The Impact of IFRS 8 on Financial Analysts' Earnings Forecast Errors: EU Evidence

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Abstract

While the IASB has eliminated virtually all the differences between US GAAP and IFRS with respect to segment reporting, the quality of segment disclosure after IFRS 8 remains questionable, with the European Parliament only endorsing IFRS 8 after a great deal of scrutiny and much debate. We investigate the impact of segment information quality and quantity on analysts' earnings forecasts after the adoption of IFRS 8.We further address how country-level enforcement influences this relationship using a sample from EU countries. The findings reveal that the quality and quantity of segment information are associated with more accurate earnings forecasts following IFRS 8. Furthermore, the results suggest that enforcement plays a pivotal role in shaping the impact of the principles-based IFRS 8. These findings contribute to the ongoing debate on the quality of segment information under the management approach and role of accounting regulation enforcement. They also provide early evidence on the usefulness of country-by-country reporting.

Introduction

This study examines the impact of changes in segment information quality on analysts' earnings forecasts after the adoption of IFRS 8 based on a sample of large firms in the European Union (EU). In 2006, the International Accounting Standards Board (IASB) issued IFRS 8 "Operating Segments" to replace IAS 14 Revised "Segment Reporting" as part of the IASB-FASB convergence project (IFRS 8, para.2). While IAS 14R was based on the management approach modified for risk and rewards, IFRS 8 adopted the full management approach, which requires that operating segments be identified based on those internal reports that are regularly reviewed by the Chief Operating Decision Maker (CODM).

The full management approach was first introduced in 1997 in the US SFAS 131, "Disclosures about Segments of an Enterprise and Related Information". Following this, the literature addressed various issues such as the information disclosed, reporting disincentives (i.e., agency and proprietary costs), and the economic consequences of disclosure (Botosan & Stanford, 2005; Ettredge, 2002; Herrmann & Thomas, 2000a; Hope & Thomas, 2008; Hope, Thomas, & Winterbotham, 2009; Nichols, Street, & Gray, 2000; Wang et al., 2011). However, few studies have examined these issues in the context of the EU (Crawford et al., 2012; Nichols, Street, & Cereola, 2012; Leung & Verriest, 2015; André, Filip, & Moldovan, 2016). Furthermore, the findings regarding the impact of the management approach on analysts' earnings forecast errors of US firms are inconclusive to date (Berger & Hann, 2003; Botosan & Stanford, 2005; Hope, Thomas, & Winterbotham, 2006).

The IASB post-implementation review documents that an investigation of the consequences of IFRS 8 would help resolve uncertainties about the adequacy of disclosures (IASB, 2013; Nichols, Street, & Tarca, 2013). Therefore, we examine how the anticipated increase in geographical fineness and decrease in the number of items disclosed under IFRS 8 affects analysts' earnings forecast errors. In so doing, we extend the ongoing debate on the quality of segment information under the management approach by providing evidence on how it enhances users' decision-making effectiveness. Specifically, we provide evidence on the usefulness of IFRS 8 to a sophisticated user of segment information, namely analysts, and clarify

which attributes of segment information help them to produce more accurate earnings forecasts. Our findings are important given the inconsistent findings in the existing literature regarding the impact of the management approach on analysts' earnings forecast errors. Our paper also provides timely evidence on the usefulness of country-by-country reporting, an important issue given the various legislative proposals to mandate country-by-country reporting in the EU and the US (KPMG 2014; OECD 2015).

Although one of the anticipated benefits of common accounting standards in the EU is the reduction of country differences and the consequent improvement in comparability, variations in disclosure practices may remain (Armstrong et al., 2010; Ball, Kothari, & Robin, 2000; Ball, Robin, & Wu, 2003; Daske et al., 2008; Holthausen, 2009). While the European Securities and Market Authority works to ensure uniform and timely implementation of regulations such as IFRS in member states, the wide diversity of enforcement systems across EU countries in terms of design, procedures and outcomes (Berger, 2010) can impede this goal. Therefore, evidence on the role of institutional settings and in particular enforcement, is needed to fully understand financial reporting outcomes (Holthausen, 2009).

