculated using the coefficients obtained from equation 1 in equation 2:

$$\frac{CFOD_{it}}{A_{it-1}} = \frac{CFO_{it}}{A_{it-1}} - \left[\widehat{\alpha_1}\left(\frac{1}{A_{it-1}}\right) + \widehat{\beta_1}\left(\frac{S_{it}}{A_{it-1}}\right) + \widehat{\beta_2}\left(\frac{\Delta S_{it}}{A_{it-1}}\right)\right] \quad (2)$$

In addition to sales, managers make strategic decisions on expenses related to the operating cycle. According to the Dechow et al. (1998) model, expenses are expressed as a linear function of current sales. Thus, the COGS, the normal growth of the volume of inventories and marketing are calculated using the volume of sales transacted by the companies.

The model for estimating COGS is:

$$\frac{COGS_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{S_{it}}{A_{it-1}}\right) + \varepsilon_{it} \quad (3)$$

Where $COGS_{it}$ is the cost of goods sold of company *i* in period *t*.

For each company/year the discretionary $COGS_{it}$ ($COGSD_{it}$) corresponds to the current $COGS_{it}$ minus the estimated $COGS_{it}$ calculated using the coefficients obtained from equation 3.

The model for estimating the normal inventory growth is:

$$\frac{\Delta INV_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{\Delta S_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \quad (4)$$

Where:

ΔINV_{it}: change in inventories of company *i* between period *t -1* and period *t;*

ΔS_{it-1}: change in sales of company *i* between period *t-2* and period *t-1*.

For each company/year the change in discretionary inventory ($\Delta INVD_{it}$) corresponds to the current inventory minus the estimated inventory calculated using the coefficients obtained from equation 4.

After the study of the suspicion of the use of discretionary spending on cash flows, we proceed to study the discretionary spending included in the commercial management of companies. The following equation, adapted from the study by Roychowdhury (2006), is used to estimate the normal level of commercialization expenses:

$$\frac{Commerc_{it}}{A_{it-1}} = \alpha_0 + \alpha_1\left(\frac{1}{A_{it-1}}\right) + \beta_1\left(\frac{S_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{\Delta S_{it-1}}{A_{it-1}}\right) + \varepsilon_{it} \quad (5)$$

With:

$$Commerc_{it} = COGS_{it} + \Delta INV_{it} \quad (6)$$

Where $Commerc_{it}$ is the commercialization of company *i* in period *t*.

For each company/year the discretionary $Commerc_{it}$ ($CommercD_{it}$) corresponds to the current $Commerc_{it}$ minus the estimated $Commerc_{it}$ calculated using the coefficients obtained from equation 5.

The higher is CommercD the higher is the commercialization volume and the higher is the income because there is a dilution of COGS. Decisions related to the trading activity

that have the intention to increase incomes may give rise to abnormally low working capital and very high trading expenses, following Cohen & Frazzini (2008) for the industrial sector. The values obtained for discretionary working capital and discretionary trading represent discretionary management through cycle-related decisions in real activity (Cohen & Zarowin, 2010; Cohen & Frazzini, 2008; Rezaee, 2002; Roychowdhury, 2006; Roychowdhury et al., 2012; Zang, 2012).

With the increase in sales volume, distribution, packaging and storage costs are subdivided by more units sold, thus reducing the unit cost; however, variable or service provision costs follow the commercialization flow (Roychowdhury, 2006). Thus, the increase in trading volume is expected to cause a decrease in cash flows. To estimate the normal level of operating cash flows (or working capital) the following adaptation of Choi, Kim, & Zang (2010) model is used. Taking into consideration that managers have the possibility to influence financial earningss through real activity (Bahri et al., 2017) with the intention of reducing the amount of tax payable, the tax variable was introduced in the measurement of business performance:

$$\frac{WC_{it}}{A_{it-1}} = \alpha_1 + \beta_1\left(\frac{1}{A_{it-1}}\right) + \beta_2\left(\frac{S_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{\Delta S_{it}}{A_{it-1}}\right) + \beta_4\left(\frac{\Delta S_{it-1}}{A_{it-1}}\right) + \beta_5\left(\frac{TXP_{it}}{A_{it-1}}\right) + \varepsilon_{it} \quad (7)$$

Where:

WC_{it}: working capital of company i in period t;

TXP_{it}: taxes paid by company i in period t.

Net working capital corresponds to the difference between current assets and current liabilities. Discretionary working capital is estimated by the difference between current WC and WC estimated using the coefficients obtained in equation 7.

With the coefficients obtained in the estimated working capital and commercialization models, the normal and discretionary values are calculated for each company/year. Discretionary management of real activities will be aggregated into a proxy named discretionary commercial management (CM_{it}) which corresponds to the sum of discretionary working capital and discretionary commercialization (Zang, 2012). Thus:

$$CM_{it} = WCD_{it} + CommercD_{it} \quad (8)$$

Where:

CM_{it}: discretionary commercial management of company i in period t;

WCD_{it}: discretionary working capital of company i in period t;

$CommercD_{it}$: discretionary commercialization of company i in period t.

In the hypothesis under study, similarly to Zang (2012), it is considered the existence of three independent variables that are considered to justify the discretionary management

of real activities and two control variables. Thus, their influence on the variable Commercial Management (CM) will be calculated through the following model:

$$CM_{it} = \alpha_1 + \beta_1\left(\frac{INV_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{DR_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{LIAB_{it}}{A_{it-1}}\right) + \beta_4\left(\frac{EBT_{it-1}}{A_{it-1}}\right) + \beta_5\left(\frac{TXP_{it}}{A_{it-1}}\right) + \varepsilon_{it} \quad (9)$$

Where:

DR_{it}: company i's accounts receivable in period t;
$LIAB_{it}$: accounts payable by company i in period t;
EBT_{it}: earnings before taxes of company i in period t.

