

INDEPENDENT AUDIT ROTATION AND EARNINGS MANAGEMENT: AN ANALYSIS OF THE BRAZILIAN AGRICULTURAL SECTOR

RODÍZIO DE AUDITORIA INDEPENDENTE E GERENCIAMENTO DE RESULTADOS: UMA ANÁLISE DO SETOR AGROPECUÁRIO BRASILEIRO

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ABSTRACT

This study aimed to verify how the earnings management of companies in the agricultural sector is affected by the rotation of independent auditors. A descriptive study with a quantitative approach was carried out. The research sample comprised Brazilian companies listed on B3 in the agricultural sector from 2012 to 2022. Panel data regression with the Pae (2005) model was used to estimate the accruals. The results showed that the FCO (Operating Cash Flow) variables were significant at 99%, which allows us to affirm that they impact the sample's earnings management in the period analyzed. Similarly, when analyzing the variable AT (Total Accruals), there was a high average value (11.20), indicating higher incidences of earnings management in some years. When examining whether the type of rotation influences the level of earnings management, the result showed that when the exchange is voluntary, earnings management is (2.09) higher. In addition, when testing whether the replacement of the independent auditor for a Big-Four company influences the level of earnings management, it was found that changes of Big-Four/Non-Big-Four and Non-Big-Four/Big-Four did not have a sufficient sample to calculate the significance of the study, showing that this is less common in the agricultural sector. Even so, it can be seen that the exchanges of Non-Big-Four to Non-Big-Four have lower earnings management than the others.

Keywords: audit firm, operating cash flow; audit rotation; earnings management.

RESUMO

O objetivo do presente estudo consiste em verificar como o gerenciamento de resultados das empresas do setor agropecuário é afetado pelo rodízio de auditoria independente. Para tanto, realizou-se uma pesquisa descritiva, com abordagem quantitativa. A amostra da pesquisa compreendeu as companhias brasileiras listadas na B3 do setor agropecuário no período de 2012 a 2022. Utilizou-se de regressão de dados em painel com o modelo de Pae (2005) para estimação dos *accruals*. Os resultados encontrados evidenciaram que as variáveis de FCO (Fluxo de Caixa Operacional) foram significativas a 99%, o que permite afirmar que estas impactam o gerenciamento de resultados da amostra no período analisado. De mesmo modo, ao se analisar a variável AT (*Accruals* Totais), apresentou-se um valor médio alto (11,20), sinalizando a ocorrência de maiores incidências da prática de gerenciamento de resultados, pontualmente, em alguns anos. Ao se examinar se o tipo de rodízio influencia o nível de gerenciamento de resultados, o resultado mostrou que, quando a troca é voluntária, o gerenciamento de resultado é (2,09) maior. Ademais, ao testar se a substituição do auditor independente para uma empresa *Big-Four* influencia o nível de gerenciamento de resultados, verificou-se que as trocas de *Big-Four*/Não *Big-Four* e Não *Big-Four*/Big-Four não obtiveram amostra suficiente para se calcular a significância do estudo, mostrando que, no setor agropecuário, isso é menos comum de acontecer. Ainda sim, é possível observar que as trocas de não *Big-Four* para não *Big-Four* possuem um gerenciamento de resultado menor comparado com as demais.

Palavras-chave: firma de auditoria, fluxo de caixa operacional; rodízio de auditoria; gerenciamento de resultados.

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1. INTRODUCTION

Brazil is internationally known for its great production capacity in the agricultural sector. According to the Institute for Applied Economic Research (IPEA), in a note published in February 2023, the agribusiness trade balance began the year with a surplus of US\$8.69 billion. This figure was much higher than the total trade balance surplus of US\$2.61 billion (Kreter et al., 2023), and the new record is due to the 16.4% increase compared to January 2022.

In addition, Brazil is the world's third-largest exporter of corn, behind only the United States and Argentina. Regarding coffee, the Brazilian harvest was a record in 2022, according to the Brazilian harvest monitoring bulletin (Conab, 2023). Another point is that Brazil is the world's largest producer and exporter of soybeans, accounting for 50% of world trade (Embrapa, 2021). However, companies in the sector often need to use third-party capital to finance potential productive growth. With the public going to raise funds from third parties, stakeholders have emerged more routinely. With it, there is a need to generate greater reliability, especially regarding access to reliable information.

In this context, independent auditing can significantly influence publicly traded companies, given that these companies are increasingly inserted in an environment that demands transparency and reliability in the financial reports published on an ordinary basis (Pereira & Vilaschi, 2006; Martins, Oliveira, Niyama & Diniz, 2014). This is because they are fundamental tools in the decision-making process of investors and are the main source of information on the financial health and strategic planning of business organizations (Paulo, 2007).