While several studies examined the role of institutional settings, much of this literature focussed on institutional factors as drivers of IFRS outcomes in general (Li, 2010; Byard, Li, & Yu, 2011; Ahmed, Neel, & Wang, 2013; Christensen, Hail & Leuz, 2013; Houqe, Easton & van Zijl 2014). Our study instead examines how country-level enforcement systems shape firm-level changes in disclosure and assesses the impact of these changes under a specific standard (IFRS 8). IFRS 8 provides more guidelines on geographical fineness disclosures than its predecessor standard, mandating the disclosure of revenues and assets by country of domicile and for each individual country with significant revenues and/or assets. In contrast, it mandates less items of disclosure, mandating only the disclosure of a profit or loss and total assets at the segment level for all firms. Instead, other items of disclosure depend upon the particular circumstances of each firm. Specifically, other line items must be disclosed only if they are included in the segment profit/loss or asset measures or if management reviews them regularly (IASB, 2006)[1]. Such a

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[1] These items are: assets, liabilities, external revenues, internal revenues, interest revenue, interest expense (or net interest), depreciation and amortization, other material items of income and expense, interest in profit or loss of associates and joint ventures

unique setting should add to our understanding of the impact of changes in accounting regulations and the importance of enforcement in determining the outcomes of financial reporting requirements.

We hypothesize that if IFRS 8 is of higher quality or an improvement on IAS14R, the impact of more disaggregated geographical information should outweigh the impact of mandating fewer items of disclosure for all firms, and these simultaneous changes should be associated with smaller analysts' earnings forecast errors. However, the persistence of substantial differences in accounting regulation enforcement at the country level should mean that the impact of the standard is not uniform across countries. Therefore, we hypothesize that the impact of IFRS 8 on analysts' earnings forecast errors will vary across countries. We use an accounting enforcement proxy developed by Christensen, Hail & Leuz (2013) to provide evidence on the role of enforcement. In addition to being an updated proxy of enforcement, it is likely to outperform general legal enforcement proxies (Preiato, Brown, & Tarca, 2015).

Our findings suggest that more country-specific disclosures and fewer items per segment under IFRS 8 are associated with more accurate earnings forecasts. While more country-specific information under IFRS 8 may result in more efficient use of country-specific factors such as inflation and interest rates, GNP, and foreign currency exchange rates, the adoption of a principles-based IFRS 8 may have also reduced the disclosure of non-relevant items, therefore mitigating the harm associated with noisy disclosures in the pre-IFRS 8 period. In addition, the results demonstrate the pivotal role that institutional settings, in particular the strength of country level enforcement systems, play in determining the quality of financial reporting outcomes and the consequent benefits associated with the adoption of accounting regulations. Overall, these results support the IASB view that firms will disseminate more relevant information following the adoption of the management approach.

The remainder of this paper is structured as follows. Section two provides an overview of IFRS 8, section three discusses the related literature, section four presents the hypotheses,

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accounted for using the equity method, income tax expense or income, material noncash items other than depreciation and amortization, investment is associates and joint venture and additions to net current assets (Paragraph 8.23 and Paragraph 8.24)

section five explains the research design, section six presents the results, and section seven concludes the paper.

2. Background

The IASB issued the controversial standard IFRS 8 "Operating Segments" to supersede IAS14R which adopted the management approach, similar to the requirements of SFAS 131. The core principle of this approach is to report segment information through the eyes of management, which, IASB argues, enhances the relevance of the information (IASB, 2006). The standard introduces important changes to the rules for the segment identification, measurement and disclosure of segment information. It requires the identification of reportable segments based on internal reports about components of the entity that are regularly reviewed by the CODM. The IASB has also refused to mandate specific line items disclosures or a specific measure of segment performance because the core principle of the standard is to report from a management perspective. Thus, IFRS 8 is considered a more principles-based standard than IAS14R because it emphasizes management judgment over detailed guidance (IASB, 2013).

For the first time, IFRS 8 introduces entity-wide disclosures that are required even when an entity has only one reportable segment. These comprise three components, namely, (i) narrative information about each product and service or groups of products and services; (ii) revenues and assets by country of domicile and for each individual country with significant revenues and/or assets; and (iii) revenues from transactions with major customer(s) if a single external customer accounts for 10% or more of an entity's total revenue[2]. However, entity-wide disclosures tend to be poorly understood and inconsistently applied across firms (Crawford et al., 2012; IASB, 2013).

