Chapter 8
The Relationship Between the Quality of Financial Information in Industrial Companies and Discretionary Inventory Management

Maria Filipa Nogueira
Instituto Politécnico de Santarém, Portugal

ABSTRACT

Inventories are the base element for the manufacturing (industrial) companies. The inclusion of discretionary in the inventory management processes of production leads to changes in the value of the companies. The accounting system produces information used in predictions and for management decision. The usefulness and opportunity of information are considered indispensable. If managers use their discretionarily, in the accounting system and in real activities, to achieve the firm value and earnings forecast, they will influence and modify the financial information quality. Ferrer and Ferrer said that a simple decision can enrich one company from one moment to another, and a small accounting change allows a great loss of results. The question arises: Do managers use their discretionarily and modify the financial information quality? Using adjusted models to capture discretionary accounting management and real activity management, it is possible to conclude that there is a strong evidence of discretionary management of the inventory in manufacturing Portuguese SME.

INTRODUCTION

Inventories are the base element for the production. Inventory management causes changes in the company's patrimonial and economic value, through its processing, acquisition and sale. The inclusion of discretionary in the management processes that include inventories leads to changes of the company's value. The possibility of the occurrence of discretionary management is the motivation for the develop-

DOI: 10.4018/978-1-5225-7817-8.ch008

ment of this article. The focus will be inventories because manufacturing companies are one of the more inventory-dependent activity sectors (e.g. Bernard & Noel, 1991; Cannon, 2008; Aaker & Gjesdal, 2010; Cook, Huston, & Kinney, 2012; Nissim, 2017; Pustylnick, Temchenko, & Gubarkov, 2017).

All management acts are reflected in the financial statements of the companies (Ferrer & Ferrer, 2016). The preparation of financial information must be based on existing regulations to provide objective and reliable financial statements. However, the ambiguity of some norms allows subjective judgments and the exercise of discretion in the accounting of operations. This discretion results in accruals change of the financial statements (changing assets and liabilities as well as items of the income statement). There are several econometric models to study accruals (e.g. Jones, 1991; Dechow, Sloan, & Sweeney, 1995). The information provided by the accounting system is one of the focus of research in accounting to study the quality of information provided (Herath & Lu, 2017).

Accounting is a system that produces information. It is used to register and quantify the facts or events that occurred during a period, to inform about the company economic and financial situation and about the results achieved. This information is useful to make predictions and to base decision-making management. The financial information can be managed by using the flexibility of the accounting normative (Stolowy & Breton, 2003).

Manufacturing companies have, in the inventories, one of their preponderant items for the introduction management discretion in accounting and in real activities. For this reason, the quality of information will be studied based on accruals and on real activities.

All management acts cause change in the financial statements, but decisions related to the volume and time of purchase and sale (timing) are used in the discretion included in real earning management (Roychowdhury, 2006). One method of managing discretionarily results is to take decisions about the operational process, that is, about activities. Changing operational practices can lead to goals on the financial information, influencing the judgment of users and it can be studied using accrual models.

For those countries where there is a big dependence between accounting and taxation, i.e. between the accounting result and the fiscal result, taxes arise as an incentive to manage the results. In the countries of continental Europe, such as Portugal, managers have a strong incentive to manage the accounting results in the downward direction, with the objective of reducing the amount of tax payable (Eilifsen, Knivsflå, & Sættem, 2010). One of the main incentives for managing results as the decrease of the tax payable (Moreira, 2008).

This study involved 12.181 Portuguese manufacturing SME. The first part is about discricionarity of accounting practices and its link with inventory management. The second part is about the discritionarity of real activities and its link with inventory management. There is an evidence that both kinds of management are used in the companies of the sample. For the study were regressed adaptations of the models used in several studies corroborating their results (Dechow, Sloan, & Sweeney, 1995; Ferrer & Ferrer, 2016; Gao, Gao, & Wang, 2017; Gunny, Jacob, & Jorgensen, 2013; Roychowdhury, 2006; Roychowdhury, Kothari, & Mizik, 2012).

The reminder of this study is organized as follows. First is the review of related literature and development of hypotheses. Next is the explanation of the sample and show of the results. Finally, the conclusions are presented on the main findings and the limitation of the study is presented.

LITERATURE REVIEW

The positive accounting theory (PAT) describes explanatory assumptions for opportunistic choices of managers. It assumes that management objectives encourage the maximization of their wealth or the companies they manage. So the motivations of managers target specific results (Watts & Zimmerman, 1978). This theory was formulated after the formulation of the agency theory (Jensen & Meckling, 1976). PAT assumes that actors in discretionary management act for their own benefit by trying to obtain political visibility, better remuneration (when contracts are indexed to an accounting reference); trying to present results that do not collide with restrictive clauses of existing contracts (as is the example of debt contracts). In addition to these motivations there are still others related to the structure of ownership of the company. The theory developed by these authors also relates to the agency contract and the management characteristics and the consequent asymmetry of information.

To monitor business performance is used the data provided by the financial reporting and financial statements produced by the accounting system. Accounting should provide useful information, contributing to the reduction of informational asymmetry. The financial statements are expected to present the economic and financial reality of the company and provide support for decision-making. There are several social, economic, political and behavioral factors that interfere so that not all economic agents have the same information (Dechow, Ge, & Schrand, 2010) so the accounting information has being the most elementary tool for the management mechanism (Santos & Paulo, 2006).

