

Earnings Management and Valuation of Biological Assets

Ricardo Luiz Menezes da Silva[†]
University of São Paulo

Paula Carolina Ciampaglia Nardi^Ω
University of São Paulo

Maisa de Souza Ribeiro[¥]
University of São Paulo

ABSTRACT

The use of fair value to measure the worth of biological assets allows discretionary choices when using discounted cash flow in the absence of an active market, influencing the quality of accounting information. The objective of this study was to investigate evidence of earnings management among Brazilian companies that have adopted fair value based on the discounted cash flow method. The firms were investigated with regard to: a) disclosure of the discount rate, b) BM&FBovespa corporate governance levels; and c) adherence to disclosure requirements in the Brazilian accounting standard CPC 29 (IAS 41). We analyzed 31 firms with significant biological assets from 2010 to 2012. The earnings management measurements were calculated according to the modified Jones, the Teoh, Welch and Wong (1998), and the KS models. The Mann-Whitney test of the means was applied and revealed evidence of greater earnings management for companies that use discounted cash flow, and the ones that least meet CPC 29 disclosure requirements, considering the KS model estimates. Regarding the other proposals, testing did not offer enough evidence of differences in discretionary accruals. In this sense, only hypotheses 1 and 4 are partially accepted, demanding more research in this area. We also present evidence in favor of adopting Exposure Draft ED/2013/08 Agriculture: Bearer Plants, Proposed amendments to IAS 16 and IAS 41, which proposes to measure biological assets at cost, because firms already following these rules showed lower earnings management in this study.

Keywords: Earnings management. Biological assets. Agricultural products. Fair value. IAS 41.

Received in 11/09/2012; revised in 04/25/2014; accepted 11/10/2014; disclosed in 07/01/2015

**Author for correspondence:*

[†] Ph.D. from the School of Economics, Administration and Accounting of the University of São Paulo
Institution: Professor at the School of Economics, Administration and Accounting Ribeirão Preto - University of São Paulo
Address: Av. Bandeirantes, Ribeirão Preto, São Paulo – SP - Brazil
E-mail: rlmsilva@terra.com.br
Telephone: (16) 3315-9016

^Ω Ph.D. from the School of Economics, Administration and Accounting of the University of São Paulo
Institution: Professor at the School of Economics, Administration and Accounting Ribeirão Preto - University of São Paulo
Address: Av. Bandeirantes, Ribeirão Preto, São Paulo - SP- Brazil
E-mail: paulanardi@fearp.usp.br
Telephone: (16) 3315-9022

[¥] Habilitation from the School of Economics, Administration and Accounting of the University of São Paulo
Institution: Professor at the University of São Paulo
Address: Av. Bandeirantes, Ribeirão Preto, São Paulo - SP – Brazil
E-mail: maisorib@usp.br
Telephone: (16) 3315-4747

Note from the Editor: The article was accepted by Emerson Mainardes.



This article has a [Creative Commons License - Attribution 3.0 Not Adapted](https://creativecommons.org/licenses/by/3.0/).

1 INTRODUCTION

The purpose of accountancy is to provide consistent and reliable information to enable identifying and measuring the real economic and financial performance of firms, to help users make decisions on allocation of resources. The adoption of international accounting standards by Brazilian firms should strengthen this information system, by generating more useful data for stakeholders, who have an important role in firms' continuity.

Furthermore, Paulo (2007, p. 10) stresses that accounting has the objective of reducing information asymmetry, minimizing conflicts of interest and contributing to better allocation of resources in the capital market. However, accounting rules allow managers a certain degree of discretion in choosing accounting practices and criteria, especially in the current scenario of convergence to international standards, which are based on principles and require greater judgment by those responsible for preparing the accounting statements. The studies of Cormier et al. (2009) in France and Hellman (2011) in Sweden provide evidence of discretionarity in the adoption of International Financial Reporting Standards (IFRS).

In this context, managers can make accounting choices for the purpose of managing the earnings results disclosed, to paint a different picture of the firm's reality than would otherwise be the case (DECHOW, 1994). International and Brazilian studies have found that certain choices are often made with the intention of altering the image of the real performance, to the point of misleading users. Therefore, when managers choose "what", "how" or "when" to disclose information, this has an impact on the company's results and can influence the quality and transparency of the accounting statements.

Some papers have investigated the application in other countries of specific rules on valuation of biological assets and agricultural products, observing limitations in their use and the possibility of earnings management (EM) due to the absence of more objective orientations about the accounting criteria (HERBOHN, 2006; PIRES; RODRIGUES, 2007; WILLIAMS; WILMSHURST, 2009; FISHER; MORTENSEN; WEBBER, 2010).

In light of the above, there is an opportunity to investigate the quality of the financial statements published by listed Brazilian corporations that are subject to CPC 29¹ – Biological Assets and Agricultural Products (issued by the Accounting Pronouncements Committee – CPC), which requires use of fair value less selling cost to measure biological assets. For this

¹ CPC 29 (*Pronunciamento Técnico do Comitê de Pronunciamentos Contábeis*), equivalent to IAS 41.

purpose, CPC 46 – Measurement of Fair Value establishes the hierarchy for fair value, which classifies in three levels the information applied in the techniques used to measure fair value.

This information ranges from prices quoted in organized markets to unobservable data, depending on the characteristics of the market for the product in question. Some valuation techniques allow greater leeway to choose in the context of IFRS. However, some studies have indicated that measurement by methods with unobserved data can be associated with unrealistic gains, impairing the quality of accounting information (BALL, 2006; DVORAKOVA, 2006).

Here we address the following main question: **Is the level of earnings management by listed Brazilian companies subject to CPC 29 greater for those that use the discounted cash flow method to value biological assets in relation to other methods?** We also examined the same question for firms that use discounted cash flow and do not disclose the discount rate versus those that do report this rate; firms listed in the traditional trading segment of the BM&FBovespa versus those present in one of the three enhanced governance segments; and between firms with less adherence to the disclosure requirements of CPC 29 and those with greater adherence.

For this purpose, we examined evidence of possible earnings management practices of the firms, or more specifically, whether those that value biological assets by the discounted cash flow method have a higher level of discretionary accruals (a proxy for EM) in relation to firms that use other methods. Firms that adopt discounted cash flow use various premises to estimate the value of biological assets, in some cases by applying parameters not observable by the market. Therefore, we expected to find a higher level of discretionary accruals for these latter firms. We also investigated if firms that use discounted cash flow and do not disclose the discount rate, a figure that is mandatory according to the CPCs, have a higher level of EM. Additionally, we examined whether firms listed in one of the premium corporate governance segments of the BM&FBovespa (Level I, Level II and New Market) have lower EM. Finally, we investigated whether the discretionary accruals of firms with stronger adherence to the requirements of CPC 29 are lower, indicating less EM.

The results reveal higher EM levels for companies that use discounted cash flow and for those that are less compliant with the disclosure requirements of CPC 29. The first result is favorable to the proposition of the document entitled “Exposure Draft ED/2013/08 Agriculture: Bearer Plants, Proposed Amendments to IAS 16 and IAS 41”, which suggests measuring biological assets for production at cost, in detriment to current fair value. The

literature contains many critiques of the subjectivity in applying fair value to some biological assets, especially those that are not earmarked for sale and depend on a high degree of measurement subjectivity. These considerations are aimed at firms that measure biological assets by the discounted cash flow method, which according to our findings tend to manage earnings more. In this case, the substitution of fair value, as proposed by the Exposure Draft, could diminish EM practices.

2 THEORETICAL FRAMEWORK

2.1 CPC 29 – BIOLOGICAL ASSETS AND AGRICULTURAL PRODUCTS

In the process of convergence to international accounting standards (IFRS), conducted by the Accounting Pronouncements Committee (CPC), Deliberation 596/2009 from the Brazilian Securities Commission (CVM) and Resolution 1,186/2009 from the Federal Accounting Board (CFC) required listed firms as well as some unlisted ones to adopt CPC 29, entitled “Biological Assets and Agricultural Products”. This CPC applies to companies that possess biological assets and agricultural products up to the point of harvest (not postharvest).