Variables EBT_{it} and TXP_{it} are control variables introduced in the model because it is considered that the amount of tax paid may be one of the objectives of managers to exert influence on earnings. By lowering the value of the earnings, the taxable base decreases and the possibility of lowering the amount of tax payable is created (Moreira, 2008). An increase in the INV_{it} is expected to have a positive influence on commercial management, i.e., the higher the inventory value, the higher the working capital that makes up CM_{it}. The same sign is expected for accounts receivable. It is expected that payables have a negative relation with CM_{it}. An increase in payables leads to a decrease in CM_{it}. An increase in EBT_{it} and TXP_{it} should lead to a decrease in $CommercD_{it}$, implying a decrease in sales volume, so a negative sign is expected for these variables.

To check the effect on discretionary cash flows (CFOD), discretionary cost of goods sold (COGSD) and discretionary inventory variation (ΔINVD) equations were formulated that include independent variables that are considered to justify discretionary management of real activities and also the control variables, adapting the models formulated by Roychowdhury (2006).

$$CFOD_{it} = \alpha_1 + \beta_1\left(\frac{INV_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{DR_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{LIAB_{it}}{A_{it-1}}\right) + \beta_4\left(\frac{EBT_{it-1}}{A_{it-1}}\right) + \beta_5\left(\frac{TXP_{it}}{A_{it-1}}\right) + \beta_6 SuspComp_{it} + \varepsilon_i \quad (10)$$

$$COGSD_{it} = \alpha_1 + \beta_1\left(\frac{INV_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{DR_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{LIAB_{it}}{A_{it-1}}\right) + \beta_4\left(\frac{EBT_{it-1}}{A_{it-1}}\right) + \beta_5\left(\frac{TXP_{it}}{A_{it-1}}\right) + \beta_6 SuspComp_{it} + \varepsilon_{it} \quad (11)$$

$$\Delta INVD_{it} = \alpha_1 + \beta_1\left(\frac{DR_{it}}{A_{it-1}}\right) + \beta_2\left(\frac{LIAB_{it}}{A_{it-1}}\right) + \beta_3\left(\frac{EBT_{it-1}}{A_{it-1}}\right) + \beta_4\left(\frac{TXP_{it}}{A_{it-1}}\right) + \beta_5 SuspComp_{it} + \varepsilon_{it} \quad (12)$$

Where:

$CFOD_{it}$: discretionary operating cash flow of company i in period t;
$COGSD_{it}$ is the discretionary cost of goods sold of company i in period t;
$\Delta INVD_{it}$: discretionary change in inventories of company i between period t -1 and period t;
INV_{it}: inventory of company i in period t;
DR_{it}: company i's accounts receivable in period t;

$LIAB_{it}$: accounts payable by company *i* in period *t;*
EBT_{it}: earnings before taxes of company *i* in period *t*;
TXP_{it}: taxes paid by company *i* in period *t*;
$SuspComp_{it}$: Company *i* suspected of incurring discretionary charges in period. Dichotomous variable that takes the value 1 when the ratio of pre-tax earnings to total assets of the previous year $\left[-0{,}05 \geq \frac{EBT_{it}}{A_{t-1}} \geq 0{,}05\right]$ and zero in the remaining cases.

Similarly to Cohen & Zarowin (2010) and Roychowdhury (2006) studies, it was considered that companies suspected of introducing discretionary management present earnings between -0.05 and 0.05 of pre-tax income (EBT) divided by total assets of the previous year. This range was defined because it is considered that companies have an interest in demonstrating financial health, seeking not to present very negative income; also, because companies discretionarily allocate part of their income to their operational activity; and also, because they try, through the timeliness of inventory purchases and sales, to decrease the annual tax base.

The sign of INV_{it} in the equation whose dependent variable is $CFOD_{it}$ is expected to be negative and, similarly to Roychowdhury's (2006) study, the coefficients of DR_{it}, $LIAB_{it}$ and TXP_{it} are also expected to be negative and that of EBT_{it} is positive. Discretionary cash flow is expected to decrease due to an increase in inventories, bargaining power relative to purchase prices, debts receivable and payable and tax payments, because an increase in the value of debts decreases cash flow and its equivalents and due to the tax paid. On the contrary, the pre-tax income is expected to have a positive influence on cash and cash equivalents. The sign of $SuspComp_{it}$ is also expected to be negative because the average *CFO* of firms under these conditions is expected to be more negative than that of other firms included in the study.

It is expected that the sign of INV_{it}, in the equation whose dependent variable is $COGSD_{it}$, will be positive as well as that of DR_{it}, similarly to Roychowdhury (2006) study, because the higher the inventory value the lower COGSD will be, considering that there will be a dilution of expenses by the amount of goods stored and that DR_{it} is related to the increase in sales volume. The coefficients of $LIAB_{it}$, EBT_{it} and TXP_{it} are expected to show negative sign as they have a negative effect on $COGSD_{it}$. The sign of $SuspComp_{it}$ is also expected to be positive because the average COGSD of firms under these conditions is expected to be more positive than that of other firms included in the study.