In small- and medium-sized enterprises (SME) the management (actions and decisions) is made by the owner, who holds the position of manager. The owner works as if he were a single shareholder, making the decisions that he believes are best for the (good) development of his business. When companies are larger and more complex decisions are made by professional managers hired for the job (Bahri, St-Pierre & Sakka, 2017) who acts to improve their own richness.

Production is the main activity of manufacturing firms. When the products are sold, their production cost appears in the income statement as "Cost of goods sold" (CGS). This item, represent a significant percentage on the total expenditures (includes direct labor costs, raw materials consumed and production overheads such as depreciation of equipment and indirect labor) so it can be used to achieve the company value desirable (Bahri et al., 2017).

Discretionary management occurs when managers use judgment in financial reporting to alter financial reports to mislead stakeholders about the underlying economic performance of the company (Healy & Wahlen, 1999). Discretionary management could arise from accounting choices that are fraudulent or from choices that are aggressive, but acceptable by the use of accounting discretion (Dechow & Skinner, 2000).

Real earnings management result from choices such as overproduction, reduction in research and development expenditures, product price reductions to increase sales, and reduction in discretionary expenditures, and it entails allocation of resources (Gupta, Pevzner, & Seethamraju, 2010; Healy & Wahlen, 1999; Roychowdhury, 2006).

Discretionary Management Based on Accounting Choices (Accruals)

Dechow & Skinner (2000) presented a study on the management of accounting. They conclude that management of accounting can be divided into two large groups: the management of results resulting from "pure" accounting decisions and the result of decisions with influence on cash flows. "Pure" accounting

standards and accounting principles the overvaluation of provisions, the acceleration of depreciation and depreciation of fixed assets and the recognition of income. The intention is to present few variations between the economic periods. There are situations where the accounting allows the choice between accounting processes or methods, without configuration of fraud.

The first empirical studies of earnings management were based on the modelling of accruals that are based on accounts included in the financial statements and can be used as a reference for the discretionary management. It is understood by discretionary accruals, all the associated accounting specialization of the economic year, which do not involve financial flows, and where the discretionary action of the manager is decisive for the recognition of an expense or income (e.g. Jones, 1991; Dechow, Sloan, & Sweeney, 1995).

There are some researchers who consider the use of discretionary measures of accruals does not provide a plausible detection of discretionary management. Ball (2013) claims that it is a form of arrogance of the researchers to assert that they can detect the management using larges data, when the auditors and the stakeholders unable to do so. To verify the management of net income and lack of accounting information quality, it's worth to make an interview to the managers (Dichev, Graham, Harvey, & Rajgopal, 2013). The specialization of the exercise and the timing are the two most important criteria to evaluate the quality of accounting reports. There are investigations that claim that there are sophisticated investors who uses discretionary accruals to analyze the results, however it is more likely that sophisticated investors analyze the difference between cash flows and additions. Accounting researchers use discretionary accruals for the study of the quality of information (Jackson, 2017).

Discretionary Management Based on Real Activities

Examples of decisions with influence on the cash flows practiced by managers are: slow sales; increase spending on advertising, training, research and development; and increase expenditure of non-operational nature. With these decisions' manager reduces the net cash flows. It is considered that the manager is having an influence on the actual activity of the company and not only on accounting management (e.g. Dechow & Skinner, 2000; Roychowdhury, 2006; Cohen, Cornett, Marcus, & Tehranian, 2014; Choi, Kim, & Zang, 2010).

Commerford, Hermanson, Houston, & Peters (2014) claim that companies generate results by using the system of accruals and accounting policies, which they call accounting-based results management and that this management can also be done through the management of real activities such as: strategic definition of the moment to make an investment, a financing or temporal definition of operational decisions to which. The authors said that the management of real activities is less subject to audit and regulation, so it is more attractive to the managers.

Quality of the Accounting Information

Accounting information is associated with its usefulness for decision-making, which depends on two qualitative characteristics: the relevance (predictive value and confirmatory value) and reliability (free from errors and prejudices). In quality of earnings analyses, one is generally concerned when growth in net operating assets exceeds growth in sales. This scenario suggests companies are inappropriately recording costs on the balance sheet instead of the income statement. The most popular proxy for earnings management is the estimated abnormal accruals. The first version is from Jones (1991).

Empirical studies use different proxies associated with the quality of the information. Licerán-Gutiérrez & Cano-Rodríguez (2017) use three categories of proxies. The first uses a set of characteristics of the financial statements that provide information to users. The second measure the investor's reaction to the published results. The third aggregates external indicators as negative opinions of auditors reviewing companies ' accounts. The investigation has mainly focused on the characteristics of the financial information.

One common way to measure the quality of accounting information is through accruals. Inventories and accounts receivable and payable are part of the models of accruals. Sudden or unexpected changes in these accounts allow discretionary behaviors because these accounts reflect the transactions that have occurred and a part of the balance sheet (Roychowdhury, 2006).

The verification of the influence of discretion on the inventory line and the quality of accounting information is a poorly analyzed area so far. However, manufacturing companies have in their inventories one of their preponderant items for the introduction of discretion in management either in accounting terms or through real activities. For this reason, the quality of information will be studied taking into account the specificity of the accruals and the actual activities focusing on the inventory heading in the manufacturing sector that is one of the sectors of activity most dependent on inventories (e.g.; Cannon, 2008; Aaker & Gjesdal, 2010; Kesavan & Mani, 2010 Basu, Nilanjan; Wang, 2011; Cook, Huston, & Kinney, 2012; Pustylnick, Temchenko, & Gubarkov, 2017).

