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Firm-specific determinants of agricultural financial reporting

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Abstract

This paper discusses agricultural financial reporting under International Accounting Standard (IAS) 41 – Agriculture of 181 worldwide listed firms that have adopted International Financial Reporting Standards (IFRS) until 2010. Due to the lack of importance of agriculture in global economy, accounting of this sector received little attention from researchers and regulators of accounting standards until the adoption of IAS 41. An index of the mandatory disclosure of biological assets is constructed and calculated based on the notes of financial statements included in 2011 annual report of this sample of firms. This study tests several hypotheses relating the index and the following variables – biological assets intensity, ownership concentration, size, auditor type and international stakeholders. The mandatory disclosure of biological assets is found to be influenced by biological assets intensity, ownership concentration and size. Being recognized as an interesting guide, IAS 41 is far from being consensual and continues on daily debate. This paper seeks to help standard setters to better understand disclosure practices and their determinants concerning biological assets and to develop future recommendations.

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1. Introduction

This study analyses disclosure practices required by International Accounting Standard (IAS) 41 – Agriculture based on the 2011 annual report for 181 listed firms in countries that have adopted International Financial Reporting Standards (IFRS) or equivalent standards until 2010.

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Bearing in mind a firm's financial position and performance, disclosure is a way of transferring economic, financial or non-financial, quantitative or qualitative information. "It is described as mandatory if companies are obliged under a disclosure regulatory regime to disclose insofar as they are applicable to them" (Owusu-Ansah, 1998:608).

Regarding mandatory disclosure, at a first glance, it may seem less reasonable to analyze it. Afterwards, if firms are obliged to answer to specific information, ideally, there would be no reasons to occur differences in disclosure reporting. "But in fact, even when disclosures are mandatory, researchers have found that firms still have some flexibility in the way they report the information" (Chavent, Ding, Fu, Stolowy, & Wang, 2006: 191). Moreover, the reason why firms voluntarily disclose is related to several theories, namely, stakeholder theory, agency theory, legitimacy theory and political economy theory. "Corporate disclosure is, however, subject to potential pressures from regulatory bodies" (Akhtaruddin, 2005:400). Also, there is a gap in the disclosure literature regarding the valuation implications of mandatory disclosure (Tsalavoutas & Dionysiou, 2011; Leuz & Wysocki, 2008).

On the topic of biological assets, before IAS 41 adoption, "current accounting principles typically do not respond very well to the particular characteristics of agricultural business and the information needs of farmers and their stakeholders" (Argilés & Slob, 2001:361). Considering disclosure practices of biological assets, and noticing that IAS 41 is much contested (Elad & Herbohn, 2011), the aim of this paper is to explore, essentially, the following research questions:

- What is the level of compliance by listed firms with the IFRS disclosure requirements on biological assets?
- What firm determinants could explain differences of IFRS disclosure compliance levels on biological assets among listed firms?

The paper is organized as follows. Section 2 provides literature review, describing IAS 41 and summarizing the debate on disclosure divergence in biological assets. Section 3 introduces the development hypotheses. Section 4 describes the methodology, explaining the sample and the disclosure index. Section 5 presents and discusses the findings from the empirical analysis. Finally, the paper closes with a brief conclusion.

2. Literature review

2.1. IAS 41

Due to the relative lack of importance of agricultural sector in global economy, accounting of this area received little attention from researchers and regulators of accounting standards until the implementation of IAS 41 (Fisher & Marsh, 2013; Fisher, Mortensen, & Webber, 2010; Herbohn & Herbohn, 2006).

This standard was originally issued in December 2000 and first applied to annual periods beginning on or after 1st January 2003. IAS 41 prescribes the accounting treatment for biological assets during the period of biological transformation and for the initial measurement of agriculture produce at the point of harvest. Other IFRSs have made minor consequential amendments to IAS 41. They include IAS 1 Presentation of Financial Statements (as revised in December 2003 and in September 2007), IAS 2 Inventories (as revised in December 2003), Improvements to IFRSs (issued in May 2008) and IFRS 13 Fair Value Measurement (issued in May 2011).