In the regression equation that has as dependent variable $\Delta INVD_{it}$, it is expected that the $SuspComp_{it}$ variable presents a positive sign because it is considered that $\Delta INVD$ is higher than the average value of the other companies included in the model. Considering that the increase in DR_{it} may occur thanks to the increase in the volume of discretionary sales resorting to sales price reduction strategies, promotions, amongst others, it is expected that the sign of this variable will be negative; the same occurring with the EBT_{it} variable. The opposite should occur with the $LIAB_{it}$ and TXP_{it} variables. Payables arise from

purchases of goods and services during normal business activity, so the increase in payables is positively related to the discretionary increase in inventories. As tax is calculated on the taxable base, an increase in tax implies an increase in sales volume and consequently a decrease in the volume of inventories.

4 Results and discussion

This section of results and discussion is divided into three subsections. The first discusses the results obtained with the estimates of the normal levels of the variables included in the models; the second with the estimates of the discretionary levels of the variables; and in the last section the analysis and validation of the hypotheses under study is made.

4.1 Normal level for operating cash flow, cost of goods sold, commercialization and change in inventories

First, the normal levels of CFO_{it}, $COGS_{it}$, ΔINV_{it} and $Commerc_{it}$ were estimated, using the regression equations (1), (3), (4) and (5), respectively, and whose results are presented in Table 1.

Table 1. Results obtained from multiple regression models, Equations (1), (3), (4) and (5)

Variable	Predicted	Operating cash flow	Predicted	Cost of goods sold	Predicted	Change in inventories	Predicted	Commerciali-zation
Intercept (*t value*)		-0,093*** (-51,06)		-0,046*** (-18,57)		-0,212*** (-130,55)		0,135*** (26,35)
$1/A_{it-1}$ (*t value*)		0,116*** (70,31)		-0,261*** (-115,10)		0,197*** (135,90)		-0,101*** (-21,83)
V_{it} (*t value*)	+	0.005*** (23,68)	+	0,901*** (2124,62)			+	0,894*** (1496,79)
ΔV_{it} (*t value*)	+	-0,002*** (-11,06)			+	0,038*** (93,17)	-	-0,001 (-0,93)
ΔV_{it-1} (*t value*)					+	0,001*** (7,64)	-	-0,001 (-1,10)
R^2		0,058		0,970		0,242		0,953
N		215.579		215.579		215.579		215.579

*** p-value < 0.01

Table 1 shows that all variables included in the models concerning Operating Cash Flow, Cost of Goods Sold and Change in Inventories, with Bonferroni correction, are statistically significant (with p-value < 0.01). The signs of the estimated β for the independent variables of the models concerning Operating Cash Flow, Cost of Goods Sold and Commercialization are as expected and identical to those found by Dechow et al. (1998), being also similar to that of Roychowdhury's study (2006), except for the variable ΔV_{it} in the calculation of Operating Cash Flow. This difference is justified by the fact that the Net Earnings for the period is determined by current revenues, causing a positive dependency. The estimated coefficients for the Change in Inventories model agree with those of Cook et al. (2012) and Cook et al. (2020).

The R^2 of the regression concerning Operating Cash Flow reports an explanatory power of 5.8%, a much lower value than that found in studies such as Roychowdhury's

(2006). This difference may be due to the characteristics of SMEs that differ from those of listed companies, such as those included in that study. The regression concerning Cost of Goods Sold has an explanatory power of 97% and that of Commercialization of 95.3%, in both cases a higher explanatory power than that presented by Roychowdhury (2006) and Zang (2012). The explanatory power of the regression concerning Change in Inventories is 24.2%. This value is lower than that found by Cook et al. (2020), nevertheless it is considered useful in explaining inventory changes.

Dechow et al. (1996) and Cook et al. (2012) state that expenses are expressed by a linear function of current sales, for this reason COGS were calculated using the volume of sales transacted by the companies. Looking for the calculation of COGS (initial inventory + purchases - closing inventory + - reclassifications and regularisations), the higher the closing inventory value, the lower the COGS.

4.2 Discretionary commercial management

This section shows the study of the suspicion of the use of discretion in Commercial Management (CM), the determination of the influence of a set of independent variables on the dependent variable CM and the verification of the impact of those independent variables on the discretionary variables found. The results allow for the conclusion that the model concerning Commercial Management fits. The explanatory variables are mostly statistically significant, and their signs are, in line with the expected results, as shown in table 2.

Table 2. Results obtained from multiple regression models, Equations (9), (10), (11) and (12)

Variable	Predicted	Commercial management	Predicted	Discretionary cash flow	Predicted	Discretionary cost of goods sold	Predicted	Discretionary inventory variation
Intercept (*t value*)		-0,274*** (-100,46)		0,030*** (115,78)		0,006*** (2,95)		0,000 (0,38)
INV_{it} (*t value*)	+	1,483*** (300,79)	-	-0,065*** (-160,94)	+	0,121*** (48,72)		
DR_{it} (*t value*)	+	0.479*** (82,07)	-	-0,052*** (-108,73)	+	0,001 (0,30)	-	-0,043*** (-21,45)
$LIAB_{it}$ (*t value*)	-	-1,008*** (-273,42)	-	-0,021*** (-69,31)	-	-0,089*** (33,99)	+	0,004*** (2,71)
EBT_{it} (*t value*)	-	-0,012 (-1,82)	+	0.977*** (1766,89)	-	-0,499*** (-133,01)	-	-0,080*** (-32,97)
TXP_{it} (*t value*)	-	-5,324*** (-90,66)	-	-0,391*** (-75,76)	-	-3,638*** (-88,09)	+	0,108*** (4,83)
SuspComp (*t value*)			-	-0,004*** (-15,69)	+	0,070*** (28,68)	+	0,014*** (12,94)
R^2		0,557		0,963		0,201		0,016
N		215.579		215.579		215.579		215.579