In this context, a firm that fits under the scope of CPC 29 must recognize and value the biological asset or agricultural product when: i) the firm controls the asset/product as a result of past events; ii) the firm will derive economic benefits from the asset/product; and iii) the fair value or cost can be reliably measured (CPC 29, item 10).

The measurement of the fair value must follow the rules of CPC 46 – Measurement of Fair Value, which defines this as the value receivable for sale of an asset in a transaction under normal conditions, without pressure, between participants in the market for that asset or the most advantageous market. However, when the price of an asset is not observable, the referred CPC establishes that the firm use techniques to estimate the value, in line with the situation and data available to measure the fair value, with maximum use of observable data (CPC 46, item 61).

In this respect, in the absence of an active trading market for biological assets, CPC 46 allows the application of fair value measurement techniques, such as discounted cash flow (CPC 46, B12 to B30). This provides leeway for managers to use their judgment to reflect the result of the transaction or event to be realized.

However, in the absence of a market quotation for the biological asset as well as the absence of reliable alternative measurement methods, item 30 of CPC 29 allows measurement at cost. Hence, there is broad accounting treatment in terms of bases to measure the value of

assets, because the standard allows the use of historical cost and fair value, enabling the use of observable and unobservable data.

Before the advent of these rules, biological assets were measured at the lower of historical cost or market value. This gave the impression of greater objectivity and verifiability. By allowing the use of fair value when observable data are absent, managers are entrusted with the responsibility of applying the discounted cash flow method, with the possibility of being more or less conservative in their projections. Fisher, Mortensen & Webber (2010), Argilés, Garcia-Blandon & Monllau (2011), Rech & Pereira (2012), Silva Filho, Martins & Machado (2013), among others, have warned of the subjectivity and possibility of EM in this context.

2.2 EMPIRICAL EVIDENCE REGARDING BIOLOGICAL ASSETS

Several studies have investigated the information content generated by recording historical cost or fair value in the accounts, such as Lewis & Jones (1980), Domínguez (1981, cited in ARGILÉS; SLOF, 2000, p. 5.), Kroll (1987) and Sturguess (1994). All of them concluded that historical cost is not as informative and that the cost allocation criteria are highly arbitrary. For this reason, fair value is seen as more suitable to compute the equity value of the firm on the balance sheet, because this value can more nearly reflect economic reality, thus providing better quality of information for making decisions.

In the view of the International Accounting Standards Board (IASB), fair value is the most suitable way to measure the transformations of biological assets, because it is possible to recognize part of the result before selling agricultural products, while measurement at historical cost only partially reflects the asset's value (PIRES; RODRIGUES, 2007). On the other hand Dvorakova (2006, p. 59) comments that although fair value meets the needs of external users, there are certain qualms that measurement by this method can be associated with fictitious gains, undermining the quality of accounting information.

Ball (2006) also argues that the use of fair value by IFRS can increase the volatility of the numbers reported in the financial statements, because in regimes with low disclosure quality, managers are more likely to smooth income through EM to reach a variety of objectives. Besides this, Burgstahler, Hail & Leuz (2006) provide evidence that the level of EM is higher in countries with weaker enforcement of accounting standards. The availability of the data necessary to measure the fair value can also influence the quality of accounting information, mainly when relying on unobservable data. On this question, a technical study by PriceWaterhouseCoopers (2009) found that the method most often used in the pulp and paper

sector is discounted cash flow, with the main justification being the absence of an active market for forest assets. The study also found that firms use a variety of approaches to determine the method's premises, with low disclosure of the criteria adopted. In this sense, Silva et al. (2013) reported that a the majority of Brazilian firms (both public and private) in the agribusiness sector use fair value for measurement, but do not disclose the premises applied in the method employed, hampering comparative analysis of the accounting statements and diminishing their relevance for users, besides providing more room for EM.

Fisher, Mortensen & Webber (2010) studied the impact in New Zealand of the inclusion of fair value in IAS 41 - Agriculture. The findings indicated concern among financial report preparers in relation to recognition of unrealized gains and losses. Additionally, the authors stress that the absence of an active market can lead to the use of discounted cash flow models that generate results of questionable quality due to the diversity of premises.

On the other hand, Silva Filho, Martins & Machado (2013) studied firms listed on the BM&FBovespa that owned biological assets in 2008 and 2009 and measured them at fair value. They concluded that the adoption of CPC 29 generated positive effects on the net equity of the firms analyzed, which was beneficial to the users of accounting information.

It can thus be seen that there are viewpoints critical of the discretionarity in the valuation of biological assets, such as the adoption of premises for measuring the discounted cash flow. Some authors have also commented that the lack of more specific parameters to determine the discount rate and more specific guidance by accounting standards can reduce the judgment exercised by managers, reducing the possibility of errors and problems of comparability and manipulation (ECKEL; FORTIN; FISHER, 2003).

2.3 ACCRUALS QUALITY AND EARNINGS MANAGEMENT

Despite the fundamental role of accounting in meeting the information needs of external users and the proper functioning of the capital market, it is known that managers have incentives not to disclose certain information or to massage the numbers so as to paint a picture of the firm's performance different from reality. In other words, managers can use the discretionarity allowed by accounting standards to influence the accounting numbers.

This discretionarity can be exercised to increase the wealth of the owners of capital or to expropriate their wealth (WATTS; ZIMMERMAN, 1990, p. 135). Expropriation of the owners' wealth results from opportunistic actions by managers, taking advantage of certain

situations to reach objectives that favor them, in detriment to the analysis of external users, by altering the firm's financial reality (NARDI, 2008, p. 26).

Therefore, the possibility of EM raises doubts about the quality of the financial statements, naturally leading users to question the reliability of the numbers presented. In this line, many studies have investigated the quality of accounting information. A good survey is presented by Francis, Olsson & Schipper (2008), following the focus of earnings quality (EQ). According to them (p. 275), EQ depends on two components: i) one considered natural, because it reflects intrinsic aspects of the business; and ii) another more discretionary, influenced by management decisions regarding disclosure of the financial statements. They also (p. 283) stress that management decision-making on what is disclosed in accounting reports is one of the main determinants of earnings quality.

Among the various metrics found in the literature to measure EQ, Francis, Olsson & Schipper (2008) present the quality of accruals. This method assumes that the best earnings quality is that which is nearest to cash flow. Dechow & Dichev (2002) measure earnings quality by a model that captures changes in working capital on past, present and future operating cash flow realizations.

Therefore, accruals that are not well explained by accounting principles are an inverse measure of earnings quality, or earnings management. Abnormal accruals can be measured by a version of the approach of Jones (1991). According to him, the abnormal accruals variable captures the discretionary decisions of managers. The interpretation of Francis, Olsson & Schipper (2008, p. 299) indicates that the larger abnormal accruals are in absolute value, the lower the quality of accruals will be.

3 METHODOLOGY

The sample (table 8 in the appendix) is composed of all listed Brazilian companies that reported owning biological assets in the middle of 2012, a total of 31 firms. We obtained the financial statements from the site of the BM&FBovespa for the period from 2010 to 2012, except for firms with sugarcane plantations, which closed their financial statements on March 31, 2011, 2012 and 2013 due to the differences in operating cycles.

We performed qualitative analysis of the explanatory notes, based on Silva et al. (2013), seeking to verify the disclosure of the information required by CPC 29. This disclosure analysis consists of observing a determined item required by CPC 29 and attributing the number 1 for cases when the disclosure rules were satisfied and 0 otherwise, and then adding

the scores for all the items. With this procedure, we obtained the elements to test hypothesis 4, describe next in section 3.1.

