

COMPETITIVE HARM AND BUSINESS SEGMENT REPORTING UNDER IFRS 8: EVIDENCE FROM EUROPEAN UNION LISTED FIRMS

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ABSTRACT

Under IFRS 8, firms' should provide financial segment disclosures that enable investors to assess the different sources of risk and income as management does. This sensitive information would also be available for competitors. The potential competitive harm may incentive firms to withhold segment information. However, the IASB believe that segment disclosure would improve. We aim to study the influence of competitive harm on the level of segment disclosures under IFRS 8 using a large sample of firms from EU. Empirical tests to our competitive harm model estimate the effect of three competitive harm proxies: abnormal profitability, industry concentration and labor power. The results showed a significant increase on the number of reportable business segments, but less significant for the number of key items. Estimation of the model, in pre and post period of IFRS 8 adoption, revealed that firms over performing their industry, operating in more concentrated industries and subject to higher labor power are still related to lower levels of segment disclosure on both periods. Furthermore, the results of the “change model2 showed that firms previously associated to abnormal profitability and labor power are statistically more related to the “no change” category than to the category representing firms that increased their disclosure. Overall the results seem to suggest that IFRS 8 had a low or a null effect in reducing non-disclosure due to proprietary costs motivations.

1. INTRODUCTION

Segment reporting, on annual financial statements, is considered as one of the most relevant financial information for allowing investors and other interested parties, to access firms' activities and desegregated performance. Several studies documented the importance of segment reporting in improving earnings prediction, risk assessment and general analysts' forecasts (e.g. Ajinkya, 1980;

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Baldwin, 1984; Hope et al., 2008). However, if segment reporting permits an improved inside view to how firms' activities contribute to global performance, these entities face also a higher exposure to competitors. Concerns of competitive harm, from the disclosure of segment data, were frequent on responses to segment standards in the past and are still documented nowadays (IASB, 2013b). Therefore, the disclosure of proprietary information could likely have an effect on loss of competitiveness. This could be higher, for example, for firms showing abnormal profitability (to industry), operating in more concentrated industries or subject to powerful suppliers, which work as incentives for managers' decisions to not, fully, desegregate their operations through business reportable segments. For this reason, the effect of competitive harm on segment disclosure has been studied since the first requirements of segment reporting and is considered a main issue within the proprietary costs theory (e.g. Hayes and Lundholm, 1996; Harris, 1998). Recently, the adoption of IFRS 8 in European Union (EU) was followed by some controversy. The IASB new standard was aligned with North American SFAS 131 and adopted the management approach, which states that external segment reporting should follow the same structure of the internal report reviewed periodically by the chief operating decision maker (CODM). Thus, this approach would improve external users to analyze firms' performance through the eyes of management. Recent published papers (e.g. Nichols et al., 2012; Crawford et al., 2012), on segment reporting under IFRS 8, are essentially descriptive and based on measuring quantitative segment disclosures and in comparison to the same disclosures made under IAS 14R. Although its relevance, competitive harm influence on segment disclosure is yet to be estimated under the new requirements and consists in an important field of research to assess IFRS 8 effect on this issue. Pisano and Landriani (2012) only examined the influence of one competitive harm proxy (industry concentration) and with a small sample of Italian listed firms. Therefore, our main objective is to estimate, if the relationship of competitive harm and lower segment reporting still persists with IFRS 8 adoption, using a larger sample and a more complete empirical model. We used segment data collected from Worldscope database and a sample of 1997 non-financial listed firms from 13 countries. Our empirical research was divided in three research questions. First, we performed a descriptive analysis on business segment reporting presented on the new and previous standard, detecting significant changes. Secondly, we test for the persistence of competitive harm in the last period of IAS 14R, using three main proxies, abnormal profitability, industry concentration and labor power. If previous literature confirmed the practice of discretionary disclosure on segment reporting due to the influence of competitive harm, this evidence is based on financial data provided by firms more than a decade ago. Finally, in the third research question we apply the same model for segment disclosures under IFRS 8 and in order to estimate if this relationship still persists. In addition we estimate a multinomial regression model (change model) to check if firms that changed their levels of business segmentation, were those likely under the previous

negative influence of competitive harm. Results of t-tests for mean comparison evidenced a significant increase in the number of reportable segments, with a general decline in single-segment firms. Evidence on the disclosure of key items was mixed and a significant decline was documented in the average number of items, disclosed by each multi-segment firms. The majority of sample firms did not change their level of business segment disclosure. The estimation of the competitive harm model revealed an overall negative relationship between all competitive harm proxies and the level of business segment disclosure on both periods of analysis. In general, results suggest that, under IFRS 8, EU firms performing better than industry mean, acting in more concentrated industries or subject to a higher pressure from labor suppliers, are still withholding important segment information to investors and other users, especially due to concerns on competitive harm. The results, for the multinomial regression model analyzing how the different categories of change are associated to previous non-disclosure due to competitive harm, showed that firms, where the number of business segments grew, were significantly less related to abnormal profitability and labor power, than firms that did not change. We also documented a significant association to abnormal profitability growth on firms that declined their level of business items per segment. Overall, evidence suggests that the new standard had a null effect (or of lower significance) in reducing such relation, while on the other hand, comments to the post-implementation review of IFRS 8 are concerned on the persistence of segment aggregation.

2. BACKGROUND AND HYPOTHESES DEVELOPMENT

2.1. IFRS 8: The Adoption of the Management Approach by the IASB

As a result of the joint convergence project with the FASB, in November 2006, the IASB issued IFRS 8 - "Operating Segments" that would definitively replace IAS 14R on firms adopting IAS/IFRS in the periods beginning on or after 1 January 2009 (IFRS 8, §35). With the new international segment reporting standard, the "risks and returns approach" for identifying firms' external structure of segmentation was replaced by the "management approach" as described in the north-American SFAS 131. Its basis is generically defined in the §5 of IFRS 8 that establishes as primary source of segmentation, the same format used in the internal reporting system regularly reviewed by the entity's CODM. The reportable segments referred as "Operating Segments" should allow investor to access firms' performance "through the eyes of management". Despite several concerns, the IASB adopted the "management approach" stating, among other reasons, that this approach would enable users to see the entity as management does or, that firms under this approach showed greater number of reported segments and provided a higher quantity of segment information. The IASB based its decision in the fact that most comments to the exposure draft were in favor of the new standard and also, in the

findings from academic studies, such as Street et al. (2000) and Street and Nichols (2002) that, respectively, analyzed SFAS 131 and IAS 14R implementation.

Our research is based on a sample of EU firms. The endorsement of IFRS 8 in EU was a controversial process, with many positions against or concerned in the use of the management approach. The Committee on Economic and Monetary Affairs (ECON) of the European Parliament (EP) expressed their concerns on the adoption of IFRS 8 in Europe and opposed the standard, calling the European Commission (EC) to urgently carry out a study to its potential impact before endorsing the standard (EC, 2007). One of those concerns stated that the new approach would permit firms to define operating segments as management finds suitable (discretionary disclosure) and which furthermore requires less mandatory disclosure on line of items². The EC conducted a public consultation on the endorsement of IFRS 8 and in September 2007 released its conclusions on the report “Endorsement of IFRS 8 Operating Segments: Analysis of Potential Effects”. The report documented that the majority of consultants were in favor of IFRS 8 and a positive cost-benefit relation should be expected. The EC report leded, on the November 2007, to the adoption of IFRS 8 in EU for the year 2009. EU firms should then, identify their operating segments in accordance with IFRS 8. This should be the main basis of firms’ external segment reporting, which may include also segment information at a secondary level and defined as “entity-wide disclosures”. Recently the IASB conducted their first post-implementation review, which related to IFRS 8 adoption analysis. The main results are presented in the literature review section.

2.2. Literature Review

The first studies, after the adoption of a segment reporting standard, were usually focused on a quantity analysis to the new segment disclosures and to the magnitude of changes. Studies like Street et al. (2000), Hermann and Thomas (2000) or Berger and Hann (2003) documented changes on segment reporting with the introduction of SFAS 131 “management approach”. Results showed a significant increase on the average number of reported segments, with a decline on single-segment firms. Most studies also documented an upgrade in the number of key items, but revealed concerns on the increase differences in the disclosed profit measures. Studying the implementation of IAS 14R, similar results were detected by Street and Nichols (2002) and Prather-Kinsey and Meek (2004) for the increase in the number of reported segments and in the number of disclosed items. These papers

² The number of items, to be disclosed by each reportable segment, is almost the same on both standards (IAS 14R and IFRS 8). However, concerns were raised on the potential decline of items disclosure, essentially due to the fact that most of requirements are only mandatory if those items are regularly reported internally to CODM. In addition, there were some concerns that firms could manage their internal reports in order to avoid external disclosure (e.g. EP, 2007).

identified however that, a significant part of the firms, still presented an important level of non-compliance. Recently the focus of research was centered in the implementation of IFRS 8 and findings on the effect of the new standard are discussed later on. After some maturity in standards adoption, investigators focus their attention to achieve evidence on the economic effects of the new segment disclosures, which is normally identified as a different stream of research. Most literature covered the effect of segmenting reporting standards in the US and almost found that the new segment information improving analysts' predictions (e.g. Nichols, 1995; Behn et al., 2002; Hope et al., 2008; Hope et al., 2009). Empirical models confirmed that new segment reporting produced changes in analysts and market expectations (Berger and Hann, 2003; Ettredge et al., 2005).

Despite analyzing the effect of a new standard, researchers are equally concern on the practice of discretionary disclosure. Since segment reporting increases the exposure of firms' activities and their performance to the market, managers may be motivated for conditioning segment disclosures to avoid agency costs and proprietary costs. This increased exposure may, for example, result in higher monitoring from shareholders (e.g. Berger and Hann, 2003) or in higher competitive harm (e.g. Harris, 1998). Thus, historically this has been, also, an important stream of research that is yet to further explore under the adoption of IFRS 8. Aligned with our objective of research we detail previous literature on competitive harm and segment reporting in a specific section.

Literature Review of Changes in the Level of Segment Reporting with IFRS 8

In July 2013, the IASB published a report and feedback statement of its post-implementation review to IFRS 8. This report included the results from an extensive review of academic research and similar literature to date. Nichols et al. (2012) paper was pointed as the most relevant cross-country published study and examined IFRS 8 adoption on blue chip firms from 14 European countries (335 firms). The others published papers were based on a single country analysis. Crawford et al. (2012) examined IFRS 8 adoption on UK firms, Kang and Gray (2013) on the Australian firms, Mardini et al. (2012) on the Jordanian firms and finally Pisano and Landriani (2012) examined segment reporting on Italian firms. Relevant working papers were also analyzed and we may find studies with significant larger samples, as in the case of Bugeja et al. (2012), which analyzes changes on segment reporting of 1.617 Australian firms. There were also some working papers trying to link the new segment disclosures and to their effect on capital markets (e.g. information asymmetry, value relevance or analysts forecast accuracy) (IASB, 2013a). Recently, Nichols et al. (2013) published a paper reviewing literature of segment reporting under the adoption of the "management approach" of SFAS 131 and IFRS 8. The conclusions of research on IFRS 8 are in line with those analyzed in the post-implementation review. Non-academic research was also discussed on the IASB, as is the case of the European Securities and

Markets Authority (ESMA), which in 2011 published the report “Review of European enforcers on the implementation of IFRS 8 – Operating Segments”. The report covers the analysis of financial statements from 118 firms of 9 European countries.

Results from Nichols et al. (2012) showed that, in almost all analyzed countries, the number of reportable segments increased on the primary format of report. Total average increased from 3,84 to 4,19 segments per firm and the t-tests revealed that average change was statistically significant. However, if this positive change was related to 27% of sample firms that increased their number of segments, the magnitude of such change was attenuated by a documented decline on 11% of firms. The majority of firms did not change their number of segments, which was also the general evidence on other studies. Results from Crawford et al. (2012) on UK listed firms confirmed the overall increase on reported segments mean. The mean on the number of segments increased on all typologies of segments with business segmentation showing a significant increase for a 5% level of significance. The average on business segmentation increased from 3,30 to 3,56 segments per firm. Pisano and Landriani (2012) documented on Italian listed firms that the average of reportable segments faced a minor increase from 3,71 to 3,85 segments per firm. In fact, 75% of the sample did not change their number of reportable segments. Kang and Gray (2013) or Mardini et al. (2012) also achieved evidence of an increase on reportable segments of Australian and Jordanian firms, respectively. In comparison with the impact of the management approach in the US (SFAS 131 adoption), IFRS 8 studies show a larger percentage of firms that did not change, which could be attributed to the fact that many of these firms already adopted the management approach under the suggestion of IAS 14R (Nichols et al., 2013). Equally, the potential enforcement on IAS 14R adoption, in the last years, could have resulted in the consistently improvement of segment reporting. Hence, the expected benefits of adopting the management approach, could already, have been partially materialized with the application of IAS 14R (Nichols et al., 2013).

One of the main objectives of segment reporting standard-setters was the reduction of firms that stated to be single-segment and therefore did not present any desegregation of segment information. In general, the papers addressing this question found a decline on single-segment firms and normally of low impact (IASB, 2013a). The research of Nichols et al. (2012) evidenced a decline from 23 to 20 single-segment firms with IFRS 8 adoption. The lower documented effect may be associated to the characteristics of the sample that in most cases was based on larger listed firms and thereby less likely to be single-segment. For example, using a larger sample of Australian firms (1.617) Bugeja et al. (2012) identified a more representative decline (of 12%) in the number of single-segment firms. Nevertheless, ESMA (2011) reported that analysts considered that firms still minimize the number of

reportable segments in the notes of financial statements, through aggregation, in order to avoid providing meaningful information.

