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DOES IFRS 8 IMPROVE THE FIRMS' INFORMATION ENVIRONMENT?

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Abstract

Purpose – This article analyzes the effect of IFRS 8 on the informational content of segment data. It aims to assess the change in quality of the financial analysts' and the shareholders' information environment due to the new segment reporting standard to verify the IASB's expectations and the conclusions of its post-implementation review.

Design/methodology/approach – Based on a sample of 250 companies listed on Euronext Paris in France, a country with poor legal protection for shareholders, over a nine-year period, the authors test whether the new standard makes the financial analysts' forecasts more accurate and reduces the implied cost of equity capital.

Findings – The findings show that IFRS 8 partially improves the informational content of segment data, partially supporting the outcome of IASB. The management approach may have forced some firms to change their segmentation to provide a more economic view of the business. The poor legal protection for shareholders in France may explain this result.

Research limitations/implications – Due to proprietary and agency costs, firms may withhold segment information whatever the standard used.

Practical implications – This study contributes to the ongoing debate about IFRS 8 and may interest financial statement users and the international standard-setter for such a criticized standard.

Originality/value – The results contribute to the segment reporting literature by addressing the partial improvement of information environment under the managerial approach in a country with lower investor protection.

Key words – IFRS 8, segment reporting, information environment, financial analysts' forecasts, cost of equity capital

Paper type – Research paper

With a view to achieving convergence with US GAAP, the international standard-setter regularly renewed some accounting standards. IFRS 8 - Operating Segments replaced IAS 14 - Segment Reporting on January 1, 2009 (or from earlier periods for early adopters). Segment information is important. It provides the users of financial statements a better understanding of risk and profitability for groups with many business activities and/or geographical areas.

These two standards adopt different approaches: a formalized approach for IAS 14 and a management approach for IFRS 8. IAS 14 specifies the way to realize the segmentation and the accounting information to be reported by segment. IFRS 8 is almost word for word the American standard SFAS 131. The required segments must be based on the breakdown used internally by the group's "chief operating decision maker" to allocate resources and to assess the performance of the operating segments. Furthermore, with the exception of the profit or loss per reportable segment, only the segment information used by group management to allocate resources to segments and assess their performance has to be disclosed.

For IASB, IFRS 8 enables the users to see the groups "through the eyes of management" by disclosing segment information that is relevant and important for the decision makers, thereby improving the transparency of financial data (IASB, 2006). For the endorsement of IFRS 8, the

European Commission's analysis confirms the expected improvement in the quality of segment reporting. It considers that adoption of this standard should have a good cost-benefit ratio and should give best relevant information. However, the main motivation of IASB with IFRS 8 was to meet the convergence target with the US GAAP. The international standard-setter aligned its new standard on existing US GAAP (the SFAS 131). There are some questions about the objectivity and reliability of reported segment data and, therefore, about the effective improvement of the management perspective. So far, published papers about IFRS 8 provide useful information about the new reporting practices regarding IFRS 8 application (Crawford *et al.*, 2012; ESMA, 2011; Franzen and Weißenberger, 2015; Nichols *et al.*, 2012).

This article analyzes whether the change relative to the new standard improves the informational content of published segment data. This topic is relevant for two main reasons. First, segment information disclosed by firms is important for financial statement users to analyze the risk and the financial situation of large diversified groups. Second, because IFRS 8 has been much criticized, it may be interesting to wonder whether the international standard-setter fulfils its main objective of building high-quality financial information with this new standard.

This article aims to extend the field of studies about IFRS 8 (Nichols *et al.*, 2013) to corroborate the conclusions of studies on the beneficial move from SFAS 14 to SFAS 131 (similar to IFRS 8) (Berger and Hann, 2003; Botosan and Stanford, 2005; Ettredge *et al.*, 2005; Hardin, 2009) and, above all, the international standard-setter's expectations and the findings of its post-implementation review (IASB, 2006, 2013) which considers that the management vision (the approach of IFRS 8) improves "users' ability to predict future results and cash flows". This question is still open to debate as few authors attempt to assess the economic consequences of disclosure under IFRS 8 and they obtain mixed results (Bugeja *et al.*, 2015; Franzen and Weißenberger, 2018; Kajüter and Nienhaus, 2017; Leung and Verriest, 2015).

To answer this question, the research studies the extent to which the changes generated by IFRS 8 improve the informational content of segment reporting. We analyze the effects of the management approach on the information environment of both the financial analysts and the investors. The financial analysts' informational environment is proxied with traditional estimates (earnings forecast errors and forecast dispersion) and the model of Baron *et al.* (1998) to measure the accuracy of public and private information sets incorporated into their earnings and the consensus. The investors' informational environment is assessed with the implicit cost of equity of the groups.