*** p-value < 0.01

Discretionary commercial management (CM_{it}) corresponds to the sum of discretionary working capital and discretionary trading, being, by its definition, a variable that includes discretion (Zang, 2012). As in the studies of Roychowdhury (2006) and Zang (2012) the signs of the variables that are active components of the financial statements have positive sign and the variables of liabilities and equity have negative sign. As can be seen in

table 2, the model explains 56% of the variability and most of the variables included in the model are statistically significant at the 1% level, except for the EBT_{it} variable. The INV_{it} variable shows the highest impact (t-value = 300.79; highest standardised β = 0.600; p-value < 0.001) on Discretionary Commercial Management (CM), where a change of one unit of inventories causes a 1.483 increase in Discretionary Commercial Management. An increase of one unit of receivables (DR_{it}) also elicits a 0.479 increase in Discretionary Commercial Management (t-value = 82.07; standardised β = 0.166; p-value < 0.001). As for the liabilities and equity variables included in the model, the expected relationship is also verified. An increase in each one of them causes a decrease in Commercial Management. The variable debts payable ($LIAB_{it}$), where debts to inventory suppliers are included, shows the second highest impact (t-value = -273.42; standardised β = -0.547; p-value < 0.001) on Discretionary Commercial Management (CM) and an impact coefficient of -1.008 that should be highlighted. There are two control variables in the model, the pre-tax income variable (EBT_{it}) and the tax variable (TXP_{it}). While the first one is not significative in this model, the later (t-value = -90.67; standardised β = -0.190; p-value < 0.001) impacts (β = -5.324) Discretionary Commercial Management (CM).

In summary it is found that discretionary commercialization ($CommercD_{it}$) together with discretionary working capital (WCD_{it}) can be changed discretionarily with inventory units in stock. Since CM is the proxy of discretionary real activities **one can state that Hypothesis 1** (H_1) - *There is a positive relationship between discretionary real activities management and volume of inventories* - **is confirmed**.

Table 2 shows that the signs obtained for the independent variables concerning Discretionary Cash Flow, Discretionary Cost of Goods Sold and Discretionary Inventory Variation correspond, with the exception justified above, to what was expected. The equation fitted to Discretionary Cash Flow presents an R^2 of 96.3% revealing a high explanatory power. The SuspComp variable is significant at 1% and, as expected, its sign is negative meaning that the interval of suspicious companies has more negative average Discretionary Cash Flow than the remaining companies in the interval. It should be noted that, for this equation, the variable with the highest weight is the explanatory variable EBT_{it}, (t-value = 1766.89; standardised β = 0.986; p-value < 0.001) with an impact of 0.977 on discretionary cash flows and suggesting that this item is one of the targets of discretion by managers. We also find that increasing the volume of inventories decreases discretionary cash flow by 0.065, which is consistent with the forecasts and allows us to **confirm Hypothesis 1.1** ($\mathbf{H_{1.1}}$) - *There is a negative relationship between discretionary cash flows and the volume of inventories*.

The regressions of the dependent variables Discretionary Cost of Goods Sold, and Discretionary Inventory Variation have a rather low explanatory power, 20.1% and 1.6% respectively. In both, the expected sign for the SuspComp variable is positive indicating that the group of suspicious firms has cost of goods sold and discretionary inventory variation higher than the average value of all other firms in the study. For the Discretionary Cost of Goods Sold, variable $INVD_{it}$ has a positive sign and is statistically significant, indicating that the increase in the volume of inventories increases the discretionary cost of goods sold and

allows **confirming Hypothesis 1.2** (**$H_{1.2}$**) - *There is a positive relationship between the discretionary cost of goods sold and the volume of inventories*. It should be noted that, for this equation, the variable with the highest weight is the explanatory variable EBT_{it}, (t-value = -133.08; standardised β = -0.299; p-value < 0.001) with an impact of -0.499 on discretionary cost of goods sold. Moreover, TXP_{it} (t-value = -88.09; standardised β = -0.210; p-value < 0.001) is the variable with the second largest weight with an impact of -3.638 on discretionary cost of goods sold. The increase in the amount of tax payable is due to the increase in income As Cost of Goods Sold is one of the accounts that directly contributes to the formation of EBT it is understandable that the increase in tax payable means a decrease in costs, in this case cost of goods sold. **Hypothesis 1.3** (**$H_{1.3}$**) - *There is a negative relationship between Discretionary Inventory Variation and Earnings Before Tax*, **is confirmed** in the result of the equation with the dependent variable Discretionary Inventory Variation, by the highest weight explanatory variable EBT_{it}, (t-value = -32.97; standardised β = -0.106; p-value < 0.001) with an impact of -0.080. As expected, the increase in EBT explains, in part, the decrease in the discretionary variation in inventories. The increase in earnings before taxes may result from the increase in sales volume, which will result in a decrease in the volume of inventories. Furthermore, TXP_{it} (t-value = 4.83; standardised β = 0.016; p-value < 0.001) has an impact of 0.108 on discretionary inventory variation. The increase in sales volume increases the EBT, which is the tax base for taxes. Thus, the increase in taxes is related to the decrease in the volume of discretionary inventories (by their sale).

4.3 Hypothesis validation and analysis

This section presents a summary of the results for the hypotheses, Table 3, and a brief discussion on the findings.