“When IFRS 8 was issued, some investors were concerned that key segment information would not be reported unless it was regularly reviewed by the CODM” (IASB, 2013:19a). Confirming these concerns, Nichols et al. (2012) found a significant decrease on the average number of reported items on the primary format of report. The majority of required items faced a decrease on their number, with a statistical significant decline on the disclosure of segment liabilities, equity method income and equity method investment, and also capital expenditures. In contrast, new items mentioned in IFRS 8, like interest revenue and interest expense showed an increase, which was however less significant. Similar results are provided by Crawford et al. (2012) on UK listed firms. On the other hand, Kang and Gray (2013) and Pisano and Landriani (2012) documented an increase on average number of items per segment. Globally, the evidence is mixed, with many studies showing a decrease on a relevant part of required items. For example, working papers like Bugeja et al. (2012) and Weissenberger and Franzen (2012) showed that under IFRS 8 the Australian and German firms reported fewer line items. These results seem to highlight the concerns on the potential decline in segment key items, which may have an effect of reducing the usefulness of segment reporting (Crawford et al., 2012; Nichols et al, 2013).

Research on Competitive Harm and Segment Reporting

The FASB (2001) listed three factors for determining if information may lead to competitive disadvantages: the type of information, the level of detail, and the timing of the disclosure. This should be the case of external disclosure of segment data, which introduces in firms’ financial statements detailed proprietary information³ of their activities. Thus, if segment reporting gives vital and more detailed financial information on firms’ activities and of their key accounting and financial items, proprietary costs may likely arise from such disclosures⁴. These proprietary costs are mainly related to competitive harm. For example, the exposure of key financial information to competitors could result in competitive disadvantages, but equally may put the firm at a disadvantage in negotiations with costumers or suppliers (including labor suppliers). In addition, the disclosure of segment data (proprietary information) may also result in other conflicting situations and as a consequence in additional proprietary costs. For example, Véron (2007) referred to the importance of geographical segment disclosures for non-financial stakeholders, such as non-governmental organizations or

³ Dye (1986:331) defined proprietary information as the “information whose disclosure reduces the present value of cash-flows of the firm endowed with the information”.

⁴ Equally, the timing of disclosure is an increasing relevant issue, since the active SFAS 131 and the new IFRS 8 demanded higher disclosure requirements for interim financial reports.

corporate social responsibility observers. Furthermore, Verrecchia (1983) refer to the potential costs of providing proprietary information in certain politically sensitive industries. Thereby, when facing proprietary costs, firms are likely more motivated to withhold segment information and practice discretionary disclosure. Verrecchia (1983) argues that proprietary costs assumptions bring noise to the reasons why managers may practice discretionary disclosure, since they extend motivation for withholding information in the presence of “good news”. In 1996 and in line with proprietary costs theory, two theoretical models were published with the initial focus on competitive harm that could result from showing segment information to competitors. Hayes and Lundholm (1996) developed a model to determine how firms choose the adequate level of aggregation in segmental disclosures, since that information is observed by both, competitors and capital market. They showed that under severe competition, firms’ value should be higher if segment aggregation is performed. Nagarajan and Sridhar (1996) discusses that mandatory segment reporting may reduce value-relevant information of financial disclosures, if it exposes (with a higher transparency) a firm to material proprietary costs. They argued that, when segment disclosures became mandatory, the firm may tend to aggregate value-relevant information to protect and avoid a potential entry of a rival.

Empirical research on the effect of proprietary costs in segment disclosures was, at first, essentially based on evidence from US listed Firms. Following the assumptions of Hayes and Lundholm (1996), Harris (1998) developed an empirical model to validate competition effect on segment reporting choices, i.e. on managers’ decision to disclose firms’ operations as business segments. Harris (1998) argues that, managers may seem reluctant to provide segment disclosures from operations in less competitive industries (highly concentrated industries) when firms present high abnormal earnings (performance superior to industry mean). Results showed that, in less competitive industries, measured by industry concentration and speed of profit adjustment, firms’ operations are less likely to be reported as segments. The transition from SFAS 14 to SFAS 131 was an important field for testing the previously influence of competitive harm on lower segment disclosures. Botosan and Stanford (2005) research had the main objective of achieving evidence on manager’s motivation to withhold segment information, using a sample of single-segment firms under SFAS 14, which started to disaggregate segment data under SFAS 131. Empirical results suggested that hidden segments of “change firms” operated in less competitive industries than their primary industries, which is line with previous papers. On the other hand, the “change firms” group showed, in average, profitable hidden segments, but at a firm-level those firms were less profitable. This result suggested that these firms masked their abnormal profitability in order to avoid competitive harm. Another paper from Ettredge et al. (2006) analyzed the effect of SFAS 131 in reducing the practice of lower segment disclosures due to competitive harm concerns, but through the use of a different measure of segment information

relevance. More specifically they looked at improvement on the cross-segment variability of reported profits by multi-segment firms. Like Botosan and Harris (2005) they used industry concentration and abnormal profitability as proxies for competitive harm. The estimation of the empirical model evidenced a negative relationship between both, abnormal profitability and industry concentration, with a higher disclosure on cross-segment variability of profits. However, using coefficient shift from the pre to the post SFAS 131 period, the results did not evidence that the decline on the negative association was statistically significant. Also based on SFAS 131 adoption, the paper of Berger and Hann (2007) discusses managers motivation to aggregate business segments in order to protect abnormal profits due to, both, agency and proprietary costs. They estimate the influence of both motivations, based on their relation to new segments disclosed under SFAS 131. The results for the competitive harm proxies (industry concentration and abnormal profit) documented a positive relationship to the new segments, but not statistically significant. In the same line of Berger and Hann (2007), a more recent study from Bens et al. (2011) investigated aggregation in external segment reporting through the use of confidential plant-level (manufacturing establishments) data from Census Bureau database. Using plant-level data, where information of firms' activities is less aggregated, they identified reportable "pseudo-segments" and compared to those reported on external segment disclosures. The disclosure or non-disclosure of the pseudo-segment was therefore tested to proxies of agency and proprietary costs motives. The database used by Bens et al. (2011) allowed them to compute new proprietary costs variables. They suggest that firms, presenting themselves as single-segment, withhold segment information, when they face a higher number of private competitors. The evidence on multi-segment firms also confirmed that speed of abnormal profits adjustment and labor power were negatively related to pseudo-segment disclosure. Bens et al. (2011) introduced also a control variable for industry concentration ratio, based on firms' higher entry barriers and lower product substitutability, which should attenuate competitive harm concerns. The results however, were not statistically significant.

Since IASB standards were adopted worldwide, research is likely more dispersed if we compare to the scope of FASB application (US listed firms). As a consequence, some of those papers are published in native language and in less available journals. Prior to IFRS 8 adoption we identified the studies of Leuz (2004) on German listed firms and the paper of Nichols and Street (2007) based in a multinational sample. Leuz (2004) examined the influence of proprietary costs on the level of voluntary segment disclosure before its mandatory adoption in 1999. The author estimated the determinants of voluntary segment disclosure in the scope of proprietary costs theory. Then, the same analysis was performed for voluntary cash-flow statements as a benchmarking for non-proprietary disclosure and whose differences to voluntary segment data model would highlight the effect of

proprietary costs in segment disclosures. With a sample of 109 non-financial listed firms, their econometric models were based on logit and ordered probit regression models, depending how the dependent variable was measured. Leuz (2004) used different levels of segment disclosure based on five key items (sales, operating income, assets, capital expenditures and depreciation). Abnormal profitability was used as proxy for proprietary costs and entry barriers, measured by capital intensity, used as control variable. Evidence showed a negative relation between abnormal profitability and voluntary segment disclosure. In opposition firms with higher entry barriers were related to higher disclosure. The results also showed that segment disclosure was more related to proprietary costs than cash-flow disclosure (benchmark for non-proprietary information). As for the paper of Nichols and Street (2007), it examined the effect of competition measured by firm abnormal profitability and under the adoption of IAS 14R. In particular, they had the objective to investigate the influence of industry level of competition on managers' decision to conceal segment financial information of the different industries where the firm operated. The multinational sample consisted in 160 firms that adopted IAS 14R between 1999 and 2002. The measure for the level of segment reporting was based on Harris (1998) model and therefore, it represented a dummy variable, identifying if firms operations were coincident, or not, with the business reportable segments. Estimation of the logistic regression model confirmed that, abnormal profitability was negatively associated to firms' decision in disclosing their operations as business segments, which is evidence in line with studies performed on US listed firms. More recently the paper from Katselas et al. (2011) examined the association between the two main competitive harm proxies and firms lobbying positions on ED 8. The results revealed mixed evidence on the expected association that abnormal profitable firms were less supportive of ED 8. Only, when an interaction term of industry concentration and abnormal profitability was included in the model, the hypothesis was confirmed. The interaction variable showed to be negatively related to ED 8 support. The validity of the model is however limited by the use of a relative small sample of 27 firms. Finally, we found one study addressing the issue of competition and segment disclosures under IFRS 8. The paper of Pisano and Landriani (2012) showed a first attempt to examine this historical relationship based on 124 Italian listed firms. Competitive harm is only estimated using the association of industry concentration (measured by Herfindahl index and the four-firm concentration ratio) with a level of disclosure based on 23 segment items and with growth percentage of the segment disclosure from 2008 to 2009. In line with proprietary costs theory, they stated that Italian firms operating in high (less) competitive industries are likely associated with higher (lower) segment disclosures. They also theorized that firms where competition is higher (lower), should be positively (negatively) related to a variation in their level of segment disclosure. Results of the regression model, confirmed the hypothesis for industry concentration. Using the Herfindahl index the results are statistical significant at a 10% level. In alternative, the estimation with the four-firm concentration ratio revealed to be

statistical significant at a 5% level of significance. The additional estimation for the variance on the level of segment disclosure showed a negative relation between industry concentration and the increase of segment disclosure score. However, this negative relation had no statistical relevance using the Herfindahl index and revealed to be significant with the four-firm concentration ratio, but only at a 10% level of significance.

Pisano and Landriani (2012) recognized some limitation of their research, essentially related to sample size and its restriction to Italian firms, but also by not exploring other effects that could influence managers' behavior on the decision of disclosing segment information. In the present paper we address the issue of competitive harm with a more complete model, using different proxies, which are estimated for a significant larger sample of 13 European countries. We also improve the analysis on segment reporting variance using new control variables and by estimating the effect of IFRS 8 through a multinomial regression model.

2.3. Research Questions and Hypotheses Development

The main objective of our research is to explore proprietary costs theory based on firms' potential competitive harm from disclosing, separately, proprietary information about their operations. More specifically, we analyze the effect of competitive harm on the level of segment disclosures under IFRS 8. In the previous sections we reviewed segment reporting research and the process of adoption of the new standard. From post-implementation review of IFRS 8, we highlight two aspects that support our research objective. First, the report of IASB, on July 2013, identified the loss of competitiveness due to segment disclosures, especially on smaller firms listed in smaller capital markets, as one of the major concerns pointed out by respondents to IFRS 8 review process, while investors were also concerned on segment aggregation. This confirms the results of Katselas et al. (2011), which suggested that firms subject to higher competitive pressure made lobbying against the adoption of IFRS 8. Secondly, studies collected by the IASB to the implementation of IFRS 8 were essentially descriptive and the effect of industry competition on the level of disclosure was not sufficiently explored (IASB, 2013a). In fact, research based on IAS/IFRS, did not cover a sufficiently combination of competitive harm proxies, as for example, the influence of labor suppliers. Additionally, the relationship between competitive harm and segment disclosures has been documented on the adoption of previous accounting standards, mainly based on US evidence or through the analysis of an individual country applying IAS 14R. Despite the Pisano and Landriani (2012) study, previous researches (e.g. Berger and Hann, 2007; Nichols and Street, 2007) were based on segment information provided by firms for over a decade ago. The adoption of IFRS 8 was a controversial process in EU and for some entities the expected positive effect of the standard was not clear (EC, 2007; Véron,

2007). However, the majority believed that IFRS 8 would increase the quantity and quality of segment reporting. IASB recent analysis to academic research on IFRS 8 identified, in general and as expected, an increase in segment disclosures. Yet, it would be equally important to research if this new available segment data has any relationship to firms that previously showed lower levels of disclosure and were associated to competitive harm pressures. If IFRS 8 was applied according to its objectives, a higher level of segment disclosure and transparency may likely reveal previous hidden disclosure practices, including from firms subjected to competitive harm.

As a response to these literature gaps, our investigation develops an extended model to estimate, under IFRS 8, the relationship between the level of business segment disclosures and competitive harm. The regression model combines three competitive harm proxies, in particular, abnormal profitability, industry concentration and labor power. We equally aim to explore if positive change on segment reporting, from IAS 14R to IFRS 8, has any relationship to firms previously associated to non-disclosure. For this purpose we developed a multinomial regression model. Our research contributes also to literature due to sample size and by including in the analysis, small listed EU firms that are likely more sensitive to competition pressures. To achieve these objectives, we organized the research questions in the following manner:

- (1) *Did the adoption of IFRS 8 result in a significant change on business segment disclosure?*
- (2) *Does competitive harm still influence the level of business segment disclosure in the period previous to IFRS 8 adoption?*
- (3) *Was competitive harm influence, on the level of business segment disclosure, maintained under IFRS 8 adoption?*

Research Question 1: Change on Business Segment Reporting with IFRS 8 Adoption

Since we aim to estimate the effect of IFRS 8 in declining non-disclosure of segment information due to competitive harm reasons, the first research question should provide a descriptive analysis of business segment reporting quantity, in the pre and post period of IFRS 8 adoption, allowing us to identify changes. Statistically, the application of t-tests for mean comparison should determine the significance of identified changes on business segment reporting. These would be the first evidence on the effect of the new standard in improving, or not, segment disclosures. As discussed in literature review section, recent papers, with emphasis to Nichols et al. (2012), examined IFRS 8 adoption and found evidence of an overall increase on the total amount of segment information. Therefore, and aligned with IASB expectations and previous literature general findings, we expect, with IFRS 8, that our sample of EU listed firms would reveal a significant increase on the number of reportable business segments and would decline the number of single-segment firms. As for the disclosure of items per

segment, literature evidenced mixed results (Nichols et al., 2012; Crawford et al., 2012) and therefore we may expect also different behaviors on our sample firms. As Crawford et al. (2012) stated, if the average number of segment disclosures increases with IFRS 8, a greater disaggregation of financial consolidated data based in business and geographical operations, is being provided to users, which may support previous arguments defending improvements of IAS 14R. On the contrary, the negative change may sustain those who revealed against or concerned about the adoption of “management approach”. However, and assuming that positive change occurred, such results would only confirm the significance of reported differences in the quantity of segment disclosures. This evidence does not clarify if changes were related to firms that previously practiced non-disclosure due to competitive harm.