However, Hendriksen and Van Breda (1992) point out that profits (or losses) can be partially distorted by arbitrary accounting choices made by managers, bringing with it a potential risk for investors. When these decisions are made on a discretionary basis and within the framework of accounting principles, while taking advantage of contractual deficiencies, the limited rationalities of interest groups, or the asymmetry of information in the market, this is called earnings management (El Diri, 2018).

This term was defined by Healy and Wahlen (1999) as the phenomenon of managers manipulating the company's economic performance through accounting choices. Although accruals (the non-financial part of the result) record the effective economic profit or loss of entities, they are also liable to be used for arbitrary purposes by managers, becoming, in their discretionary element, a proxy for earnings management (Martinez, 2008).

In other words, this earnings management can occur through differentiated accounting treatments or economic decisions that influence the entity's cash flows, investments, or production (El Diri, 2018). These actions seek to manipulate the information disclosed in the reports and, consequently, the interpretation of interest groups. Given this, the independent audit becomes one of the mechanisms by which shareholders can monitor corporate decisions and actions. The fact that it is responsible for verifying the accuracy and reliability of the data contained in the financial statements lends credibility to the information (Ribeiro & Coelho, 2018).

In auditing corporate governance practices and dealing with stakeholders, Law (2011) points out that the aim is to meet the requirements of all stakeholders, thus maximizing the interests of both parties. In addition, the need for improvement and value creation is highlighted through timely and periodic disclosure of the risks involved and the practices explored to minimize the risks, serving stakeholders.

Therefore, transparency is one of the basic principles of corporate governance, mitigating the asymmetry of information in companies and being a necessary condition for earnings management, as pointed out by Consoni, Colauto, de Lima (2017), and Schipper (1989). Because of this, Bortolon, Neto and Santos (2013) recognize independent auditing as one of the possible mechanisms for increasing transparency in the manager-investor relationship, admitting that, according to these authors, the purpose of independent auditing "is, through impartial investigation and recognized technical capacity, to endorse the financial statements" (Bortolon, Neto & Santos, 2013, p. 28).

In this context, the relationship between governance and stakeholders lies in developing governance systems that minimize their concerns and challenges. According to McGahan (2021), some questions about the function of governance systems are studied in different streams, such as comparative governance, adaptation of governance, and governance mechanisms (McGahan, 2021).

Therefore, auditing is important in corporate governance, earnings management, and the agricultural sector. With this in mind, the following research problem arises for this study: Is the use of earnings management by companies in the agricultural sector impacted by the rotation of independent auditors?

Based on this problem, the general objective is to investigate whether the replacement of the independent auditor impacts earnings management in companies in the agricultural sector listed on B3 between 2012 and 2022. The specific objectives are to analyze whether the data related to earnings management are divergent when there has been voluntary or mandatory rotation of the independent auditor; and whether there are differences between the observed levels of earnings management when the independent auditor has been replaced by companies considered Big-Four (Deloitte Touche Tohmatsu, Ernst & Young, KPMG and PriceWaterhouse Coopers) or not.

This research contributes to the discussion of the impacts of earnings management through the need for audit firms and partners to rotate auditors within five years, as established by law. In this scenario, the study highlights how the rotation and exchange of companies considered Big-Four or Non-Big-Four impact earnings management in Brazilian agribusiness companies. This is because companies in this sector have increasingly sought greater transparency on the capital markets, often adopting a set of management procedures widely discussed today. Therefore, audit rotation and

the size of the audit firm can signal to the market that independent auditing is a tool that enables greater optimization in generating reliable information for external users of financial information.

2. LITERATURE REVIEW

2.1 Corporate governance

Corporate governance is discussed and perceived worldwide, given its importance in management and contribution to decision-making. According to Chagas (2007), this expression came from the English term Corporate Governance, representing how shareholders manage their company. In light of this, according to the Brazilian Institute of Corporate Governance (IBGC, 2015), corporate governance is defined as a system that directs, monitors, and encourages companies and other organizations, encompassing the relationships between shareholders, the board of directors, management, supervisory bodies, and other stakeholders. In addition, good governance practices aim to preserve and optimize long-term economic value, facilitate access to resources, and promote the quality of management, the longevity of organizations, and the common good.

Delving deeper into the literature on corporate governance, Aguiar (2002) presents two figures contained in corporate governance: the principal and the agent. The principal is represented by the investor, shareholder, or creditor, those with a general interest in the company's best performance, also known as stakeholders. On the other hand, agents are represented by administrators who may or may not act in the interests of stakeholders, generating what are known as agency conflicts. This conceptualization is necessary to understand and identify the importance of governance as an influential agent in this context.