Table 3. Summary of the results for the hypotheses

H	Hypothesis	Predicted	Obtained	Result
H_1	*There is a positive relationship between discretionary management of real activities and the volume of inventories*	+	+	Validated
$H_{1.1}$	*There is a negative relationship between discretionary cash flows and the volume of inventories*	-	-	Validated
$H_{1.2}$	*There is a positive relationship between the discretionary cost of goods sold and the volume of inventories*	+	+	Validated
$H_{1.3}$	*There is a negative relationship between the change in the volume of discretionary inventories and earnings before tax (EBT)*	-	-	Validated

In view of the results, it can be said that all the hypotheses under study are confirmed. Considering that discretion is synonymous with arbitrariness, free choice, and freedom, it can be stated that management options taken in this spirit alter financial information, not because they include material errors, but because the objectives that encourage management are opportunistic or manipulative (Beneish, 1999). Portuguese SMEs in the commercial sector use inventory management in a discretionary way, changing the value of their earnings through Cost of Goods Sold and, consequently, the value of the company. The results obtained allow us to state that the inventories of companies in the

commercial sector are subject to discretionary management, that discretionary inventory management affects the value of companies, that studies based on the value of companies may obtain biased results and that with the change in value, the information conveyed and transmitted to stakeholders also does not convey a true picture of the companies.

Financial statements are the basic information, provided by companies, for their relationship with stakeholders. The discretionary management of real activities through inventories causes changes in the composition and value of companies. Therefore, accounting provides elements that are not efficient as a basis for trading and contracting. Discretionary inventory management also influences the value of taxes payable, as validated in Hypothesis 1.3. Thus, when firms exhibit an EBT value between -0.05 and 0.05 of total asset value, they may be firms that exhibit discretionary inventory asset management. This finding may be of particular interest to all users of financial information.

It should be noted that the present study was based on existing and widely disseminated methodology, however, the study of the specificity of inventories in small and medium Portuguese companies in the commercial sector, has no disseminated research, to our knowledge. For this reason, it is not possible to make a more detailed comparison of the results obtained.

5 Concluding Remarks

The main objective of this study was to contribute to the knowledge on the discretionary management of companies in the commercial sector, specifically Portuguese SMEs, using discretionary inventory management. To this end, a sample of 30,797 companies with available information for the period between 2013 and 2019 was analysed. We intended to answer the question: "what is the effect of discretionary inventory management, through real activities, in the accounting information of Portuguese SMEs in the commercial sector?", in line with the studies already conducted by some authors, such as Cohen & Zarowin (2010); Cohen & Frazzini (2008); Roychowdhury (2006); Zang (2012); Commerford et al. (2014); Gunny et al., (2013); Kothari et al. (2016); Pustylnick et al. (2017), Ge (2009), Cook et al. (2020) among others.

The results obtained after the estimation of the models allow us to conclude that: (i) the managers of SMEs included in the study tend to include discretion in the management of the real activities and that the volume of inventories is one of the factors that weighs in this same discretionary management in agreement with the seminar studies by some authors, such as Alper et al. (2016); Gaur et al. (2014); Roychowdhury (2006); Sabir & Farooquie (2018); (ii) the discretion included in inventory management is related to commercial management. Managers have the power to choose real activities to achieve their objectives. These options cause changes in the value of companies' financial reports, which can be stimulating for managers who want to present financial statements that meet the requirements of stakeholders and their own interests; (iii) the companies included in the study use the increase or decrease in the volume of inventory to change the cost of goods sold and consequently the value of the earnings and the value of the company. This

discretion in the real activity has repercussions on the financial statements and the results obtained by the theoretical or practical analysis carried out based on these statements.

This work was based on the agency theory and the positive accounting theory. The results confirmed both theories, when there is conflict of interest the manager seeks to act to maximize their welfare by using discretion. The discretion causes deliberate changes in the economic and financial reality of the companies and consequently in the financial statements that are the support element for decision making. This proves that it deliberately causes asymmetry of information between the owner and the other stakeholders.

Regarding limitations, it should be noted that the present study included all SMEs in the commercial sector. This means that companies were included that employ less than 250 people and whose annual turnover does not exceed 50 million euros or whose annual balance sheet total does not exceed 43 million euros, as stipulated in Decreto - Lei no. 372/2007. It means that within the same group are included with quite different management realities. To remedy the difference in size the variables were divided by the total assets of the previous year, but this procedure does not standardise all the differences between companies, which constitutes a limitation to the study. Another limitation is the non-inclusion, in the study, of the differences between different types of commercial companies such as retailers, wholesalers of various activities such as: food products, fuel, technological and other household equipment because the motivations and forms of discretion may have different configurations. One of the proposals for the continuation of this study is to replicate it comparing the results in various activities of the commercial sector. Moreover, comparing the behaviour of Portuguese firms with SMEs in the trading sector from other countries is a way to obtain additional knowledge on the inclusion of discretion in inventory management, allowing us to verify whether the Portuguese reality and the degree of discretion are similar across different business realities.

Currently, the studies about inventories are focused on their control, such as the control of entries, confrontation between the volume that is documented and the real volume and control of COGS and turnover (Feng et al., 2015). Thus, it emerges as issues for future deepening the verification of the relationship between inventory turnover and accounting information, the study in companies with financial reporting realities different from the Portuguese and the verification of the occurrence of accounting discretion in a commercial sector company.