Research Question 2: Competitive Harm and the Level of Business Segment Disclosure Previous to IFRS 8 Adoption

This research question, despite contributing to literature by updating evidence on the relationship between competitive harm and lower levels of segment disclosure in a more actual period, is also an essential requirement to check, on research question 3, the effect that IFRS 8 might had in encouraging firms that withhold information due to this fact. This potential effect of IFRS 8 assumes that competitive harm is still conditioning segment disclosure in the last period of IAS 14R. For this purpose we employ a regression model labelled as “**competitive harm model**” based on three main hypotheses, representing proprietary costs motivations to withhold segment information.

As documented, industry concentration and abnormal profitability were the two main competitive harm proxies used in previous literature. These proxies represent firms’ competitive environment that may lead to proprietary costs due to the disclosure of segment information. The costs should be higher for firms operating in more concentrated industries (less competitive) and showing higher profitability in relation to industry mean. We identified also the use of other proxies for competitive harm, such as speed of abnormal profits adjustment, labor power, entry barriers, major customers, or private competitors. Of these competitive harm proxies, we are unable to use the variables for private competitors (non-listed competitors) and major customers, since information was not available for EU listed firms and in Worldscope database. Additionally, we will not use the proprietary costs proxy based on the speed of abnormal profit adjustment of Harris (1998). Computing this variable would require the calculation of abnormal profitability (firm and industry measures) persistence through several years. Due to the temporal limitation of our analysis, we do not estimate this proxy and therefore it is not included in our model. This reason was equally pointed by other researchers, when analyzing the replacement of a segment reporting standard in a limited period (e.g., Nichols and Street, 2007). Thus, we estimate in our model the effect of abnormal profitability, industry concentration,

labor power, entry barriers and an additional variable representing industries with a single firm (monopolistic industry). Although related to competitive harm, the last two work as control variables, as we will further explain. Thus, abnormal profitability, industry concentration and labor power are defined as our three main hypotheses of the model and for all we expect a negative association to the levels of segment disclosure.

Firms' abnormal profitability is a proxy for higher exposition to competitive harm. In this environment, firms are likely, more associated to non-disclosure and to potentially hide their profitable activities. Abnormal profitability is also known as profitability adjusted to industry, and represents the difference between firms' profitability and the industry mean for the same measure. We assume abnormal profitability as a positive difference, which indicates that a given firm had a performance superior to its industry. Several studies demonstrated that abnormal profitability is factor influencing managers to practice discretionary disclosure on firms' segment reporting (e.g. Leuz, 2004; Botosan and Stanford, 2005; Nichols and Street, 2007). Thus, we hypothesize that firms with higher abnormal profitability are associated to a lower level of business segment disclosure in the previous period to IFRS 8 adoption.

Hypothesis 1a: Firms with abnormal profitability should be negatively related to the level of business segment disclosure in the previous period to IFRS 8 adoption.

Proprietary costs theory argued that firms acting in less competitive industries (concentrated industries) are likely associated with withholding relevant segment information (e.g., Harris, 1998; Botosan and Harris, 2005; Ettredge et al., 2006; Berger and Hann, 2007; Pisano and Landriani, 2012). This was probably the most tested proxy for competitive harm due to the disclosure of proprietary information. Harris (1998) argues that firms face competitive harm due to the risk of disclosing sensitive information to stronger rivals, which may reduce their market share and profitability. This is especially accentuated in more imperfect industries, where the level of concentration is higher. In industries with few competitors, a higher dispersion between firms' sizes could represent a highly imperfect competition and therefore the risk of competitive harm due to exposure of performance is higher for smaller firms. In the recent post-implementation review of IFRS 8 (IASB, 2013b), it was recognized that smaller listed firms operating in small markets face increase competitive harm, which as we discussed, may come from larger incumbent firms or new competitors. Our second hypothesis examines the effect of industry concentration on lower segment disclosure, in the period previous to IFRS 8 and after an increase maturity of EU firms on IAS 14R adoption.

Hypothesis 1b: Firms acting in more concentrated industries should be negatively related to the level of business segment disclosure in the previous period to IFRS 8 adoption.

Proprietary costs may also arise from the potential decline on bargain power with customers or suppliers, such as the suppliers of labor. Firms with higher labor weight in their structure may want to avoid exposure of their business to employees or labor unions, for example, by not separating profitable activities from other not so profitable. However, and as discussed by Bens et al. (2011), previous literature gave little attention to the effect of labor power on the practice of discretionary disclosure. Bens et al. (2011) addresses this issue on their model and found a negative relationship between the weight of labor and the probability of firms' operations to be disclosed as business segment. This variable is yet to be studied, in the scope of IASB segment reporting based research, as a proxy for competitive harm. Thus, we include it in our model, assuming that firms where the labor power is higher, managers may face an incentive to avoid full segment disclosure practices. A negative association is expected between the weight of labor costs and our level of business segment disclosure.

Hypothesis 1c: Firms with higher labor power should be negatively related to the level of business segment disclosure in the previous period to IFRS 8 adoption.

Research Question 3: The Effect of IFRS 8 on Competitive Harm Influence in Segment Reporting

In the first research question we expect to provide evidence consistent with an overall increase on segment reporting after the introduction of IFRS 8. On the other hand, our second research question should evidence that, in the last period of IAS 14 adoption, potential harm from an adverse competitive environment, was still a factor related to lower levels of business segment disclosure. Thus, if hypotheses from our first tests are confirmed, we should now fulfill our main objectives of research and achieve evidence that would answer the following questions:

- ✓ Is competitive harm, under the adoption of IFRS 8, still related to lower levels of business segment disclosure?
- ✓ Did IFRS 8 had any positive effect on declining this association, encouraging higher disclosure on previously constrained firms?

First evidence of IFRS 8 effect, in reducing non-disclosure on firms subject to competitive harm, should result from replicating the competitive harm regression model used on previous research question. As discussed, although the expected general increases on disclosure, we may expect that, with IFRS 8, competitive harm still has an influence on segment reporting. Katselas et al. (2011),

studding lobbying positions on ED 8, identified that firms showing abnormal profits and acting in less competitive industries were related to non-support of the new standard. More recently, Pisano and Landriani (2012) found that industry concentration kept its negative association to the level of segment disclosure under IFRS 8 adoption. Nevertheless, they studied competitive harm influence based on, only one competition proxy and for a small sample of Italian listed firms. Additionally, the recent post-implementation review on IFRS 8 identified that some firms are still concerned on the commercial sensitivity of segment disclosures (IASB, 2013b). Thereby, recent literature seems to suggest that competitive harm influence may still persisted, even after IFRS 8.

In order to estimate this persistence, we use our competitive harm model to the level of business segment disclosure in 2009, considering the assumptions defined on research question 2. We kept the same prediction sign on our hypotheses in order to enhance the comprehension on competitive harm effect and turn comparison easier.

Hypothesis 2a: Firms with abnormal profitability should be negatively related to the level of business segment disclosure under IFRS 8 adoption.

Hypothesis 2b: Firms acting in more concentrated industries should be negatively related to the level of business segment disclosure under IFRS 8 adoption.

Hypothesis 2c: Firms with higher labor power should be negatively related to the level of business segment disclosure under IFRS 8 adoption.

If results exhibit that the significant negative relationship between competitive harm proxies and the level of business segment disclosure is maintained, it could represent primary evidence that IFRS 8 was unsuccessful on improving disclosure of firms subject to this environment. Otherwise, if those proxies revealed a non-statistical significance, it may induce that IFRS 8 likely resulted as an incentive to higher disclosure on these particularly firms. Overall, the results should evidence the persistence, or not, of lower segment disclosures associated to competitive harm, but are limited to explain the effect of the new standard. For example, if a general increase is expected in segment reporting, literature also evidenced that some firms declined their levels of segmentation, which may introduce some noise to the effect of IFRS 8⁵. Thus, on the next section we construct a regression model with a dependent variable representing the different firm position on segment reporting change. We apply a multinomial regression model to estimate if firms that increased their level of segment disclosure were associated

⁵ In literature there were some concerns on managers concealing internal segment information in order to control and aggregate their segment disclosures. If aggregation happened, the effect of IFRS 8 should have led to negative change, which may bias our results for increase disclosure factors. For example, in line with these concerns, firms associated to abnormal profitability may explore the management approach to withhold segment disclosures instead of moving to a higher level of reporting.

to previous competitive harm variables, while controlling for other factors that may have influenced change. As an example, results should evidence if positive changing firms, in the previous period of new standard adoption, were associated with higher abnormal profitability or acted in more concentrated industries. If so, the results may suggest that IFRS 8 had some success in improving segment reporting on these firms. In contrast, a negative association to positive change would reveal that IFRS 8 was unable to reduce this problem. Literature testing for change and competitive harm is essentially concentrated in US evidence and on firms that shift from single-segment to multi-segment (Botosan and Stanford, 2005; Berger and Hann, 2007). Berger and Hann (2007) explored higher abnormal profitability and industry concentration as related to new reportable segments under SFAS 131, which were not disclosed in the previous SFAS 14. Their research, gave priority to the agency costs motive to non-disclosure (firms hiding poor performance segments). Low evidence was found for proprietary costs proxies in association to change, i.e. to new segments under SFAS 131. Instead, Botosan and Stanford (2005) through a comparative analysis found statistical evidence that new segments were related to higher abnormal profitability and industry concentration. Recently, Pisano and Landriani (2012) analyzed the variance of disclosed items per segment, from IAS 14R to IFRS 8, and results showed a negative and statistical association to industry concentration, but only within a 10% level of significance. Despite the focus on positive change, we should also contribute to literature through the use of a multinomial regression model that considers all categories of change. This methodology would help us to isolate firms that had a positive change from those that declined their level of business segmentation, without excluding any category from the model. In fact, the separation of “increase and decrease firms” is important to better access the reasons behind each change behavior. Thus, using multinomial regression model we may estimate the association of our independent variables for firms that increased disclosures separately from those that declined. We designate this regression model as the “**change model**”

In research question 2 we assumed that, in the period previous to adoption of IFRS 8, firms associated to higher abnormal profitability, industry concentration and labor power, showed lower levels of segment disclosure. If these hypotheses are confirmed, we expect that firms with an increase on their disclosures should be related to those that held segment disclosures due to concerns on loss of competitiveness. Therefore, we estimate the association to change using firms’ position on competitive harm, in the period previous to IFRS 8 adoption. The hypotheses for testing change and the effect of IFRS 8 would require the multinomial “change model” to include abnormal profitability, industry concentration and labor power measured under IAS 14R adoption. Hypotheses are stated in a positive way:

Hypothesis 3a: Firms with abnormal profitability in the period previous to IFRS 8 adoption should be positively related to an increase on the level of business segment disclosure.

Hypothesis 3b: Firms acting in more concentrated industries in the period previous to IFRS 8 adoption should be positively related to an increase on the level of business segment disclosure.

Hypothesis 3c: Firms with higher labor power in the period previous to IFRS 8 adoption should be positively related to an increase on the level of business segment disclosure.

We also include in the change model, control variables for change on segment reporting due to the variance on competitive harm proxies and not necessarily related to IFRS 8 enforcement power. The explanation of all control variables are discussed on the model design section.

3. RESEARCH DESIGN

3.1. Sample and Data

In line with our research proposal, we aim to analyze competitive harm effect on segment reporting with IFRS 8 adoption and in non-financial EU listed firms. In order to obtain a substantial larger multi-national sample, we used segment information identified on Worldscope database and from which we extract data from listed firms of 13 EU countries: Austria, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and Sweden. On the other hand, since we are analyzing the effect of IFRS 8, we selected data representing the pre and post periods of its adoption. For the last period of IAS 14R adoption we opted for segment reporting presented in 2007, instead of 2008, with the objective of eliminating the effect of early adopters or previous adjustments, which could bias the real effect of the new standard. Previous literature, such as Prather-Kinsey and Meek (2004) also used the penultimate year of the replaced standard in order to avoid segment reporting previously aligned with future standard requirements. Additionally, since our segment disclosure data is not directly obtained from content analysis to firms annual financial reports, the identification of earlier adopters would be trickier and therefore the use of 2007 is preferable to 2008. Nichols et al. (2012) analyzed IFRS 8 implementation through the comparison with the last year of IAS 14R, i.e. with 2008 data. However, early adopters of IFRS 8 were identified through the notes to the annual reports. Finally, we extracted the same data for the 2009, which represents the first year of IFRS 8.

Worldscope database provide information for up to ten reportable products/services (business) segments. For each segment, we may obtain information on five key financial items: sales, operating income, assets, capital expenditures and depreciations. Whenever, information is not available for a specific item Worldscope identifies it as “NA” (not available). Despite limited to five items by each

reportable segment, Worldscope segment data provides important evidence of information quantity on the disclosure of major items, and since our main objective is to estimate competitive harm, it has the advantage of allowing testing this issue on a vast number of firms and countries. Worldscope database is also important to directly or indirectly (computed data) measure our independent variables.

Data extracted from Worldscope database gave us a total of 4.330 listed firms in 2007 and 3.975 listed firms in 2009. The process for sample selection was performed country by country. First, we started by removing all firms where the “fiscal year end” was not coincident with 31st of December, assuring that all firms were subject to the same segment requirements. Then, we removed all firms that did not apply IAS/IFRS and therefore are not subject to mandatory adoption of IAS 14R or IFRS 8. On other hand, since in EU, IAS/IFRS are only mandatory for consolidated reports, we removed all listed firms that published individual accounts (non-consolidated reports). In addition, we excluded all firms that were not listed in both years and for whom, an evolution analysis on the level of reported segment information would be impossible to perform. Finally, we decide to concentrate our analysis on non-financial entities. As a consequence, we ended with a total of 1997 non-financial listed firms.