Institutional differences may make the implementation of IFRS different from one country to another, even for countries within the EU as shown by Liao *et al.* (2012) for France and Germany. Consequently, it may be interesting to focus on a single-country study to obtain a more homogeneous sample in terms of country attributes (Isidro *et al.* 2016). France is chosen for two main reasons. First, this country is one of the EU's major economies capital markets. Second, regarding La Porta *et al.* (2002, 2006), investor protection is lower in France compared with Anglo-Saxon countries such as the UK or the US (Chen *et al.*, 2016). So, by focusing on companies listed in France, this research addresses the issue of segment reporting in a country with poor legal protection for shareholders. In this situation, the improvement of environment information using the managerial approach of IFRS 8 is more questionable.

The sample consists of the 250 largest market capitalizations quoted on Euronext Paris over a nine-year period. First, the tests do not show an improvement of the financial analysts' informational environment when applying IFRS 8. The analysts' forecast errors do not decrease significantly with segmentation change under the management approach. Furthermore, companies reducing the number of segments under IFRS 8 experience a higher dispersion of analysts' forecasts. We just notice an increase in the precision of public information over the first two years of IFRS 8 adoption for firms with less-aggregated segmentation due to the

management approach. Second, difference-in-differences and regression tests show a smaller cost of equity capital for firms with more-aggregated segmentation when applying IFRS 8 suggesting an improvement in the investors' information environment. The new segmentation provides a more economic view of the business. We do not find similar results for less-aggregated firms under IFRS 8. The segmentation change from these companies may be more heterogeneous. This seemingly contradictory result between the impact on the financial analysts' or the investors' information environment may be explained by the fact that financial analysts and investors have different information needs.

Taken together, the tests partially confirm the results expected by IASB about the improvement in the quality of segment reporting when applying IFRS 8 (IASB, 2013). Unlike Bugeja *et al.* (2015), Franzen and Weißenberger (2015) and Leung and Verriest (2015) who do not obtain any significant results, our study partially corroborates Kajüter and Nienhaus' conclusion (2017) on higher quality of the segment data for investors under IFRS 8. It also agrees with the conclusions of studies on the beneficial move from SFAS 14 to SFAS 131 (Berger and Hann, 2003; Botosan and Stanford, 2005; Ettredge *et al.*, 2005; Hardin, 2009).

Compared with other studies, the poor legal protection for shareholders in France may explain the results. The management approach may have forced some firms to change their segmentation to provide a more economic view of the business and, therefore, improved the investors' information environment. The results contribute to the segment reporting literature by addressing the improvement of environment information under the managerial approach in a country with lower investor protection. Because IFRS 8 has been much criticized, this study contributes to the ongoing debate about the managerial approach. By issuing IFRS 8, the IASB partially fulfils its main objective to build high-quality financial information.

After a literature review, the research models are explained. The informational consequences relative to the application of IFRS 8 are then studied.

Background and hypothesis development

After presenting the change in practice observed on the application of IFRS 8, we analyze its consequences on the informational content of segment data.

The change in practice observed on the application of IFRS 8

With IFRS 8, the double segmentation by line of business and geographical area is replaced by segmentation used internally by the group's "chief operating decision maker" to estimate the performance of the operating segments and to decide on allocation of resources.

IFRS 8 requires the disclosure of additional reporting. However, with the exception of the profit or loss per reportable segment whose disclosure is mandatory, the measures are only required to be disclosed if they are reviewed by, or regularly provided to, the group management to make decisions. Furthermore, contrary to IAS 14, reported segment information is no longer formalized. Firms henceforth disclose financial information being sourced from the internal reporting system. In other words, under IAS 14, the group had to report a list of "formal" accounting segment information while IFRS 8 require the publication of segment measures based on the internal reporting system provided to the chief decision maker. IASB (2006) considers that segment information with IFRS 8 should be more relevant allowing investors to "see the group through the eyes of management". The European Commission (2007) validates these expectations.

However, the management approach was criticized because of the lack of formalization of data leading to greater flexibility about segment information to report and its definition. So, segment reporting might be less homogeneous and comparable between firms, and also less reliable and objective. Overall, because information is more prone to manipulation, it might be easier to

conceal bad performances achieved by some operating segments (European Commission, 2007).

Several articles analyze the change due to IFRS 8 using European (ESMA, 2011; Nichols *et al.*, 2012), Australian (Bugeja *et al.*, 2015), British (Crawford *et al.*, 2012) and German (Franzen and Weißenberger, 2015) samples. They show that IFRS 8 has not led to significant changes in disclosure practices. First, these studies note a limited impact on segmentation probably due to segmentation under IAS 14 already strongly based on the entity's organizational structure and internal reporting system, in accordance with the IASB's recommendations. On the one hand, IAS 14 primary segments and segmentation under the management approach are quite consistent. On the other hand, IFRS 8 has led to a significantly more detailed segmentation, although only a small increase, with a greater number of segments and fewer single-segment groups. Second, the number of items of disclosed segment information per segment has considerably decreased, as measures not reported to the chief operating decision maker are no longer required. Third, these data are still based on the financial accounting framework.