The methodological procedures can be divided into two parts. We initially estimated the discretionary accruals by applying three models and then applied tests to compare the means.

3.1 RESEARCH HYPOTHESES

Based on what was found in the literature review on EM, we formulated four hypotheses, described below.

Valuation methods based on unobservable data to measure fair value allow greater discretion in choosing the parameters and premises. This freedom can be exercised to increase the reported wealth of owners of capital or to expropriate it (WATTS; ZIMMERMAN, 1990, p. 135), depending on the incentives that influence managers' actions. With this, the application of discounted cash flow models can generate results of questionable reliability, due to the diversity of premises, directly influencing the quality of accounting information (FISHER; MORTENSEN; WEBBER, 2010), leading to the following hypothesis:

H₁: Companies subject to CPC 29 that use the discounted cash flow method to value biological assets have greater evidence of EM.

Furthermore, CPC 46 stresses the need to disclose the inputs utilized when this type of valuation is employed. Therefore, the possibility of EM from applying valuation methods without market parameters, such as the discounted cash flow method (CORDEIRO, 2010; PIRES; RODRIGUES, 2007), leads to hypothesis 2:

H₂: For companies subject to CPC 29 that use the discounted cash flow method to value biological assets and that do not disclose the discount rates, there are indications of a higher level of EM.

Earnings management can also be analyzed in the context of good corporate governance (CG) practices, which hinder expropriation of the interests of the principles by the actions of agents, including reducing EM practices. In this context, Ramos & Martinez (2006) investigated whether CG practices minimize EM by Brazilian firms and observed less variability of accruals for those with enhanced governance practices. These results are supported by those of Chen, Kao & Tsao (2010).

Therefore, assuming that firms listed in one of the trading segments of the BM&Bovespa that require higher CG, the third hypothesis is:

H₃: Companies subject to CPC 29 listed in one of the enhanced corporate governance segments of the BM&Bovespa have evidence of lower EM in relation to those listed in the traditional segment.

Finally, the transparency of accounting information can also be investigated. Information is considered transparent when it enables the user to have an accurate picture of the financial reality of the firm, implying reduced uncertainties and risks in making investment and other choices. This consequence, according to Dias Filho (2000, p. 47), is the essence of accounting information, which can be achieved by disclosing the information required by each accounting standard. In this sense, Barth, Landsman & Lang (2008) observed a lower level of EM and greater relevance of accounting information after adoption IFRS, i.e., an increase in the quality of the financial statements. This means that the expectation of information with higher quality and transparency arising from adoption of international standards should be equivalent to lower EM. Some authors have studied this relation, such as Zéghal, Chtourou & Sellami (2011), who found evidence of lower EM with adoption of international standards.

This prompted our interest in analyzing the fourth hypothesis, for which we used the method for identifying transparency with respect to CPC 29 described by Silva et al. (2013), as mentioned in the introduction to the third section:

H₄: Companies subject to CPC 29 whose disclosure satisfies a larger number of the standard's requirements have evidence of lower EM.

3.2 ESTIMATION OF DISCRETIONARY ACCRUALS

To analyze EM with some characteristics of Brazilian firms that follow CPC 29, we considered three existing models to calculate discretionary accruals, which start from the assumption that discretionarity is a proxy for EM.

The KS model of Kang & Sivaramakrishnan (1995), according to Martinez (2001, p. 95), most efficiently describes the process of defining accruals. It has been utilized to study Brazilian firms by Formigoni, Paulo & Pereira (2007, p. 8), Paulo, Corrar & Martins (2006, p. 8), Cardoso & Martinez (2006, p. 5) and Nardi & Nakao (2009), among others. The modified Jones (DECHOW; SLOAN; SWEENEY, 1995), Teoh (TEOH; WELCH; WONG, 1998) and KS models are all based on the reasoning that total accruals are composed of discretionary and nondiscretionary items.

$$TA = DA + NDA ,$$

where TA denotes total accruals; DA stands for discretionary accruals; and NDA denotes nondiscretionary accruals.

Therefore:

$$DA = TA - NDA.$$

We calculated total accruals based on Healy (1985), Jones (1991, p. 207) and Dechow, Sloan & Sweeney (1995, p. 203), with an adjustment to consider the variation of the market value of biological assets, since total accruals do not necessarily represent an effect on cash flow.

After calculating the total accruals, we computed the discretionary accruals based on the modified Jones model, which can be estimated by means of the following equation:

$$\frac{TA_{jt}}{Asset_{j,t-1}} = \kappa_1 \frac{1}{Asset_{j,t-1}} + \kappa_2 \frac{\Delta Rev_{jt}}{Asset_{j,t-1}} + \kappa_3 \frac{PPE_{jt}}{Asset_{j,t-1}} + \kappa_4 \frac{BA_{jt}}{Asset_{j,t-1}} + \varepsilon_{jt}$$

where TA_{jt} denotes the total accruals of firm j in year t ; $Asset_{jt-1}$ is the value of total assets of firm j at the start of the period ($t-1$); ΔRev_{jt} is the variation in net revenue of firm j between years $t-1$ and t ; PPE_{jt} corresponds to the property, plant and equipment (or fixed assets) of firm j in year t ; and BA_{jt} is the total worth of the biological assets of firm j in year t .

This model highlights fixed assets given the possibility of using this category for purposes of EM. However, biological assets can have significant representation in the financial statements, so we considered it prudent to separate them to allow visualizing their coefficient of regression.

We then estimated discretionary accruals based on the model of Teoh, calculated as follows:

$$\frac{TAC_{jt}}{Asset_{j,t-1}} = \gamma_1 \frac{1}{Asset_{j,t-1}} + \gamma_2 \frac{\Delta Rev_{jt}}{Asset_{j,t-1}} + \nu_{jt},$$

where TAC_{jt} denotes the total current accruals of firm j in year t ; $Asset_{jt-1}$ stands for the total assets of firm j at the start of the period ($t-1$); and ΔRev_{jt} is the variation of net revenue of firm j between years $t-1$ and t .

The last model used was the KS, where we estimated the discretionary accruals by the following adapted formula:

$$TA_{j,t} = \phi_0 + \phi_1 \times \left[\frac{AR_{j,t-1}}{Rev_{j,t-1}} \times Rev_{j,t} \right] + \phi_2 \times \left[\frac{APB_{j,t-1}}{EXP_{j,t-1}} \times EXP_{j,t} \right] + \phi_3 \times \left[\frac{DEP_{j,t-1}}{PPE_{j,t-1}} \times PPE_{j,t} \right] + \phi_4 \times \left[\frac{EXA_{j,t-1}}{BA_{j,t-1}} \times BA_{j,t} \right] + U_{j,t}$$

where $AR_{j,t-1}$, is short-term accounts receivable; $APB_{j,t-1}$ is net working capital without considering accounts receivable of firm j in year $t-1$; $EXP_{j,t-1}$ is the operating expense before depreciation and amortization of firm j in year $t-1$; $EXP_{j,t}$ is the operating expense before depreciation and amortization of firm j in year t ; $DEP_{j,t-1}$ is the depreciation and amortization expense of firm j in year $t-1$; $EXA_{j,t-1}$ corresponds to the adjustment to fair value net of depletion expense of the biological assets of firm j in year $t-1$; and $BA_{j,t}$ denotes the biological assets of firm j in year t .