Table 1 – Sample selection process

Identification Process	2007 (IAS 14R)	2009 (IFRS 8)
Listed Firms on Worldscope (13 EU Countries)	4330	3975
Exclusions	2333	1978
1 - Fiscal Year End Different than December	533	478
2 - Non-IFRS firms	958	834
3 - Individual Accounts	101	72
4 - Listed in Only One Year	319	172
5 – Financial Entities	422	422
Final Sample	1997	1997
% (Final Sample / Total Listed Firms)	46,1%	50,2%

A brief comparison of our sample size to samples used in similar studies analyzing the adoption of new segment reporting standards or the proprietary costs influence on the level of such disclosure is presented in appendix A. As we can observe, the largest samples were used on proprietary costs stream of research for US listed firms. On the same stream and under IAS/IFRS segment reporting standards, Nichols and Street (2007) used the biggest sample, comprising 160 listed firms. Our final sample of 1997 non-financial listed firms is more than twelve times their size. On the other hand, it is

almost six times larger than the sample used by Nichols et al. (2012) for analyzing the introduction of IFRS 8 on European countries.

3.2. Measuring Dependent Variables

For measuring our dependent variables we had to compute Worldscope data to determine the levels of business segment disclosure score and the different categories of change.

Measurement of the Level of Business Segment Disclosure

We estimate our model to three measures of segment reporting score. First score is based in the number of reportable segments and the second score is represented by a binary response based on confronting single-segment firms with multi-segment firms. Finally, the third score is measured by the number of disclosed key items per segment as used by Leuz (2004). These different levels of business segment disclosure are calculated for both periods of analysis. As mentioned, Worldscope database provides up to ten business segments. For counting the number of reportable segments, we decided to eliminate all non-real segments, such as segment observations labelled as “others”, “unallocated”, “eliminations” “reconciliations”, “intra-group”, “adjustments” or other similar descriptions. After determining the ordered number of reportable business segments, we computed a disclosure score classifying firms as disclosures (multi-segment) or non-disclosures (single-segment). Firms that did not show any segment information were considered as single-segment firms. Also, we labeled as single-segment firms, those who presented data for only one segment. We identify those firms as “pseudo disclosures”. In most of these cases segment data is coincident with consolidated data⁶. In fact, disaggregation implies that consolidated information is separately presented for different operations (business or geographical segments). Thus, in practice when a firm discloses one segment coincident with consolidate values, there is not a real disaggregation in financial information of firm activities. Due to this reason, for now on, in all our tests these “pseudo-disclosures” are considered as single-segment firms. Finally, our third segment disclosure score resulted from counting the items disclosed per segment, which in accordance with Worldscope database could range from zero to five items. As we previously justified, in the counting process we considered the “pseudo-disclosures” (firms with only one segment) as non-disclosures of key items per segment.

Categories of Change on Business Segment Disclosure

After the introduction of IFRS 8, we measure change on segment reporting confronting firms’ levels of business segment disclosure exhibited in 2009 with those showed in 2007 under IAS 14R. The

⁶ As an example, in 2007, BDI-Bioenergy Intl. presented only one business segment “Biodiesel” showing the value of all five key items for such segment. However, the value of those items was equal to consolidated data.

differences on the number of reported segments and on the number of key items, analyzed through descriptive statistics, would allow us to identify three categories of change for our multinomial regression model:

- ✓ **Increase Category**, which is the firms' category representing positive change for the number of business reportable segments or for the number of key items.
- ✓ **Decrease Category**, which is the firms' category representing negative change for the number of business reportable segments or for the number of key items.
- ✓ **No Change Category**, which is the category representing firms that did not change their level of business reportable segments or disclosed key items.

Despite analyzing how firms behaved on changing their level of business reportable segments, the analysis for change on the level of key items is especially interesting as it was a sensitive potential effect of IFRS 8. As discussed earlier, firms may disaggregate their operations through the presentation of several business segments, but avoid exposure by withholding the disclosure of important items. With the new segment requirements, is not clear the effect of the standard in the disclosure of key items. If overall improvements in segment reporting are expected, the disclosure of items per segment may be reduced, since only a measure of profit or loss and the value of segment assets are, in 2009, directly mandatory with IFRS 8. Other requirements are only mandatory if regularly reported to CODM, which rule was extended to the disclosure of total assets for annual financial statements in 2010. Previous literature reported mixed results for change on items disclosed per segment, with some studies documenting a partial decline (IASB, 2013a).

3.3. Regression Models Design

The “Competitive Harm Model” (Ordinal and Logistic Regression)

In line with our research questions, the competitive harm model is estimated for the pre and post period of IFRS 8 adoption. Due to the different measures for the business segment disclosure score, the estimation is performed through different regression models⁷. We use a logistic regression model for the binary (dummy) dependent variable representing the distinction of multi-segment firms from single-segment firms. As for the number of reportable segments and number of key items, they represent ordered outcomes and therefore an ordinal regression model should be applied (Long, 1997). The regression model for competitive harm influence on business segment disclosure is designed as follows:

⁷ “Once the level of the dependent variable is determined, it is important to match the model used to the level of measurement. If the chosen models assume the wrong level of measurement, the estimator could be biased, inefficient, or simply inappropriate” (Long, 1997:3).

$$\begin{aligned}
BSEG_NUM_i \text{ (or } BMULTISEG_i \text{, or } ITEMS_BS_i) = & \alpha_i + \beta_0 ABN_PROFIT_i + \beta_1 HERF_i + \\
& \beta_2 LAB_POW_i + \beta_3 ENT_BAR_i + \beta_4 SIZE_i + \beta_5 LEV_i + \beta_6 FIRM_PROFIT_i + \beta_7 LIST_INT_i + \\
& \beta_8 IND_FIRM_i + \varepsilon_i
\end{aligned} \tag{1}$$

Where:

BSEG_NUM_i, is an ordinal variable representing the number of reportable business segments disclosed by firm *i* and available on Worldscope database.

BMULTISEG_i, is a dummy variable that assume 1 if firm *i* reported two or more business segments or 0 if it represents a single-segment firm.

ITEMS_BS_i, is an ordinal variable representing the number of key items per segment, disclosed by firm *i* and available on Worldscope database.

ABN_PROFIT_i, represents abnormal profitability, which consists in the difference between firm *i* ROA and the average of all firms' ROA operating in the same industry group. Return on assets (ROA) is measured by the ratio of operating income to total assets.

HERF_i, represents the Herfindahl index as a measure for industry concentration (or competition) for the industry group where firm *i* operates.

LAB_POW_i, represents labor power, which proxy for the influence of labor on firm *i* financial reporting decisions.

ENT_BAR_i, represents "entry barriers" to firm *i* operations and is measured by capital intensity.

SIZE_i, represents firm *i* size, measured by the natural logarithm of total assets.

LEV_i, represents financial leverage of firm *i* measured by the ratio of total debt to total assets.

FIRM_PROFIT_i, represents firm *i* profitability independently of the industry context and is measured by firm ROA.

LIST_INT_i, represents listing status of firm *i* and is measured by a dummy variable, which assumes the value 1 if firm *i* is listed internationally (outside its country of domicile) and 0 otherwise.

IND_FIRM_i, is a binary variable, which assumes the value 1 if firm *i* is the only firm in a given industry and therefore likely associated with monopoly. It would assume 0 otherwise.

The most common measure for ABN_PROFIT is based in the ratio of return on assets (ROA), which should give us a perspective of performance compared to total investment. ROA is the preferential basis for achieving abnormal profitability when measured at a firm-level (Leuz, 2004; Nichols and Street, 2007; Katselas et al., 2011). ABN_PROFIT represents the difference between firm ROA and the average of all firms' ROA that are operating in the same industry group (competitors)⁸. The Herfindahl index (HERF) consists on squaring the market share of all firms operating in a given industry, as a measure for industry concentration. Using the Herfindahl index, the weight of larger firms increases proportionally to the weight of smaller firms. Thus, higher HERF rates represent a more concentrated and less competitive industry, where smaller firms may withhold segment disclosure due to the existence of a powerful incumbent firm. This is especially important for our study, since we use a large sample including smaller listed firms. Both competitive harm proxies are based in industry measures. For this purpose we followed the industry group classification provided in Worldscope database and at a two-digit level of desegregation. Using an industry code with four-digit would result in a more desegregated industry analysis and a better measure for direct competition. However, in samples with different countries, a higher disaggregation level could result in many

⁸ Industry ROA was determined by calculating the mean of all firms' ROA acting in the same industry code within each country, as applied by Nichols and Street (2007).

industry codes with only one firm, which is an inherent problem for competition comparison⁹. Even on US samples, important studies like Berger and Hann (2007) used an industry concentration ratio based on industry codes at a two-digit level. Despite presenting the main results at this level of disaggregation, we equally estimate the model in our robustness tests for a three-digit level of industry aggregation. Nevertheless and independently of the used industry level, we may find several industries with only one firm operating, which could likely be representative of a monopolistic competition. In these cases, it is not clear that a firm faces a pressure from potential competitive harm, when disclosing proprietary information. The argument of withholding business segment financial data from new competitors or incumbent firms loses some validity if competitors are inexistent. Thus for HERF at its maximum, the negative association is not so expected. To control this potential inverse effect of HERF, we introduced a binary variable *IND_FIRM*, where 1 identifies a potential monopolistic industry and a positive relationship is expected. Finally, for measuring our third hypothesis represented by labor power (*LAB_POW*), we follow the same ratio used by Bens et al. (2011) that consists in the division of firms' total labor costs by firms' total revenue.

Along with *IND_FIRM*, we included in the model additional five control variables. *ENT_BAR* representing firms with higher entry barriers to their activities that should be less exposed from potential entrants. Thus, when entry barriers are higher, firms have likely less motivation to withhold segment data and positive association to disclosure should be expected. *ENT_BAR* is measured by capital intensity, which is given by the weight of firms' net property, plant and equipment on firms' total assets, as described by Leuz (2004). *SIZE* is a common factor used as control variable to explain the level of segment disclosure in the scope of segment reporting research (Herrmann and Thomas, 1996; Prencipe, 2004; Prather-Kinsey, 2004; Nichols and Street, 2007; Pisano and Landriani, 2012). In general, larger firms have more resources, are less exposed to competitive disadvantages and face more agency costs due to information asymmetry, which are all incentives to disclose segment data. We measure *SIZE* through the natural logarithm of total assets and expect a positive association to the level of business segment disclosure. Leverage (*LEV*) is a common variable tested as a proxy for discretionary disclosure in the scope of segment reporting and especially on non-US based studies (Leuz, 2004; Prencipe, 2004; Katselas et al., 2011). Literature, in general, expects a positive relation between the rate of financial leverage and the extent of financial disclosures. For Prencipe (2004) providing more information would reduce agency costs, when financial leverage rate is high. In the opposite direction, some literature also refer that debt indicator can be used for monitoring managers' performance in accordance with shareholders' interests, what could lead to lower disclosure (Hope,

⁹ The problem of identifying differences in industry concentration, when there are many industry groups with few firms, would have been accentuated if we used the four-firm concentration ratio as an alternative to Herfindahl index.

2003). Despite, some mixed results on previous literature we hypothesize a positive sign on the association of LEV and the level of business segment disclosure. Due to direct availability in Worldscope database, we measure the leverage ratio by firms' total debt (short-term and long-term debt) to firms' total assets. We also add firm own profitability (FIRM_PROFIT) and expect that without the industry context and thereby combined with ABN_PROFIT, it would reveal agency costs motivation for higher disclosure, when firms may want to positively expose to the market, or for lower disclosure, when managers may want to avoid exposure of poor performance (Verrecchia, 1983; Berger and Hann, 2007). Thereby, we control for agency costs motives on influencing segment disclosure in a contrary way of abnormal profitability. Firm's profitability is measured by firms' ROA. Finally, we control for higher segment disclosure due to the fact that the firm is listed outside its country of domicile. Previous literature showed that firms listed internationally are associated with higher levels of compliance with segment reporting standards (Hermann and Thomas, 1996; Hope, 2003; Prather-Kinsey and Meek, 2004). Hope (2003) pointed two reasons for this expected relation. First, foreign markets may induce in extra disclosure requirements and secondly, firms may increase their disclosure in order to obtain funds at a lower cost. Researching for lobbying position on ED 8, Katselas et al. (2011) documented that firms listed internationally supported IFRS 8, which the authors relate to the fact that those firms already practice higher segment disclosure and most of them were listed in US markets. LIST_INT is measured by a dummy variable, that assumes 1 if the firm is listed outside its country of domicile and 0 otherwise. A positive association is expected for LIST_INT. Measurement and the expected sign of each independent variable is resumed in appendix B.

The "Change Model" (Multinomial Regression)

For estimating how firms previously associated to lower segment disclosure reacted to IFRS 8, the "change model" relates the three categories of change with the competitive harm proxies measured in the period of IAS 14R. We assume that under the old standard these factors are still influencing negatively firms' segment disclosures. Furthermore, defining change in categories result in a nominal dependent variable with three non-ordered categories and the application of multinomial regression analysis¹⁰. When using a multinomial logistic regression, we ignore the outcomes order and the analysis is centered in the logit comparison between all categories. On our multinomial model we use the "no change" category as reference. Thereby, the results of the change model should highlight the association of the independent variables to "increase or decrease firms" in comparison to those that did not change. The multinomial regression model is estimated for change in business reportable segments

¹⁰ The nominal dependent variables assume that we are dealing with categories that cannot be ordered. However, the multinomial logit regression model is often used as alternative to the ordinal model, when researchers try to avoid the proportional odds assumption (Long, 1997).

(BSEG_CHANGE) and separately for change in business key items (ITEMS_CHANGE). The multinomial change model is designed in following equation:

$$\begin{aligned} BSEG_CHANGE_i \text{ (or ITEMS_CHANGE}_i) = & \alpha_i + \beta_0 ABN_PROFIT_07_i + \\ & \beta_1 ABN_POFIT_GR_i + \beta_2 HERF_07_i + \beta_3 HERF_GR_i + \beta_4 LAB_POW_07_i + \\ & \beta_5 LAB_POW_GR_i + \beta_6 SIZE_GR_i + \varepsilon_i \end{aligned} \quad (2)$$

Where:

BSEG_CHANGE_i, represents firm *i* category of change on segment reporting based on the number of business reportable segments. Business segment change would assume 1 if firm *i* increased (*BSEG_INC*), 2 if decrease (*BSEG_DEC*) or 3 if there was no change (*reference category*) on the level of segment disclosure.