Under IFRS 8, the reported segment information shows some inadequacies. Firstly, the segment measures do not always reflect the detailed information used internally by managers (IASB, 2013) due to over-aggregated data or incorrectly-aggregated data. So, segment information might be less useful for the account users (Crawford *et al.*, 2012; ESMA, 2011). Secondly, the flexibility offered by IFRS 8 allows firms to withhold information to hide loss-making activities or sensitive information to competitors (Crawford *et al.*, 2012; IASB, 2013). However, in its post-implementation review, IASB considers that IFRS 8 improves financial information giving users a better understanding of the group's business model.

The informational content of segment data under IFRS 8

Numerous studies have attempted to assess the effect of SFAS 131 (almost word for word, the IFRS 8) on the informational content of segment data. They show that SFAS 131 leads to a less-aggregated segmentation which improves the informational content of segment data. It decreases the financial analysts' forecast errors (Berger and Hann, 2003) and increases analysts' reliance on public data (Botosan and Stanford, 2005). It also decreases the information asymmetry (Hardin, 2009) and improves the market's ability to anticipate future earnings (Ettredge *et al.*, 2005). However, this improvement in segment information for analysts and investors under SFAS 131 is not demonstrated for geographical information (Hope and Thomas, 2008; Hope *et al.*, 2009a, 2009b). In any case, these results are obtained in a different spatial and temporal context.

Few scholars have assessed the impacts of IFRS 8 on the informational content and obtained mixed results. On the one hand, based on an Australian sample, Bugeja *et al.* (2015) note that groups with less-aggregated segmentation under IFRS 8 do not improve the accuracy of analysts' earnings forecasts. So, the identification of additional segments does not bring useful additional information to financial analysts. With a European sample, Leung and Verriest (2015) show that IFRS 8 does not have any effects on the financial analysts' forecasts, the cost of equity capital and the bid-ask spread, including for groups with more detailed geographical information with the new standard. Lastly, Franzen and Weißenberger (2015) do not find any impacts on the information environment for the mandatory adoption of IFRS 8 for German firms. Compared to the early adopters of the management approach, the mandatory adopters do not experience a reduction in information asymmetry measured by the bid-ask spreads, the depths and the forecast accuracy. On the other hand, for German firms, Kajüter and Nienhaus (2017) note that segment data is more value relevant under IFRS 8 and decreases information asymmetry (proxied by the bid-ask spread).

Except Kajüter and Nienhaus (2017), the results do not corroborate the conclusions of studies on the move from SFAS 14 to SFAS 131 and, above all, do not validate the international standard-setter's expectations and the findings of its post-implementation review (IASB, 2006, 2013). This raises the question of the usefulness of IFRS 8 for the account users: shareholders and financial analysts. First, the above studies define a two-year or four-year sample with two sub-periods: the pre and post IFRS 8 periods. To consider the temporary loss of bearings and the potential learning process involved in applying a new standard, this study does not limit the analysis to the first years of implementation of the management approach. With a longer study period, it should also be able to counteract the impact of the financial crisis (Filip and Raffournier, 2014). Second, the effects of IFRS 8 may be different according to the institutional context. In a country with poor legal protection for shareholders, the improvement of environment information under the managerial approach is questionable. So, this research aims to corroborate (or not) the conclusions of the international standard-setter which considers that IFRS 8 improves the "users' ability to predict future results" with a longer study period focusing on a single country with a lower investor protection.

To analyze whether the change arising from IFRS 8 improves the informational content of segment reporting, we study the effects of the management approach on the information environment of both the financial analysts and the investors. The two following hypotheses will be tested:

H1. The change arising from IFRS 8 improves the information environment of financial analysts.

H2. The change arising from IFRS 8 reduces the implied cost of equity capital.

Methodology

After presenting the sample, the research models are explained.

Sample

The sample is built from the 250 highest market capitalization companies from Euronext Paris on December 31, 2009, at the end of the first year of application of IFRS 8. For homogeneity reasons, it only includes firms with an accounting date ended 31 December. Financial and insurance groups, those applying a non-IFRS accounting framework or with an IPO in 2009 are removed from the selection. After reviewing the annual reports, companies opting for early application of IFRS 8 are also excluded, as well as those with missing data or followed by less than three financial analysts or involved in a disposal or merger affecting the segmentation of the group. The sample is comprised of 126 companies.

The segment data are hand-collected from the 2008 and 2009 annual reports. As a first step, the segment information reported under IAS 14 for the financial year 2008 is compared with the segment reporting under IFRS 8 for the financial year 2009. The groups also applied IFRS 8 to restate the previous year's segment information reported as comparative information in their 2009 annual reports. Because 2008 segment information prepared under both IAS 14 (2008 annual report) and IFRS 8 (2009 annual report) is available, it is possible to verify whether the segmentation has been prepared in the same way and therefore estimate the change in the number of reported segments. As a second step, to consider the potential learning process involved in applying a new standard, the changes in segmentation for years subsequent to 2009 are also analyzed. Furthermore, a nine-year period is defined to reduce the consequences of the financial crisis.