3.3 TEST TO COMPARE THE MEANS

We used the Mann-Whitney test to compare the earnings management levels of the groups “companies that adopt discounted cash flow versus another method” – hypothesis 1, “companies that adopt discounted cash flow and disclose the discount rate versus others that use discounted cash flow” – hypothesis 2, “companies listed in enhanced corporate governance trading segments of the BM&FBovespa versus companies listed in the traditional segment” – hypothesis 3, and “companies with high disclosure of items of CPC 29 versus low disclosure” – hypothesis 4. According to Fávero et al. (2009), this is one of the most powerful nonparametric tests for two independent samples. The null hypothesis is that there is no difference between the groups, measured by the Z-statistic, given by:

$$Z_{cal} = \frac{(U - N * N / 2)}{\sqrt{\frac{1}{N(N-1)} \left(\frac{N^2 - N^2}{12} - \sum_{i=1}^g \frac{t_i - t_i}{12} \right)}}$$

where $\sum_{i=1}^g \frac{t_i - t_i}{12}$ is a correction factor when there are ties, g is the number of groups

with tied ranks; t_i is the number of tied observations in group i ; N_1 is the number of cases in group 1, which is that with the fewest number of observations; N_2 is the number of cases in group 2, which has the highest number of observations; and $U = \min(U_1, U_2)$, with $U_1 = N_1 \times N_2 + \frac{N_1(N_1+1)}{2} - R_1$ and $U_2 = N_1 \times N_2 + \frac{N_2(N_2+1)}{2} - R_2$; R_1 is the sum of the ranks of group 1; and R_2 is the sum of the ranks of group 2 (FÁVERO et al., 2009).

4 ANALYSIS OF THE RESULTS

4.1 DESCRIPTIVE STATISTICS

According to Table 1, the average value of biological assets increased steadily from 2009 to 2012, with the lowest value occurring in 2009. Assuming that biological assets represent changes in the firms' net worth, these statistics show an increase in wealth associated with biological assets. However, the ratio between biological assets and total assets declined during this period, indicating that other accounts composing total assets grew more strongly.

Table 1 – Descriptive Statistics

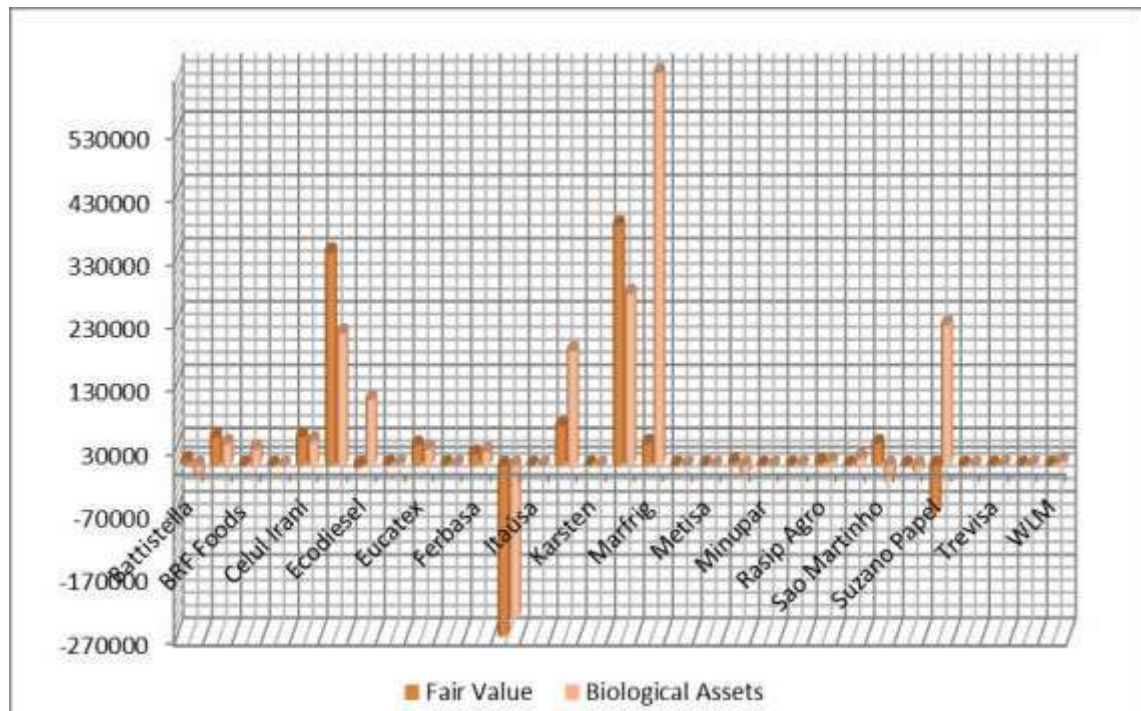
	Biological Assets 2009	Biological Assets 2010	Biological Assets 2011	Biological Assets 2012
Mean	388,925	436,763	486,356	580,251
Median	40,658	69,807	68,469	62,268
Standart Deviation	838,813	850,283	857,192	968,636
Minimum	0	0	0	0
Maximum	3,791,084	3,550,636	3,264,210	3,441,495
Sum	12,056,687	13,539,642	15,077,024	17,987,779
Observations	31	31	31	31
	Fair Value 2009	Fair Value 2010	Fair Value 2011	Fair Value 2012
Mean	4,081	21,811	-2,418	-2,784
Median	0	992	0	0
Standart Deviation	106,537	78,534	55,819	124,596
Minimum	-268,214	-152,475	-280,564	-339,140
Maximum	469,541	381,894	68,791	521,823
Sum	126,506	676,137	-74,971	-86,302
Observations	31	31	31	31
	Biological Assets 2009/ Total Assets 2009	Biological Assets 2010/ Total Assets 2010	Biological Assets 2011/ Total Assets 2011	Biological Assets 2012/ Total Assets 2012
Mean	10,49%	8,40%	7,03%	6,88%
Median	5,25%	6,04%	2,99%	2,73%
Standart Deviation	12,63%	8,70%	9,08%	9,04%
Minimum	0,00%	0,00%	0,00%	0,00%
Maximum	43,37%	32,53%	38,37%	33,38%
Observations	31	31	31	31
	Fair Value/ Revenue 2009	Fair Value/ Revenue 2010	Fair Value/ Revenue 2011	Fair Value/ Revenue 2012
Mean	4,69%	7,18%	0,02%	2,07%
Median	0,00%	0,18%	0,00%	0,00%
Standart Deviation	32,08%	27,07%	1,94%	6,24%
Minimum	-22,54%	-15,03%	-5,06%	-3,81%
Maximum	172,66%	118,53%	4,85%	26,98%
Observations	31	31	31	31

Note: Biological assets correspond to the values presented in current and long-term assets (in R\$ thousand); and fair value is composed of the variation of fair value net of depletion expense (in R\$ thousand).

Source: Prepared by the authors.

With respect to the variation of fair value, there was an increase of nearly R\$ 22 million in 2010, but the values declined in 2011 and 2012, contributing to reduce the value of biological assets. The ratio between fair value and revenue fell from 4.69% to 2.07% in the

period. Note there was an increase of 434% (R\$ 126,506 thousand in 2009 to R\$ 676,137 thousand in 2010) in the variation of fair value net of depletion due to adjustment to market value, growth of R\$ 549,631 thousand. This is coherent with the expected effects of the first year of mandatory adoption of IFRS. This growth was decomposed among the firms in the sample as indicated in the graph below.



Graph 1 – Decomposition of the variation of fair value due to adjustment to market value and biological assets, between 2010 and 2009. The fair value is net of depletion expense.

Source: Prepared by the authors.

The graph reveals that the largest variations of fair value occurred for Cosan, Fibria and Klabin. On the other hand, the firms reporting the largest variations in the worth of biological were Cosan, Fibria, JBS, Klabin, Marfrig and Suzano Papel. The companies JBS and Marfrig, in the meat packing sector, were not among those with high variations in fair value net of depletion because of the short life cycle of their herds. In contrast, Fibria and Klabin have extensive planted forests, which take many years to reach harvest age, explaining the variations in fair value. In the case of Klabin, the high variation of fair value net of depletion expense is due to the reduction of the company's weighted average cost of capital, one of the variables used in the discounted cash flow method. Nevertheless, the company did not explain the reason for the reduction in the cost of capital in note 13 to the financial statements for 2012.