References

Achleitner, A.-K., Günther, N., Kaserer, C., & Siciliano, G. (2014). Real Earnings Management and Accrual-based Earnings Management in Family Firms. *European Accounting Review*, *23*(3), 431–461. https://doi.org/10.1080/09638180.2014.895620

Afrifa, G. A., Alshehabi, A., Tingbani, I., & Halabi, H. (2021). Abnormal inventory and performance in manufacturing companies: evidence from the trade credit channel. *Review of Quantitative Finance and Accounting*, *56*, 581–617. https://doi.org/10.1007/s11156-020-00903-y

Allee, K. D., Baik, B., & Roh, Y. (2021). Detecting Financial Misreporting with Real Production Activity: Evidence from an Electricity Consumption Analysis. *Contemporary Accounting Research*, *38*(3), 1581–1615. https://doi.org/10.1111/1911-3846.12674

Anton, S. G., & Carp, M. (2020). The effect of discretionary accruals on firm growth. Empirical evidence for SMEs from emerging Europe. *Journal of Business Economics and Management*, *21*(4), 1128–1148. https://doi.org/10.3846/jbem.2020.12734

Bahri, M., St-Pierre, J., & Sakka, O. (2017). Performance measurement and management for manufacturing SMEs: a financial statement-based system. *Measuring Business Excellence*, *21*(1), 17–36. https://doi.org/10.1108/MBE-06-2015-0034

Barth, M. E., Cram, D. P., & Nelson, K. K. (2001). Accruals and the prediction of future cash flows. *Accounting Review*, *76*(1), 27–58. https://doi.org/10.2308/accr.2001.76.1.27

Basu, N., & Wang, X. (2011). Evidence on the Relation between Inventory Changes, Earnings, and Firm Value. *The International Journal of Business and Finance Research*, *5*(3), 1–14. https://ssrn.com/abstract=1879403

Beneish M.D. (1999). The Detection of Earnings Manipulation. *Financial Analysts Journal*, *55*(5), 24–36. https://doi.org/10.2469/faj.v55.n5.2296

Capkun, V., Hameri, A., & Weiss, L. A. (2009). On the relationship between inventory and financial performance in manufacturing companies. *International Journal of Operations & Production Management*, *29*(8), 789–806. https://doi.org/10.1108/01443570910977698

Choi, J. H., Kim, J. B., & Zang, Y. (2010). Do Abnormally High Audit Fees Impair Audit Quality? *Auditing*, *29*(2), 115–140. https://doi.org/10.2308/aud.2010.29.2.115

Cohen, D., Pandit, S., Wasley, C.E. & Zach, T. (2020). Measuring Real Activity Management. *Contemporary Accounting Research*, *37*(2), 1172–1198. https://doi.org/10.1111/1911-3846.12553

Cohen, D. A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics*, *50*(1), 2–19. https://doi.org/10.1016/j.jacceco.2010.01.002

Cohen, L., & Frazzini, A. (2008). Economic Links and Predictable Returns. *The Journal of Finance*, *63*(4), 1977–2011. https://doi.org/10.1111/j.1540-6261.2008.01379.x

Commerford, B. P., Hermanson, D. R., Houston, R. W., & Peters, M. F. (2014). Real Earnings Management: A Threat to Auditor Comfort? *AUDIT: A Journal of Practice & Theory*, *35*(4), 39–56. https://doi.org/10.2308/ajpt-51405

Cook, K. A., Huston, G. R., & Kinney, M. R. (2012). Managing Earnings by Manipulating Inventory: The Effects of Cost Structure and Valuation Method. *Available at SSRN*. http://dx.doi.org/10.2139/ssrn.997437

Cook, K. A., Huston, G. R., Kinney, M. R., & Smith, J. S. (2020). Just How Much Does the Tail Wag the Dog? Altering Inventory to Manage Earnings. *Decision Sciences*, *52*(1), 216–261. https://doi.org/10.1111/deci.12425

Cordeiro, C. M. R. (2003). Contabilidade criativa: um estudo sobre a sua caracterização. *Revista do Conselho Regional de Contabilidade do Estado do Paraná*, *126*(2).

Dechow, P. M., & Dichev, I. D. (2002). The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors. *The Accounting Review*, *77*(s-1), 35–59. https://doi.org/10.2308/accr.2002.77.s-1.35

Dechow, P. M., Hutton, A. P., Kim, J. H. & Sloan, R. G. (2012). Detecting Earnings Management: A New Approach. *Journal of Accounting Research*, *50*(2), 275–334. https://doi.org/10.1111/j.1475-679X.2012.00449.x

Dechow, P. M., Kothari, S. P., & Watts, R. L. (1998). The relation between earnings and cash flows. *Journal of Accounting and Economics*, *25*(2), 133–168. https://doi.org/10.1016/s0165-4101(98)00020-2

Dechow, P. M., & Skinner, D. J. (2000). Earnings Management: Reconciling the Views of Accounting Academics, Practitioners, and Regulators. *Accounting Horizons*, *14*(2), 235–250. https://doi.org/10.2308/acch.2000.14.2.235

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting Earnings Management. *The Accounting Review*, *70*(2), 193–225. https://doi.org/10.2307/248303

Decreto - Lei no 372/2007. (2007). Conceito de PME. *In Diário da República no 213 - Série I* (pp. 8080-8084).

Dichev, I. D., Graham, J. R., Harvey, C. R., & Rajgopal, S. (2012). Earnings quality: Evidence from the field. *Journal of Accounting and Economics*, *56*(2-3), 1–33. https://doi.org/10.1016/j.jacceco.2013.05.004

Eilifsen, A., Knivsflå, K. H., & Sættem, F. (2010). Earnings manipulation: cost of capital versus tax. *European Accounting Review*, *8*(3), 481–491. https://doi.org/10.1080/096381899335899

Erickson, M., Hanlon, M. & Maydew, E. L. (2004). How Much Will Firms Pay for Earnings That Do Not Exist? Evidence of Taxes Paid on Allegedly Fraudulent Earnings. *The Accounting Review*, *79*(2), 387–408. http://www.jstor.org/stable/3203249

Feng, M., Li, C., McVay, S. E., & Skaife, H. (2015). Does ineffective internal control over financial reporting affect a firm's operations? Evidence from firms' inventory management. *Accounting Review*, *90*(2), 529–557. https://doi.org/10.2308/accr-50909

Ferrer, R. C., & Ferrer, G. J. (2016). Earnings management indicators and their impact on inventory turnover under food, beverage, and tobacco sector. *Academy of Accounting and Financial Studies Journal*, *20*(2), 93–103.