As a simple rule, IAS 41 requires that biological assets shall be measured on initial recognition and at subsequent reporting dates at fair value less costs to sell. This means a radical change from the traditional historical cost model (Elad & Herbohn, 2011; Lefter & Roman, 2007). Moreover, the single exception allowed is only applied on initial recognition and in singular conditions: a market-determined price is not available and the entity cannot assure a reliable estimate of fair value. In such position, the entity recognizes the biological assets at cost less depreciation and impairment. Furthermore, agriculture produce shall be measured at fair value less costs to sell at the point of harvest.

The disclosure required by IAS 41 comprise both financial and non-financial information that corresponds to mainly mandatory information and also some recommended information. "On the whole, the mentions concerning the notes from the annual financial statements form approximately 25% of the entire standard" (Lefter & Roman, 2007:20). Therefore, paragraphs 40–57 of IAS 41 cover mandatory information except paragraphs 43 and 51 that correspond to recommended information.

There is a limited scope project from IASB to consider an amendment to IAS 41 in relation to bearer biological assets (e.g. fruit trees, grape vines). Instead of using fair value as prescribed by IAS 41, a possible alternative is to measure these assets, once mature, under the cost model in accordance with IAS 16 Property, Plant and Equipment. An exposure draft is expected in the second half of 2013. The amendments to IAS 41 are expected to be finalized by the first quarter of 2014 and to have an effective date in 2015.

2.2. Disclosure divergence in biological assets

Argilés & Slof (2001) believe that IAS 41 introduces important improvements, such as definition, valuation and presentation of biological assets and agriculture produce with supportive classifications (mature and immature biological assets; consumable and bearer biological assets). They also defend that IAS 41 impact is mainly on a conceptual level and obliges additional tools for its practice. In fact, several authors (Silva, Figueira, Pereira, & Ribeiro, 2012; Elad & Herbohn, 2011; Aryanto, 2011; Fisher, Mortensen, & Webber, 2010; Argilés, Bladón, & Monllau, 2009; Argilés, 2007; Elad, 2007; George, 2007; Elad, 2004) raise the controversy about the “goodness” of fair value under IAS 41.

Prior literature presents several studies that evaluate the impact of IAS 41 implementation in different countries. Elad & Herbohn (2011), PriceWaterHouseCoopers (PWC) (2011 and 2009) and Silva, Figueira, Pereira, & Ribeiro (2012) are the following examples.

Elad & Herbohn (2011) have developed a survey concerning biological assets in three countries, France, United Kingdom and Australia. They concluded, as main lessons, that there is a lack of comparability of disclosure practices, the costs of measuring and reporting biological assets at fair value outweigh the benefits and that the fair value accounting model prescribed by IAS 41 increases the volatility of earnings. Nonetheless, Argilés, Bladón, & Monllau, (2009) claim that fair value adoption in agriculture allows more predictable earnings and consequently reduces agency problems, as managers are considered to be more responsible. Elad & Herbohn (2011) argue that there is a need for the IASB to revisit IAS 41. Another concern is the apparent need of the auditor to write an audit report about firm’s financial statements that claims “the reader’s attention to inherent uncertainties regarding the valuation of biological assets under IAS 41” (Elad & Herbohn 2011:107). As a matter of fact, in some cases, auditors and managers collide in disagreement.

PWC (2011 and 2009) has elaborated two international studies concerning the impact of IAS 41 adoption in timber sector. The main goal was to provide what might be considered to establish best practices in fair valuing of this sector and the related disclosures. Furthermore, PWC identified the major pronouncements described in the notes of the financial statements, underlining some of the principal constraints, comparisons and dissimilarities. Although disclosure of several firms brings information transparency to the users of financial statements, usually they do not discuss fair valuation assumptions, so there is an opportunity for further improvement. PWC (2011) recommends several practices in this field, namely: to present key valuation assumptions (such as the forest and harvest plans and the complexity of the structure of the asset); to discuss expected future prices and costs to better understand the valuation adopted; to provide a sensitivity analysis related to each weighty assumption used in the valuation that have an effect on the value in case of a change (such as discount rate, prices, costs and growth). Also, regarding Hooks & Staden (2011:211), firms interested in improving the quality of their reporting shall increase the amount of informative disclosure since “good quality score cannot be obtained with a limited number of sentences.”