Also of note is that the majority of the firms in the sample that applied CPC 29 did not satisfy some basic requirements of the standard (SILVA et al. 2013). Low compliance like

this reduces the relevance of the accounting statements (FISHER; MORTENSEN; WEBBER, 2010), besides hampering comparison of companies in the same sector (WILLIAMS; WILMSHURST, 2009). Therefore, although the numbers resulting from applying CPC 29 are not very impressive according to Table 1, it is fundamental to investigate the quality of the financial statements, given that transparency is one of the determinants to attract investments to boost the country's economic development. Besides this, Brazil is one of the main emerging countries that have adopted IFRS and production of agricultural commodities makes up a relevant share of its total output, making it an important player in the process of discussing and revising international standards, including CPC 29 (IAS 41).

4.2 ESTIMATES OF THE EARNINGS MANAGEMENT MODELS

The first step in analyzing the data was to calculate the discretionary accruals by the modified Jones (MJ), Teoh and KS models. The results are shown below.

Table 2 – Statistics of the MJ, Teoh and KS Models

Models	Variables	Estimates
MJ	$1/Asset_{j,t-1}$	-24878 (-1.28)
	$\Delta Rev_{j,t}/Asset_{j,t-1}$	0.03 (0.47)
	$PPE_{j,t}/Asset_{j,t-1}$	-0.15 (-1.10)
	$BA_{j,t}/Asset_{j,t-1}$	0.46 (2.96)**
	R^2	0.11
	F	10.92**
Teoh, Welch & Wong	$1/Asset_{j,t-1}$	-0.04 (-1.74)***
	$\Delta Rev_{j,t}/Asset_{j,t-1}$	0.05 (0.69)
	R^2	0.01
	F	27915**
KS	ϕ_0	-0.02 (-0.32)
	$Rev_{j,t}$	0.26 (0.93)
	$EXP_{j,t}$	-0.25 (-0.79)
	$PPE_{j,t}$	0.02 (0.19)
	$BA_{j,t}$	-0.39 (-1.32)
	R^2	0.05
	F	14.72**

Source: Prepared by the authors; *significant at 5%, **significant at 1%, ***significant at 10%.

The R^2 value is low for the three models, as also observed by Paulo (2007), Martinez (2008), Coelho & Lima (2009), Formigoni, Antunes & Paulo (2009) and Formigoni et al. (2012), who applied the models to analyze EM in other contexts.

We estimated the MJ and Teoh models by means of panel data, using the Hausman test to indicate the specification of the fixed effects. To check for satisfaction of the premises of the model, such as absence of correlation and heteroscedasticity, we applied the robust variance estimator matrix, suggested by Arellano (1987), following White (1980). For the KS model, we applied the instrumental variables technique, given the specific characteristics of the model. As can be seen in Table 2, the three models were statistically significant at 1%. The biological assets variable was statistically significant in the Jones model, revealing that the model's fit was adequate.

We then analyzed the Pearson and Spearman correlation coefficients to verify if the discretionary accruals were converging.

Table 3 –Spearman and Pearson Correlation Coefficients for the Earnings Management Variables

	MJ	T	KS
MJ		0.36**	0.24
T	0.72**		-0.16
KS	-0.42	-0.10	

Source: Prepared by the authors; *significant at 5%, **significant at 1%, ***significant at 10%.

The numbers in Table 3 above the diagonal are the coefficients estimated by the Spearman correlation test, while the numbers below the diagonal refer to the Pearson correlation. These tests reveal a high correlation between the discretionary accruals of the Teoh and modified Jones models. The absence of significant correlation observed with the KS model can be explained by the premises of the model, which uses instrumental variables to estimate the regression coefficients (KANG; SIVARAMAKRISHNAN, 1995).

It should be noted, however, that the Spearman test, according to Triola (1998), is a nonparametric test that considers the correlation by ranks, and unlike the Pearson test, it does not require assuming the data are normally distributed. In this sense, the results of the parametric and nonparametric tests converged, regardless of examination to verify the distribution of the data.

4.3 TESTS OF THE DIFFERENCE OF MEANS

Next we present the results of the tests to compare the means of the groups and respective hypotheses: i) “companies that adopt discounted cash flow versus another method” – hypothesis 1; ii) “companies that adopt discounted cash flow and disclose the discount rate

versus those that do not disclose it” – hypothesis 2 ; iii) “companies listed for trading in one of the enhanced corporate governance segments of the BM&FBovespa versus companies listed in the traditional segment” – hypothesis 3; and iv) “companies with high disclosure of items required by CPC 29 versus low disclosure” – hypothesis 4 .

The results of the first test are shown in Table 4.

Table 4 – Test comparing the means for the EM variables between the groups “companies that adopt discounted cash flow versus another method”

Variables	Discounted		
	Cash Flow	Other Method	Z
MJ	40.11	56.12	2.83**
T	40.09	56.15	2.84**
KS	58.06	32.35	-4.55**

Source: Prepared by the authors; *significant at 5%, **significant at 1%, ***significant at 10%.

The table above reports the mean EM values calculated by each model for firms that use the discounted cash flow and those that use other methods. There was a significant difference in discretionary accruals for companies that measure biological assets by the discounted cash flow method in relation to the other firms. This result allows rejecting the null hypothesis of the Mann-Whitney test for the three models and concluding that there are differences in terms of EM between the groups. The results of the KM model reveal higher discretionary accruals for the group using discounted cash flow. These firms employ various premises, including those based on managerial judgment, unlike other companies, which have an active market and so use market parameters to measure the worth of their biological assets. This provides evidence that the firms in the first group use discretionary parameters due to the absence of an active market and disclose less reliable numbers (HERBOHN, 2006; PIRES; RODRIGUES, 2007; WILLIAMS; WILMSHURST, 2009; OHLSON et al., 2010), while those in the second group can rely on variations in the market value of the assets in question.

Nevertheless, unlike the expectation expressed in hypothesis 1, the level of discretionary accruals was lower for the firms using discounted cash flow as measured by the MJ and Teoh models, which weakens acceptance of this hypothesis.

The contrary result can be explained by the characteristics of the models applied. According to Martinez (2001) and Almeida (2010), the KS model more efficiently describes the process of generating accruals in Brazil than the others. Despite this, the Teoh and MJ models have been used in Brazilian studies and been found to produce results consistent with the international literature, demonstrating they can also reveal indications of EM.

The next table reports the results of comparison between companies that adopt discounted cash flow but do not disclose the discount rate versus those that do announce this rate.

Table 5 – Test comparing the means for the EM variables between the groups “companies that adopt discounted cash flow and disclose the discount rate versus others that use discounted cash flow and do not disclose the discount rate”

Variables	Disclose	Do not disclose	Z
MJ	28.78	25.15	-0.85
T	22.44	31.73	2.18*
KS	30.07	23.81	-1.48

Source: Prepared by the authors; *significant at 5%, **significant at 1%, ***significant at 10%.

The test statistics reveal a difference of the means only for discretionary accruals in the Teoh model, leading to rejection of the null hypothesis of the test of the means. Nevertheless, it cannot be concluded that the firms in the group adopting discounted cash flow and not announcing the discount rate manage earnings more than the other companies, because the Z-statistic for the model that is most suitable for Brazilian reality, the KS, was not significant. Therefore, our findings do not allow accepting hypothesis 2.

However, this analysis only involved seven firms that announce the discount rate against nine that do not, as shown in table 8. This is a very low number of companies. Furthermore, of the nine that do not disclose the rate, eight are listed for trading in one of the premium corporate governance segments of the BM&FBovespa, which theoretically means they are more transparent and offer better investor protection than firms listed in the traditional segment.