Given the above, corporate governance is directly linked to the management and administration of companies, thus generating an issue, the Agency Theory. Jensen and Meckling (1976) point out that the Agency Theory identifies the problems inherent in the fact that the investor is not linked to the company's direct management. This raises the issue of information asymmetry between investors and management, which, through transparency, seeks to be minimized, as this is one of the basic principles of corporate governance (IBGC, 2015). This clarifies the power of influence, the possibility of informational asymmetry, and the management of results by the agent responsible for management.

Therefore, informational asymmetry can be characterized as incomplete information between the parties. Milgrom and Roberts (1992) state that informational asymmetry is when one of the parties to the transaction does not have all the information necessary to ascertain whether the proposed contract terms are mutually admissible and will be complied with. That said, the importance and necessity of submitting to an independent audit are reinforced to ensure investors' reliability.

In this context, independent auditing is fundamental to guaranteeing the reliability of information from company management through financial statements, which are the object of information for decision-making by investors and stakeholders. Thus, control mechanisms are needed to help align interests between internal and external agents.

However, corporate governance can also considerably affect the auditor's ability to identify management misstatements and the outcome of negotiations between the auditor and the client on audit adjustments (Keune & Johnstone, 2012). Given that previous studies have shown that governance focuses on controls and stakeholder interests, these facts should be analyzed in terms of the maturity and knowledge of the independent auditor.

Bortolon et al. (2013) also mentioned some internal governance procedures that can affect the independence and costs of audit services, such as the performance of boards of directors and audit committees. In this view, the literature can be divided into those investigating the determinants of audit costs and those verifying the risks and effects of the external auditor's loss of independence. This raises the question of the length of the audit mandate and its rotation, as set out in Instruction 308 (CVM308/99).

About the services provided by audit firms and the influence of corporate governance, Myers et al. (2003) portray that the audit firm can conduct an audit effectively and efficiently over the engagement periods, as well as having experience and competence in the client's business acquired by the auditors over a period. Furthermore, auditors can limit the discretionary accruals management, which indicates when the audit mandate is extended.

2.2 Audit rotation

On May 14, 1999, the Securities and Exchange Commission (CVM) published Instruction N. 308 (CVM308), which provides for the registration and exercise of independent auditing activities within the scope of the securities market. In this instruction, it was established that the independent auditor may not provide services to the same client for more than five consecutive years, counted from the date of the instruction, and that the replaced auditor may not be rehired for less than three years. This act instituted what came to be known colloquially as the rotation of auditors. According to Oliveira and Santos (2007), adopting rotation aimed to mitigate the lack of credibility in the financial market due to the discontinuity of financial institutions and the damage they caused to their account holders.

According to Formigoni, Pompa, Soares, and Paulo (2008), there are two types of audit rotation: audit firm and auditor rotation. The first consists of the commercial break between the audit firm and the client; the second refers to

the replacement of the professionals who carry out the audit activities without a commercial break between the audit firm and the client.

In addition to compulsory rotation, there is voluntary rotation in which, for some reason, the audit firm is replaced by another within five years. Sprenger, Silvestre, and Laureano (2016) mention that companies that receive a modified audit report are likely to replace their independent auditors, and they conclude that the so-called Big Four companies are less vulnerable to voluntary rotation.

Turnover has become a much-studied subject in the literature, as it influences the relationship between auditors and their clients and the entire audit firm market, thus questioning its effectiveness (Quevedo & Pinto, 2014). In addition, the obligation to rotate auditors is not unanimous around the world, as there is debate as to whether this practice maximizes the independence and quality of the external audit. Oliveira and Santos (2007) presented a table with the positive and negative aspects of independent audit rotation, based on Brazilian and international studies, as shown in Figure 1.

Figure 1 - Positive and negative aspects of independent audit rotation

Positive aspects	Negative aspects
<p>a. It socializes technical knowledge because it breaks the monopoly of knowledge and auditing practice in a given segment;</p> <p>b. It satisfies the public by breaking long-term relationships, giving certain users of financial statements a perception of greater independence;</p> <p>c. The profile of the auditor in companies subject to rotation changes. A more technical profile of the auditor is favored over a commercial profile that generates new work;</p> <p>d. It requires greater attention from the auditor due to the frequent process of exchange and exposure of their working papers to other auditors, successors, or reviewers;</p> <p>e. It focuses the auditor's attention on the shareholder and not on management;</p> <p>f. It changes the audit methodology with a concentrated focus on mandatory procedures and greater objectivity in the allocation and focus of audit tests;</p> <p>g. It mitigates the lack of state supervision, since the possibility of the successor auditor having access to the working papers relating to auditing the companies' financial statements can be considered an additional form of supervision, which the state should carry out.</p>	<p>a. It does not maintain the accumulated knowledge of the auditing firm carrying out the work. The focus of the new auditor's work may not be on risk areas;</p> <p>b. It destabilizes the economic relationship between the parties.</p> <p>In the first year of work, firms make a considerable investment in the expectation that it will be recouped in subsequent years by more efficient and better-planned work;</p> <p>c. There is a reduction in investments in auditor specialization, as firms would not allocate resources to technical training without the certainty that the relationship would be interrupted by normal circumstances and not by a regulatory decision;</p> <p>d. Corporate governance is affected, because freedom of choice would be impacted in its essence;</p> <p>e. It unbalances the firms' market because the search for the recomposition of client portfolios would be structured inappropriately, without respecting normal market conditions;</p> <p>f. A career in auditing would be hampered, as the loss of these clients could even lead to firms ceasing to audit.</p>