Over nine years, the theoretical number of firm-year observations is 1,134. Some observations are removed when required data are missing, when the company is not listed over the whole period, when there are less than three financial analysts following the firm or when there is a

significant disposal or merger. After applying the above selection criteria, the sample includes 977 firm-year observations over the period of 2006–2014.

Research design

The study tests whether IFRS 8 improves the informational content of segment reporting for the financial analysts and the investors.

First, we focus on the financial analysts with traditional measures (earning per share (EPS) forecast errors and forecast dispersion) and the Barron *et al.* (1998) model (precision of public information, precision of idiosyncratic (private) information and consensus). These methodologies have never been used together to explain the effects of standards governing segment information such as the SFAS 131 or the IFRS 8. By using them together, it may provide a better understanding of the consequences of IFRS 8 for the financial analysts' informational environment. If the hypothesis 1 is validated, the management approach should lead to an improvement of financial analysts' ability to anticipate future earnings.

Second, many scholars study the relationship between the reported data and the cost of equity capital. They consider that an increase in the quantity of reported information and information of better quality should reduce information risk and information asymmetry and/or transaction costs, thereby improving stock liquidity and reducing the cost of equity capital (Botosan, 2006; Lambert *et al.*, 2007). Although some studies about the association between reported information and the cost of equity capital sometimes give contradictory results, most demonstrate a negative relationship, as expected (Francis *et al.*, 2008). Among other things, the implied cost of equity capital may reflect the quality of the financial information disclosed (Daske *et al.*, 2008). In other words, if IFRS 8 improves the informational content of segment reporting as expected by the IASB, the cost of equity capital should decrease.

The financial analysts' information environment. The following model is run to analyze whether the financial analysts' information environment changes under IFRS 8:

$$IE_{i,t} = \alpha_{i,t} + \beta_1 CHANGE_i + \beta_2 POST_i + \beta_3 POST_i \times CHANGE_i + \beta_4 SIZE_{i,t-1} + \beta_5 NBANA_{i,t} + \beta_6 VOLAT_{i,t-1} + \beta_7 VAREPS_{i,t} + \beta_8 LEV_{i,t-1} + \beta_9 LOSS_{i,t-1} + \beta_{10} M / B_{i,t-1} + \sum_{j=i}^7 \beta_{11,j} Industry_{i,j} + \sum_{z=1}^9 \beta_{12,z} Year_z + \varepsilon_{i,t}$$

With dependent variables:

$IE_{i,t}$: the information environment of firm i at date t . First, to analyze whether the adoption of IFRS 8 improves the analysts' information environment, we investigate whether the managerial approach leads to lower analysts' forecast errors and dispersion:

$$AFE_{i,t,N} = \left| \frac{EPS_{i,N} - FEPS_{i,t,N}}{P_{i,t-1}} \right| \times 100: \text{the absolute forecast error between the actual EPS for}$$

firm i and year N and the mean of forecasted EPS (FEPS) made by financial analysts at date t for firm i and year N , divided by the share price of firm i at the end of the previous month. Date t is the end of May [1];

$DISP_{i,t,N}$: the standard deviation of analysts' forecasted EPS for firm i at date t divided by the share price at the end of the previous month.

Second, the Barron *et al.* (1998) measures are used to capture the precision of analysts' public (PUBLIC) and private (PRIVATE) information. This model relates unobservable properties of financial analysts' information environments to observable properties of their forecasted EPS (dispersion, error, number of forecasts). Barron *et al.* (1998) assume that financial analysts observe two signals about future earnings: a public signal common across all analysts (public

information) and a private signal that is unique to each analyst (private information). In other words, financial analysts rely on public and private information to forecast future earnings. The private and public information can be used to compute the consensus among the financial analysts which is the proportion of analysts' total information that is public.

With IFRS 8, the segmentation relies on that used internally by the “chief operating decision maker” to allocate resources and to assess the performance of each operating segment. As this segmentation should be closer to the group's economic reality, segment information might be more relevant. It should improve the financial analysts' information environment with a decrease in EPS forecast errors (AFE) and in forecast dispersion (DISP) associated with an increase in the precision of public information (PUBLIC) compared with the total information available (public and private) and so an improvement of consensus (CONSENSUS). This improvement may concern companies increasing the number of reported segments and then disclosing more detailed segment information. A reduction in the number of segments may also improve the information environment if the new segmentation provides a more economic view of the business. However, it could have the opposite effect due to a higher aggregation of disclosed segment data.