Silva, Figueira, Pereira, & Ribeiro (2012) have developed a disclosure index concerning the information related to agricultural sector of Brazilian firms. The disclosure of the types of biological assets and the reconciliation of the carrying value of these changes are the most frequently reported items, but other items are neglected, such as management risks and other restrictions of biological assets. They concluded that the higher transparency level of disclosure helps to mitigate information asymmetry. As a consequence, stakeholders improve their understanding of biological assets’ activities.

3. Development of hypotheses

Due to the literature review, this study focuses on the following two research questions:

- What is the level of compliance by listed firms with the IFRS disclosure requirements on biological assets?
- What firm determinants could explain differences of IFRS disclosure compliance levels on biological assets among listed firms?

Taking into account a sample of 181 worldwide firms, the research model includes a disclosure index and explores several factors that are expected to be related with it, namely, biological assets intensity, ownership concentration, size, auditor type and international stakeholders.

Conceptually, several theories can explain firms' disclosure. Positive accounting theory supports the effort of explaining and predicting accounting practices, in this case related to biological assets. The main goal of positivist accounting research is to corroborate a specific accounting fact with related causal explanations (Luft & Shields, 2013:1). Although the results must be "replicable by other researchers in the same setting (...) and persuasive within a community of researchers", usually these explanations have implicitly a subjective decision.

In order to assure causality, there is a need to eliminate alternative causal explanations. Regarding Luft & Shields (2013), there are two possible ways of performing it. First, by providing credible evidence against other possible justifications. Second, by narrowing specification of context that reduces the number of alternative causal explanations. This study adopts the second way, electing firm-level segment which is explained as follows.

- Biological assets intensity

Considering other non-financial assets, such as goodwill impairment, firms have higher propensity to disclose when they have larger amounts of this asset (Amiraslani, Iatridis, & Pope, 2013; Heitzman, Wasley, & Zimmerman, 2010). Moreover, goodwill impairment requires valuation skills, so there is also a strong expectation that companies allocate more resources to improve quality report when they have a relative materiality position (Glaum, Schmidt, Street, & Vogel, 2012; Shalev, 2009). That could be the case of biological assets, given the complexity of measurement and disclosure practices. Another example is the disclosure level of provisions, which is "a rational consequence of application of the materiality principle" (Chavent, Ding, Fu, Stolowy, & Wang, 2006:188).

Bearing in mind stakeholder theory, Silva, Figueira, Pereira, & Ribeiro (2012) expect that the preparers of financial reporting of biological assets assure compliance with disclosure regulated by IAS 41 in order to provide information to users of such financial statements. This statement increases significance if firms have material amounts of biological assets.

The above considerations indicate an expected positive sign for the relation.

H1: There is a significant positive association between biological assets intensity and the extent of mandatory disclosure concerning biological assets.

- Ownership concentration

Firms' reporting incentives are influenced by ownership structure (Glaum, Schmidt, Street, & Vogel, 2012; Leuz, 2010). Bearing in mind that agency problems arise because of the separation of ownership and control (Jensen & Meckling, 1976), agency costs rise as ownership structure becomes more dispersed (Fama & Jensen, 1983). In order to decrease agency costs, companies with higher ownership diffusion have stronger incentives to provide transparent financial reporting (Oliveira, Rodrigues, & Craig, 2006).

Also, IAS are settled to assure information to shareholders, to decrease information asymmetry between managers and external users and to enhance disclosure transparency (Ding, Hope, Jeanjean, & Stolowy, 2007). Firms that are controlled by several investors, higher demand for public disclosure may lead to higher incentives for compliance as well (Daske, Hail, Leuz, & Verdi, 2013).