Source: Oliveira e Santos (2007, p. 95).

However, it is important to note that independent audit rotation studies have different approaches. The research by Dopuch, King, and Schwartz (2001), which compares mandatory rotation regimes with optional rotation regimes, found evidence that those that require rotation reduce the auditor's willingness to issue opinions with a favorable bias. In contrast to this 2001 study, Johnson, Khurana, and Reynolds (2002) showed that the quality of results drops when auditors have been auditing a company for less than 3 years. Myers, Myers, and Omer (2003) found evidence that voluntary turnover produces more opinions with a favorable bias than mandatory turnover.

This is no different in Brazil, since Azevedo and Da Costa (2012) showed that changing the audit firm does not impact earnings management. On the other hand, Silvestre, Costa, and Kronbauer (2018) found evidence that auditor rotation reduces the volume of discretionary accruals and improves earnings quality. These findings show that research has not yet stabilized in terms of results and indicate that more studies involving other variables should be carried out to identify this relationship accurately.

2.3 Earnings management

Earnings management is a tool that interests all company stakeholders and explains the constant evolution of accounting research in recent years. Bispo and Lamounier (2011) point out that investors and other capital market participants are interested in determining how much companies' results are manipulated, since these findings are decisive in making a series of decisions, including whether to buy or sell shares.

Schipper (1989) conceptualizes earnings management as an intentional intervention in the financial reporting process to obtain some private gain. For Healy and Wahlen (1999), earnings management occurs when managers use their judgment to modify the understanding of some of the company's stakeholders in its economic performance or to influence contractual results that depend on accounting figures.

In this regard, it is important to emphasize that management practice does not constitute accounting fraud. In other words, the manager operates within the limits of what the legislation prescribes; however, where the rules give the manager discretion, he makes his choices not according to what reality dictates, but according to other incentives (Martinez, 2001). Therefore, earnings management is not always harmful to stakeholders, as when administrators use managerial discretion to signal their expectations of the company's future cash flows. In general, empirical research into earnings management focuses on discretionary accruals (Martinez, 2013).

Accruals arise from applying the accrual basis when there is a mismatch between the cash inflow or outflow and the accounting recognition of a transaction (Ronen & Yaari, 2008). In other words, there is no accrual when a transaction's accounting recognition occurs simultaneously as its cash inflow or outflow. Therefore, accruals do not occur on a cash basis and are a natural consequence of the accrual basis.

In this view, when management uses discretion to manage the accrual and, consequently, the result, it is called a discretionary accrual. An accrual that occurs naturally, without management interference, is called a non-discretionary accrual (Ronen & Yaari, 2008). In addition, accruals are estimates that are materially representative of results and can be legally manipulated within the framework of accounting principles (Ronen & Yaari, 2008). Thus, specific accruals offer a unique opportunity to detect earnings management.

Following these definitions, the purpose of the audit committee is to monitor the financial discretion of managers, as a way of guaranteeing the credibility of the financial statements, protecting the interests of shareholders, and improving the quality of the accounting information reported (Davidson, Goodwin-Stewart & Kent, 2005). In their study, the authors validate that this committee's efficiency is associated with its members' degree of independence. Thus, the audit committee's efficiency in supervising managers' activities to improve the quality of accounting information is associated with the degree of independence of its members (Sultana, Singh & Van Der Zahn, 2015).

Cunha, Hillesheim, Faveri, and Rodrigues (2014), in an analysis of 415 companies listed on BM&FBovespa in 2010 and 2011, found that the size of the audit committee and the independence of its members do not influence the level of discretionary accruals. According to DeAngelo (1981), choosing a larger auditing firm guarantees higher audit quality, since large companies have more resources and expertise to detect earnings management practices that reduce the quality of the information reported to external users.

2.4 Previous studies and formulation of hypotheses

Previous studies have been dedicated to identifying the level of earnings management in publicly traded companies after the replacement of the independent auditor and verifying the quality of audits during audit firm rotation. Figure 2 below shows the most recent international research.