ITEMS_CHANGE_i, represents firm *i* category of change on segment reporting based on the number of business key items. Thus, items change would assume 1 if firm *i* increased (*ITEMS_INC*), 2 if decrease (*ITEMS_DEC*) or 3 if there was no change (*reference category*) on the level of segment disclosure.

ABN_PROFIT_07_i, *HERF_07_i*, *LAB_POW_07_i*, represent our competitive harm proxies measured by 2007 data, i.e., from the period previous to IFRS 8 adoption.

ABN_PROFIT_GR_i, *HERF_GR_i*, *LAB_POW_GR_i* and *SIZE_GR_i* represent firm *i* growth percentage of abnormal profitability, Herfindahl index, labor power and size, from the pre (2007) to the post (2009) period of IFRS 8 adoption.

We introduced the growth rates of our competitive harm proxies in order to control firms' behavior not attributed to the enforcement of IFRS 8, in reducing previous lower segment disclosure due to proprietary costs motives. In accordance with previous assumptions, we hypothesize that firms facing a decline (increase) on abnormal profitability, industry concentration or labor power, should be higher (less) encouraged to accomplish with IFRS 8, than to withhold segment disclosures. Thus, since we use "no change" category as reference, we expect the evolution on these variables to be negatively associated with the "increase" category (*BSEG_INC* or *ITEMS_INC*). Higher growth on competitive harm proxies should be more related to firms that did not change their level of business segment reporting. In contrast, we expect a positive association to firms on the "decrease" category (*BSEG_DEC* or *ITEMS_DEC*). Additionally, we also control for higher disclosure of reportable business segments associated with firms' entrance in new activities and not related the enforcement power of IFRS 8. We use the variance on firms size (*SIZE_GR*) as a proxy for the potential growth of firms' real business diversification.

4. RESULTS

4.1. Changes on Business Segment Reporting with IFRS 8 Adoption

Primary evidence on business segment reporting, provided by Worldscope database, is presented in table 2. It represents the weight of single-segment firms (non-disclosures and "pseudo-disclosures") and multi-segment firms on business segment disclosure. In a total of 1997 analyzed firms, more than

a quarter exhibit zero or only one segment (29,3% in 2007 and 27,5% in 2009). The weight of single-segment firms, on our sample, is considerably higher than detected by Nichols et al. (2012). This difference results, mainly, from the fact that our sample is not based only on the largest listed firms. Our results show that, with IFRS 8, the number of single-segment firms decreased in a total of 36 firms (6,1% of all single-segment firms under IAS 14R).

Table 2 – Business single-segment firms versus multi-segment firms

Business Segment Disclosures	Number of Segments	IAS 14R (2007)	%	IFRS 8 (2009)	%	Change
Single-Segment:	0-1	586	29,3%	550	27,5%	-36
- Non-Disclosures	0	144	7,2%	108	5,4%	-36
- Pseudo-Disclosures	1	442	22,1%	442	22,1%	0
Multi-Segment	> 1	1411	70,7%	1447	72,5%	36
Total of Firms		1997	100,0%	1997	100,0%	-

In table 3 we resume the number of business reportable segments and the number of business key items disclosed by our sample firms. Statistical relevance of changes in the average of segment disclosures was estimated and included in the table. The average number of reportable segments and key items is exhibited taking all sample firms into account or considering only the multi-segment firms.

Table 3 – Change on segmentation typology and on the number of segments

Business Segment Reporting	IAS 14R (2007)			IFRS 8 (2009)			Statistics	
	Firms	No.	Average	Firms	No.	Average	<i>t-test</i> ^a	<i>p-value</i>
Reportable Segments								
Multi-Segment	1411	4318	3,06	1447	4522	3,13	1,618	0.106
Average Total Firms	1997	4318	2,16	1997	4522	2,26	3,405	0.001
Key Items								
Multi-Segment	1411	4857	3,44	1447	4949	3,42	-3.841	0.000
Average Total Firms	1997	4857	2,43	1997	4949	2,48	1,421	0.155

^a Coefficients of mean comparison based on paired-samples t-test, when firms are the same on both years. Mean comparison for sub-samples with different number of firms was estimated through independent-samples t-test.

Table 3, in line with table 2, reports that 70,7% (1.411 firms) were business multi-segment firms in 2007, which percentage increased to 72,5% (1.447 firms) in 2009. Considering only the multi-segment firms, the average of business reportable segments was 3,13 under IFRS 8 (or 2,26, including single-segment firms counted as zero segments). We find a general growth in LOB disclosure, which is statistically significant at 1% level, when we use the full sample. This result, combined with the decrease of single-segment firms, confirms the expected positive effect of IFRS 8 in increasing potential relevant information to investors and other users about firms' activities.

A deeper characterization of firms business segment disclosure, reveal that the majority of multi-segment firms, on both standards, disclosed two or three business segments. For example, under IFRS 8 the number of firms disclosing two to three segments was 1030 (551 firms with two segments and 479 firms with three segments), which represents 71,2% of all multi-segment firms (or 51,6% of all firms). The number of firms declines in representativeness for observations in the highest category of reported segments. In fact, firms disclosing five or more business segments represent less than 10% of the sample. This evidence is reinforced if we recall the average of 3,06 reportable business segments under IAS 14R or 3,13 with IFRS 8 (average considering only multi-segment firms).

The majority of firms did not change their number of segments, which percentage represents 66,4% (1327 firms) of all sample. Of those, 442 firms (22,1%) remained as single-segment firms. The global increase in the number of reportable business segments represents a net positive change of 80 firms, which was a result of 380 firms improving their disclosure, while 290 firms moved in the opposite way. This positive change included a net increase of 36 previously single-segment firms. The majority of firms increased or decreased one to two segments, which is resulted in an average change of 2,0 segments on "increased firms" (380 firms) and -1,9 segments on "decrease firms" (290 firms). For example, the highest category of change occurred in firms that went from two to three segments (82 firms), followed by firms that upgraded their level of disclosure from non-disclosures to two segments (78 firms) and firms that declined from three to two segments (71 firms).

As for the number of key items per business segment, the results show that the higher number of multi-segment firms resulted in an increase on the global number of key items (table 3). However, taking the sample as a whole, this improvement is not statistically significant ($t=1,421$ and $p\text{-value}=0.155$). In fact, considering only the multi-segment firms, we find a significant decline on the average number of key items ($t=-3,841$ and $p\text{-value}=0.000$). This partial analysis to multi-segment firms confirms that, in total, they add up to a larger number of items, but in average, they are disclosing a lower number of items per segment under IFRS 8 adoption. In a more detailed analysis,

we observe that 1311 (65,6%) firms that did not change, 344 (17,2%) firms that increased disclosure and 342 (17,1%) firms moving in the contrary way. The weight of both categories of change is almost the same, which is indicative of the mixed effect that IFRS 8 had in this partial analysis of business segment disclosure. This seems to suggest that a significant part of the sample stepped back on their level of key items disclosure and therefore relevant segment information could have been omitted, from firms' annual financial statements under IFRS 8 adoption. The disclosure score of five key items is the most representative for multi-segment firms. However, the number went from 614 under IAS 14R to 576 with IFRS 8. It represents a net negative change of 38 firms (167 "decrease firms" less 129 "increase firms"). Along with the declining of firms that disclosed five items, the most accentuated positive change occurred in the non-disclosure category (single-segment firms).

In comparison to other studies on IFRS 8 adoption, our results on items disclosure are based in a greater number of firms, but however limited to five key items. Those studies analyzed change item by item, and as IASB resumed, the key items "capital expenditure" and "liabilities" were those that faced a higher decline (IASB, 2013a). Our analysis to segment reporting under IAS 14 and IFRS 8 revealed that not all firms disclosed the five key items. Although the differences, results are in line with Nichols et al. (2012), which documented also a general growth on the number of reportable segments. However, the majority of firms did not change their levels of business segment disclosure and a higher number of single-segment firms still prevailed. The post-implementation review of IFRS 8 (IASB, 2013a) related this to the fact that firms adopted, under IAS 14R, a structure of reporting already based on internal report for decision making.

If with IFRS 8 there is a higher number of segment information due to the improvement in the number of multi-segment firms, independent sample t-tests confirmed that these firms are now, in average, disclosing less key items per segment. Therefore, evidence is not clear on the effect of IFRS 8. In the next section we apply the competitive harm model to the level of segment disclosure, trying to capture if proprietary costs proxies are still suggesting a negative relation with these disclosures. Additionally, we estimate the change model in order to check if this global change, from IFRS 8 adoption, had any effect on reducing the previously documented influence of proprietary costs motives to withhold segment information.

4.2. Competitive Harm and the Level of Business Segment Disclosures Previous to IFRS 8 Adoption

Competitive harm model, applied under IAS 14R, should evidence if proprietary costs motivation still persists to constrain the level of segment reporting in the period previous to IFRS 8. Estimation of the

model is detailed on table 4, for three different measures of segment disclosure score. In the first column the disclosure score BSEG_NUM is based in the ordered number of reported business segments (ordinal regression). Second column describe the estimation of a logistic model using a binary variable BMULTISEG, separating multi-segment firms from single-segment firms. In this analysis, disclosure firms are all classified in the same category, independently of their number of business segments, which reduces the potential error from the effect of higher disclosure due to real firm diversification. As for third and fourth columns, the competitive harm model is estimated through an ordinal regression for the disclosure score based on the number of key items per segment, using the full sample or only the multi-segment firms. By performing the additional estimation of the model with a sub-sample of multi-segment firms (1374 firms) we exclude the repeated effect of single-segment firms included on previous estimations, which should improve the analysis for ITEMS_BS.

Overall, evidence shows that EU listed firms, subject to potential proprietary costs, due to competitive harm, are still related to lower levels of business segment reporting in the last periods of IAS 14R and at the edge of IFRS 8 adoption. The results for BSEG_NUM and BMULTISEG are similar and, in both versions of the model, we found a negative relationship for ABN_PROFIT and HERF at a significance level of 1%. The lower differences between the two estimations seem to suggest that firms performing better than their competitors and acting in more concentrated industries are essentially related to decision of presenting themselves as single-segment firms¹¹. Thus, if these firms provided less segment disclosures, they were likely withholding relevant information from competitors and from the market. Like in prior literature (e.g. Harris, 1998; Botosan and Harris, 2005), firms operating in more concentrated industries are related to lower segment disclosure, as they fear competitive harm from strong incumbent firms or new competitors, which could lead to the potential loss of market share and to profitability reduction.

As discussed earlier, firms may consider their operations as reportable segments, but limited its comprehension if key items are omitted. Results from the ordinal regression model, using the full sample, show that lower ITEMS_BS are associated with firms' performing superior to their industry and to firms that are operating in higher concentrated industries. ABN_PROFIT is negatively and statistical significant for a level of significance of 1%. Leuz (2004) paper achieved also a statistical and negative relationship between profitability (to industry) and the level of key items disclosed by German listed firms. Removing the influence of single-segment firms in the model, i.e. using only multi-segment firms, the association of ABN_PROFIT with the practice of lower disclosure is

¹¹ In fact, if we estimate the ordinal regression model for BSEG_NUM using only multi-segment firms (ordered categories with at least two reportable business segments), we failed to identify statistical associations on all competitive harm proxies.

reinforced. The negative and significant relationship of ABN_PROFIT, within the same level of significance, seems to induce that although providing reportable business segments, managers potentially hide important segment indicators in order to protect access to performance measures of their activities. As for HERF, the estimated coefficient, for the full sample, shows that higher industry concentration rates are related to lower ITEMS_BS within a 5% significance level. However, if we take only multi-segment firms into account the relationship loses statistical significance. Thereby, for firms desegregating operations through reportable business segments, there is no statistical evidence that they are withholding important line of items per segment. Combined results seem to suggest that firms operating in more concentrated industries are essentially related to the primary decision of non-disclosing segment information, i.e. to likely show themselves as single-segment firms.

Table 4 – Competitive harm and the level of business segment disclosure previous to IFRS 8 adoption

VARIABLES	BSEG_NUM ¹ (ordered)	BMULTISEG (binary)	ITEMS_BS ² (ordered)	ITEMS_BS ³ (ordered)
ABN_PROFIT_2D	-3.603 ***	-4,868 ***	-4,573 ***	-3.381 ***
HERF_2D	-0.877 ***	-1.063 ***	-0.442 **	0.140
LAB_POW	-0.318 **	-0.319 *	-0.646 ***	-0.783 ***
ENT_BAR	-0.274	-0.245	0.206	0.384
SIZE	0.690 ***	0.644 ***	0.847 ***	0.716 ***
LEV	0.625 ***	0.427	-0.300	-0.551 *
FIRM_PROFIT	2.991 ***	4.321 ***	4,831 ***	4.122 ***
LIST_INT	-0.107	0.012	0.010	0.001
IND_FIRM_2D	0.724 ***	0.890 **	0.588 *	0.139
Constant ⁴	-	-2.205 ***	-	-
Number of Firms ⁵	1860	1860	1860	1374
LR test	283,29 ***	173,21 ***	369,86 ***	228,00 ***
Cox & Snell pseudo R ²	0.141	0.089	0.180	0.153

*, **, ***, represents, respectively, statistically significant at 10% ($p < 0.10$), 5% ($p < 0.05$) and 1% ($p < 0.01$).

¹ Ordinal regression with ordered categories from zero to five business segments, which meets the assumption of proportional odds (parallel lines test). Last category includes observations with five or more business segment number.

² Ordinal regression with three ordered categories of key items disclosure, which meets the assumption of proportional odds. Lower category includes observations of zero, one or two items. Second category for observations of three or four items and a higher category for full key items disclosure.

³ Previous ordinal regression using a sub-sample of multi-segment firms.

⁴ On ordinal regression we obtain constant values for the different categories, which are all significant at a 1% level, but not showed individually.

⁵ The regression tests are based on a sample of 1860 non-financial firms, as a result of removing 137 firms from the initial sample (1997 firms) due to missing data in at least one independent variable.