The above considerations indicate an expected negative sign for the relation.

H2: There is a significant negative association between ownership concentration and the extent of mandatory disclosure concerning biological assets.

- Size

Some studies indicate firm size as a determinant of compliance with reporting standards (Amiraslani, Iatridis, & Pope, 2013; Glaum, Schmidt, Street, & Vogel, 2012; Oliveira, Rodrigues, & Craig, 2006). Glaum, Schmidt, Street, & Vogel (2012:45) demonstrate that "larger companies tend to have more resources designated to accounting

departments than smaller companies, allowing for a higher quality of financial reporting”. Depoers (2000) has confirmed this argument. Also, costs of increased disclosure are well supported by firms with higher dimension (Amiraslani, Iatridis, & Pope, 2013).

Larger firms are likely to have a greater percentage of outside capital and also enlarged agency costs (Jensen & Meckling, 1976) and then, are required to assure a more developed level of information to stakeholders, especially financial analysts (Depoers, 2000).

The above considerations indicate an expected positive sign for the relation.

H3: There is a significant positive association between size and the extent of mandatory disclosure concerning biological assets.

- Auditor type

Auditing is an effective function of restraining managers’ opportunistic reporting conduct (Tsalavoutas, 2011). Consequently, and regarding agency theory, independent auditors reduce agency costs (Jensen & Meckling, 1976). Watts & Zimmerman (1983:615) emphasize that it is possible “(...) only if the market expects the auditor to have a nonzero level of independence”. Committees and penalties, including reputation loss, are some of the incentives for auditors to assure their independence. To avoid reputation costs, these firms demand higher levels of disclosure (Oliveira, Rodrigues, & Craig, 2006; Chalmers & Godfrey, 2004).

Furthermore, prior literature explains the strength of enforcement of accounting standards by the existence of stronger audit firms (Hope, 2003). The larger is the audit firm, the higher is its perceived quality (DeAngelo, 1981). Several studies reveal a positive association between compliance and being audited by the Big 4 auditing firms (Glaum, Schmidt, Street, & Vogel, 2012; Cascino & Gassen, 2011; Hodgdon, Tondkar, Adhikari, & Harless, 2009).

The above considerations indicate an expected positive sign for the relation.

H4: There is a significant positive association between auditor type and the extent of mandatory disclosure concerning biological assets.

- International stakeholders

Disclosure level is positively related with the degree of foreign activity of the firm (Daske, Hail, Leuz, & Verdi, 2013; Amiraslani, Iatridis, & Pope, 2013). Managers of firms that operate in several geographical areas have to provide larger disclosure, bearing in mind higher complexity of the firm activities (Cooke, 1989).

Due to signaling theory, international trading activities imply large and complex amount of information to control, and consequently, influence firms to express their international position to stakeholders, by improving disclosure (Oliveira, Rodrigues, & Craig, 2006; Depoers, 2000).

The above considerations indicate an expected positive sign for the relation.

H5: There is a significant positive association between international stakeholders and the extent of mandatory disclosure concerning biological assets.

Regarding the independent variables introduced above, their measurement, the hypotheses and the expected signals are described in the following table. The data was collected in Data Stream.

Table 1. Hypotheses, variables’ proxies and expected signals

Hypotheses	Proxies	Expected signals
Biological assets intensity	BA – Biological assets (WS18277) divided by total assets (WS02999)	Positive
Ownership concentration	HELD – Closely held shares (WS05474) divided by common shares outstanding (WS05302)	Negative
Size	SIZE – Natural logarithm of the number of employees (WS07011)	Positive
Auditor type	AUD – Binary variable based on whether the auditor is a Big 4 firm (WS07800)	Positive
International stakeholders	INT – Percentage ratio of foreign sales (WS08731)	Positive

Biological assets intensity corresponds to a ratio between biological assets and total assets. This measure identifies which firms have a relatively material proportion of biological assets.