Inventory

Inventory and accounts receivable are underestimated components in determining the degree of discretionary accruals. Unexpected or sudden changes in these accounts reflect possible discretionary behavior of activity (Roychowdhury, 2006). Discretionary management can be taken by varying level of activity. If a firm starts higher activity levels, that can be discretionary management. The activity ratios are altered and reflects those changes. The ratios capture daily operations and demonstrate the values of the current assets, particularly of inventories and of accounts of receivables. Sales is the primary target of the increase or decrease activity. Accruals are important when managers have a desired activity ratio for benchmarking operational factors. Activities "can be difficult to control while changes in accounting estimates provide a direct and controllable effect on the financial statement figures" (Ferrer & Ferrer, 2016).

Hypothesis

The information provided by the accounting system has been one of the focuses of research in accounting. It is intended to realize the quantity and the type information widespread (Herath & Lu, 2017). Accounting system serve to produce information for various purposes and different agents. It serves to quantify the facts or events that occurred during a given period and to inform about the economic and financial situation of a company and the results achieved. This information is useful to make predictions and to base decision-making management.

Based on the importance of financial information, this study analyses the economic truth of the transactions that enable the financial statements. The question arises: is there a way to detect discretionary information management through the study of financial statements? Prior and actual studies base the study of the information quality in the study of the accruals. The information provided can be amended

by using the flexibility of the accounting normative (Stolowy & Breton, 2003), using real management activities (Roychowdhury, 2006) and fraudulent management (Dechow & Skinner, 2000).

Quality of Information Management

The preparation of financial information should be based on existing regulations to provide objective and reliable financial statements. However, the ambiguity of some norms allows subjective judgments and the exercise of discretion in the accounting of some facts. This discretion results in discretionary accruals that alter the financial statements (changing assets and liabilities as well as earnings and income-accounting form of results management). The quality of the accounting information depends on the management discretion the following assumptions of investigation are formulated:

Hypothesis One: Discretionary accruals have a positive relation with inventory fluctuation.

Using accruals as quality of accounting information indicator, it is expected to find evidence that discretionary accruals are influenced by the inventory and by the accounts receivable and payable. Sales and cost of the good sold are components of the income statement (not from the balance sheet), so they must have relation with discretionary management of real activities.

The results of the studies indicate that the influence of the discretion on the inventory line and the quality of the accounting information is an area with few studies. It is intended to investigate whether the managers of the companies in the manufacturing sector practice discretionary management on their inventories and the reflexes of this management on the accounting information. It is expected to obtain confirmation of the use of accounting discretion on inventories which will influence the results and the patrimonial value described in the financial statements.

Real Activities Management

All management acts cause change in the financial statements, but decisions related to the volume and time of purchase and sale (timing) are one of the most preponderant factors in the discretion included (Roychowdhury, 2006). One method of managing discretionarily results is to make decisions about the operational process, that is, about real activities. Changing operational practices can lead to goals on the financial information influencing the judgment of users. The question arises: is there a way to detect real earnings management through the study of financial statements?

Hypothesis Two: Discretionary management of real activities have a positive relation with inventory fluctuation.

Using discretional production cost and working capital as an indicator of discretionary management of real activities it is expected to find evidence that working capital and production are influenced by the management of real activities (Zang, 2012).

Production is the process of combining various material inputs and immaterial inputs to make an output. It is the act of creating output, a good or service which has value and contributes to the utility of individuals. Production is a function of the company sales. When the amount of outputs increases

the production increases too. So, the production cost is the sum of cost of goods sold with change in inventory and depends on it (Roychowdhury et al., 2012).

Working capital is a of a company's liquidity, efficiency, and overall health. It includes cash, inventory, accounts receivable, accounts payable, the portion of debt due within one year, and other short-term accounts, a company's working capital reflects the results of a company activities, including inventory management, debt management, revenue collection, and payments to suppliers. Positive working capital indicates that a company can pay its short-term liabilities. Negative working capital indicates a company is unable to do so. One of the most significant uses of working capital is inventory. The longer inventory stays in the company, the longer the company's working capital is stopped (Ferrer & Ferrer, 2016).

In a turbulent and competitive environment, the survival of the companies depends on the sales. However, SMEs depend on a few numbers of costumers and supplier, making them vulnerable (Bahri et al., 2017). This is the reason to include accounts receivable and liabilities in the study of the discretionary management of real activities. Empirically researchers showed that sales are positively related with customer satisfaction.

RESEARCH

The data was collected in the data base *Amadeus* de *Bureau Van Dijk*. The base was the entire population of manufacturing industries of Portuguese SMEs between 2005 and 2015. This data base contains comparable financial data for European public and private companies.

The selected financial data were related to all active companies, from the manufacture sector. With the intention of ensuring that the companies in study were in operation, were imposed the following restrictions: have accounts available for each year; the total value of the assets, the value of the sales, the value of the fixed assets, the value of current assets, the value of current liabilities, the value of inventories and the value added is greater than 1 for all years of the sample.

The data collected was data from the financial statements of the companies, specifically the balance sheet, and the income statement of results, other data and accounting and financial information. The sample is 121,810 company-year observations.

Methodology

All variables used in the models are described in the Appendix.