Francis, B., Hasan, I., & Li, L. (2016). Evidence for the Existence of Downward Real-Activity Earnings Management. *Journal of Accounting, Auditing and Finance*, *31*(2), 212–248. https://doi.org/10.1177/014855X15582086

Frankel, R. M., & Sun, Y. (2018). Predicting Accruals Based on Cash-Flow Properties. *Accounting Review*, *93*(5), 165–186. https://doi.org/10.2308/accr-52001

Galdi, F. C., & Johnson, E. S. (2021). Accounting for inventory costs and real earnings management behavior. *Advances in Accounting*, *53*, 100530. https://doi.org/10.1016/j.adiac.2021.100530

Gaur, V., Kesavan, S., & Raman, A. (2014). Retail inventory: Managing the Canary in the Coal Mine. *California Management Review*, *56*(2), 55–76. https://doi.org/10.1525/cmr.2014.56.2.55

Gaver, J. J., Gaver, K. M., & Austin, J. R. (1995). Additional evidence on bonus plans and income management. *Journal of Accounting and Economics*, *19*(1), 3–28. https://doi.org/10.1016/0165-4101(94)00358-C

Gołaś, Z. (2020). The effect of inventory management on profitability: Evidence from the Polish food industry: Case study. *Agricultural Economics (Czech Republic), 66*(5), 234–242. https://doi.org/10.17221/370/2019-AGRICECON

Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of Accounting and Economics*, *40*(1-3), 3-73. https://doi.org/10.1016/j.jacceco.2005.01.02

Gunny, K. (2005). *What are the consequences of real earnings the management?* Working Paper. University of Colorado at Boulder.

Gunny, K.A. (2010). The Relation Between Earnings Management Using Real Activities Manipulation and Future Performance: Evidence from Meeting Earnings Benchmarks. *Contemporary Accounting Research, 27*(3), 855–888. https://doi.org/10.1011/j.1911-3846.2010.01029.x

Gunny, K.A., Jacob, J., & Jorgensen, B.N. (2013). Implications of the integral approach and earnings management for alternate annual reporting periods. *Review of Accounting Studies, 18*(3), 868–891. https://doi.org/10.1007/s11142-013-9235-x

Hançerlioğulları, G., Şen, A., & Aktunç, E.A. (2016). Demand uncertainty and inventory turnover performance: An empirical analysis of the US retail industry. *International Journal of Physical Distribution & Logistics Management, 46*(6/7), 681–708. https://doi.org/10.1108/IJPDLM-12-2014-0303

Healy, P. M. (1985). The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics*, *7*(1-3), 85–107. https://doi.org/10.1016/0165-4101(85)90029-1

Healy, P. M., & Wahlen, J. M. (1999). A Review of Earnings Management Literature and its Implications for Standard Setting. *Accounting Horizons*, *13*(4), 365–383. https://doi.org/10.2308/acch.1999.13.4.365

Herusetya, A., & Stefani, C. (2020). The Association of Tax Aggressiveness on Accrual and Real Earnings Management. *Journal of Accounting and Investment*, *21*(3), 434–451. https://doi.org/10.18196/jai.2103158

Hribar, P., & Collins, D. W. (2002). Errors in Estimating Accruals: Implications for Empirical Research. *Journal of Accounting and Public Policy*, *40*(1), 105–134. https://doi.org/10.1111/1475-679X.00041

Huang, X. S., & Sun, L. (2017). Managerial ability and real earnings management. *Advances in Accounting*, *39*, 91–104. https://doi.org/10.1016/j.adiac.2017.08.003

Isaksson, O. H. D., & Seifert, R. W. (2014). Inventory leanness and the financial performance of firms. *Production Planning and Control*, *25*(12), 999–1014. https://doi.org/10.1080/09537287.2013.797123

Jensen, C., & Meckling, H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Jones, K. L., Krishnan, G. V., & Melendrez, K. D. (2008). Do models of discretionary accruals detect actual cases of fraudulent and restated earnings? An empirical analysis. *Contemporary Accounting Research*, *25*(2), 499–531. https://doi.org/10.1506/car.25.2.8

Kesavan, S., & Mani, V. (2010). The Predictive Power of Abnormal Inventory growth: Application to Earnings Forecasting for Retailers. *Available at SSRN*. http://dx.doi.org/10.2139/ssrn.1541141

Kosorukov, O. A., Maslov, S. E., & Sviridova, O. A. (2020). Accounting for the uncertainty of delivery terms in inventory management models. *EurAsian Journal of Biosciences*, *14*(2), 6323–6328.

Kothari, S. P., Mizik, N., & Roychowdhury, S. (2016). Managing for the moment: The role of earnings management via real activities versus accruals in SEO valuation. *Accounting Review*, *91*(2), 559–586. https://doi.org/10.2308/accr-51153

Licerán-Gutiérrez, A. & Cano-Rodríguez, M. (2019). A Review on the multidimensional analysis of earnings quality. *Revista de Contabilidad Spanish Accounting Review*, *22*(1), 41-60. https://doi.org/10.6018/rcsar.22.1.354301

Marquardt, C. A., & Wiedman, C. I. (2004). How are Earnings Managed? An Examination of Specific Accruals. *Contemporary Accounting Research*, *21*(2), 461–491. https://doi.org/10.1506/G4YR-43K8-LGG2-FOXK

Moreira, J. A. C. (2008). A Manipulação dos Resultados das Empresas: um contributo para o estudo do caso português. *Jornal de Contabilidade*, *XXXII*, 144-153.