Figure 2 - Previous studies

Author/Title	Method	Results
Lennox, CS, Wu, X., & Zhang, T. (2014). Does Mandatory Rotation of Audit Partners Improve Audit Quality?	Método Logístico Dados em Paineis Testes multivariados Modelo de Regressão	The results suggest that the mandatory rotation of partners responsible for the work results in higher quality audits in the years immediately following the rotation. Specifically, a significantly higher frequency of audit adjustments was found during the last year of the outgoing partner's term before and during the first year of the incoming partner's term after the mandatory rotation.
Martani, D., Rahmah, NA, Fitriany, F., & Anggraita, V. (2021). Impact of audit tenure and audit rotation on the audit quality: Big 4 vs non big 4	Sampling method intentional Jones's model Kasnik's model	Audit firm rotation positively impacts audit quality, and the positive impact is lower in the Big 4. It was also observed that, in the Big 4, the rotation of audit partners is sufficient to improve audit quality because they have enough partners to carry out a quality review.

Panel Data	Method	Results
Ele, LJ e Chen, J. (2021). Does Mandatory Audit Partner Rotation Influence Auditor Selection Strategies?	Regression model Panel data	The results show that for audit partner rotations, compared to voluntarily rotated companies, a higher percentage of companies choose specialist auditors from the sector to be their successor audit partners under mandatory rotation.
Chen, L., Xiao, T., & Zhou, J. (2023). Do auditor changes affect the disclosure of critical audit matters? Evidence from China	Regression model Panel data	The study found that changes in the disclosure of CAMs - Critical Audit Matters - due to auditor changes positively affect audit quality, the quality of financial reports and the efficiency of stock market prices.
Cimini, R., Mechelli, A., & Sforza, V. (2022). Auditor independence and value relevance in the European banking sector: do the investor protection environment and corporate governance matter?	Regression model Panel data	The findings show that, in different investor protection environments or in the presence of differences in the quality of corporate governance, phenomena that could be interpreted as a deterioration in auditor independence do not necessarily determine a decrease in value relevance of the accounting figures.

Based on this evidence and the proposed research problem, namely “how is earnings management in companies in the agricultural sector affected by the rotation of independent auditors?”, hypothesis 1 was chosen:

H_1 : The replacement of the independent auditor influences the level of earnings management in companies in the agricultural sector.

The research will also investigate whether voluntary rotation and mandatory rotation are different from each other when analyzing earnings management data. The following hypothesis is proposed:

H_2 : The type of rotation (mandatory or voluntary) influences the level of earnings management in companies in the agricultural sector.

Another proposal of the research was to investigate whether there are differences between companies considered to be Big-Four or not in terms of earnings management:

H_3 : The replacement of the independent auditor by/for a Big-Four firm influences earnings management in companies in the agricultural sector.

3. RESEARCH METHODOLOGY

3.1 Sample and data source

The sample for this study consists of all the companies classified in the agricultural sector that traded their securities on B3 between 2012 and 2022. This choice was made exclusively to capture only the agricultural sector and the information period available for the study. The companies were selected by collecting information from the basic database of the Brazilian Securities and Exchange Commission and the Economática® software, totaling 25 companies. The Pae (2005) model was used to estimate accruals, which are understood as a proxy for earnings management.

In addition, the information regarding the replacement of the independent auditor is listed in the Reference Form, which publicly traded companies must submit to the CVM every year. Section 2 of the form presents the identification and remuneration of the independent auditors. This section collects all the data necessary to classify the rotation as voluntary or mandatory and the rotation date. We also checked whether the company is a Big Four and whether a Big Four company has replaced the auditor.

Table 1 below shows the information on the audits collected from the reference form, with 227 observations over the eleven years analyzed.

The companies 3tentos, Ctc S.A, BRF S.A and Marfrig, only have one rotation in the period, which is because the companies hired the audit firms in 2012 and remained until 2017 when they made the first rotation and remained for six years, exceeding the 5 (five) year period established by legislation, until they made the second change in 2023 (period not analyzed).