The estimated coefficients for labor influence in segment disclosure (LAB_POW) confirm our third hypotheses. Yet, the negative association with BSEG_NUM and BMULTISEG is statistically significant, respectively, within a 5% and 10% level of significance. Despite confirming the initial predictions, we expected this association to be even stronger for key items disclosure, since employees could be more sensitive to indicators of performance, than to the number of business the firms operates. These predictions are confirmed through the ordinal regression model applied to ITEMS_BS, where we found a negative significant relationship at 1%, even when we estimated the model only for multi-segment firms. Therefore, the results confirm our hypothesis for the influence of labor power on segment disclosures, which could induce that managers concealed information in order to avoid the loss of bargain power with employees or union labors. These results represent the first evidence that, under IAS 14R, the weight of labor seems to influence managers decisions to conceal segment data.

As for our control variables, we could not find any evidence on the effect of entry barriers (ENT_BAR) in all tested disclosure scores, despite the positive relationship found with ITEMS_BS. Our prediction that firms with higher entry barriers (measured by capital intensity) were less exposed to competitive harm and therefore more predisposed to disclose segment information, was not confirmed. Predictions for SIZE and FIRM_PROFIT are confirmed as we found, in all disclosure scores, a positive relationship to the disclosure of segment information at 1% level of significance. Evidence on firms' size is aligned with previous literature, which states that larger firms are more exposed to the market and have lower costs of producing information. Larger firms have higher incentives to disclose segment information reducing agency costs. They are also better prepared for avoiding competition harm and, due to their diversity and complexity, when compared to smaller firms they have higher ability to aggregated activities, without presenting lower levels of disclosure. The positive association of firm own profitability is especially interesting, because we found that controlling FIRM_PROFIT together with ABN_PROFIT, i.e. with the effect of performance over industry, firms could likely have an incentive to disclose segment information in order to positive influence the market and distinguish themselves from other firms. On other hand, we expected also this variable to capture non-disclosure due to extreme negative profitability. When agency costs motivation overlaps proprietary costs motivation, firms may want to withhold information about poor performance.

The results for LEV are mixed, and if a positive and strong relationship is found for the number of business segments (BSEG_NUM), results on key items (ITEMS_BS) disclosed by multi-segment firms show a contrary association (at a 10% level of significance). Estimated coefficients of LEV did not reveal a statistical association to BMULTISEG and ITEMS_BS when using the full sample. The

problem with leverage results on ITEMS_BS could be associated with country differences related to the manner, how firms culturally manage their relation with financiers, as discussed on leverage hypothesis. For example, Leuz (2004) found a negative relation to key items disclosure by German firms, but only significant in one of the used dependent variables. Instead, Prencipe (2004) found a positive association for Italian listed firms. We also find that firms operating in a potential monopolistic environment (IND_FIRM) are positively related to higher segment disclosure, within a level of significance of 1% for BSEG_NUM, 5% for MULTISEG and 10% for ITEMS_BS (with full sample). As predicted, the positive and significant relationship seems to suggest that industry concentration at its maximum (HERF = 100%) have an inverse relationship to the level of business segment disclosure, than higher concentration ratios on industries with two or more competitors. Thus, evidence suggests that without competitors, firms lose their motivation to withhold segment information. This is an important result, since it represents a new variable tested in this context. Finally and in contrast with some previous findings (Leuz, 2004; Katselas et al., 2011), we did not find any statistical evidence on the relationship between LIST_INT and the level of segment disclosures.

In conclusion, we confirm that, in the last period of IAS 14R adoption, firms are likely withholding segment data in order to avoid competition costs, since in line with proprietary costs theory, ABN_PROFIT, HERF and LAB_POW revealed to be negatively and statistically associated with the different levels of segment disclosure. By updating this issue on recent segment disclosure practices and by step up the analysis (new proprietary costs proxies) in the context of EU listed firms, these results are an initial, but important contribution to literature. However, as we previously documented, with IFRS 8 adoption there was a general increase on segment reporting. Thus, if the new segment information represents an increase in segment disclosure transparency, we expect the estimation of our model, under IFRS 8, to evidence a loss of significance on the negative relation between the competitive harm proxies and the different levels of business segment disclosure. We may also expect that firms with an increase in their segment information should be those associated with abnormal profitability, less competitive industries (higher concentrated) and higher labor weight in the previous period to IFRS 8 adoption. In the next section we deal with competitive harm influence under IFRS 8 and the potential effect of the new standard on reducing such influence on firms previously associated to non-disclosure of segment data.

4.3. IFRS 8 Effect on Competitive Harm Influence in Segment Reporting

Competitive Harm and Segment Reporting under IFRS 8

To identify IFRS 8 effect on previous association of competitive harm and segment reporting, we start to apply the same regression models, but in the context of the new standard. In table 5 we resume the estimation of competitive harm model for each of the disclosure scores defined before. Overall, evidence seems similar to those obtained when the model was applied for the last period of IAS 14R, which may suggest that the adoption of IFRS 8 was unable to reduce the level of significance in the association of competitive harm to lower disclosure. Results show that firms over performing their industry (ABN_PROFIT) and operating in less competitive industries (HERF) maintain their negative relationship to the ordered number of reported segments (BSEG_NUM) and to firms' identification as multi-segment (BMULTISEG). On the other hand, the negative association of LAB_POW is also maintained, but reinforced for a 1% level of significance. The evidence for our three hypotheses seems consistent with the low or null effect of IFRS 8 on decreasing the relationship between competitive harm and lower disclosure, although the documented overall increase on the average number of reportable business segments and on the decline of single-segment firms. In fact, if we estimate the ordinal regression model, using only multi-segment firms (not tabulated), with IFRS 8 we found a negative statistical significant association of ABN_PROFIT and the number of reportable business segments, which was not documented under IAS 14R. Thus, despite disaggregating their business segment under IFRS 8, firms performing better than its competitors tend to disclose a lower number of reportable segments, what seems to highlight the reduce positive effect attributed to the new standard.

Table 5 - Competitive harm and the level of business segment disclosure under IFRS 8

VARIABLES	BSEG_NUM ¹ (ordered)	BMULTISEG (binary)	ITEMS_BS ² (ordered)	ITEMS_BS ³ (ordered)
ABN_PROFIT_2D	-2.108 ***	-2.130 ***	-2.922 ***	-2.696 ***
HERF_2D	-1.038 ***	-1.624 ***	-0.648 ***	0.094
LAB_POW	-0.519 ***	-0.682 ***	-0.530 ***	-0.287
ENT_BAR	-0.088	0.145	0.397 *	0.366
SIZE	0.680 ***	0.710 ***	0.811 ***	0.666 ***
LEV	-0.013	-0.044	0.003	0.310
FIRM_PROFIT	1.593 ***	1.526 **	2.553 ***	2.825 ***
LIST_INT	-0.140	-0.046	-0.038	-0.021
IND_FIRM_2D	0.687 **	0.699 *	0.752 **	0.544
Constant ⁴	-	-1.953 ***	-	-
Number of Firms	1891	1891	1891	1420
LR test	267,08 ***	199,74 ***	342,79 ***	198,92 ***
Cox & Snell pseudo R ²	0.132	0.100	0.166	0.131

*, **, ***, represents respectively, statistical significant at 10% (p < 0.10), 5% (p < 0.05) and 1% (p < 0.01).

¹ Ordinal regression with ordered categories from zero to four business segments, which meets the assumption of proportional odds (parallel lines test). Last category includes observations with four or more business segment number.

² Ordinal regression with three ordered categories of key items disclosure, which meets the assumption of proportional odds. Lower category includes observations of zero, one or two items. Second category for observations of three or four items and a higher category for full key items disclosure.

³ Previous ordinal regression using a sub-sample of multi-segment firms.

⁴ On ordinal regression we obtain constant values for the different categories, which are all significant at a 1% level, but not showed individually.

⁵ The regression tests are based on a sample of 1891 non-financial firms, as a result of removing 106 firms from the initial sample (1997 firms) due to missing data in at least one independent variable.

Equally, for the segment disclosure score based on key items (ITEMS_BS with full sample), the negative and significant associations for all competitive harm proxies, persist with IFRS 8. Therefore, the new standard does not seem to be associated with firms that were practicing lower disclosure of key items per segment, due to concerns of competition costs. After the quantitative analysis, this result was likely expected, despite the global increase on the number of key items, once the average number per segment declined. Firms' behavior was mixed and, despite we are not providing a direct analysis on the disclosure of each item, some firms may have also taken advantage of IFRS 8 requirements¹² for declining their number of items. As for the model estimates on ITEMS_BS without single-segment firms, only ABN_PROFIT revealed to be negative and statically associated, while LAB_POW lost its statistical significance.

SIZE and FIRM_PROFIT kept their positive relationship to all segment disclosure scores, while we could not find, with IFRS 8, a positive association for LEV. The control variable proxying for entry barriers show weak results, but a positive and significant association was found to ITEMS_BS (full sample), within a 10% level of significance. In addition, potential monopolistic firms (IND_FIRM) are also positively and statistically related to higher disclosures, which allow us to control for the expected negative association of higher Herfindahl index to segment disclosure, whenever the firm is not the only player in the market (sample).

Globally, these econometric tests revealed that IFRS 8 seems to have been unsuccessful in reducing the historical association of competitive harm to lower segment disclosure. Quantitative analysis evidenced an increase on segment reporting, but a relevant part of the sample moved also in opposite way. Furthermore and as we described earlier, concerns of competition harm providing from the disclosure of segment information was still an important issue identified by respondents to IASB post implementation review (IASB, 2013b). Investors also responded to the IASB showing some concerns on the persistence, under IFRS 8, of managers' ability to explore segment aggregation rule.

¹² As discussed on IFRS 8 requirements, most of line-of-items are only mandatory, if they are disclosed on internal segment reporting analyzed by the CODM.

Nevertheless, in the next section we look at the different categories of change decomposing the potential partial effects of IFRS 8. Furthermore, we also provide alternative estimations for the competitive harm model under IFRS 8, which tests the robustness of our analysis.

Competitive Harm and Firms' Change on Segment Reporting

The “change model” should provide additional evidence to the partial effects of the new standard based in the way firms changed their segment disclosures. More specifically, we estimate a multinomial regression model for the influence of competitive harm for the three possible categories of change on segment reporting (“increase” category, “decrease” category, “no change” category). The model is estimated separately for both levels of business segment disclosure (number of segments and number of items) and by using multinomial regression, we may separate the estimation of IFRS 8 effect on “increase” and “decrease” categories. Since we aim to analyze competitive harm to positive and negative change, we selected the “no change” category as reference.

Table 6 – Multinomial regression model for competitive harm and change on the number of business segments

VARIABLES	BSEG_INC	BSEG_DEC
ABN_PROFIT_07	-1.155 **	-1.452 ***
ABN_PROFIT_2D_GR	-0.015	0.672
HERF_07	-0.183	0.110
HERF_2D_GR	-0.049	0.818
LAB_POW_07	-0.601**	-0.403 *
LAB_POW_GR	-0.505	-0.015
SIZE_GR	0.042	-0.144
Constant	-1.002 ***	-1.389 ***

*, **, ***, represents, respectively, statistical significant at 10% ($p < 0.10$), 5% ($p < 0.05$) and 1% ($p < 0.01$). Firms considered in the model in a total of 1866 (131 firms excluded from regression model due to missing values). LR test is 30,47 (p -value=0.007). Cox & Snell pseudo R^2 is 0.016. Multinomial model with “no change” category as reference. BSEG_INC (BSEG_DEC) represents firms that increased (decreased) their number of business segments.

Table 6 shows the results of the multinomial estimation model for the number of business segments. The second column exhibit the estimated coefficients for “increase firms” (BSEG_INC) compared to those firms that did not changed, while the third column shows the estimated coefficients for firms that decreased segment reporting (BSEG_DEC). If, as theorized, IFRS 8 would force firms that concealed the number of business segment to start disclosing their full operations, we should expect a positive association between our competitive harm proxies and the “increase” category (BSEG_INC).

However, results from the change model, shown on table 6, induce in the opposite direction. Statistical evidence suggests that firms with higher abnormal profitability (ABN_PROFIT_07) and labor power (LAB_POW_07), in the period previous to IFRS 8 adoption, are negatively related to the growth of business segments number. As for HERF_07 the estimated coefficient is also negative, but statistically insignificant. Thus, in general, the results do not confirm the hypotheses and seem to induce that firms previously subject to higher competitive harm were those that did not change their number of business segments.

Evidence for firms that declined their number of business segments (BSEG_DEC) attenuate the potential negative effect of IFRS 8, since ABN_PROFIT_07 and LAB_POW_07 shown a negative and significant association to BSEG_DEC. Thereby, firms with previously higher abnormal profitability and higher labor power are statistically associated to the “no change” category, instead of “decrease” category. Overall, the combined results for BSEG_INC and BSEG_DEC seem to suggest that IFRS 8 had a null impact on reducing the association of abnormal profitability, industry concentration and labor power with lower disclosure scores based on business operating segments. This evidence appears to be in line with the initial results, where we estimated the competitive harm model on segment disclosures provided under IFRS 8 adoption. We could not find a significant association for the control variables representing growth on the competitive harm variables and on firms’ size. Although not statistically significant, firms where business reportable segments decreased are positively related to abnormal profitability and industry concentration growth, which likely accentuate the negative relationship of those variables under IFRS 8.

Table 7 – Multinomial regression model for competitive harm and change on the number of key items

VARIABLES	ITEMS_INC	ITEMS_DEC
ABN_PROFIT_2D	-0.617	-0.534
ABN_PROFIT_2D_GR	0.082	1.054**
HERF_2D	-0.358	-0.313
HERF_2D_GR	-0.100	-1.004
LAB_POW	-0.584 **	-0.369
LAB_POW_GR	-0.352	-0.075
SIZE_GR	0.023	-0.084
Constant	-1.034 ***	-1.065 ***

*, **, ***, represents, respectively, statistical significant at 10% ($p < 0.10$), 5% ($p < 0.05$) and 1% ($p < 0.01$). Firms considered in the model in a total of 1866 (131 firms excluded from regression model due to missing values). LR test is 24,89 (p -value=0.036). Cox & Snell pseudo R^2 is 0.013. Multinomial model with “no change” category as reference. ITEMS_INC (ITEMS_DEC) represents firms that increased (decreased) their number of key items.