IFRS 8 has generated much debate among users, regulators and preparers, particularly in the EU. The EU Parliament (EP) opposed its endorsement and asked for further investigation and analysis of its potential impact. However, while the EP endorsed the standard, heated debate continues on the effectiveness of this approach. For instance, the identity of the CODM and the

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[2] This need not be disclosed if the information in unavailable or the cost is excessive in which case this must be disclosed.

aggregation criteria are two issues that could cause practical problems for preparers and auditors. According to IFRS 8, the first and critical step in preparing a segment information report is to identify the CODM. While this is usually the highest level of management (such as the managing director, the chief executive officer or the chief operating officer), it is a function rather than a specific title and can be performed by either a person or a group (such as the board of directors, executive committee, or management committee) (IASB, 2006). Identifying the CODM can therefore be problematic because it depends on the entity's management structure and processes. Thus, almost half of the post-implementation review (PIR) responses from preparers and auditors confirmed that the concept is difficult to understand and apply (IASB, 2013). In contrast, investors tended to be concerned that too much operating segment aggregation could take place, thus limiting the usefulness of the information disclosed (IASB, 2013).

Further concerns raised include the use of non-IFRS measures, the potential loss of geographical information, and the abuse of management discretion. Unlike the preceding standard that required segment information to be produced using the same methods as used in the consolidated statements, the management approach has not identified or recommended a single measure for any financial item. While this might enable investors to better understand managements' decision making, this diversity in measurement may impede their ability to compare similar segments across firms or even within a firm. Another tension around IFRS 8 is the expected decrease in geographical disclosures because secondary segments are no longer required. Given this lack of specific disclosure rules, it is not surprising to find that users were generally concerned that IFRS 8 may encourage management to act in their own self-interest and manipulate segment reporting and that the objectivity of the reported information may be more questionable under the management approach (Berger & Hann, 2003; Crawford et al., 2012; ESMA, 2011; IASB, 2013).

The quality of segment information has been linked to the predictability of earnings (Herrmann & Thomas, 1997; Kou & Hussain, 2007), and the majority of analysts' believe that segment performance data are the most useful information for investment decision making (Berger & Hann, 2003). For instance, Healy, Hutton & Palepu (1999) documented that an improvement in segment disclosure is among the most cited reasons why analysts upgrade annual

ratings of firm disclosures, and Abraham, Marston & Darby's (2012) surveys revealed that segment information is among the most relevant and useful form of information for UK analysts.

We argue, therefore, that the benefits of IFRS 8 are a function of how the anticipated changes in segment information post-IFRS 8 adoption impact the quality of analysts' earnings forecasts. However, the variation in financial reporting environments and institutional settings across EU countries can affect this; therefore, we examine how country level enforcement shapes the anticipated benefits of the principles-based IFRS 8. The literature has established that the quality of financial reporting and its consequences are affected by three major factors: firm-level reporting incentives, regulation quality, and institutional settings (Ball, 2006; Ball, Kothari, & Robin, 2000; Daske et al., 2008; 2013; Kvaal & Nobes, 2010; Nobes, 2006; 2011). For instance, several studies find that the substantial capital-market benefits around IFRS are conditioned by strong enforcement systems to ensure proper implementation and enforcement (Byard, Li, & Yu, 2011; Christensen, Hail & Leuz, 2013; Daske et al., 2008; Li, 2010). However, Houqe, Easton & van Zijl (2014) documented that the impact of IFRS on information quality is higher in low investor protection countries, while Ahmed, Neel, & Wang (2013) argued that the enforcement regime has no impact on accounting quality if the regulations are looser and allowed for increased managerial discretion.

3. Literature review

The impact of IFRS 8 on segment disclosure

IFRS 8 emphasizes the importance of reporting revenues and assets by country of domicile and each individual significant country. Therefore, it is not surprising that prior studies have found that the fineness of geographical information increased significantly after the introduction of IFRS 8. Crawford et al. (2012) conducted an empirical analysis of FTSE 250 firms, and Nichols, Street, & Cereola (2012) did likewise for 335 firms in continental Europe. Both reported substantial improvement in the disaggregation of geographical information. Similarly, Leung & Verriest (2015) found significant increases in the numbers and the fineness of the geographical segments one year following the introduction of IFRS 8. In a recent study, Cereola, Nichols &Street (2017) revealed that the requirement to disclose material countries

under IFRS 8 resulted in a significant number of companies reporting disaggregated revenues at the individual country level.