Table 1 - Frequency distribution of audit rotations

Company	Sector	No. of observations	Rotating
<i>3tentos</i>	Agriculture and Fishing	5	1
<i>Agribrasil</i>	Agriculture and Fishing	5	-
<i>Agrogalaxy</i>	Agriculture and Fishing	5	-
<i>Boa Safra</i>	Agriculture and Fishing	6	-
<i>Brasilagro</i>	Agriculture and Fishing	11	4
<i>Ctc S.A.</i>	Agriculture and Fishing	6	1
<i>Pomifruit</i>	Agriculture and Fishing	11	2
<i>Raizen</i>	Agriculture and Fishing	2	-
<i>SLC Agrícola</i>	Agriculture and Fishing	11	2
<i>Vittia</i>	Agriculture and Fishing	6	-
		68	10
<i>Ambev S/A</i>	Food and drink	11	2
<i>BRF SA</i>	Food and drink	11	1
<i>Camil</i>	Food and drink	5	-
<i>Excelsior</i>	Food and drink	11	2
<i>JBS</i>	Food and drink	11	2
<i>Josapar</i>	Food and drink	11	2
<i>M Dias Branco</i>	Food and drink	11	3
<i>Marfrig</i>	Food and drink	11	1
<i>Minerva</i>	Food and drink	11	2
<i>Minupar</i>	Food and drink	11	2
<i>Oderich</i>	Food and drink	11	2
		115	19
<i>Irani</i>	Pulp and Paper	11	2
<i>Klabin S/A</i>	Pulp and Paper	11	2
<i>Melhor SP</i>	Pulp and Paper	11	5
<i>Suzano S/A</i>	Pulp and Paper	11	1
		44	10
<i>Total</i>		227	39

By delimiting the sample to the years between 2012 and 2022 as the period of analysis, this research recognizes that, as a result of the mandatory rotation in 2012, Brazil has adopted the hypothesis of two types of external auditor replacement: voluntary and mandatory. In this way, all the rotations were broken down into mandatory and voluntary, year of attendance, whether or not the company replaced in the rotation was one of the companies considered to be Big-Four and whether or not the new audit company, following the rotation, was one of the companies considered to be Big-Four (Table 2).

Table 2 - Frequency distribution of audit rotations

Total casters	39	100%
<i>Voluntary castors</i>	11	28%
<i>Compulsory castors</i>	28	72%
<i>Big-Four to non-Big-Four</i>	2	5%
<i>Non-Big-Four to Big-Four</i>	2	5%
<i>Big-Four to Big-Four</i>	17	44%
<i>Non-Big-Four for Non-Big-Four</i>	18	46%
<i>Castors 2012-2013</i>	5	13%
<i>Castors 2013-2014</i>	-	-
<i>Castors 2014-2015</i>	3	8%
<i>Castors 2015-2016</i>	2	5%
<i>Castors 2016-2017</i>	9	23%
<i>Castors 2017-2018</i>	5	13%
<i>Castors 2018-2019</i>	2	5%
<i>Castors 2019-2020</i>	2	5%
<i>Castors 2020-2021</i>	3	8%
<i>Castors 2021-2022</i>	8	21%

Table 2 shows that 72% of the sample's audit rotations were mandatory. In 44% of the rotations that took place, the replaced company and the replacement company were Big Four. The end of 2016 and the end of 2021 were the years that saw the most casters, 23% and 21%, respectively. All the information related to the replacement of the independent auditor was collected directly from the Reference Forms published on the companies' investor relations portals or the CVM website.

3.2 Model

A proxy for earnings management frequently used in research on the subject has been the so-called accruals. Colau-to and Beuren (2006, p. 10) mention that accruals "represent the elements of the result which, although under the cash basis, have already been effected, are not yet attributed within the calculation period or under the accrual basis". That said, it should be emphasized that accruals are not a problem in themselves, as the reality of the company's business may require the application of accruals.

For the analysis of this research, Pae's (2005) accruals model was used to measure earnings management. Pae (2005) proposed an improvement to the Jones (1991) and modified Jones (1995) models, both of which are widely used in academic research to estimate accruals. The choice of the Pae (2005) model is justified by the fact that this model aims to increase the predictive power of the Jones (1991) and modified Jones (1995) models, which is possible by including variables that represent operating cash flow and the natural reversal of previous accruals (Paulo, 2007; Baptista, 2008).

According to Pae (2005), total accruals are calculated using equation 1.

$$TA_{it} = a \left(\frac{1}{A_{it-1}} \right) + \beta_1(\Delta R_{it}) + \beta_2(PPE_{it}) + \lambda_1(FCO_{it}) + \lambda_2(FCO_{it-1}) + \lambda_3(TA_{it-1}) + \varepsilon_{it} \quad (1)$$

in which:

TA_{it} = total accruals of company i in period t;

A_{it-1} = total assets of company i at the end of period t-1;

ΔR_{it} = change in net revenues of company i from period t-1 to period t;

PPE_{it} = balances of the Fixed Assets accounts of company i at the end of period t;

FCO_{it} = operating cash flow of company i in period t;

FCO_{it-1} = operating cash flow of company i in period t-1;

ε_{it} = regression errors, taken as discretionary accruals.

As Azevedo and Costa (2012) point out, the further away from zero the accruals result, the greater the level of earnings management. This study used a panel data model and Stata software for statistical procedures.