Accruals Management

In general, an accruals model is run by regressing total accruals on variables that are associated with explaining those levels. Generally, these models are run on an industry-year basis using an OLS model:

$$y_i = \alpha + \sum_{k=1}^{n} \beta_k x_i + \varepsilon_i$$

The fitted values from equation are then generally classified as the "normal" level of accruals. The residual is the discretionary component of accruals. The success of discretionary accruals models depends on the assumption of homogeneity to estimate normal accruals (Jackson, 2017). The proxy for quality of information is based on discretionary accruals to study the accrual-based earnings management. Discretionary accruals are the difference between firms' actual accruals and the normal level of accruals. The estimation was based on the following adjusted Jones (1991) (Dechow et al., 1995):

$$\frac{Accruals_{it}}{TA_{it-1}} = \beta_1 + \beta_2 \frac{1}{TA_{it-1}} + \beta_3 \left[\frac{\Delta REV_{it}}{TA_{it-1}} - \frac{\Delta REC_{it}}{TA_{it-1}} \right] + \beta_4 \frac{FA_{it}}{TA_{it-1}} + \varepsilon_{it}$$

where accruals are working capital minus operating profit (net cash from operations) in year t; TA_{it-1} is total assets in year t − 1; ΔREV_{it} is the change in operating revenue from year t −1 to t; ΔREC_{it} is the change in accounts receivable from year t− 1to t and FA_{it} it is gross property, plant and equipment. The estimated residual captures discretionary accruals. It is used the absolute value of the residual as the proxy for accrual-based earnings management.

The results are presented in Table 1 – Estimation of accruals. The Model is adjusted, and all the variables are statically significant. All variables of the model have impact on total accruals. The increase of the value of each variable of the model leads to a decrease of the total accrual value. The variable ΔREV_{it} - ΔREC_{it} is related with the acquisition and with the sells because captures the accounts receivable and payable (AltintaŞ, Sari, & OtluoĞlu, 2017). This variable has an impact of 0,491 with a significance of p=0,000. This suggests that acquisitions and sales have a big impact on the accounts. The question arises: is the impact due to the discricionarity included? The answer is achieved by the studies of the residuals.

The decrease in the variation in operating revenue subtracted from accounts receivable causes a decrease in the value of accruals, as well as the variation of tangible fixed assets. In this type of management, discretionary management is not linked to the change in the company's economic activities, but rather to the accounting choices used for the preparation of the financial statements. The decrease in debtors ' values and the postponement of increasing the value of tangible fixed assets are some of the examples of management of results by accruals (Roychowdhury, 2006). An advantage of management by accruals is that it does not affect the cash flow of the current exercise and doesn't destroy company value. Another motivation for the use of this type of management is the possibility of recording the accruals at the end of the economic period, when managers already know the amount needed to be manipulated to achieve the objectives in relation to the results (Gunny et al., 2013).

With the coefficients obtained were estimated the normal level of accruals. The difference between the total accruals and normal accruals is the discretionary accruals. With the discretionary accruals estimated a new equation is regressed. Inventories is a component of the balance sheet and it is influenced by accounting choices. Like the study of real earnings management, in this paper is studied the influence of inventory stocks, debtors' sales and cost of the good sold.

$$\frac{AccrualsD_{it}}{TA_{it-1}} = \beta_1 + \beta_2 \frac{\Delta Stock_{it}}{TA_{it-1}} + \beta_3 \frac{\Delta REC_{it}}{TA_{it-1}} + \beta_4 \frac{\Delta S_{it}}{TA_{it-1}} + \beta_5 \frac{\Delta CGS_{it}}{TA_{it-1}}$$

where $AccrualsD_{it}$ are discretionary accruals estimated, $\Delta Stock_{it}$ is the change in inventory sock from year t −1 to t; ΔREC_{it} is the change in accounts receivable from year t− 1to t; ΔS_{it} is the change in sales from year t – 1 to t and ΔCGS_{it} is the change in cost of goods sold from year t – 1 to t.

The production activities influence fixed assets, current assets (cash, inventories and accounts receivable) and current liabilities reported in the balance sheet. A manufacturing firm invests in fixed assets (as equipment, machinery, systems, vehicles and buildings). Assets' depreciation, maintenance and provisions for renewal can represent a significant percentage of the firm's costs. In addition, quality of equipment has a direct impact on product quality and production costs. This clearly shows the importance of managing fixed assets properly, not only to ensure their best use but also to control their associated costs (Bahri et al., 2017).

The results are presented in Table 2 – Study of the influence of inventory in accruals. The model is adjusted, and all the variables are statically significant. The variables have impact on total accruals. The increase of the value of each variable in the balance sheet (stock and accounts receivable) of the model leads to an increase of the discretionary accrual. There is a strong evidence that the quality of accounting information is influenced by the management ability to introduce discretionarily in the judgement and in the actions. This is consistent with several studies about earnings quality. Discretionary accruals models have been widely used in the literature, and are often considered to be a proxy for earnings management, or earnings quality (Jackson, 2017).

Discretionary accruals have a positive relation with inventory fluctuation, is confirmed in this study. Stock (inventory stock) has 0.724 impact on measuring discretionary accrual and ΔREC_{it} has 0.086 impact so, it is possible to say that managers of Portuguese SMEs include discretionarily in the accounts using the variable inventory as well as accounts receivable.