In contrast, the number of items disclosed per segment declined following IFRS 8. Crawford et al. (2012) and Nichols, Street, & Cereola (2012) report that the number of items disclosed per operating segment and as part of entity-wide disclosures substantially decreased under the management approach. Similarly, Bugeja, Czernkowski & Moran (2015) used all Australian listed firms to document a reduction in the number of line-item disclosures whilst Leung & Verriest (2015) documented a loss of information about geographical segment income.

The impact of segment disclosure under IFRS 8 on analysts' earnings forecast errors

Although prior research has examined the changes in segment-reporting practices after IFRS 8, the usefulness of those changes remains unclear. A common approach employed to test the usefulness of segment information is to consider the impact this information has on earnings forecasts precision. Previous studies document the usefulness of both overall and specific types of disclosures for analysts' predictions (Beretta & Bozzolan, 2008; Hope, 2003a; 2003b; Lang & Lundholm, 1996; Yu, 2010). For segment information, the fineness theorem suggests that the disclosure of disaggregated data is preferable to the disclosure of only consolidated data (Herrmann & Thomas, 1997). This should enable analysts to better evaluate risk and profitability and therefore should improve the quality of their predictions.

Early evidence using mechanical-based forecasts supported the fact that the integration of segmental information with industry or country projections outperformed consolidated-based forecasts (Balakrishnan, Harris, & Sen, 1990; Kinney, 1971; Mande & Ortman, 2002; Roberts, 1989). However, mechanical-based forecasts have limitations and the integration of external data with internal data is effective only if the segments are properly classified and correspond to specific industries or economies. In the case of geographical disclosures, while external economic forecasts are generally available for individual countries, most firms group geographic segment information into regions such as Europe or Asia Pacific, which further complicates the integration of external and individual firm data (Roberts, 2010).

In contrast, the forecasts of financial analysts provide observable and actual measures of earnings predictability by sophisticated users of financial statements (Hope, Thomas, &

Winterbotham, 2006). There is evidence that analysts' earnings forecasts are greatly superior to mechanical models as proxies for investors' expectations because they incorporate much of the information available to market participants (Brown et al., 1987; Kim & Schroeder, 1990; Lobo, Kwon, & Ndubizu, 1998) and they have a clear impact on investors' investment decisions (i.e., stock prices and firm values) (Firth & Gift, 1999; Hope, Thomas, & Winterbotham, 2006). Therefore, it is likely that rational investors form their expectations using analysts' forecasts (Hussain, 1997). Similar to the mechanical forecasts literature, Baldwin (1984) found that the accuracy of these forecasts increased after the introduction of line-of-business requirements, particularly for multi-segment firms with no prior segment disclosure.

After the adoption of the management approach in the US, Berger and Hann (2003) found that analysts' earnings forecast errors significantly decreased for firms that changed the number of segments reported after SFAS 131. In contrast, Botosan and Stanford (2005) reported that analysts' earnings forecast errors instead increased for first time reporters. With regard to IFRS 8, Leung and Verriest (2015) when examining analysts' earnings forecast errors and dispersion as well as bid–ask spreads and implied cost of capital suggested that there are no economic benefits associated with the adoption of IFRS 8 in the EU, even for firms with an increase in the number of items or segments reported or in geographical fineness. Likewise, André, Filip, & Moldovan (2016) concluded that, post IFRS 8, financial analysts do not always benefit from increased segment reporting quality and that too many items of information may impair their ability to accurately forecast earnings.

Our study differs from Leung & Verriest (2015) and André, Filip, & Moldovan (2016) in several important respects. While they used only two years' data to explore pre- and post-IFRS 8 periods, we use a relatively longer period, four years. Moreover, we measure segment disclosure in a different way. While André, Filip, & Moldovan (2016) used cross-segment variability in return, we use country-specific disclosure to measure the fineness of geographical disclosures, arguing that country level disclosures could be more easily and effectively used by analysts. In addition, our study extends the literature by addressing the effects of country level enforcement on the impact of the fineness of geographical information and the quantity of segment information on analysts' earnings forecast error.