Ownership concentration is a ratio between the number of closely held shares (that represents shares held by insiders) and the common shares outstanding (that represents the most recent common shares outstanding available in the database, which is the difference between issued shares and treasury shares).

Prior literature measures size in several different ways. In this study, size corresponds to the logarithm of the number of employees. The number of employees is an alternative to a more commonly size proxy used, total assets, since there is another independent variable in this study, biological assets intensity, which relates biological assets with total assets.

Type of auditor is a dummy variable coded 1 for clients of Big 4 auditing firms and 0 otherwise. In 2011, Big 4 auditors are PWC, Deloitte Touche Tohmatsu, Ernst and Young and KPMG.

Finally, international stakeholders correspond to a ratio between foreign sales and total sales.

4. Methodology

4.1. Sample

To examine the potential associations between mandatory disclosure of biological assets and firm determinants, this study explores disclosures by listed firms covering biological assets during the period of 2011. IFRS 1 – First-time Adoption of International Financial Reporting Standards allows some exemptions and exceptions which may cause some constraints to analyze and make inferences about the information of the year of adoption (Gastón, García, Jarne, & Láinez Gadea, 2010). Consequently, 2010 should be the limit year to consider firms with IFRS (or equivalent standards) adoption.

The data was collected in Data Stream. First, countries that have adopted IFRS until 2010 were selected and then the same was done regarding firms that have biological assets, by following the variable WS18277 biological assets – NBV. This worldwide item from Data Stream represents the net book value of living animals or plants, such as sheep, trees and vines. This field is used when biological assets are reported outside of current assets or when the company has adopted an unclassified balance sheet. The result was 181 firms from several countries and different sectors, but 7 of them do not have an available 2011 annual report, so the effective number of analyzed firms is 174. When not available in DataStream, there was an effort to find information in the annual report to mitigate the effect of missing information in this study.

4.2. The disclosure index

Based on prior research (Santos, Ponte, & Mapurunga, 2013; Lopes & Rodrigues, 2007; Oliveira, Rodrigues, & Craig, 2006; Akhtaruddin, 2005; Owusu-Ansah, 1998; Inchausti, 1997), this study includes a disclosure index as a dependent variable.

The index is constructed based on the disclosures required by IAS 41 and calculated with the notes of consolidated financial statements included in 2011 annual reports of this sample of firms. “Although there are several ways of communicating company information, such as interim reporting, press releases, letters, etc., the annual report is still considered the major medium disclosing information” Akhtaruddin (2005, 407).

Three categories compose this index: mandatory items, non-mandatory but recommended items and non-mandatory and non-recommended items. The first and the second classifications cover all disclosure items required by IAS 41. The last category corresponds to voluntary information that signifies firms exceed the mandatory information. Given the intrinsic complexity of biological assets fair-value valuation, non-mandatory and non-recommended items are only applicable to firms that measure biological assets at fair value. This third classification is constructed according to PWC (2011). Three topics are identified as followed by their clients in disclosure practices, where timber sector is concerned, namely: to reveal the complexity of valuation parameters although there is limited information regarding the effect on the valuation; to provide more information on the effects of variations in key valuation factors; to expose firm assumptions on future prices and costs, as well as disclosing a sensitivity

analysis with multiple parameters. The items selected for inclusion in the disclosure index and the results are shown in Table 3.

Based on the literature concerning this research topic (Santos, Ponte, & Mapurunga, 2013; Lopes & Rodrigues, 2007; Owusu-Ansah, 1998), the disclosure index is dichotomous, unweighted and adjusted for non-applicable items. First, a score of 1 is assigned to an item if it is disclosed, and a score of 0 otherwise, which means that the index is dichotomous. The maximum number of items is 40. Second, each item is equally important for all three categories. Though the “weighted approach (...) allows distinctions to be made for the relative importance of information items to the users (Inchausti, 1997:49)”, here the assumption is that an unweighted approach will result in a minor bias, because the effort of the index relies in all three categories. Finally, the index follows a tolerant criterion (Santos, Ponte, & Mapurunga, 2013) and covers the applicability of any item to each firm. It excludes the items when there is no information in notes about one disclosure item of IAS 41.