The results for the firms that belong to one of the three enhanced corporate governance levels of the BM&FBovespa are shown below.

Table 6 – Test comparing the means for the EM variables between the groups “companies listed for trading in one of the enhanced corporate governance segments of the BM&FBovespa versus companies in the traditional segment”

Variables	Enhanced CG	Traditional	Z
MJ	37.12	62.64	4.44**
T	44.21	51.42	1.25
KS	47.21	46.67	-0.95

Source: Prepared by the authors; *significant at 5%, **significant at 1%, ***significant at 10%.

Table 6 reveals a difference in the means only for discretionary accruals according to the MJ model, so the null hypothesis of the Mann-Whitney test can only be rejected for this model. Furthermore, the level of discretionary accruals was lower for the firms in the enhanced governance group, indicating less EM. This result agrees with the findings of Ramos & Martinez (2006), Chen, Kao & Tsao (2010) and Barros, Soares & Lia (2013),

indicating a negative relation between better corporate governance and earnings management. Firms listed for trading in one of the premium governance segments are subject to stricter reporting rules, among other aspects, implying greater transparency and stronger legal protection for shareholders. However, the KM model does not provide evidence of this result, preventing acceptance of hypothesis 3.

Next we present the results of the difference in means regarding the level of compliance with CPC 29.

Table 7 – Test Comparing the Means for the EM Variables Between the Groups “Companies with High Disclosure of Items of CPC 29 Versus Low Disclosure”

Variables	Higher disclosure	Lower disclosure	Z
MJ	32.33	15.30	-4.26**
T	28.71	19.09	-2.41*
KS	20.29	27.87	1.89***

Source: Prepared by the authors; *significant at 5%, **significant at 1%, ***significant at 10%. The disclosure index was calculated based on Silva et al. (2013).

Table 7 reveals differences in the means for the groups studied. Nevertheless, only nondiscretionary accruals calculated according to the KS model show indications of higher earnings management for the firms in the group with lower disclosure (lower compliance), coherent with hypothesis 4. Therefore, firms with a stronger commitment to satisfying the requirements of CPC 29, and hence greater transparency, manage earnings less. However, this result is weaker for the MJ and Teoh models.

This study identified evidence of a higher level of discretionary accruals among Brazilian firms that have biological assets, and thus are subject to CPC 29, that use the discounted cash flow method to measure these assets, and for those that have lower compliance with the requirements of that standard. With this, it is possible to partially accept hypothesis 1: companies subject to CPC 29 that use the discounted cash flow method to value biological assets have greater evidence of EM; and hypothesis 4: companies subject to CPC 29 whose disclosure satisfies a larger number of the standard’s requirements have evidence of lower EM. In both cases we observed higher EM indexes according to the KS model. Although the analysis of hypotheses 2 and 3 presented favorable results, they were not confirmed by the KS model. These findings are coherent with those of international studies (CORDEIRO, 2010; PIRES; RODRIGUES, 2007) of the association between accounting standards for biological assets and the level of earnings management practices.

These results can contribute to research on the adoption of IFRS, which is expected to improve the quality of financial statements (SILVA, 2013). However, this quality is

influenced by institutional characteristics, the development level of the capital market, the typical capital structure of firms and by the country's political and legal systems (SODERSTROM; SUN, 2007). We believe there are incentives in Brazil for aggressive accounting, which according to Kothari (2001) means disclosing information that does not reflect the firm's financial reality. Although CPC 29 is aimed at reliable measurement of the fair value of biological assets, it does not clearly explain what is meant by reliable estimation. More reliable measurement of biological assets is the goal of the Exposure Draft ED/2013/08 Agriculture: Bearer Plants, Proposed Amendments to IAS 16 and IAS 41, issued on June 2013, aimed specifically at the accounting treatment of plants that bear fruits (MACKENZIE et al., 2013). This type of biological assets would be measured at cost, which in some situations can be more reliable, reducing the variation of fair value in the accounting results. In particular, hypothesis 1 of this study identifies greater EM by firms that use discounted cash flow than other methods (cost and market value).

5 FINAL CONSIDERATIONS

With the process of convergence to IFRS, Brazilian companies that own biological assets and sell agricultural products have adopted CPC 29. Some studies (HERBOHN, 2006; PIRES; RODRIGUES, 2007; WILLIAMS; WILMSHURST, 2009; FISHER; MORTENSEN; WEBBER, 2010) have identified problems after application of the new rules, such as wider scope for earnings management.

Since managers have incentives to make accounting choices to serve their own interests (WATTS; ZIMMERMAN, 1990), the question arises of whether accounting information reflects the real financial performance of companies or if the information is manipulated. Therefore, our objective was to investigate the level of EM by listed Brazilian firms that are subject to CPC 29, or more specifically, whether firms that measure biological assets by the discounted cash flow method tend to have a higher level of discretionary accruals (proxy for EM) than do firms that use other methods. Firms that use discounted cash flow employ various premises to estimate the value of their biological assets, some of which do not have parameters that are observable by the market. This can provide more leeway for discretionary accruals by these companies. The results found here also show that firms that use discounted cash flow and do not disclose the discount rate have a higher average level of EM. We also investigated if firms with shares listed for trading in one of the enhanced governance segments of the BM&FBovespa have lower EM, and also whether discretionary accruals are

lower among firms that are more compliant with CPC 29, indicating lower propensity to manage earnings.

After estimating discretionary accruals by the MJ, Teoh and KS models, we applied the Mann-Whitney test to compare the means of four groups: i) “companies that adopt cash flow versus another method” – hypothesis 1, ii) “companies that adopt discounted cash flow and disclose the discount rate versus those that do not disclose the discount rate” – hypothesis 2, iii) “companies listed in an enhance governance segment of the BM&FBovespa versus companies listed in the traditional segment” – hypothesis 3, and iv) “companies with high disclosure of the items of CPC 29 versus low disclosure” – hypothesis 4.

The results of the test to compare the means for group “i” identified a statistically significant difference in EM of companies that adopt discounted cash flow in relation to those that use another method, and according to the KS model, the former companies manage earnings more. With respect to group “ii”, it was not possible to confirm whether there are differences in EM between firms that do and do not disclose the discount rate used for calculating the discounted cash flow, since the results were only significant when applying the Teoh model. In turn, for group “iii” it also was not possible to confirm differences in EM between firms listed for trading in one of the premium corporate governance segments of the BM&FBovespa and those in the traditional segment, even though the result was significant by the MJ model. Finally, for group “iv”, there was a statistically significant difference in EM of companies with greater and lower compliance with CPC 29. According to the KS model, firms with greater compliance tend to manage earnings less.

Based on these results, hypothesis 1 (companies subject to CPC 29 that use the discounted cash flow method to value biological assets have greater evidence of EM) and hypothesis 4 (companies subject to CPC 29 whose disclosure satisfies a larger number of the standard’s requirements have evidence of lower EM) were accepted partially, due to the favorable results of the KS test.

We stress that the characteristics of the models can explain the contrary results, and point out some limitations of the study: the low number of firms in the sample; the restricted period investigated (2010-2012); the absence of uniform adoption of CPC standards, which naturally implies greater discretionarity in disclosing accounting numbers; and heterogeneity of the firms, since although all own biological assets, they have distinct activities and ways of using those assets.

Another limitation is the econometric premises used to observe earnings management. We used secondary data to calculate the models' variables, which implies the possibility of errors in the variables. Future studies can be conducted covering longer time intervals, to increase the number of firm-year observations and thus the degrees of freedom. Finally, the distinct characteristics of the firms is an aspect that can be controlled in future research.

The results provide evidence of greater earnings management by companies that use discounted cash flow, a method that is under discussion for bearer plants according to the Exposure Draft ED/2013/08 Agriculture: Bearer Plants, Proposed Amendments to IAS 16 and IAS 41, issued in June 2013.