Najera Ruiz, T., & Collazzo, P. (2021). Management accounting use in micro and small entreprises. *Qualitative Research in Accounting & Management*, *18*(1), 84–101. https://doi.org/10.1108/QRAM-02-2020-0014

Nardi, P. C. C., Amadi, A. F., & Silva, R. L- M. (2019). Análise da Relação entre as Características Qualitativas da Informação Contábil e o Audit Delay. *Advances in Scientific and Applied Accounting*, *12*(3), 101–119. https://doi.org/10.14392/asaa.2019120306

Nguyen, N. T. M., Iqbal, A., & Shiwakoti, R. K. (2022). The context of earnings management and its ability to predict future stock returns. *Review of Quantitative Finance and Accounting*, *59*(1), 123–169. https://doi.org/10.1007/s11156-022-01041-3

Opoku, R. K., Abboah, C. K. B., & Owusu, R. T. (2021). Inventory management strategies of food manufacturing industries in a developing economy. *LogForum*, *17*(1), 37–48. https://doi.org/10.17270/J.LOG.2021.557

Parte-Esteban, L., & Garcia, C. F. (2014). The influence of firm characteristics on earnings quality. *International Journal of Hospitality Management*, *42*, 50–60. https://doi.org/10.1016/j.ijhm.2014.06.008

Pereira, A. S. (2006). Revisão da informação financeira - prospectiva. *Revisores & Empresas*, *8*(34), 26–35.

Pustylnick, I., Temchenko, O. & Gubarkov, S. (2017). Estimating the influence of accounting variables change on earnings management detection. *Journal of International Studies*, *10*(1), 110–122. https://doi.org/10.14254/2071-8330.2017/10-1/7

Rezaee, Z. (2002). The three Cs of Fraudulent Financial Reporting. *Internal Auditor*, *29*(5), 56–61. https://doi.org/10.3102/00346543067001043

Roychowdhury, S. (2004). *Manipulation of earnings through the management of real activities that affect cash flow from operations* [doctoral dissertation]. University of Rochester.

Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of Accounting and Economics*, *42*(3), 335–370. https://doi.org/10.1016/j.jacceco.2006.01.002

Sabir, L. B., & Farooquie, J. A. (2018). Effect of Different Dimensions of Inventory Management of Fruits and Vegetables on Profitability of Retail Stores: An Empirical Study. *Global Business Review*, *19*(1), 99–110. https://doi.org/10.1177/0972150917713278

Salikhov, M., Parker, P., Mihm, J., Popescu, D., & Rudi, N. (2017). *Accounting-Based Incentives Can Induce Cyclical Inventory Build-Ups.* Working Paper 2017/34/TOM. INSEAD. http://dx.doi.org/10.2139/ssrn.2972482

Sánchez-Ballesta, J. P., & Yagüe, J. (2021). Financial reporting incentives, earnings management, and tax avoidance in SMEs. *Journal of Business Finance and Accounting*, *48*(7-8), 1404–1433. https://doi.org/10.1111/jbfa.12519

Song, Z., Liu, Y., & Wang, J. (2022). Mandatory internal control and earnings management. *Emerging Markets Finance and Trade*, *58*(12), 3439–3453. https://doi.org/10.1080/1540496X.2022.2050903

Steiberg, H. (2022). A Retrospective on Federal Agency Financial Reporting. *Journal of Government Financial Management, 70*(4), 61–64.

Stolowy, H., & Breton, G. (2003). La gestion des donnés comptables: une revue de la literature. *Comptabilité-Contrôle_Audit*, *9*(1), 125–152. https://doi.org/10.3917/cca.091.0125

VanAuken, H., Ascigil, S., & Carraher, S. (2016). Turkish SMEs' Use of Financial Statements for Decision Making. *The Journal of Entrepreneurial Finance*, *19*(1), 6. https://digitalcommons.pepperdine.edu/jef/vol19/iss1/6

Wang, Y., Bhanugopan, R., & Lockhart, P. (2015). Examining the quantitative determinants of organizational performance: evidence from China. *Measuring Business Excellence*, *19*(2), 23–41. https://doi.org/10.1108/MBE-05-2014-0014

Wang, I., Jung, T., Lee, W. J., & Yang, D. G. (2021). Asymmetric Inventory Management and the Direction of Sales Changes. *Contemporary Accounting Research*, *38*(1), 676–706. https://doi.org/10.1111/1911-3846.12635

Watts, R. L., & Zimmerman, J. L. (1978). Towards a Positive Theory of Determination of Accounting Standards. *The Accounting Review*, *53*(1), 112–134. https://doi.org/10.2307/245729

Yan, H., Yano, C. A., & Zhang, H. (2019). Inventory Management under Periodic Profit Targets. *Production and Operations Management*, *28*(6), 1387–1406. https://doi.org/10.1111/poms.12986

Yuan, K., Zeng, D., Yuan, X., & Lan, F. (2022). Real Earnings Management, Manipulation Incentives and Accounting Conservatism: Evidence from China. *Emerging Markets Finance and Trade*, *58*(4), 939–951. https://doi.org/10.1080/1540496X.2020.1852927

Zang, A. Y. (2012). Evidence on the trade-off between real activities manipulation and accrual-based earnings management. *The Accounting Review*, *87*(2), 675–703. https://doi.org/10.2308/accr-10196