Extensive research supports the notion that disclosure quality and its consequences are affected by mandatory regulatory intervention, reporting incentives, and institutional factors (Ahmed, Neel, & Wang, 2013; Ball, 2006; Glaum et al., 2013; Houqe, Easton & van Zijl, 2014). Nevertheless, the debate continues on how these factors interact to determine financial reporting quality (Christensen, Hail & Leuz, 2013; Lee, Walker & Christensen, 2008). The diversity in the financial reporting environment and institutional settings in the EU provides fertile ground from which to contribute to this debate. While some countries in the EU, such as the UK, are shareholder-common-law countries, others are stakeholder-model countries and prior research has documented the existence of substantial differences in investor protection, enforcement, ownership structure and corporate governance across EU countries (La Porta et al., 1997; 2002; Leuz, Nanda, & Wysocki, 2003).

4. Hypothesis development

Segment information quantity and analysts' earnings forecast errors after IFRS 8

As discussed above, there is evidence that the adoption of IFRS 8 is associated with a reduction in the number of items disclosed per segment (Nichols, Street, & Cereola, 2012; Crawford et al., 2012; Bugeja, Czernkowski & Moran, 2015; Leung & Verriest 2015; André, Filip, & Moldovan 2016). It is, however, difficult to predict the impact of this on the predictability of earnings. On the one hand, firms that disclose fewer items under IFRS8 may be motivated by higher proprietary costs so that IFRS8 would led to a loss of relevant information and to higher analysts' earnings forecast errors. Alternatively, given that the management approach emphasizes relevance and judgment over detailed guidance, the reduction could be of benefit to users as it limits the disclosure to include only relevant items, thereby avoiding any negative impact of noisy disclosures. Given these competing arguments, we state the following non-directional hypothesis:

H1. There is a significant association between the quantity of segment information and analysts' earnings forecast errors after the introduction of IFRS8.

Segment geographical fineness and analysts' earnings forecast errors after IFRS 8

Prior research reveals substantial improvements in the level of country-specific disclosure following the introduction of IFRS 8 (Bugeja, Czernkowski & Moran, 2015; Crawford et al., 2012; Leung & Verriest, 2015; Nichols, Street & Cereola, 2012). Country-specific information represents the highest possible level of fineness, and its usefulness is clear in the demand by financial analysts and others for country-by-country information. It has the advantage of being more easily combined with information about the operating environment to provide more accurate earnings prediction. Thus, the increase in country-specific information following IFRS 8 should better inform users about an organization's risk profile and the assessment of growth prospects. Therefore, the anticipated increases in geographical fineness under IFRS 8 should be associated with smaller earnings forecast errors. We thus state our second hypothesis:

H2. Country-specific disclosure under IFRS 8 has an inverse relationship with analyst's earnings forecast errors.

The role of enforcement in shaping the impact of IFRS 8 on analysts' earnings forecast errors

The literature has documented the role of institutional settings in determining the quality of financial reporting and its consequences. For instance, Francis & Wang (2008) found a positive relationship between earnings quality and the strength of the legal system and investor protection, and Hope (2003b) found that analysts' earnings forecast errors is negatively associated with strong enforcement. Hope (2003b) argued that in a strong enforcement environment, managers have to follow the rules; therefore, the complexity of forecasting and analysts' uncertainty decreases. Byard, Li, & Yu (2011) showed that the adoption of IFRS in the EU is associated with smaller forecast errors for countries with strong enforcement. Likewise, Li (2010) revealed an association between the mandatory adoption of IFRS and a reduction in the cost of capital, but only in countries with strong enforcement mechanisms. Christensen, Hail & Leuz (2013) found that the liquidity benefits around IFRS adoption are limited to only five EU countries that made substantive changes to their enforcement of financial reporting around the same time. This generates the third and fourth hypotheses:

H3. The quantity of segment disclosure under IFRS 8 has an inverse relationship with analyst's earnings forecast errors in countries that have strong enforcement systems.

H4. Country-specific disclosure under IFRS 8 has an inverse relationship with analyst's earnings forecast errors in countries that have strong enforcement systems.

5. Research design

Sample selection

As outlined, our main objective is to examine the impact of the adoption of IFRS 8 on the analysts' information environment. The study population is the top 500 firms in Europe based on the Financial Times list as of 30 March 2011. To achieve consistency, both non-EU firms and the financial sectors are excluded, resulting in 285 firms from 18 countries. Thereafter, 10 firms were excluded due to unavailability, non-English language, or USA format reports, while two firms with late adoption were excluded, leaving 273 firms. Out of these 273, 18 firms were structured as single-segment firms and were also excluded, generating a final sample of 255 firms.