REFERENCES

- ARELLANO, M. Computing robust standard errors for within-groups estimators. **Oxford Bulletin of Economics and Statistics**, v.49, p.431-34, 1987.
- ARGILÉS, J. M.; GARCIA-BLONDON, J.; MONLLAU, T. Fair value versus historical cost-based valuation for biological assets: predictability of financial information. **Revista de Contabilidad-Spanish Accounting Review**. v.14, n.2, p.87-113, 2011.
- ARGILÉS, J. M.; SLOF, E. J. New opportunities for farm accounting. **Working Paper**. Mar. 2000. Disponível em: <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=246522>. Acesso em: 25 jan. 2012.
- BALL, R. International Financial Reporting Standards (IFRS): pros and cons for investors. **Accounting and Business Research, International Accounting Policy Forum**, p. 5-27, 2006.
- BARROS, C. M. E.; SOARES, R. O.; LIMA, G. A. S. F. A relação entre governança corporativa e gerenciamento de resultado em empresas brasileiras. **Revista de Contabilidade e Organizações**, v. 19, p. 27-39, 2013.
- BARTH, M.; LANDSMAN, W. R.; LANG, M. H. International accounting standards and accounting quality. **Journal of Accounting Research**, v. 46, n. 3, p. 467-498, jun. 2008.
- CARDOSO, R. L.; MARTINEZ, A. L. Gerenciamento de resultados contábeis no Brasil mediante decisões operacionais. In: ENCONTRO NACIONAL DA ASSOCIAÇÃO NACIONAL DE PÓS-GRADUAÇÃO E PESQUISA EM ADMINISTRAÇÃO (ENANPAD), 30., 2006, Salvador. **Anais...** Salvador: ANPAD, 2006.
- CHEN, A.; KAO, L.; TSAO, M. To improve investors' valuation of accounting earnings in emerging markets: evidence from Taiwan. **Canadian Journal of Administrative Sciences**, v.27, n.4, p.376-390, jul. 2010.
- COELHO, A. C.; LIMA, I. S. Gerenciamento de resultados contábeis no Brasil: comparação entre companhias de capital fechado e de capital aberto. **Revista de Administração – RAUSP**, v.44, n.3, p.207-221, set. 2009.

CPC. COMITÊ DE PRONUNCIAMENTOS CONTÁBEIS. **Pronunciamento Técnico CPC 29**: ativo biológico e produto agrícola: correlação às normas internacionais de contabilidade – IAS 41. 2009. Disponível em: <<http://www.cpc.org.br/index.php>>. Acesso em: 7 fev. 2009.

_____. **Pronunciamento Técnico CPC 46**: mensuração do valor justo: correlação às normas internacionais de contabilidade – IFRS 13. Disponível em: <<http://www.cpc.org.br/index.php>>. Acesso em: 31 dez. 2013.

CORDEIRO, J. E. P. A problemática contabilística dos activos biológicos. **Dissertação** (Mestrado em Gestão) – Faculdade de Economia da Universidade de Coimbra, Portugal, 2010. Disponível em: <<https://estudogeral.sib.uc.pt/bitstream/10316/14467/2/Relat%C3%B3rio%20de%20Est%C3%A1gio%20-%20final.pdf>>. Acesso em: 25 jan. 2012.

CORMIER, D. et al. First-time adoption of IFRS, managerial incentives, and value-relevance: some french evidence. **Journal of International Accounting Research**. v.8, n.2, p.1-22, 2009.

DECHOW, P. M. Accounting earnings and cash flows as measures of firm performance: the role of accounting accruals. **Journal of Accounting and Economics**. v.18, p.3-42, 1994.

DECHOW, P. M.; DICHEV, I. D. The quality of accruals and earnings: the role of accounting accruals estimation errors. **The Accounting Review**. v.77, p.35-59, 2002.

DECHOW, P. M.; SLOAN, R. G.; SWEENEY, A. P. Detecting earnings management. **The Accounting Review**. v.70, n.2, p.193-225, apr. 1995.

DIAS FILHO, José M. A Linguagem utilizada na evidenciação contábil: uma análise de sua compreensibilidade à luz da teoria da comunicação. **Revista de Contabilidade e Finanças**, v. 13, n. 24, p. 38-49, jul./dez. 2000.

DVORAKOVA, D. Application of fair value measurement model in IAS 41: relation between fair value measurement model and income statement structure. **European Financial and Accounting Journal**. v.1, n.2, p.49-70, 2006.

ECKEL, L.; FORTIN, S.; FISHER, K. The choice of discount rate for external reporting purposes: considerations for standard setting. **Accounting Forum**, v. 27, n. 1, março 2003.

FÁAVERO, L. P. et al. **Análise de dados**: modelagem multivariada para tomada de decisões. Rio de Janeiro: Elsevier, 2009.

FISHER, R.; MORTENSEN, T.; WEBBER, D. Fair value accounting in the agricultural sector: an analysis of financial statement preparers' perceptions before and after the introduction of IAS 41 agriculture. In: ACCOUNTING & FINANCE ASSOCIATION OF AUSTRALIA AND NEW ZEALAND (AFAANZ), 2010, Christchurch (NZ). **Anais...** Christchurch: AFAANZ, 2010. Disponível em: <http://www.afaanz.org/openconf/2010/modules/request.php?module=oc_program&action=view.php&id=57>. Acesso em: 25 jan. 2012.

FORMIGONI, H.; ANTUNES, M. T. P.; PAULO, E. Diferença entre o lucro contábil e lucro tributável: uma análise sobre o gerenciamento de resultados contábeis e gerenciamento tributário nas companhias abertas. **Brazilian Business Review - BBR**, v.6, n.1, p.44-61, abr 2009.

FORMIGONI, H. et al. Estudo sobre os incentivos tributários para o gerenciamento de resultados contábeis nas companhias abertas brasileiras. **Revista de Administração e Contabilidade da Unisinos - BASE**, v. 9, n. 1, p. 41-52, mar. 2012.

FRANCIS, J.; OLSSON, P.; SCHIPPER, K. Earnings quality. **Foundations and Trends in Accounting**, v. 4, n. 4, p. 259-340, 2008.

GUAY, W. R.; KOTHARI, S. P.; WATTS R. A market-based evaluation of discretionary accrual model. **Journal of Accounting Research**, v. 34, supl., p. 85-105, 1996.

HEALY, P. M. The effect of bonus schemes of accounting decisions. **Journal of Accounting and Economics**, v.7, p.85-107, abr. 1985.

HELLMAN, N. Soft adoption and reporting incentives: a study of the impact of ifrs on financial statements in Sweden. **Journal of International Accounting Research**, v. 10, n. 1, p. 61-83, 2011.

HERBOHN, K. Accounting for SGARAs: a stocktake of accounting practice before compliance with AASB 141 Agriculture. **Australian Accounting Review**, v. 16, n. 2, p. 62-76, 2006.

JENSEN, M.; MECKLING, W. H. Theory of the firm: managerial behavior, agency costs and ownership structure. **Journal of Financial Economics**, Amsterdã, v. 3, n. 4, p. 305-360, oct. 1976.

JONES, J. J. Earnings management during import relief investigations. **Journal of Accounting Research**, v. 29, n. 2, p. 193-228, oct., 1991.

KANG, S.; SIVARAMAKRISHNAN, K. Issues in testing earnings management and an instrumental variable approach. **Journal of Accounting Research**, Oxford, v. 33, n. 2, p. 353-367, 1995.

KOTHARI, S. P. Capital markets research in accounting. **Journal of Accounting and Economics**, v. 31, p. 105-231, 2001.

KROLL, J. C. Le nouveau plan comptable: les occasions perdues. **Économie Rurale**, v. 180, p. 20-25, 1987.