Consequently, the total score of the mandatory disclosure index for biological assets (Index) for a firm is:

$$Index_i = \frac{\sum_{i=1}^m d_i}{m} \tag{1}$$

where $d_i = 0$ or 1 , as follows: $d_i = 1$ if the item is disclosed and $d_i = 0$, otherwise; $m =$ maximum number of applicable items a firm may disclose.

5. Results

5.1. Descriptive analysis

Table 2 presents the descriptive statistics for the variables employed in the paper. There is a wide range in the disclosure index (Index) in the sample. The highest disclosure score obtained is 1 and the lowest is 0. The mean disclosure score is 55.76 (median = 58.58). The average biological assets intensity (BA) is 9,94% but the median is less than 3,19% and this variable lists a maximum of 95,38%. The ownership concentration (HELD) mean is 52,59% (median = 59,35%) and registers a maximum of 99,24%. Regarding size (LOG(SIZE)) and international stakeholders (INT), even though some observations are collected in annual reports when DataStream have no information, these are the independent variables with more missing values ($n = 134$ and $n = 156$, respectively). Finally, the majority of the sample of firms (76,4%) is audited by a Big 4 auditing firm (AUD).

Table 2. Descriptive statistics

	Index	BA	HELD	LOG(SIZE)	INT
Mean	0.557626	9.938755	52.59341	7.650665	52.90481
Median	0.585784	3.187514	59.34500	7.636502	45.43000
Maximum	1.000000	95.38257	99.24000	11.79582	883.6600
Minimum	0.000000	0.000380	0.010000	3.258097	0.000000
Std. Dev.	0.213211	15.47654	28.79678	1.912940	77.85802
Observations	174	174	170	134	156

AUD	Frequency	Percent
0	41	23.6
1	133	76.4

Table 3 summarizes, by disclosure item, the number of firms that disclose biological assets information. The most frequently reported items are: “A reconciliation of changes in the carrying amount of biological assets between the beginning and the end of the period” ($n = 157$; parag.50); “This reconciliation includes desegregation” ($n = 155$;

parag.50); and “A description of each group of biological assets” (n = 139; parag.41). This evidence is consistent with prior literature (Silva, Figueira, Pereira, & Ribeiro, 2012) for Brazilian firms. The least reported items are: “The range of estimates within which fair value is highly likely to lie” (n = 1; parag.54); and “This information is presented by group of biological assets” (n = 3; parag.51).

Mandatory items are the most frequently reported (mean = 54,92%; 26 items), closely followed by non-mandatory and non-recommended items (mean = 54,33%; 3 items), and non-mandatory but recommended items (mean = 24,25%; 4 items). These findings suggest that there is an opportunity for additional enhancement of biological assets disclosure, as concluded by PWC (2011) for the timber sector.