The adoption year was determined based on a manual investigation of the annual report. IFRS 8 was issued in 2006, and its effective date is the period beginning on or after 1 January 2009. Given that firms used a variety of different year-ends, the years were coded as a categorical variable with four values: pre-periods one and two (hereafter Pre2 and Pre1) to represent the two years before the adoption of IFRS 8 by a specific firm and post-periods one and two (hereafter Post 1 and Post 2) to represent the first and second years of adoption.

The initial sample distributed across eighteen EU countries, as shown in panel A, table 1. There is a high representation of UK firms (25%), which is consistent with the sample distribution in most EU-based studies (Daske et al., 2008; Glaum et al., 2013; Leung & Verriest, 2015). However, the sample represents countries with both weak and strong enforcement systems (46% versus 54%, respectively). Observations without financial analysts' annual earnings forecast data available from the I/B/E/S summary database have been excluded (99 observations) and 78 additional observations were excluded due to the unavailability of disclosure measures or control variables. Therefore, as indicated in panel B, table 1, the final number of firm-year observations used in the regression is 843.

Table 1   Sample composition and size.

Panel A: Initial sample composition by country

Country	Firm-Year observations	Percent
Austria	20	2%
Belgium	20	2%
Czech Republic	8	1%
Denmark	44	4%
Finland	32	3%
France	192	19%
Germany	136	13%
Greece	12	1%
Hungary	4	0%
Ireland	12	1%
Italy	52	5%
Luxembourg	4	0%
Netherlands	56	5%
Poland	12	1%
Portugal	20	2%
Spain	52	5%
Sweden	84	8%
UK	260	25%
Total	1020	100%

Panel B: The number of firm-year observations used in the analysis of the relationship between segment information and analysts' earnings forecast errors under IFRS 8.

Sample	Number of firm years	%
Initial sample	1020	100%
Less: Firms with missing I/B/E/S forecasts	99	10%
Less: Missing observations	78	8%
Final number of observations used in the regression	843	82%

Models and variables

The following regression models are used to address the impact of IFRS 8 on analysts' earnings forecasts[3]:

Analysts' Forecast Error (LOGAFE) $_{it}$ =

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[3] The robust cluster technique by company is used as suggested in Petersen (2009).

$\alpha + \beta_{it}$ CSS $+ \beta_{it}$ FSQ $+ \beta_{it}$ IFRS8 $+ + \beta_{it}$ IFRS 8*FSQ $+ \beta_{it}$ IFRS 8*CSS$+ \beta_{it}$ LOGMV $+ \beta_{it}$ FOLLOWING $+ \beta_{it}$ PV $+ \beta_{it}$ SDROE $+ \beta_{it}$ LOSS $+ \beta_{it}$ LOB $+ + \beta it$ Earlyadopt$+ \beta_{it}$ DS$+ \beta_{it}$ ENFORCE   Model (1)

Analysts' Forecast Error (LOGAFE) $_{it}$ =

$\alpha + \beta it$ CSS $+ \beta it$ FSQ $+ \beta it$ IFRS 8 $+ \beta it$ ENFORCE $+ \beta it$ ENFORCE * CSS $+ \beta it$ ENFORCE * FSQ $+ \beta it$ ENFORCE * IFRS 8 $+ \beta it$ IFRS 8*FSQ $+ \beta it$ IFRS 8*CSS $+ \beta it$ ENFORCE * IFRS 8 * FSQ$+ \beta it$ ENFORCE * IFRS 8 * CSS$+ \beta_{it}$ LOGMV $+ \beta_{it}$ FOLLOWING $+ \beta_{it}$ PV $+ \beta_{it}$ SDROE $+ \beta_{it}$ LOSS $+ \beta_{it}$ LOB $+ + \beta it$ Earlyadopt$+ \beta_{it}$ DS   Model (2)

The main variables of interest are the interaction terms. While the two-level interactions between IFRS 8 and the segment information quantity and country-specific disclosure (IFRS 8 * FSQ and IFRS 8 * CSS) in model (1) are employed to test the first two hypotheses, the three-level interactions in model (2) (ENFORCE * IFRS 8 * FSQ and ENFORCE * IFRS 8 * CSS) address how the accounting regulation enforcement affects the impact of IFRS 8 on earnings predictability. The models also control for firm size (LOGMV), the number of analysts following (FOLLOWING), price volatility and earning stability (PV and SDROE), loss (LOSS), segment structure (LOB), early adoption of IFRS8 (Earlyadopt), and domestic sales (DS). Table 2 summarises the variables in our models.