With independent variables:

$POST_i$ takes the value 1 if the group's forecasts are based on segment information built with IFRS 8 and 0 otherwise;

$CHANGE_i$ measures the change in segmentation for firm i due to IFRS 8. The change in segmentation is first tested with the variable $CHANGE_SEG_i$ which takes the value 1 if the number of segments changes under IFRS 8 and 0 otherwise. The impact for the information environment can be different according to the kind of change (increase or decrease in the number of segments). This dummy is split therefore into two variables:

INC_SEG_i (DEC_SEG_i) is the absolute value of the relative variation in the number of segments if the group i increases (decreases) the number of reported segments and 0 otherwise.

The regression also includes the following control variables: $SIZE$ (natural logarithm of the market value of equity), $NBANA$ (natural logarithm of the number of analysts following the firm), $VOLAT$ (standard deviation of stock market returns for the 36 previous months), $VAREPS$ (the absolute value of the change in EPS over two years divided by the share price), LEV (debt to total assets), $LOSS$ (with the value 1 if the earnings is a loss and 0 otherwise), M/B (the market to book ratio), industry and year indicator variables (Byard *et al.*, 2011; Gu and Wu, 2003).

The analysis of coefficient β_3 for the interaction variable $POST \times CHANGE$ provides the answer to the improvement of information environment if the number of segments changes due to IFRS 8. If β_3 is statistically different from zero, then the groups changing their segment information with IFRS 8 experience an improvement of information environment between the pre and post IFRS 8 periods compared to firms with no change (control firms).

The investors' information environment. To analyze whether the shareholders' information environment changes under IFRS 8, the following regression tests the impact on the implied cost of equity capital:

$$CC_{i,t} = \alpha_0 + \alpha_1 CHANGE_i + \alpha_2 POST_i + \alpha_3 POST_i \times CHANGE_i + \alpha_4 BETA_{i,t-1} + \alpha_5 SIZE_{i,t-1} + \alpha_6 M/B_{i,t-1} + \alpha_7 LEV_{i,t-1} + \alpha_8 DISP_{i,t} + \sum_{j=1}^7 \alpha_9 Industry_{i,j} + \sum_{z=1}^9 \alpha_{10} Year_z + \varepsilon_{i,t}$$

With dependent variable:

$CC_{i,t}$: cost of equity capital of firm i for year t . Like Cao *et al.* (2015) and Daske *et al.* (2008), an average of four estimates based on Claus and Thomas (2001), Gebhardt *et al.* (2001), Easton (2004) and Ohlson and Juettner-Nauroth (2005) is calculated. It includes the share price and the forecasts at the end of May, i.e. five months after the fiscal year-end. At this date, financial statement information is available and then incorporated into the share price and the financial analysts' forecasts.

A significant negative α_3 coefficient would confirm the assumption that the cost of equity decreases when applying IFRS 8.

Several control variables are included: BETA (beta of firm calculated with monthly return observations over the previous five-year period), SIZE, M/B, LEV, DISP (dispersion of forecasted EPS in May), industry and year indicator variables (Dhaliwal *et al.*, 2005; Gebhardt *et al.*, 2001).

All variables are defined in Appendix. The data are obtained from I/B/E/S database (EPS forecasts, forecast dispersion, number of financial analysts and actual EPS), Worldscope database (share prices, market capitalization, leverage, market to book ratios) and the analysis of firms' financial reports (CHANGE variable).

Variables are winsorized at the 1% level and standard deviations are calculated with the clustering method by firm. The correlation matrix (untabulated) shows that the SIZE variable is highly correlated with the NBANA variable (nearly 0.80). So, the first model is run without the SIZE variable. The multicollinearity is also checked with the variance inflation factor (VIF coefficient). None of the variables has a VIF factor greater than 10.

The study uses panel data over nine years. According to the Breusch and Pagan tests and the Hausman tests, random effects models are run. Because of error autocorrelation and heteroscedasticity problems, a model with corrected standard errors is used [2].

Empirical Results

After a presentation of descriptive statistics, the empirical results of the regressions are analyzed.

Descriptive statistics

IFRS 8 gives rise to an increase, statistically significant at the 1% level, in the average number of reported segments which increased from 3.31 in 2008 with IAS 14 to 3.57 in 2009 with IFRS 8 (table 1).

[Insert table 1- The change in the number of reported segments with IFRS 8]

In accordance with the results obtained from prior scholars, IFRS 8 has a limited impact on segmentation. The number of segments remains unchanged for 93 groups (74%) in 2009. Of the 33 other companies, 23 disclose an increased number of segments with one more segment for 9% of the total sample, two more for 3%, three or more for 6%. The ten last groups report a reduced number of segments with one less segment for 5% of the total sample.

In the following years, ten more groups change their segmentation relative to the application of IFRS 8. Six decrease the number of segments (up to two operating segments less). The four other increase it (up to three segments). The new standard therefore leads to a change in the number of segments for 43 companies. Even with limited segmentation change, IASB (2013) considers that the management vision results in more useful data for users.