Table 1. Estimation of Accruals

Model Summary						
Model	R	R Squared	Adjusted R Squared	Estimated standard error	Durbin-Watson	
	.495	.245	.245	.36608	1.296	
ANOVA						
		Sum of squares	gl	Medium square	F	Sig.
	Regression	5,309.403	3	1,769.801	13,206.220	.000
	Residual	16,323.549	121,806	.134		
	Total	21,632.952	121,809			
Coefficients						
		Non-standard coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
	(Constant)	.426	.001		312.351	.000
	1/TA-1	-5.006	.119	-.112	-42.084	.000
	ΔREV- ΔREC	-.612	.003	-.491	-178.873	.000
	FA/TA1	-.277	.002	-.347	-131.560	.000
Dependent variable: Accruals/TA-1						

Table 2. Study of the influence of inventory in accruals

Model Summary						
Model	R	R Squared	Adjusted R Squared	Estimated standard error	Durbin-Watson	
	.636	.404	,4.4	.1617	1.514	
ANOVA						
		Sum of squares	gl	Medium square	F	Sig.
	Regression	2,146.013	4	536.503	20,653.379	.000
	Residual	3,164.072	121,805	.026		
	Total	5,310.085	121,809			
Coefficients						
		Non-standard coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
	(Constant)	.313	.001		426.115	.000
	Stock/TA-1	.075	.002	.086	36.511	.000
	ΔREC /TA-1	.481	.002	.724	237.662	.000
	ΔS/TA-1	-.044	.001	-.171	-54.772	.000
	ΔCGS/at-1	-.080	.001	-.167	-71.424	.000
Dependent variable: AccrualD						

Real Activity Management

All activities may be subject to discretionary decisions that cause changes in the valuation of the company. Managers make decisions about business activities that bring them benefits. These may increase or decrease the values presented in the financial statements and lead to the presentation of economic and financial results favorable to the manager's intention (Ferrer & Ferrer, 2016).

In this paper will be studied two types of real activities earnings management: accelerating the timing of sales and/or generating additional unsustainable sales through increased price discounts or more lenient credit terms; increasing earnings by reducing cost of goods sold through overproduction (Roychowdhury et al., 2012). The first type is measured by the abnormal level of cash flow from operations. The second type is measured by the abnormal level of production cost (Gao et al., 2017).

To estimate the normal level of cash flow from operation is used following equation (Choi et al., 2010):

$$\frac{WC_{it}}{TA_{it-1}} = \beta_1 + \beta_2 \frac{1}{TA_{it-1}} + \beta_3 \frac{S_{it}}{TA_{it-1}} + \beta_4 \frac{\Delta S_{it}}{TA_{it-1}} + \beta_5 \frac{\Delta S_{it-1}}{TA_{it-1}} + \beta_6 \frac{Employees_{it}}{TA_{it-1}} + \beta_7 \frac{Tax_{it}}{TA_{it-1}} + \varepsilon_{it}$$

WC_{it} is working capital in year t; S_{it} is sales in year t; ΔS_{it} is the change in sales from year t to $t-1$; ΔS_{it-1} is the change in sales from year $t-1$ to $t-2$; $Employees_{it}$ is the cost of the employees in year t;

Tax_{it} is tax payments in year t. The discretionary working capital is estimated with the residual from the equation. The results, in Table 3- Estimation of Working Capital, show that the model is well adjusted, and all variables are significative. Sales and ΔS_{it-1} have a negative impact in working capital. The reason may be the credit conceded to buyers. The cost of employees and the payment of taxes have a positive influence in the working capital, that means the companies are trying to sell more to solve their obligations (Choi et al., 2010).

It is possible to suppose that the need of payment brings to the companies the need of collecting more money. The upward management of sales, using discounts and special credit conditions implies the increase of the results and at the same time the decrease of the working capital. In the sample used the working capital decrease slightly the increase in sales volume, which assumes that Portuguese companies do not use aggressive discount and credit policies to manage sales volume (Choi et al., 2010).

To estimate the normal level of production costs is used the following equation (Roychowdhury, 2006):

$$\frac{PROD_{it}}{TA_{it-1}} = \beta_1 + \beta_2 \frac{1}{TA_{it-1}} + \beta_3 \frac{S_{it}}{TA_{it-1}} + \beta_4 \frac{\Delta S_{it}}{TA_{it-1}} + \beta_5 \frac{\Delta S_{it-1}}{TA_{it-1}} + \varepsilon_{it}$$

where $PROD_{it}$ is the sum of cost of goods sold in year t and the change in inventory from year $t-1$ to t. The abnormal level of production costs is measured as the estimated residual from the above equation.

Table 3. Estimation of working capital

Model Summary						
Model	R	R Squared	Adjusted R Squared	Estimated standard error	Durbin-Watson	
	.237	.056	.056	.39711	1.256	
ANOVA						
		Sum of squares	gl	Medium square	F	Sig.
	Regression	1,136.132	6	189.355	1,200.763	.000
	Residual	19,101.549	121.129	.158		
	Total	20,237.681	121.135			
Coefficients						
		Non-standard coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
	(Constant)	.360	.002		182.379	.000
	1/TA-1	-6.395	.145	-.138	-44.037	.000
	S/TA-1	-.006	.002	-.017	-4.140	.000
	ΔSit-1/TA-1	.100	.002	.173	44.463	.000
	ΔSit-2	-.003	.001	-.010	-3.408	.001
	Employees/TA-1	.173	.008	.071	20.761	.000
	Tax/TA-1	.572	.061	.032	9.364	.000
Dependent variable: WC/TA-1						

The higher the residual, the larger the amount of inventory overproduction, and the greater increase in reported earnings through reducing cost of goods sold. In Table 4 – Estimation of Production Costs, is possible to read the results of the regression. The model is well adjusted, and all variables are significative. Sales and the growth of sales has a positive and significant impact in PROD, that means when the sales grow the cost of goods sold grows have influence in inventory.