Table 7 shows the multinomial regression results for business key items change taking also firms that did not change as the category of reference. Once again, we achieve evidence contrary to the expected positive effect of IFRS 8. The coefficients for ABN_PROFIT_07 exhibit a negative association to firms that increased or decreased their level of key items, but however not statistical significant. In addition, table 7 exhibits a positive relationship between abnormal profitability growth (ABN_PROFIT_GR) and firms that declined their number of key items (ITEMS_DEC), when compared to firms that did not change. This result suggests that, in the IFRS 8 period of adoption, when abnormal profitability grows firms likely started to withhold important segment data, which could be a result of IFRS 8 requirements for line of items (only mandatory when reported to CODM). The last statistical evidence suggests that ITEMS_INC (firms with an increase on key items) is negatively associated to higher labor power (LAB_POW_07) in the period previous to IFRS 8. The negative relationship of all competitive harm proxies to ITEMS_INC highlight the null effect of IFRS 8 on firms subject to a more severe competitive environment. This suggests that these firms maintained their lower levels of items disclosure or likely adopted IFRS 8 with more caution. Other control variables for growth on competitive harm proxies and for firms size change (SIZE_GR) exhibit results, statistically non-significant..

General conclusion for all tests, performed on the effect of IFRS 8, suggest that the new standard, had no (or an insignificant) effect on reducing lower disclosure practices due to proprietary costs. Competitive harm model estimated for 2009 segment data still evidences a negative and statistical relationship between our competitive harm proxies (abnormal profitability, industry concentration and labor power) and the level of business segment reporting, despite the global increase in segment disclosures. Furthermore, the multinomial regression model did not show any relevant and positive association between firms that increased segment disclosures and competitive harm proxies from the pre-period of IFRS 8 adoption. In contrary, some significant evidence was found for a negative association of ABN_PROFIT_07 and LAB_POW_07 to “increase firms” in opposition to those that did not changed.

If expectations aligned with IASB were not confirmed, the future maturity on IFRS 8 implementation may force these EU listed firms, within a higher competitive harm environment, to increase their segment disclosures. Since we analyzed the first year of adoption, firms may acted with precaution, waiting for competitors’ reaction to the standard. Thus, in the future, accounting enforcement from IASB and other actors, such as auditors, may pressure these EU listed firms to improve their level of segment desegregation.

Robustness Check and Additional Tests

In order to turn our analysis more robust, we performed additional econometric tests and alternative estimations of the competitive harm model for the levels of segment reporting under IFRS 8:

- Multinomial regression analysis as an alternative to the previous estimated ordinal regression for key items, using the multi-segment sample and, for which the proportional odds assumption failed (appendix C);
- Competitive harm model estimation controlling for the level of industry aggregation (appendix D);
- Competitive harm model estimation controlling for the generic industry group classification (appendix E);
- Competitive harm model estimation controlling for the relevance of geographic segmentation over business segmentation (appendix F);
- Competitive harm model estimation controlling for the strong correlation of abnormal profitability to firm profitability (appendix G).

Despite providing an econometric alternative to ordinal regression validity, the application of a multinomial regression, also allows a different view of analysis to the competitive harm model and the number of key items disclosed by multi-segment firms (last column of table 5). These firms may represent five different categories of disclosure (from 1 to 5 key items). In order to simplify the analysis we estimate the model, taking full disclosure as reference (5 key items reported) and therefore we expect that lower categories of key items to be positively related to competitive harm proxies. For example, given the previous results we expect that abnormal profitability is more related to the disclosure of one key item than to the disclosure of all five key items (value of reference in the multinomial model). Robustness check provided by the multinomial model, shown on appendix C, confirm the previous negative association of ABN_PROFIT to the level of key items, since the categories of one and two items are those positively related to ABN_PROFIT in comparison to the “five items category”. Tabulated results also identify that, in average, firms with higher ABN_PROFIT disclosed one or two items per segment. The estimated coefficient for labor power, in the original ordinal regression was not statistically significant. However, with the higher detail provided by multinomial regression, we documented that, statistically, firms disclosing one item are more related to higher ABN_PROFIT than firms providing full disclosure (five key items).

On our main tests to the competitive harm model, the independent variables were calculated based on an industry group level of aggregation of two-digit, as used for example by Berger and Hann (2007). If it avoids obtaining many industries with a single firm, we may obtain some industries too broad in

their scope of classification. In this sense, a more disaggregated industry level would represent a more fine analysis of competition. Thus, in appendix D, we present the estimation of the competitive harm model using a classification based on three-digit industry groups, such as use by Nichols and Street (2007). The variables *ABN_PROFIT*, *HERF* and *IND_FIRM* were recalculated and introduced into the model, replacing those measured at a two-digit level. The results show that the significant negative relationship between abnormal profitability (*ABN_PROFIT*), industry concentration (*HERF*) and labor power (*LAB_POW*) with the level of business segment disclosure remain practically unchanged. In fact, using this level of industry aggregation, we now obtain a negative and statistical relation between industry concentration and the disclosure of key items by multi-segment firms.

In addition to previous robustness tests for the level of industry aggregation we restrict the competitive harm model removing firms classified in industry groups too generic on their scope. These industry groups could contain miscellaneous activities, which mean that firms within this broad classification may not be direct competitors. For this purpose, we removed miscellaneous industry groups and applied our model to a sample of 1508 firms, whose results are shown in appendix E. Once again, the evidence confirms that our competitive harm model is robust to the exclusion of potential diversified industry classifications, since the results for our main hypotheses (*ABN_PROFIT*, *HERF* and *LAB_POW*) are all confirmed.

Another robustness test was conducted to control for the relevance of geographic segmentation over the disclosure of business segments. Since Worldscope database does not inform which typology of segmentation corresponds to the operating segments (primary format of report under IFRS 8), some of our business disclosures could be less, because operating segments may be based on geographical segmentation. In these cases, firms may show extended segment disclosures that are not captured by business segment reporting. If this may seem a limitation of our model, we also defend that despite the lower business segmentation due to higher geographical disclosures, the results indicating a negative association to competitive harm proxies, would evidence that relevant business segment data is being omitted from the investors and other interested parties. Furthermore, it is also accepted that firms with higher international activities are less exposed to internal industry competition. Thus, we re-estimated our model, controlling for potential lower disclosure of business segments due to firms' segment reporting being based on geographical areas. For this purpose, we excluded from our tests, firms that showed higher and relevant geographical disclosure. This sample filter is defined by a binary response, where we identified if firms' geographical segmentation was higher and relevant. Identification process, started with the comparison between the number of geographical and business key items. If operating segments are based on geographic areas, their number of disclosed items should be higher

than those present by business segmentation. In addition, for these firms, we analyze the relevance of geographical segments, for which, we define as a satisfactory level geographic heterogeneity. With this assumption we want to capture “real” geographical segmentation and avoid excluding firms that may justify lower business disclosures with non-relevant geographic reporting. Thereby, we consider that firms with only two geographical segments do not represent a relevant desegregation. In contrast, firms with four or more geographic segments were considered relevant. In cases where the firm showed three reportable segments, we checked for heterogeneity, considering relevant whenever a firm presented country by country segmentation (e.g. Austria, France, United States) or different geographic areas such as continents (e.g. Europe, Africa, Asia). We consider non-relevant, for example, when the three segments represented regions of firms’ domicile country or when the segments represented home country and two broad regions (e.g. Austria, Europe, Rest of the World).

With the exclusion of firms associated to both, higher geographic key items disclosure and relevant geographical areas reported as segments, the robustness of the model was tested using a subsample of 1675 firms. Appendix F shows the results for all our measures of business segment disclosure and where, after controlling for relevant international firms, we find evidence consistent with our main results. Firms showing abnormal profitability, acting in less competitive industries (more concentrated) and subject to higher labor power continue to evidence a negative and statistically relationship to the overall level of business segment disclosure.

Finally we also estimate the competitive harm model controlling for the identified higher value of correlation between firm profitability and abnormal profitability (Pearson/Spearman correlation). We included firm profitability in the model (without the industry context), in order to control for two situations that could introduce noise on abnormal profitability results. First, firms with exceptional profitability may have an incentive to higher disclosure, trying to positively influence the market and reducing agency costs. Secondly, firms with higher negative profitability may withhold segment reporting to mask poor performance and avoid adverse reaction from the market. Thus and although the results of our competitive harm model including the two variables were in line with predictions, we added these robustness tests removing FIRM_PROFIT from the main model. Results on appendix G show that, overall, our model is robust to the removal of firm profitability as control variable. The negative relationship of ABN_PROFIT and BSEG_NUM, BMULTISEG and ITEMS_BS (using full sample) is still statistically significant, but however for the last two, only for a level of significance of 5%. However, the results for ITEMS_BS on multi-segments firms, showed the sensitivity of ABN_PROFIT to firm profitability, as the relationship revealed to be non-statistical significant. This may indicate that once a firm decided to separately disclosure business segments, the decisions to

practice lower disclosure through key items in order to protect abnormal profitability, loses relevance. In fact, the disclosure of profit/loss measure was in 2009 mandatory for firms presenting operating segments based on business desegregation.

4.3. Limitations and Future Research

Despite the importance of our findings, we identified some limitations that may work as starting point for future research. The use of Worldscope database allows us to adopt a substantially larger sample and therefore turn our regression model and results more robust, but it also limited in the available segment data, especially when we are using a level of disclosure based in the number of segment items. The use of all demanded items would increase the differences of disclosure between sample firms and improve the relevance of the results. Segment disclosures could be directly collected from firms' financial statements, which however, would difficult the use of a sample with the dimension of ours. Another limitation, which is common to most previous studies, comes from the use of only listed firms. This situation makes that unlisted firms are not considered as competition. However, since we used a larger sample, we included smaller listed firms that are omitted in some previous researches.

Our results are also limited in country by country analysis. Overall, the application of our competitive harm model to each EU country showed weak and mixed results (not tabulated). This could be due to the fact that the competitive harm model is more related to firms' characteristics on competition than to country analysis. Nichols and Street (2007) evidenced also limited country results. Exploring competitive harm on geographical disclosure is yet a challenge for research on segment reporting. If literature discusses, essentially, competitive harm due to industry factors, multinational firms may also be pressured to avoid the disclosure of financial information from their operations in more sensitive countries. The inclusion of non-European firms applying IFRS 8 could also improve the analysis, since it would likely increase the differences among firms based on country of origin. Another improvement to the model may come from including other control variables that may exercise influence on financial segment reporting, especially due to agency costs motivation.

Finally, we tested our competitive harm model using the first year of IFRS 8 adoption. However the maturity on its interpretation and adoption, accentuated by the potential enforcement from the IASB, Securities Commissions or Auditors, may lead to improvements in segment reporting over time and a decline on its negative association to competitive harm. Therefore, an analysis comprehending several years of IFRS 8 adoption would highlight the potential effect of the new standard. Equally, the analysis to the disclosure of an individual item may provide an additional view on segment reporting practices. For example, since segment total assets are, for exercises beginning in 2010, only mandatory

if disclosed internally to CODM, the examination of its change would improve evidence of how the management approach may use IFRS 8 to influence segment items disclosure.

5. CONCLUSION

The main objective of this paper was to investigate, if competitive harm still persists as a negative influence on the levels of firms' segment reporting and estimate the potential positive effect of IFRS 8. Despite addressing this problematic under the scope of a new standard, we aim to contribute to literature through our model specifications and sample differences relatively to previous research. We use an improved "competitive harm regression model" based in three competitive harm proxies (abnormal profitability, industry concentration and labor power), which were not tested together yet on the scope of IASB segment reporting standards. We also add a new control variable for industry concentration representing the expected contrary effect of potential monopolistic firms. The model was estimated with different regression techniques and in line with the different measures for segment disclosure score. In addition, we developed a an empirical model for estimating how firms previously associated to competitive harm reacted to change on segment reporting with the introduction of IFRS 8. We applied a multinomial regression model ("change model") comparing firms that increased and firms that declined segment reporting with those that did not change. Furthermore, we use a substantial larger sample of 13 EU countries, including a significant portion of small and medium size listed firms, which are likely more sensitive to competitive harm. For all these reasons, we believe that the relevance and timeliness of our research was justified and we expected our results to be a clearly contribution to proprietary costs theory on the practice of discretionary disclosure due to competitive harm.

Overall, our results showed that, under IFRS 8, competitive harm is still a factor associated to lower levels of segment disclosure and the standard did not have a significant effect in reducing such relation. However, and aligned with literature, we identified a significant increase in the number of reportable segments, with a general decline in single-segment firms. As for the disclosure of business key items, we found that the average disclosure on multi-segment firms decreased significantly. The majority of firms did not change segment reporting and a relevant part of the sample moved in fact, in the contrary way, which was especially observed on the negative change of disclosed key items. Country by country evidence on change, in the average number of reportable business segments and reportable key items, revealed mixed results. The non-mandatory requirements (only if reported to CODM) for disclosure in line of items may explain this decline of reporting. On the other hand, feedback statement on the post-implementation review of IFRS 8 documented that users are still

concern with the potential use of segment aggregation criteria by managers seeking to withhold segment information.