The t-test was used to compare means in the Stata software to analyze whether the observed means were statistically significant for testing the study's hypotheses. The average accruals were observed before and after the independent audit rotation for each hypothesis. Martinez (2008, p. 8) points out that discretionary accruals have "the sole purpose of managing the accounting result". Baptista (2008) and Silva and Lucena (2017) mention that total accruals also contain important information regarding the level of earnings management; therefore, for the analysis of the results, the averages of total accruals and discretionary accruals were observed for each event analyzed.

4. ANALYSIS AND DISCUSSION OF RESULTS

Initially, the panel data model with fixed effects and robust standard errors was applied because, according to Gujarati (2006), it tends to provide more informative results, with greater variability and less collinearity between the variables, more degrees of freedom, and more efficiency. However, the panel data model with random effects was applied, and the correlation between the unobservable component and the regressors was assumed to be zero. The Hausman test was then carried out to confirm the use of random effects, and the null hypothesis was not rejected, i.e., the hypothesis that the random effects model is more appropriate than the fixed effects model. Therefore, the random effects model was used because it has more efficient estimators than the fixed effects model.

The analysis proposed in this article was to identify the level of explanation of the variables in Pae's (2005) accruals model in the perception of earnings management in companies in the agricultural sector. To this end, accruals were considered a sign of the practice of manipulating companies' earnings.

Table 3 shows the descriptive statistics of the observations of the variables for the application of the Pae (2005) model, considering the estimation of total accruals, and there was no exclusion of outliers. The AT(Total Accruals) variable had a high average value (11.20), different from the values found by the research carried out by Silva and Lucena (2017) and Parreira, Nascimento, Puppim and Murcia (2020), to identify the perception of earnings management in companies with an initial public offering of shares. Furthermore, its maximum value (15.38) was much higher than its average. Thus, according to Baptista (2008), it can be inferred that, in some periods, even higher accruals were identified, which may indicate the occurrence of higher incidences of earnings management in some years.

Table 3 - Descriptive statistics of the observations

Variable	Average	Standard deviation	Minimum	Maximum
<i>Total Accruals</i>	11.20	2.04	3.83	15.38
<i>1/ Total assets</i>	0.00	0.00	0.00	0.00
ΔR	13.09	2.46	7.28	18.20
<i>PPE</i>	13.67	2.59	5.12	18.07
<i>FCO</i>	12.54	2.60	5.91	16.98
<i>FCO (t-1)</i>	12.52	2.56	5.91	16.98
<i>Total Accruals (t-1)</i>	11.12	2.03	3.83	15.38

As explained in this research's methodology, Accruals were obtained through regression using Stata software. The results are shown in Table 4. The coefficient of determination of the regression analyzed (R^2 —adjusted) was 97% for Within, 40.30% for Between, and 37.08% for overall.

Table 4 - Regression results using the panel data model

Adjusted R^2	Prob > chi2	0.000		
	corr (u_i, X)	0.000		
	Within =	0.9700		
	Between =	0.4030		
	Overall =	0.3708		

Variable	Coefficient	Standard error	T-reason	P-value
<i>1/ Total assets</i>	147247.3	284885.9	0.520	0.605
ΔR	-0.11782	0.20093	-0.590	0.558
<i>PPE</i>	-0.34761	0.48805	-0.710	0.476
<i>FCO</i>	-0.64241	0.23911	-2.690	0.007
<i>FCO (t-1)</i>	0.79818	0.15275	5.230	0.000

The results presented in Table 4 show that, for the significance test, the p-value of two variables, namely the operating cash flow for period t and the operating cash flow for period t-1, was statistically significant at 1%. This result contributes to reaffirming the study by Li and Zaiats (2017), which identified the practice of earnings management through cash flows.

Regarding the results of the coefficients, the expected sign for the variation in revenue (DR) is not very precisely defined, since a variation in revenue can cause both positive variations in profit, through an increase in accounts receivable, and negative variations, through an increase in accounts payable. As for the coefficient of the PPE variable, it was confirmed as negative, as it is part of the group of profit reducers (depreciation and amortization). Moreover, the coefficients of the FCO and FCO (t-1) variables are expected to show positive signs, as accruals are used to offset the transitory effects of cash flow (Ball & Shivakumar, 2006).

The variables in the model show positive and negative relationships with the dependent variable, discretionary accruals, with emphasis on FCO (Operating Cash Flow in period t). For FCO, the applicable analysis is that a change of 1 unit in discretionary accruals causes a negative change of approximately 0.64 units in the company's operating cash flows.

In order to analyze whether there is a statistically significant difference in the level of earnings management between the group of companies that changed audit firms and those that did not change audit firms, we applied the student's t-test, which is shown in Table 5.