Operational decisions to increase results can generate: abnormally low operating working capital and production costs abnormally high (Cohen & Frazzini, 2008). The values obtained for the discretionary working capital (WCD), discretionary production (PRODD) represent management of results by means of operational decisions (Cohen & Zarowin, 2010; Cohen & Frazzini, 2008; Rezaee, 2002; Roychowdhury, 2006; Roychowdhury et al., 2012; Zang, 2012).

Some Business practices can affect financial performance via operational performance (Bahri et al., 2017). It is important to add the income before taxes and taxes to measure the firm's performance. The variables defined in this study, which are subject to some type of discretionary management are: stock of inventories, represented by the variable St_{It}, accounts receivable represented by REC_{It}, accounts payable represented $LIAB_{It}$, income before taxes represented with $Incbefore_{It}$ and taxes payed represented by Tax_{It}. With the coefficients obtained, in the estimated models, the normal and discretionary values were calculated for each of the companies/year for working capital and for production. The real activities earnings management measures were aggregated into one proxy, RMit, by taking their sum (Zang, 2012): RMit = WCDit + PRODDit or the second hypotheses developed there are five independent variables: St_{It},(inventory sock), REC_{It},(accounts receivable), $LIAB_{It}$ (accounts payable), $Incbefore_{It}$ (income before taxes) and Tax_{It} (taxes payed).

Table 4. Estimation of production costs

Model Summary						
Model	R	R Squared	Adjusted R Squared	Estimated standard error	Durbin-Watson	
	.534	.285	.285	.40642	1.137	
ANOVA						
		Sum of squares	gl	Medium square	F	Sig.
.	Regression	7,979.355	4	1,994.839	12,077.005	.000
	Residual	20,008.009	121,131	.165		
	Total	27,987.364	121,135			
Coefficients						
		Non-standard coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
	(Constant)	.283	.002		141.966	.000
	1/TA-1	-1.228	.146	-.023	-8.435	.000
	S/TA-1	.204	.002	.461	135.709	.000
	ΔS/TA-1	.086	.002	.126	38.060	.000
	ΔSit-1	-.010	.001	-.028	-10.817	.000
Dependent variable PROD						

The reduction of the tax may be one of the managers ' goals (Moreira, 2008). By lowering income, the taxable base became lower and so it is possible to ascertain a lower tax value. The results obtained in Table 5 show that companies manage inventories, receivables, payables, income before taxes and taxes, causing changes discretionary working capital and production. The values determined in the regression indicate there is a strong impact of the change in inventory values and fees payable on RM (production and working capital).

The coefficient obtained in real activities earnings management confirm hypothesis two: discretionary management of real activities have a positive relation with inventory fluctuation. Inventory have an impact of 0.547 in the discretionary managing and the only variable that has a negative signal is liabilities (this is a passive), this means when the company uses discricionarity the obligations increase, so the purchases are made on credit (this is consistent with other studies as Roychowdhury et al., 2012).

CONCLUSION

From reading the results of the regressions it is noted that companies continue to use discretionary power over the accounting policies and about the activities to benchmarking the company income. With the results obtained it is verified that companies in the manufacturing sector incur in practices of discretionary management of accruals confirming hypothesis 1 and of production confirming hypothesis 2.

Table 5. Real activities earnings management

Model Summary						
Model	R	R Squared	Adjusted R Squared	Estimated standard error	Durbin-Watson	
	.539	.291	.291	.51596	1.229	
ANOVA						
		Sum of squares	gl	Medium square	F	Sig.
	Regression	13,206.000	5	2,641.200	9,921.261	.000
	Residual	32,246.762	121.130	.266		
	Total	45,452.762	121.135			
Coefficients						
		Non-standard coefficients		Standardized coefficients	t	Sig.
		B	Standard error	Beta		
1	(Constant)	-.213	.002		-89.505	.000
	St/TA-1	1.415	.007	.547	211.107	.000
	REC/TA-1	2.138E-5	.000	.026	10.657	.000
	LIAB /TA-1	-.228	.002	-.271	-100.411	.000
	Incbefore/TA-1	.208	.011	.059	19.412	.000
	Tax/TA-1	3.466	.083	.128	41.979	.000
Dependent variable RM						

Portuguese companies are included in a code law system, so the accounting is a mean of achieving the income desirable to avoid tax payable (Incbefore and Tax) and the amount of taxes to be paid. The results confirm the existence of a positive link between these two variables and the discretionary management of real activities.

Discretionary production costs cover a large part of the company's operational activity. It is confirmed that SME managers belonging to the manufacturing sector, use the increase of debt, decrease current liabilities and the increase of the value of inventories and accounts receivable to practice reach objectives.

Using Dechow et al (1995) model was found the quality of the information is affected. With the intention of perceiving the activities to which the companies suspected of manipulating results were calculated to normal and discretionary values for the working capital and production volume. Variables were introduced in the previous model that allowed to ascertain the characteristics and objectives of discretionary management and there is evidence that the inventory is a way of discricionarity.

The production and real activities are a target of the discricionarity (Ferrer & Ferrer, 2016; Gunny, 2005; Gunny et al., 2013; Roychowdhury, 2006; Roychowdhury et al., 2012; Whelan & Mcnamara, 2004; Zang, 2012). By reducing the sales flow, the working capital reduces too. Managers caused decreases in results through discricionarity attributed to the accounts, such as asset and liabilities measurement criteria and registration of imparity. The Portuguese manufacturing SME present evidence of managing discretionarily inventories. This evidence is valid either for accounting management or for management by real activities. It can be managed lowering the cash flows and the accrual.