Applied to the pre and post period of IFRS 8 adoption, the estimated competitive harm model showed similar results on both periods. Evidence, documented an overall negative relationship between all competitive harm proxies and the level of business segment disclosure. If results for IAS 14R segment reporting confirm the persistence of competitive harm influence on lower disclosures, results from IFRS 8 reveal that the new standard seemed to have an insignificant effect on this issue. Under both standards, firms performing better than its industry mean are likely more motivated to aggregate financial segment data of their different activities. Through aggregation of potential segment data (number of segments and items per segment), firms are likely avoiding exposure to competitors about their sources of abnormal profitability. On other hand, firms acting in less competitive industries (higher industry concentration) continue to show a negative relationship to the level of segment disclosure. Evidence is statistically significant for the pre and post period of IFRS 8, which may suggest that EU firms persist to withhold segment data when the market shows a higher imperfect competition. The higher values of Herfindahl index for industry concentration are evidence for the existence of a powerful competitor with a higher market share compared to others. In this scenario, other firms are likely more reluctant to expose themselves, due to their higher sensibility to competition harm. The binary variable, measuring for potential monopolistic firms confirmed a positive association to segment disclosure, which controlled for the inverse expectation when industry concentration is close to its maximum. Finally, we also tested for the influence of labor power in the level of segment disclosures. Once again, we found a significant negative association, which improved under IFRS 8 adoption when estimating the model with full sample. If these results are strong when the full sample is used, the estimation of the model on key items reported by multi-segment firms revealed that, from the three proxies, only firms with higher abnormal profitability keep the negative association on both periods. This may suggest that, in general, the influence of a competitive harm environment, on lower level of items disclosure, decreases when firms already took the decision to desegregate their activities into business reportable segments. Furthermore, it may suggest that the referred negative influence is essentially related to firms' decision to present themselves as single-segment (non-disclosures).

We therefore conclude that competitive harm is still an influence for lower segment disclosure under IFRS 8. Additionally, robustness tests for the sensibility of the model to the level of industry aggregation, generic industry classification and to the relevance of geographical disclosure, confirmed our main results. Thus, if with the new standard this negative relationship still persisted, we analyzed

in addition, the potential partial effect of IFRS 8, separating the different categories of change. The analysis showed that firms with an increase on the number of business segments were significantly less related to abnormal profitability and labor power, under IAS 14R, than firms that did not change. This evidence seems to suggest that IFRS 8 did not have the expected enforcement effect on firms previously subject to competitive harm. On the other hand, we documented a significant association between firms that declined their level of key items and abnormal profitability growth. Once more, there is no evidence on the expected positive effect of IFRS 8.

We think that our research evidences the null effect of IFRS 8 on reducing the influence of competitive harm in segment disclosures. We believe that our results are an important input for the IASB Group, responsible for the post-implementation review of IFRS 8, since they confirm the continuous practice of lower segment disclosure due to competition concerns. In the final report of the IASB Group (IASB, 2013b), investors responding to IFRS 8 implementation showed some concerns that operating segment are being inappropriately aggregated. Despite its recent adoption, IFRS 8 was targeted for potential adjustments, which seem to exalt the relevance and timing of researching on this issue. Thus, we believe that segment reporting is, nowadays, one of the most important topics of research on firms' financial disclosure practices. Our results should work as an important contribution, not only to academic literature, but equally to accounting standard setters.

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APPENDIX

Appendix A – Sample comparison to similar literature

Authors	Stream of Research	Sample Size ^a	Scope
Thesis	Standard Adoption / Proprietary Costs	1997 / 1891	IAS 14R + IFRS 8 (13 EU Countries)
Literature on IAS/IFRS:			
- Street and Nichols (2002)	Standard Adoption	210	IAS 14 + IAS 14R (multi-country)
- Prather-Kinsey and Meek (2004)	Standard Adoption	146	IAS 14 + IAS 14R (28 Countries)
- Leuz (2004)	Proprietary Costs	109	Voluntary IAS 14R (Germany)
- Prencipe (2004)	Proprietary Costs	64	Voluntary IAS 14R (Italy)
- Nichols and Street (2007)	Proprietary Costs	160	IAS 14R (multi-country)
- Nichols et al. (2012)	Standard Adoption	335	IFRS 8 (14 countries [12 EU])
- Crawford et al. (2012)	Standard Adoption	150	IFRS 8 (UK)
- Pisano and Landriani. (2012)	Proprietary Costs	124	IAS 14R + IFRS 8 (Italy)
Literature on SFAS (US):			
- Street et al. (2000)	Standard Adoption	160	SFAS 14 + SFAS 131 (US)
- Botosan and Harris (2005)	Proprietary Costs	340	SFAS 14 + SFAS 131 (US)
- Ettredge et al. (2006)	Proprietary Costs	1293	SFAS 14 + SFAS 131 (US)
- Berger and Hann (2007)	Proprietary Costs	796	SFAS 14 + SFAS 131 (US)

^a Sample size is given by the largest number of firms-year. Tests of our competitive harm model are based on 1860 firms in 2007 and 1891 firms in 2009. For standard adoption quantity analysis we used the full sample based on 1997 firms. Multi-country sample is a sample based on countries from different continents and for which, the information on the number of firms by each country was partially omitted.

Appendix B – Description and measurement of independent variables for the competitive harm model

Abbreviations	Description	Measurement	Sign
ABN_PROFIT	Abnormal Profitability	Firm ROA – Industry ROA, where ROA = Firm Operating Income / Total Assets	-
HERF	Industry Concentration	Herfindahl Index at a Two-Digit Industry Group	-
LAB_POW	Labor Power	Firm Labor Costs / Firm Revenue	-
ENT_BAR	Entry Barriers	Firm Net Value of PPE / Firm Total Assets	+
SIZE	Size	Natural Logarithm of Firm Total Assets	+
LEV	Leverage	Firm Debt / Firm Total Assets	+
FIRM_PROFIT	Firm Profitability	Firm ROA	+
LIST_INT	Listing Status	Dummy: Listed Internationally = 1	+
IND_FIRM	Monopoly Industry	Dummy: Monopolistic Firm = 1	+

Appendix C – Multinomial regression for business key items disclosure on multi-segment firms under IFRS 8

VARIABLES	1 ITEM	2 ITEMS	3 ITEMS	4 ITEMS
ABN_PROFIT_2D	2.609 **	4.582 ***	-0.576	-0.380
HERF_2D	0.192	-0.420	-0.646	-0.193
LAB_POW	0.869 **	-0.167	0.237	0.406
ENT_BAR	0.168	-1.334 ***	-0.045	-0.327
SIZE	-0.852 ***	-1.005 ***	-0.469 ***	-0.081
LEV	-0.674 *	0.084	0.141	-0.584
FIRM_PROFIT	-1.786	-5.189 ***	0.367	-0.376
LIST_INT	-0.177	0.071	-0.172	0.213
IND_FIRM_2D	-2.161 **	-0.327	0.409	-0.094

Constant	1.541	5.332 ***	1.765 *	-0.187
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*, **, ***, represents, respectively, statistical significant at 10% ($p < 0.10$), 5% ($p < 0.05$) and 1% ($p < 0.01$). Number of observations (firms) is 1420. LR Chi-Square is 261,62 ($p < 0.01$). Pseudo R^2 of Cox & Snell is 0.168. Reference category represents full key items disclosures (firms with five key items).

Appendix D – Regression results controlling the level of industry aggregation under IFRS 8 adoption

VARIABLES	BSEG_NUM ¹ (ordered)	BMULTISEG (binary)	ITEMS_BS ² (ordered)	ITEMS_BS ³ (ordered)
ABN_PROFIT_3D	-1.852 ***	-2.122 ***	-1.871 ***	-1.270 **
HERF_3D	-0.440 **	-0.458 *	-0.521 ***	-0.474 **
LAB_POW	-0.519 ***	-0.650 ***	-0.528 ***	-0.306
ENT_BAR	-0.211	0.053	0.385 *	0.411
SIZE	0.622 ***	0.642 ***	0.794 ***	0.670 ***
LEV	-0.007	-0.022	0.012	0.344
FIRM_PROFIT	1.244 ***	1.423 ***	1.457 ***	1.395 **
LIST_INT	-0.272 *	-0.217	-0.083	-0.015
IND_FIRM_3D	0.192	0.161	0.474 ***	0.519 ***
Constant⁴	-	-1.912 ***	-	-
Number of Firms	1891	1891	1891	1420
LR test	206,44 ***	160,07 ***	330,83 ***	198,92 ***
Cox & Snell pseudo R²	0.103	0.081	0.161	0.129

*, **, ***, represents, respectively, statistical significant at 10% ($p < 0.10$), 5% ($p < 0.05$) and 1% ($p < 0.01$).

¹ Ordinal regression with ordered categories from zero to three business segments, which meets the assumption of proportional odds (parallel lines test). Last category includes observations with three or more business segment number.

² Ordinal regression with three ordered categories of key items disclosure, which meets the assumption of proportional odds. Lower category includes observations of zero, one or two items. Second category for observations of three or four items and a higher category for full key items disclosure.

³ Previous ordinal regression using a sub-sample of multi-segment firms.

⁴ On ordinal regression we obtain constant values for the different categories, which are all significant at a 1% level, but not showed individually.

Appendix E – Regression results controlling for generic industry classification under IFRS 8 adoption

VARIABLES	BSEG_NUM ¹ (ordered)	BMULTISEG (binary)	ITEMS_BS ² (ordered)	ITEMS_BS ³ (ordered)
ABN_PROFIT_2D	-1.643 ***	-1.930 **	-3.465 ***	-3.510 ***
HERF_2D	-0.785 ***	-1.426 ***	-0.605 ***	-0.003
LAB_POW	-0.646 ***	-0.740 ***	-0.458 **	-0.169
ENT_BAR	-0.065	0.074	0.250	0.252
SIZE	0.707 ***	0.743 ***	0.811 ***	0.676 ***
LEV	0.405 *	0.120	0.210	0.318
FIRM_PROFIT	1.129 *	1.312	2.979 ***	3.447 ***
LIST_INT	-0.293 *	-0.248	0.024	0.157
IND_FIRM_2D	0.566 *	0.597	0.732 **	0.595
Constant ⁴	-	-2.126 ***	-	-
Number of Firms	1508	1508	1508	1155
LR test	240,76 ***	165,41 ***	287,38 ***	166,27 ***
Cox & Snell pseudo R ²	0.148	0.104	0.174	0.134

*, **, ***, represents, respectively, statistical significant at 10% ($p < 0.10$), 5% ($p < 0.05$) and 1% ($p < 0.01$).

¹ Ordinal regression with ordered categories from zero to six business segments, which meets the assumption of proportional odds (parallel lines test). Last category includes observations with six or more business segment number.

² Ordinal regression with three ordered categories of key items disclosure, which meets the assumption of proportional odds. Lower category includes observations of zero, one or two items. Second category for observations of three or four items and a higher category for full key items disclosure.

³ Previous ordinal regression using a sub-sample of multi-segment firms.

⁴ On ordinal regression we obtain constant values for the different categories, which are all significant at a 1% level, but not showed individually.

Appendix F – Regression results controlling for geographical relevance for lower business disclosure under IFRS 8 adoption

VARIABLES	BSEG_NUM ¹ (ordered)	BMULTISEG (binary)	ITEMS_BS ² (ordered)	ITEMS_BS ³ (ordered)
ABN_PROFIT_2D	-2.364 ***	-3.215 ***	-3.379 ***	-2.666 ***
HERF_2D	-1.043 ***	-1.820 ***	-0.541 **	0.205
LAB_POW	-0.556 ***	-0.724 ***	-0.404 **	-0.089
ENT_BAR	-0.029	0.256	0.464 *	0.393
SIZE	0.762 ***	0.930 ***	0.960 ***	0.787 ***
LEV	-0.017	-0.077	-0.006	0.310
FIRM_PROFIT	1.814 ***	2.471 ***	3.299 ***	3.234 ***
LIST_INT	-0.136	0.057	-0.048	-0.076
IND_FIRM_2D	0.589 *	0.667	0.604 *	0.450
Constant ⁴	-	-2.756 ***	-	-
Number of Firms	1675	1675	1675	1322
LR test	293,96 ***	238,92 ***	409,17 ***	237,08 ***
Cox & Snell pseudo R ²	0.161	0.133	0.217	0.164

*, **, ***, represents, respectively, statistical significant at 10% (p < 0.10), 5% (p < 0.05) and 1% (p < 0.01).

¹ Ordinal regression with ordered categories from zero to four business segments, which meets the assumption of proportional odds (parallel lines test). Last category includes observations with four or more business segment number.

² Ordinal regression with three ordered categories of key items disclosure, which meets the assumption of proportional odds. Lower category includes observations of zero, one or two items. Second category for observations of three or four items and a higher category for full key items disclosure.

³ Previous ordinal regression using a sub-sample of multi-segment firms.

⁴ On ordinal regression we obtain constant values for the different categories, which are all significant at a 1% level, but not showed individually.

Appendix G – Regression results controlling for correlation effect of firm profit under IFRS 8 adoption

VARIABLES	BSEG_NUM ¹ (ordered)	BMULTISEG (binary)	ITEMS_BS ² (ordered)	ITEMS_BS ³ (ordered)
ABN_PROFIT_2D	-0.656 ***	-0.689 **	-0.615 **	-0.258
HERF_2D	-1.159 ***	-1.771 ***	-0.829 ***	-0.083
LAB_POW	-0.615 ***	-0.762 ***	-0.684 ***	-0.422 *
ENT_BAR	-0.049	0.190	0.456 **	0.436 *
SIZE	0.688 ***	0.718 ***	0.821 ***	0.678 ***
LEV	-0.009	-0.043	-0.010	0.252
FIRM_PROFIT	-	-	-	-
LIST_INT	-0.120	0.028	-0.008	0.015
IND_FIRM_2D	0.768 ***	0.805 **	0.911 ***	0.685 *
Constant ⁴	-	-1.944 ***	-	-
Number of Firms	1891	1891	1891	1420
LR test	259,76 ***	195,50 ***	328,53 ***	186,58 ***
Cox & Snell pseudo R ²	0.128	0.098	0.159	0.123

*, **, ***, represents, respectively, statistical significant at 10% ($p < 0.10$), 5% ($p < 0.05$) and 1% ($p < 0.01$).

¹ Ordinal regression with ordered categories from zero to four business segments, which meets the assumption of proportional odds (parallel lines test). Last category includes observations with four or more business segment number.

² Ordinal regression with three ordered categories of key items disclosure, which meets the assumption of proportional odds. Lower category includes observations of zero, one or two items. Second category for observations of three or four items and a higher category for full key items disclosure.

³ Previous ordinal regression using a sub-sample of multi-segment firms.

⁴ On ordinal regression we obtain constant values for the different categories, which are all significant at a 1% level, but not showed individually.