Table 5 - Earnings management mean test

Companies	Average Accruals	Standard deviation	P-value
<i>With exchange</i>	9.68	1.23	0.0187
<i>No exchange</i>	11.35	0.22	

The average number of accruals in companies in which there was an audit change was (9.68), and the average of those without a change was (11.35) at a significance level of 98%. This confirmed the hypothesis tested: The replacement of the independent auditor influences the level of earnings management in companies in the agricultural sector. By testing this hypothesis, it was possible to answer the problem proposed by the research, namely whether "the earnings management of companies in the agricultural sector is affected by the rotation of independent auditors", contradicting the findings of the authors Azevedo and Costa (2012), who found evidence that changing the audit firm does not impact the level of earnings management. In addition, the authors mention that, once the companies' accruals have been obtained, the further away from zero, the greater the level of earnings management.

In order to further investigate whether voluntary rotation and mandatory rotation are different from each other when analyzing earnings management data, we propose: The type of rotation (mandatory or voluntary) influences the level of earnings management in companies in the agricultural sector. The result showed that when the exchange is voluntary, earnings management is (2.09) higher than when it is mandatory.

Table 6 - Earnings management test - Voluntary or compulsory exchange

Companies	Average Accruals	Standard deviation	P-value
<i>Compulsory</i>	9.27	1.37	0.0073
<i>Volunteer</i>	11.36	0.22	

The last proposal of the research was to investigate whether there are differences between companies considered to be Big-Four or not in terms of earnings management: The replacement of the independent auditor by/for a Big-Four firm influences the level of earnings management in companies in the agricultural sector.

Table 7 shows that the Big-Four/Non-Big-Four and Non-Big-Four/Big-Four exchanges did not have a sufficient sample to calculate the significance of the study, which is less common in the agricultural sector. However, it can be seen

that companies that switch from non-Big-Four to non-Big-Four have lower earnings management compared to others in the sector.

Table 7 - Earnings management test - Big-Four/Big-Four

Companies	Average Accruals	P-value
<i>Big-Four/ Big-Four</i>	10.95	0.4315
<i>Big-Four/ Non-Big-Four</i>	11.77	*
<i>Non-Big-Four/ Big-Four</i>	12.14	*
<i>Non-Big-Four/ Non-Big-Four</i>	7.31	0.0003

Furthermore, it can be said that the type of audit firm (Big-Four and Non-Big-Four) does not have the same impact on earnings management. In this sense, the evidence corroborates the findings of Becker, DeFond, Jiambalvo and Subramanyam (1998), Silva and Bezerra (2010), Martinez and Reis (2010) and Azevedo and Costa (2012).

5. CONCLUSIONS

The aim of this study was to identify, by means of statistical analysis using the accruals Pae's (2005) model, whether the rotation of independent auditors has any effect on the level of earnings management of Brazilian agricultural companies listed on B3 between 2012 and 2022. The literature reviewed advocates that changing the audit firm contributes to increasing the independence of the audit firm in relation to the audited company, in addition to serving as an instrument for reducing earnings management, since the new auditor can be more skeptical about the financial statements, thus increasing the quality of the financial statements (Cunha, Leite & Moraes, 2019).

The study aimed to analyze how audit rotation influences the earnings management of companies in the Brazilian agricultural sector. The results showed that the variables relating to operating cash flow in the following year and in the year prior to the rotation had an impact on the earnings management of companies in the sector in the period analyzed. Similarly, when analyzing accruals, it can be seen that the high average value indicates the occurrence of higher incidences of earnings management practices in certain years.

With regard to the hypothesis, namely that the type of rotation (mandatory or voluntary) influences the level of earnings management in companies in the agricultural sector, the research showed that when there was a voluntary exchange, the companies showed greater management compared to those that did not or those with a mandatory exchange. As for the Big-Four/Non-Big-Four and Non-Big-Four/Big-Four exchanges, the study did not obtain a sufficient sample to calculate the significance of the relationship, showing that this is less common in the agricultural sector. Even so, it can be seen that the switches from non-Big-Four to non-Big-Four have lower earnings management compared to the others.

Therefore, this research has contributed to a better understanding of how earnings management behaves when there is audit rotation in companies in the Brazilian agricultural sector. As future studies, we suggest carrying out an individual analysis of the companies in the sector, since significant relationships were found. However, in order to validate the influence of Big-Four companies, it may be necessary to carry out an in-depth examination, such as a case study, which could undertake an analysis with a broader perspective and with internal documents that facilitate the relationship between the variables studied.

In addition, the agricultural sector has peculiarities that directly affect companies' financial results. This characteristic can generate greater uncertainty and pressure to smooth or manage results, especially in adverse periods. These conditions make the role of auditing more challenging, requiring rigor and skepticism. It may therefore be worth studying this impact in a future study.

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