The purpose of this study is to verify the existence of earnings management as well as real activities management that affects the information quality in Portuguese SME. It is possible to conclude there is an evidence of the discretionarily included in the accounts and in the activities and its influence in the information. It is also a concern the use of inventory discretionarily, and it was also showed in the models used. This study is consistent with other actual studies (Altinta et al., 2017; Ferrer & Ferrer, 2016).

This study contributes to literature by presenting evidence of discretionarily management in the manufacturing Portuguese SME based on the inventories. This discretionarily affect the value of the company and the relevance and reliability of the information given to the stakeholders.

REFERENCES

Aaker, H., & Gjesdal, F. (2010). *Do Models of Discretionary Accruals Detect Actual Earnings Management via Inventory? A Comparison of General and Specific Models*. Academic Press.

Altinta, Ş. A. T., Sari, E. S., & OtluoĞlu, E. (2017). The impact of earnings management on the value relevance of earnings: empirical evidence from Turkey. *The Journal of International Social Research, 10*(51), 885–891.

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. doi:10.1108/MBE-06-2015-0034

Ball, R. (2013). Accounting informs investors and earnings management is rife: Two questionable beliefs. *Accounting Horizons*, *27*(4), 847–853. doi:10.2308/acch-10366

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.

Bernard, V., & Noel, J. (1991). Do Inventory Disclosures Predict Sales and Earnings? *Journal of Accounting, Auditing & Finance*, *6*(2), 145–181. doi:10.1177/0148558X9100600202

Cannon, A. R. (2008). Inventory improvement and financial performance. *International Journal of Production Economics*, *115*(2), 581–593. doi:10.1016/j.ijpe.2008.07.006

Choi, J. H., Kim, J. B., & Zang, Y. (2010). Do abnormally high audit fees impair audit quality? *Auditing*, *29*(2), 115–140. doi:10.2308/aud.2010.29.2.115

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. doi: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. doi:10.1111/j.1540-6261.2008.01379.x

Cohen, L. J., Cornett, M. M., Marcus, A., & Tehranian, H. (2014). Bank Earnings Management and Tail Risk during the Financial Crisis. *Journal of Money, Credit & Banking, 46*(1), 171–197.

Commerford, B. P., Hermanson, D. R., Houston, R. W., & Peters, M. F. (2014). *Real Earnings Management: A Threat to Auditor Comfort?* Academic Press.

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 https://Ssrn.Com/Abstract=997437

Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, *50*(2–3), 344–401. doi:10.1016/j.jacceco.2010.09.001

Dechow, P. M., & Skinner, D. J. (2000). Earnings Management: Reconciling the Views of Accounting Academics, Practitioners, and Regulators. *Accounting Horizons*, *14*(2), 235–250. doi: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. doi:10.2307/248303

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and Consequences of Earnings Manipulation: An Analysis of Firms Subject to Enforcement Actions by SEC. *Contemporary Accounting Research*, *13*(1), 1–36. doi:10.1111/j.1911-3846.1996.tb00489.x

Dichev, I. D., Graham, J., Harvey, C. R., & Rajgopal, S. (2013). Earnings Quality: Evidence from the Field. *Journal of Accounting and Economics*, *56*(2–3), 1–33. doi:10.1016/j.jacceco.2013.05.004

Dos Santos, A., & Paulo, E. (2006). Diferimento das perdas cambiais como instrumento de gerenciamento de resultados. *Brazilian Business Review*, *3*(1), 15–31.

Eilifsen, A., Knivsflå, K. H., & Sættem, F. (2010). *European Accounting Review Earnings manipulation : cost of capital versus tax.* Academic Press. doi:10.1080/096381899335899

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

Gao, J., Gao, B., & Wang, X. (2017). Trade-off between real activities earnings management and accrual-based manipulation-evidence from China. *Journal of International Accounting, Auditing & Taxation*, *29*, 66–80. doi:10.1016/j.intaccaudtax.2017.08.001

Gunny, K. (2005). *What Are the Consequences of Real Earnings Management?* Working Paper, University of Colorado at Boulder.

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. doi:10.100711142-013-9235-x

Gupta, M., Pevzner, M., & Seethamraju, C. (2010). The implications of absorption cost accounting and prodution decisions for future firm performance and valuation. *Contemporary Accounting Research*, *27*(3), 889–922. doi:10.1111/j.1911-3846.2010.01030.x

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. doi:10.2308/acch.1999.13.4.365

Herath, H. S. B., & Lu, X. (2017, September). Inference of economic truth from financial statements for detecting earnings management: Inventory costing methods from an information economics perspective. *Managerial and Decision Economics*, 1–14. doi:10.1002/mde.2912

Jackson, A. B. (2017). Discretionary Accruals: Earnings Management ... or Not? *Abacus*, *54*(2), 136–153. doi:10.1111/abac.12117

Jensen, C., & Meckling, H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, *3*(4), 305–360. doi:10.1016/0304-405X(76)90026-X

Jones, J. J. (1991). Earnings Management During Import Relief Investigations. *Journal of Accounting Research*, *29*(2), 193–228. doi:10.2307/2491047

Kesavan, S., & Mani, V. (2010). *The predictive power of abnormal inventory growth : Application to earnings forecasting for retailers*. North.

Licerán-Gutiérrez, A., & Cano-Rodríguez, M. (2017). A Review on the multidimensional analysis of earnings quality. In *XIX Congresso AECA. Santiago de Compostela, Espanha.* (pp. 1–24). Academic Press. 10.2139srn.2998134

Moreira, J. A. C. (2008). *A Manipulação dos Resultados das Empresas: um contributo para o estudo do caso português*. Academic Press.