LEWIS, A. E.; JONES, W. D. Current cost accounting and farming businesses. **Journal of Agricultural Economics**, v. 31, n. 1, p. 45-53, 1980.

MACKENZIE, B. et al. **IFRS 2012: interpretação e aplicação**. Porto Alegre: Bookman, 2013.

MARTINEZ, A. L. Gerenciamento dos resultados contábeis: estudo empírico das companhias abertas brasileiras. 2001. 153 f. **Tese** (Doutorado em Ciências Contábeis) - Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo, São Paulo, 2001.

_____. Quando o conselho de administração e a auditoria evitam earnings management? Evidências empíricas para as empresas brasileiras. In: CONGRESSO USP DE CONTROLADORIA E CONTABILIDADE, 8., 2008, São Paulo. **Anais...** São Paulo, 2008.

NARDI, P. C. C. Gerenciamento de resultados contábeis e a relação com o custo da dívida das empresas brasileiras de capital aberto. 2008. 126f. **Dissertação** (Mestrado em Contabilidade) – Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo (FEA/USP), Ribeirão Preto (SP), 2008.

NARDI, P. C. C.; NAKAO, S. H. Gerenciamento de resultados e a relação com o custo da dívida das empresas brasileiras abertas. **Revista de Contabilidade e Finanças**, v. 20, n. 51, set./dez, 2009.

OHLSON, J. A. et al. A Framework for financial reporting standards: issues and a suggested model. **Accounting Horizons**, v. 24, n. 3, p. 471-485, 2010.

PAULO, E. Manipulação das informações contábeis: uma análise teórica e empírica sobre os modelos operacionais de detecção de gerenciamento de resultados. 2007. 269f. **Tese** (Doutorado em Contabilidade) – Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo, São Paulo, 2007.

PAULO, E.; CORRAR, L. J.; MARTINS, E. Detectando gerenciamento de resultados pela análise do diferimento tributário. In: ENCONTRO NACIONAL DOS PROGRAMAS DE PÓS-GRADUAÇÃO EM ADMINISTRAÇÃO (ENANPAD), 30., 2006, Salvador (BA). **Anais...** Salvador: ANPAD, 2006.

PIRES, A. M. M.; RODRIGUES, F. J. P. A. Necessidade de adaptar e ajustar a IAS 41 ao sector agrícola português. **Revista Universo Contábil**, v. 4, n. 1, p. 126-140, jan./mar. 2008.

PRICEWATERHOUSECOOPERS. Forest, paper & packaging, forest industry: application review of IAS 41, agriculture: the fair value of standing timber. 2009. Disponível em: <<http://www.pwc.com/gx/en/forest-paper-packaging/ias41>>. Acesso em: 6 fev. 2012.

RAMOS, G. M.; MARTINEZ, A. L. Governança corporativa. **Revista Contemporânea de Contabilidade**, v. 1, n. 6, p. 143-164, jul./dez. 2006.

RECH, I. J.; PEREIRA, I. V. Valor justo: análise dos métodos de mensuração aplicáveis aos ativos biológicos de natureza fixa. **Custos e @gronegocio on line**, v. 8, n. 2, abr./jun. 2012. Disponível em: <www.custoseagronegocioonline.com.br>. Acesso em: 31 dez. 2013.

SILVA FILHO, A. C. C.; MARTINS, V. G.; MACHADO, M. A. V. Adoção do valor justo para os ativos biológicos: análise de sua relevância em empresas brasileiras. **Revista Universo Contábil**, v. 9, n. 4, p. 110-127, 2013.

SILVA, R. L. M. **Adoção completa das IFRS no Brasil**: qualidade das demonstrações contábeis e o custo de capital próprio. 2013. 217 p. Tese (Doutorado em Ciências Contábeis) - Faculdade de Economia, Administração e Contabilidade, Universidade de São Paulo (USP), São Paulo (SP), 2013.

SILVA, R. L. M. et al. CPC 29: uma análise dos requisitos de divulgação entre empresa de capital aberto e fechado do setor de agronegócios. **Sociedade, Contabilidade e Gestão**, Rio de Janeiro, v. 8, n. 1, jan/abr 2013.

SODERSTROM, N. S.; SUN, K. J. IFRS adoption and accounting quality: a review. **European Accounting Review**, v. 16, n. 4, p. 675-702, 2007.

TEOH, S. H.; WELCH, I.; WONG, T. J. W. Earnings management and the long run underperformance of seasoned public offerings. **Journal of Financial Economics**, v. 50, p. 63-99, 1998.

TRIOLA, M. F. **Introdução à estatística**. 7. ed. Rio de Janeiro: LTC, 1998.

WATTS, R. L.; ZIMMERMAN, J. L. Positive accounting theory: a ten year perspective. **The Accounting Review**, v. 65, n. 1, p. 131-156, jan. 1990.

WHITE, H. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. **Econometrica**, v. 48, n. 4, p. 817-838, maio 1980.

WILLIAMS, B. R.; WILMSHURST, T. The achievability of sustainable reporting practices in agriculture. **Corporate Social Responsibility and Environmental Management**, v. 16, p. 155-166, mar. 2009.

ZÉGHAL, D.; CHTOUROU, S.; SELLAMI, Y. M. An analysis of the effect of mandatory adoption of IAS/IFRS on earnings management. **Journal of International Accounting, Auditing and Taxation**, v. 20, n. 2, p. 61-72, 2011.

APPENDIX

Firms	Disclosure Score	BM&FBovespa Segment	Preponderant valuation method adopted	If discounted cash flow, the discount rate used
Battistella	26	Traditional	Discounted Cash Flow	11.00% p.a.
Brasilagro	20	New Market	Discounted Cash Flow	Not identified
BRF Foods	32	New Market	Historical Cost	Does not apply
Ceece-D	16	Level 1	Market Value	Does not apply
Celul Irani	31	Traditional	Discounted Cash Flow	Not identified
Cosan	22	New Market	Discounted Cash Flow	Not identified
Ecodiesel	28	New Market	Discounted Cash Flow	Not identified
Encorpar	19	Traditional	Market Value	Does not apply
Eucatex	27	Level 1	Discounted Cash Flow	Not identified
Fab C Renaux	14	Traditional	Market Value	Does not apply
Ferbasa	26	Level 1	Discounted Cash Flow	8.85% p.a.
Fibria	21	New Market	Discounted Cash Flow	13.2% before income tax
Itaúsa	26	Level 1	Discounted Cash Flow	Not identified
JBS	35	New Market	Historical Cost	Does not apply
Karsten	11	Traditional	Discounted Cash Flow	Does not apply
Klabin S/A	35	Level 1	Discounted Cash Flow	Not identified
Marfrig	28	New Market	Historical Cost	Does not apply
Melhor SP	7	Traditional	Historical Cost	Does not apply
Metisa	14	Traditional	Market Value	Does not apply
Minerva	17	New Market	Market Value	Does not apply
Minupar	13	Traditional	Historical Cost	Does not apply
Randon Part	1	Level 1	Discounted Cash Flow	Does not apply
Rasip Agro	29	Traditional	Discounted Cash Flow	8.10% p.a.
Renar	23	New Market	Historical Cost	Does not apply
Sao Martinho	34	New Market	Discounted Cash Flow	Not identified
SLC Agricola	43	New Market	Discounted Cash Flow	9.00% p.a.
Suzano Papel	22	Level 1	Discounted Cash Flow	12.3% before income tax
Tereos	24	New Market	Discounted Cash Flow	Not identified
Trevisa	29	Traditional	Discounted Cash Flow	12.00% p.a.
Wembley	17	Traditional	Market Value	Does not apply
WLM	18	Traditional	Market Value	Does not apply

Table 8 – Firms in the sample and their information for the years 2010-2012.

Source: Prepared by the authors.

Note: The disclosure score was based on analysis of the notes to the financial statements regarding biological assets.