Table 2 shows the measures for the analysts' information environment and the cost of equity under IAS 14 and IFRS 8.

[Insert table 2- Descriptive statistics for dependent variables]

The comparison of IAS 14 and IFRS 8 shows a significant increase in the consensus and the cost of equity capital for the years when IFRS 8 is used. To complete the univariate statistics, we also use a difference-in-differences setting to compare the dependent variables of the no change firms (i.e. with no change in the number of segments) and the change firms (i.e. with an increase or a decrease in the number of segments) before and after the adoption of IFRS 8. The difference-in differences tests (untabulated) are statistically significant at the 10% level for the precision of private information, the consensus and the implied cost of equity capital. First, compared to firms with no change (control firms), companies increasing the number of segments under IFRS 8 experience a significant increase in the precision of private information from the IAS 14 to the IFRS 8 period. Segment disaggregation may have been an incentive for analysts to invest more in improving the precision of their private information. Second, firms with more-aggregated segmentation when applying IFRS 8 exhibit a significant decrease in the consensus and a smaller cost of equity capital. It suggests that financial analysts supplement firms' financial information by placing greater relative emphasis on their own private information compared with public information. It also suggests that the shareholders' information environment is improved under the managerial approach for firms with more-aggregated segmentation under IFRS 8.

Regression results

The impact of IFRS 8 on the financial analysts' forecasts. Table 3 presents the regression results on earnings forecast errors and forecast dispersion.

[Insert table 3-Results for the analysts' earnings forecast errors and forecast dispersion]

The first two regressions show a statistically significant deterioration of analysts' earnings forecast errors for the IFRS 8 period (i.e. the years 2010 up to 2014) for groups without any change (POST variable). When the number of segments changes under IFRS 8, we observe a higher accuracy of the analysts' forecasts for the 2010-2014 period (interaction variables: POSTxINC_SEG and POSTxDEC_SEG). However, the coefficients are not statistically significant. With the fourth regression, the dispersion of analysts' forecasts is positively associated with the decrease in the number of segments when applying IFRS 8 (POSTxDEC_SEG variable).

Table 4 analyzes the forecast characteristics. For firms increasing the number of operating segments under IFRS 8, the decrease in consensus is statistically significant (POSTxINC_SEG coefficient: -1.80) partially offsetting the observed improvement for groups without any change (POST coefficient: +8.63) (regression 6). In other words, financial analysts supplement firms' financial information by placing greater relative emphasis on their own private information compared with public information. This result may be explained by the statistically significant increase in the precision of private information (variable POSTxINC_SEG in regression 4) which confirms the first difference-in-differences result previously obtained. There is no evidence that forecasts rely more on public information for firms with a change in segmentation under IFRS 8. The results suggest that segment disaggregation may have been an incentive by analysts to invest more in improving the precision of their private information.

[Insert table 4- Results for the precision of analysts' public and private information and the consensus]

To check the stability in time of the results, we rerun the models over various time periods: a two-year (i.e. the last year under IAS 14 and the first year of IFRS 8 adoption: 2009 and 2010), four-year (i.e. the years 2008 up to 2011), six-year (the years 2007 up to 2012) and eight-year periods (the years 2006 up to 2013). We obtain the same results (untabulated) for the earnings forecast errors (AFE) and the forecast dispersion (DISP) whatever the sub-period is. However, these results are not robust for the PUBLIC, PRIVATE and CONSENSUS variables. For the two- and four-year periods, the tests do not demonstrate a significant increase in the precision of private information for firms increasing the number of segments under IFRS 8 (variable POSTxINC_SEG). On these sub-periods (i.e. the first years of IFRS 8 adoption), the analysts' forecasts rely more on public information for less-aggregated firms under IFRS 8. It suggests that the segmentation change when applying the management approach improves the financial analysts' information environment. For the two-year period, it also leads to an increase in consensus. Compared with the total information available (public and private), the precision of public information (PUBLIC) increases.

Taken together, the first hypothesis is not validated. The tests do not show an improvement of financial analysts' informational environment under IFRS 8. The analysts' forecast errors do not decrease significantly with segmentation change under the management approach. Furthermore, companies reducing the number of segments under IFRS 8 experience a higher dispersion of analysts' forecasts. We just notice an increase in the precision of public information on the first years of IFRS 8 adoption for firms with less-aggregated segmentation when applying the management approach.

The impact of IFRS 8 on the implied cost of equity. With the regressions in table 5, the impact of IFRS 8 on the investors' information environment is analyzed with the implied cost of equity capital.

[Insert table 5- Results for the implied cost of equity]

The second regression shows a significant negative impact on the cost of equity capital for firms with more-aggregated segmentation under IFRS 8 (POSTxDEC_SEG coefficient: -0.37). It confirms the difference-in-differences test. A change in segmentation and to an even greater extent segment aggregation under the new standard appear to improve the quality of investors' information environment.