Nissim, D. (2017). *Overproduction and EBITDA*. Columbia Business School Research Paper, No. 17-102. doi:10.2139srn.3054282

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. doi:10.14254/2071-8330.2017/10-1/7

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

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

Roychowdhury, S., Kothari, S. P., & Mizik, N. (2012). *Managing for the Moment: The Role of Real Activity Versus Accruals Earnings Management in SEO Valuation*. SSRN Electronic Journal. doi:10.2139srn.1982826

Stolowy, H., & Breton, G. (2003). La gestion des donnés comptables: une revue de la littérature. *Comptabilité-Contrôle-Audit, 9*(1), 125–152.

Watts, R. L., & Zimmerman, J. L. (1978). Towards a Positive Theory of Determination of Accounting Standards. *The Accounting Review*. doi:10.2307/245729

Whelan, C., & Mcnamara, R. (2004). *The Impact of Earnings Management on the Value-relevance of Financial Statement Information*. Academic Press.

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. doi:10.2308/accr-10196

KEY TERMS AND DEFINITIONS

Accounting: Financial accounting is the process of recording, summarizing and reporting the transactions resulting from business operations over a period. The transactions are shown in financial statements, including the balance sheet, income statement and cash flow statement. Financial reporting occurs using financial statements. The financial statements present the classifications of financial data: revenues, expenses, assets, liabilities, and equity.

Accruals: Change of the financial statements (changing assets and liabilities as well as items of the income statement); all the associated accounting specialization of the economic year, which do not involve financial flows, and where the discretionary action of the manager is decisive for the recognition of an expense or income.

Inventory: Is an asset that is intended to be sold in the ordinary course of business. The inventory of a manufacturer should report the cost of its raw materials, work-in-process, and finished goods. The cost of inventory should include all costs necessary to acquire the items and to get them ready for sale. Inventory items can fall into one of the following three categories: held for sale in the ordinary course of business; or in the process of being produced for sale; or for consumption in the production process. Inventory is typically classified as a short-term asset, since it is usually liquidated within one year.

Inventory Management: Is the management of inventory and stock. As an element of supply chain management, inventory management includes aspects such as controlling and overseeing ordering inventory, storage of inventory, and controlling the amount of product for sale.

Quality of Accounting Information: The usefulness of accounting for decision-making, which depends on qualitative characteristics as the relevance (predictive value and confirmatory value) and reliability (free from errors and prejudices).

Real Activities Discretionary Management: Alteration of normal course operational practices, motivated by managers' desire to mislead some stakeholders to achieve financial reporting goals.

Real Activity: All the normal operational activities of a company.

APPENDIX

Table 6. Variable description

$\frac{Accruals_{it}}{TA_{it-1}}$	Working capital minus operating profit of the company i for the year t deflated by total assets of the year t-1
$\frac{\Delta CGS_{it}}{TA_{it-1}}$	Change in cost of goods sold of the company i for the year t deflated by total assets of the year t-1
$\frac{\Delta REC_{it}}{TA_{it-1}}$	Change in accounts receivable of the company i for the year t deflated by total assets of the year t-1
$\frac{\Delta REV_{it}}{TA_{it-1}}$	Change in operating revenue of the company i for the year t deflated by total assets of the year t-1
$\frac{\Delta S_{it}}{TA_{it-1}}$	Change in sales of the company i for the year t deflated by total assets of the year t-1
$\frac{\Delta S_{it-1}}{TA_{it-2}}$	Change in sales of the company i for the year t-1 deflated by total assets of the year t-2
$\frac{\Delta Stock_{it}}{TA_{it-1}}$	Change in inventory stock of the company i for the year t deflated by total assets of the year t-1
$\frac{AccrualsD_{it}}{TA_{it-1}}$	Discretionary accruals estimated of the company i for the year t deflated by total assets of the year t-1
$\frac{Employees_{it}}{TA_{it-1}}$	Cost with employees of the company i for the year t deflated by total assets of the year t-1
$\frac{FA_{it}}{TA_{it-1}}$	Gross property, plant and equipment of the company i for the year t deflated by total assets of the year t-1
$\frac{Incbefore_{it}}{TA_{it-1}}$	Income before taxes of the company i for the year t deflated by total assets of the year t-1

continued on following page

Table 6. Continued

$\frac{LIAB_{it}}{TA_{it-1}}$	Liabilities of the company i for the year t deflated by total assets of the year t-1
$\frac{PROD_{it}}{TA_{it-1}}$	Production is the sum of cost of goods sold and inventory in the company i for the year t deflated by total assets of the year t-1
$\frac{REC_{it}}{TA_{it-1}}$	Accounts receivable of the company i for the year t deflated by total assets of the year t-1
$\frac{S_{it}}{TA_{it-1}}$	Sales of the company i for the year t deflated by total assets of the year t-1
$\frac{Tax_{it}}{TA_{it-1}}$	Tax payments of the company i for the year t deflated by total assets of the year t-1.
$\frac{WC_{it}}{TA_{it-1}}$	Working capital of the company i for the year t deflated by total assets of the year t-1
$PRODD_{it}$	Discretionary production estimated of the company i for the year t deflated by total of the year t-1
RM_{it}	$WCD_{it} + PRODD_{it}$
WCD_{it}	Discretionary working capital estimated of the company i for the year t deflated by total of the year t-1