Table 3. The disclosure index of the sample of firms

Paragraphs IAS 41	Score (if disclosed)	Disclosure index	Number of firms
<i>Mandatory items – the entity discloses,</i>			
40		An aggregate gain or loss arising during the period:	
40	1	On initial recognition of biological assets	13
40	1	On initial recognition of agriculture produce	5
40	1	Related to change in fair value less costs to sell of biological assets	122
41	1	A description of each group of biological assets	139
42	1	The description of paragraph 41 is narrative	117
42	1	The description of paragraph 41 is quantified	115
46	1	A description of the nature of an entity's activities with each group of biological assets	87
46		A description of non-financial measures or estimates of physical quantities:	
46	1	Of assets on hand at the end of the period	105
46	1	Of agriculture produce output during the period	40
47	1	The methods and assumptions applied in determining the fair value of each group of agricultural produce at the point of harvest and each group of biological assets	80
48	1	The fair value less costs to sell of agricultural produce harvested during the period, determined at the point of harvest	59
49	1	The information about biological assets whose title is restricted or that are pledged as security	26
49	1	The amount of commitments for development or acquisition of biological assets	20
49	1	The financial risk management strategies related to biological assets	34
50	1	A reconciliation of changes in the carrying amount of biological assets, between the beginning and the end of the period	157
50	1	This reconciliation includes desegregation	155
<i>Additional disclosures when fair value cannot be measured reliably</i>			
54		The entity measures biological assets at their cost less any accumulated depreciation and any accumulated impairment losses – <i>the entity discloses,</i>	
54	1	A description of the biological assets	25
54	1	An explanation of why fair value cannot be measured reliably	33
54	1	The range of estimates within which fair value is highly likely to lie	1
54	1	The depreciation method used	19
54	1	The useful lives or the depreciation rates used	22
54	1	The gross carrying amount and the accumulated depreciation (aggregated with accumulated impairment losses) at the beginning and end of the period	21
55	1	Gain or loss recognized on disposal of such biological assets	5
55	1	Impairment losses, in case of disposal	0

Paragraphs IAS 41	Score (if disclosed)	Disclosure index	Number of firms
55	1	Reversals of impairment losses, in case of disposal	0
55	1	The depreciation, in case of disposal	9
56		The fair value of biological assets previously measured at cost less any accumulated depreciation and impairment losses become reliably measurable during the current period - <i>the entity discloses,</i>	
56	1	A description of the biological assets	0
56	1	An explanation of why fair value has become reliably measurable	0
56	1	The effect of the change	0
57		Government grants – <i>the entity discloses,</i>	
57	1	The government grants and	14
57	1	The nature and extent of government grants recognized in the financial statements	5
57	1	Unfulfilled conditions and other contingencies attaching to government grants	0
57	1	Significant decreases expected in the level of government grants	0
		<i>Non-mandatory but recommended items – the entity discloses,</i>	
43		A quantified description of each group of biological assets, distinguishing between:	
43	1	Consumable and bearer assets	29
43	1	Mature and immature assets	54
51	1	The amount of change in fair value less costs to sell included in profit or loss due to physical changes and due to price changes	11
51	1	This information is presented by group of biological assets	3
		<i>Non-mandatory and non-recommended items – the entity discloses,</i>	
NA	1	The complexity of various parameters but there is limited information regarding the effect on the valuation	88
NA	1	More information on the effects of variations in key factors	46
NA	1	The assumptions on future prices and costs, as well as disclosing a sensitivity analysis with multiple parameters	29

40

5.2. OLS regression model

Regarding the following OLS regression model, three independent variables are statistically significant, namely, biological assets intensity, ownership concentration and size (Table 4).

$$Index_i = b_0 + b_1BA + b_2HELD + b_3LOG(SIZE) + b_4AUD + b_5INT + u_i \quad (2)$$

H1, which states that biological assets intensity is positively related with mandatory disclosure, is supported by the results. This finding is consistent with other non-financial assets, such as goodwill impairment (Amiraslani, Iatridis, & Pope, 2013; Heitzman, Wasley, & Zimmerman, 2010; Glaum, Schmidt, Street, & Vogel, 2012; Shalev, 2009) and provisions (Chavent, Ding, Fu, Stolowy, & Wang, 2006).

Regarding H2, that expects mandatory disclosure is related with ownership concentration, the coefficient is statistically significant but the effective signal is positive. Depoers (2000) also rejects the influence of this variable on voluntary disclosure in the French context.

H3, which suggests size is positively related with mandatory disclosure, is supported by the results. This finding is consistent with prior literature (Amiraslani, Iatridis, & Pope, 2013, Glaum, Schmidt, Street, & Vogel, 2012; Oliveira, Rodrigues, & Craig, 2006; Depoers, 2000).