When we rerun the model sequentially over various time periods (untabulated results), we obtain the same results for almost all sub-periods. There is just one exception for the two-year period: 2009 (the last year under IAS 14) and 2010 (the first year of IFRS 8 adoption). For this sub-period, we do not find any significant result. It may be explained by the temporary loss of bearings due to the segmentation change. Except for the first year of IFRS 8 adoption, the second hypothesis is validated for firms with more-aggregated segmentation under IFRS 8. In this situation, the shareholders' information environment is improved when applying the managerial approach.

Conclusion

This article tests the impact of IFRS 8 on both the financial analysts' and the shareholders' information environment over a nine-year period. The results partially support the outcome of IASB about the improvement in the quality of segment reporting when applying IFRS 8. First, the tests do not show any improvement of financial analysts' informational environment under IFRS 8. The analysts' forecast errors do not significantly decrease with segmentation changes. Furthermore, companies reducing the number of segments when applying IFRS 8 experience a higher dispersion of analysts' forecasts. We just notice an increase in the precision of public

information on the first years of application of IFRS 8 for firms with less-aggregated segmentation under IFRS 8. Second, the difference-in-differences and regression tests show a reduction in the cost of equity capital for firms with more-aggregated segmentation when applying IFRS 8. It suggests that the managerial approach improves the shareholders' information environment. The new segmentation provides a more economic view of the business. We do not find any improvement for less-aggregated firms. The companies increasing the number of segments under IFRS 8 may be more heterogeneous.

The seemingly contradictory results between the impact on the financial analysts' or the investors' environment are in line with the theory of Cho *et al.* (2015) which explains that firms engage in differentiated information disclosure to respond to different social and institutional pressures. Financial analysts and investors may have different information needs.

Overall, these findings make four main contributions to the segment reporting literature by addressing the improvement of environment information under the managerial approach of IFRS 8. First, this research extends the field of studies concerning IFRS 8 which mainly focus on the change in reported segment information with the application of the managerial approach. It analyzes the consequences of IFRS 8 on the informational content of segment data.

Second, this research corroborates the conclusions of studies on the contribution of the managerial approach in the US context with the move from SFAS 14 to SFAS 131. The results are consistent with Kajüter and Nienhaus' conclusion (2017) that IFRS 8 improves the quality of the segment data for investors under the management approach. Even if these results partially confirm the outcome of IASB about the improvement in the quality of segment reporting, we do not demonstrate the international standard-setter's expectations (IASB, 2006) and the findings of its post-implementation review (IASB, 2013) which considers that IFRS 8 improves "users' ability to predict future results and cash flows".

Third, the scholars studying the impact of the management approach (SFAS 131 or IFRS 8) usually define a variable measuring the increase of segments when applying the management approach. They consider that it becomes more difficult to withhold information with additional segments. These firms are supposed to disclose more detailed segment information, leading to an improvement in the information content of segment data (Berger and Hann, 2003; Botosan and Stanford, 2005; Hardin, 2009). The scholars do not test the impact on the information environment for firms with a reduction of segments under the new standard. However, these firms can also improve the information environment, as demonstrated in the article, if the new segmentation provides a more economic view of the firm business allowing the users to see the groups "through the eyes of management" by disclosing segment information that is relevant and important for the decision makers. It is therefore important to analyze the impact for the information environment under IFRS 8 according to the kind of change: increase or decrease in the number of segments. The proxy used to assess the segmentation change may explain the lack of results for some studies.

Fourth, the article analyzes the contribution of IFRS 8 in a European context, especially with regard to France, a country with poor legal protection for shareholders compared with Anglo-Saxon countries as the UK or the US for example. Unlike other studies (Bugeja *et al.*, 2015; Franzen and Weißenberger, 2018; Leung and Verriest, 2015), we demonstrate that IFRS 8 partially improves the informational content of segment data for investors. The lower investor protection in France may explain this result. When assessing the informational consequences of new mandatory accounting standards, scholars should always take care of the level of legal protection for shareholders.

Because this new standard has been much criticized, this study also provides interesting feedback for financial statement users and accounting regulators. It shows that, once again, with the publication of IFRS 8, the IASB partially fulfils its main objective of building high-quality financial information.

Whatever the standard, some companies always conceal segment information due to proprietary and agency costs (Berger and Hann., 2007; Botosan et al., 2005) by managing the segment reporting, the allocation of common charges and the transfer prices. These items require a certain degree of judgment and may therefore lead to discretionary/opportunistic behaviors. In other words, when a firm wants to withhold information, a new segment reporting standard may not have any impact on the quality of the information environment. In future research, scholars could address the issue of the informational content of segment data under the management approach by including the risk of firms' opportunistic behaviors.