H4 and H5 state, respectively, the auditor type and the international stakeholders are positively related with mandatory disclosure but are not supported by the model. Neither are the coefficients statistically significant nor the expected signals are effective. In the case of the auditor type, the result is probably related to the fact that the majority of firms are audited by a Big 4 auditing firm, so the variable has little exploratory power. In the case of international stakeholders, Oliveira, Rodrigues, & Craig (2006) also reject that the extent of voluntary disclosure of intangibles information is positively related to the internationalization of the firm, which was measured by the same variable.

Table 4. OLS regression

Dependent Variable: INDEX				
Method: Least Squares				
Sample (adjusted): 1 172 Included observations: 118 after adjustments				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.279754	0.081495	3.432756	0.0008
BA	0.006613	0.001203	5.498187	0.0000
HELD	0.001467	0.000595	2.466761	0.0151
LOG(SIZE)	0.023283	0.009951	2.339872	0.0211
AUD	-0.010639	0.045149	-0.235640	0.8141
INT	-0.000414	0.000438	-0.943610	0.3474
R-squared	0.274455	Mean dependent var		0.569252
Adjusted R-squared	0.242065	S.D. dependent var		0.204787
S.E. of regression	0.178287	Akaike info criterion		-0.561338
Sum squared resid	3.560050	Schwarz criterion		-0.420456
Log likelihood	39.11895	Hannan-Quinn criter.		-0.504136
F-statistic	8.473347	Durbin-Watson stat		1.936927
Prob(F-statistic)	0.000001			0.569252

The correlations between independent variables are presented in table 5. International stakeholders are negatively correlated with ownership concentration at 1% level of significance and positively correlated with size at 5% level of significance. The results also show that size is negatively correlated with biological assets intensity, at 10% level of significance. Since there are no are highly correlated variables, all variables are maintained in the model.

Table 5. Pearson correlation

Covariance Analysis: Ordinary				
Sample (adjusted): 1 172 Included observations: 118 after adjustments				
Balanced sample (listwise missing value deletion)				
	BA	HELD	LOG(SIZE)	INT
BA	1.000000			

HELD	0.018218	1.000000		
	0.8448	-----		
LOG(SIZE)	-0.160179	-0.129195	1.000000	
	0.0832	0.1632	-----	
INT	0.143121	-0.259267	0.209936	1.000000
	0.1221	0.0046	0.0225	-----

6. Conclusions, limitations and suggestions for future research

Regarding the recent debate concerning IAS 41, this study examines the impact of five firm determinants on mandatory disclosure of biological assets. Biological assets intensity and size have significant positive impact on mandatory disclosure practices which is supported by stakeholders and agency theories. Surprisingly, ownership concentration has significant positive impact on mandatory disclosure practices.

There are several limitations to this study. Firstly, there is a subjectivity problem inherent to the disclosure index construction and calculation. For example, to decide which paragraphs of IAS 41 should be grouped and represent one index item; to decide if an item is applicable or not to a specific firm. Secondly, other potential firm determinants were not considered in this study, such as, sector and listing status. Furthermore, in this sample there are firms that measure biological assets at fair value and there are others that use fair value unreliability clause for biological assets. Another possible research might be considering only the firms with fair-value valuation and analyze their disclosure practices.

Additionally, taking into account that this study focuses the causality explanation in a specific segment – firm-level determinants – the obtained results are not able to make inferences about other contexts. “Evidence of the importance of individual-level variables is not by itself evidence against the importance of culture or vice versa. Individual-level studies often hold culture constant and thus provide no evidence about effects of cultural variation” Luft & Shields (2013:8). Consequently, future research on this area could follow context/environmental determinants, such as legal origin.

Finally, this paper has several implications to different users. The goal is to stimulate awareness among the standard setters concerning the biological assets disclosure constraints, that relates to firms with less dimension and firms where biological assets do not represent the core business. In return, stakeholders who are focused on large firms and firms with high biological assets intensity will benefit the most, since these firms register high level of disclosure index. Regarding agricultural firms, this paper states the need to comply with the disclosures required by IAS 41.

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