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Appendix - Variable definitions

Variables	Definition
Dependent variables	
AFE	The absolute forecast error between the actual earnings per share (EPS) and the mean of forecasted EPS made by financial analysts, divided by the share price at the end of the previous month.
DISP	The standard deviation of analysts' forecasted EPS divided by the share price at the end of the previous month.
PUBLIC	The precision of analysts' public information.
PRIVATE	The precision of analysts' private information.
CONSENSUS	The proportion of analysts' total information that is public: PUBLIC/(PUBLIC+PRIVATE).
CC	The implied cost of equity capital is an average of four estimates based on Claus and Thomas (2001), Gebhardt et al. (2001), Easton (2004) and Ohlson and Juettner-Nauroth (2005).
Main independent variables	
POST	The variable equals to 1 if the group's forecasts are based on segment information built with IFRS 8 and 0 otherwise.
CHANGE_SEG	The variable takes the value 1 if the number of segments changes under IFRS 8 and 0 otherwise.
INC_SEG (DEC_SEG)	The absolute value of the relative variation in the number of segments if the firm increases (decreases) the number of reported segments and 0 otherwise
Control variables	
SIZE	Firm size is measured as the natural logarithm of the market value of equity.
NBANA	Analyst coverage is measured as the natural logarithm of the number of analysts following the firm.
VOLAT	A measure of firm risk, computed as the standard deviation of stock market returns for the 36 previous months, annualized.
VAREPS	The absolute value of the change in EPS over two years divided by the share price at the end of the previous year.
LEV	Leverage is measured as the ratio of total debt to total assets.
LOSS	This variable equals to 1 if the earnings is a loss and 0 otherwise.
M/B	The market to book ratio.
BETA	The beta of firm calculated with monthly return observations over the previous five-year period.
Industry effect	Dummy variables according to SIC two-digit classification.
Year effect	Dummy variables for each year.

Measurement of the implied cost of equity capital

Like Cao *et al.* (2015) and Daske *et al.* (2008), an average of four estimates is calculated. The estimates are based on the residual income valuation models and the abnormal earnings growth valuation models.

The residual income valuation models

Claus and Thomas (2001):

$$P_t = BVS_t + \sum_{i=1}^5 \frac{EPS_{t+i} - r \times BVS_{t+i-1}}{(1+r)^i} + \frac{(BPS_{t+5} - r \times BVS_{t+4}) * (1+g)}{(r-g) \times (1+r)^5}$$

With P: share price; BVS: book value of equity per share measured at the beginning of the year when $t=0$ and estimated when $t > 0$; EPS: financial analysts' EPS forecasts; g: expected growth rate of residual income and r: implicit cost of equity capital.

Gebhardt *et al.* (2001):

$$P_t = BVS_t + \sum_{i=1}^3 \frac{EPS_{t+i} - r \times BVS_{t+i-1}}{(1+r)^i} + \frac{EPS_{t+T+1} - r \times BVS_{t+T}}{r(1+r)^T}$$

After three years, the authors assume that the company's return on equity (EPS_t/BVS_{t-1}) converges linearly with the industry median return on equity. After 12 years (T=12), the residual income is assumed constant.

For the residual income valuation models, after the period t+3, the authors assume clean surplus to calculate future book values of equity: $BVS_{t+i} = BVS_t + EPS_{t+i} - DPS_{t+i}$

With $DPS_{t+i} = EPS_{t+i} \times k$ (k: average dividend payout ratio calculated over the previous three years).

The abnormal earnings growth valuation models

These models can only be run for companies with positive earnings growth rates.

Easton (2004):

$$P_t = \frac{EPS_{t+2} + r \times DPS_{t+1} - EPS_{t+1}}{r^2}$$

With DPS: financial analysts' dividends per share forecasts.

Ohlson and Juettner-Nauroth (2005):

$$P_t = \frac{EPS_{t+1}}{r} * \frac{g_c + r \frac{DPS_{t+1}}{EPS_{t+1}} - g_l}{(r - g_l)}$$

With g_c : short-term EPS growth rate = $\frac{EPS_{t+2} - EPS_{t+1}}{EPS_{t+1}}$; g_l : expected rate of growth of abnormal earnings beyond year t+1.

The data are obtained from Datastream and I/B/E/S databases.

¹ The tests are also run with analysts' forecasted EPS at the end of April and with the median error. The results are not significantly different.

² In most studies in empirical accounting research, endogeneity is an important concern. The econometric relations might be driven by unobserved hidden variables. To prevent this bias, we use different commonly applied econometric approaches to the endogeneity problem. First, we run difference-in-differences regressions to analyze whether companies with segmentation change under IFRS 8 experience an improvement in the quality of segment reporting between the pre and post IFRS 8 periods compared to firms with no change (control firms). Second, following Nikolaev and van Lent (2005), we also use fixed effects estimation to capture any endogeneity driven by underlying unobservable firm-level characteristics. Our results are robust to the inclusion of these fixed effects for both the financial analysts' and the shareholders' information environment.