Table 2 Summary of Variables definition

Variables	Definitions	Expected Sign
Analysts' forecast errors (LOGAFE)	The natural logarithm of AFE, where AFE is the squared error in a median forecast (actual earnings−mean forecast) 2 scaled by stock price	
Variable of Interest		
Country-specific disclosure (CSS)	% of sales disclosed on a country basis (country-by-country reporting)	
Segment information quantity (FSQ)	The quantity of segment information provided in the footnote of the annual report	
IFRS 8	A dichotomous variable equal to 1 if time t is post the adoption of IFRS 8 and 0 otherwise	
IFRS 8 *FSQ (H1)	The impact of FSQ after IFRS 8 on analysts' earnings forecast errors	**-/+**
IFRS 8 * CSS (H2)	The impact of CSS after IFRS 8 on analysts' earnings forecast errors	**Negative**
IFRS 8 * FSQ* ENFORCE (H3)	The impact of FSQ after IFRS 8 in countries with strong enforcement on analysts' earnings forecast errors	**Negative**
IFRS 8 *CSS* ENFORCE (H4)	The impact of CSS after IFRS 8 in countries with strong enforcement on analysts' earnings forecast errors	**Negative**
Market Value (LOGMV)	The natural logarithm of market value (share price multiplied by the number of ordinary shares issued at the beginning of the year)	
Number of analysts following (FOLLOW)	The number of estimates at the time of the forecast	
Price Volatility (PV)	Price volatility is a measure of a stock's average annual price movement to a high and a low price from a mean price for each year	
Standard deviation of return on equity (SDROEs)	The standard deviation of five years ROE (before the forecast year)	
Loss (LOSS)	A dichotomous variable equal to 1 if firm "i" has negative earnings and 0 otherwise	
Line of business (LOB)	A dichotomous variable equal to 1 if firm "i" defined as –LOB and 0 otherwise	
Earlyadopt	A dichotomous variable equal to 1 if firm "i" adopted IFRS 8 early and 0 otherwise	
Domestic sales (DS)	The percentage of domestic sales to totals sales	
Enforcement (ENFORCE)	A dichotomous variable takes a value of '1' for strong enforcement and '0' otherwise, based on the recent improvement in accounting regulations enforcement at a country level that took place between 2001 and 2009 (Christensen et al., 2013).	

There is agreement in the literature on the proxy of analysts' earnings forecast errors (Bhat, Hope, & Kang, 2006; Duru & Reeb, 2002; Hope, 2003b; Jiao et al., 2012; Lang & Lundholm, 1996). Forecast error is used to measure the precision of analysts' earnings forecasts. Consistent with prior studies (Acker, Horton, & Tonks, 2002; Botosan & Stanford, 2005; Dehning, Pfeiffer, & Richardson, 2006; Lehavy, Li & Merkley, 2011), the analysts' forecast error (AFE) is calculated as the squared error in the median forecast, whereas the error is the difference between the actual earnings per share and the median forecast of one year ahead (EPS - median forecast)[2], which is scaled by the stock price at the beginning of the year. As argued in prior studies, it is difficult to identify the date on which the annual report information reaches the market and influences the analysts' earnings forecast errors (Lang & Lundholm, 1996). In line with Hope (2003b), the average consensus forecast of the annual EPS made in months 4-12 is used. As a common procedure and to prompt the normality of regression residuals, the natural logs of the measures are used (Barron, Kile, & O'Keefe, 1999; Jones, 2007). The analysts' forecast information is extracted from the I/B/E/S database.

Segment information measurement

To measure the quantity of information disclosed, consistent with previous studies (Botosan, 1997; Meek, Roberts, & Gray, 1995; Singhvi & Desai, 1971; Wallace & Naser, 1995), we use an index to measure the extent of segment information by counting the number of items disseminated in the financial statement notes about segments. IFRS 8 describes key principles that should be applied to provide useful information; whether an item is mandatory or not often depends upon the specific characteristics of the firm. This means that the distinction between mandatory disclosure and voluntary disclosure is somewhat blurred, so this index does not distinguish between them.

Our selected items are derived from an analysis of the standard and a literature review. The initial disclosure list was then checked during a pilot study of 20 firms from various sectors and countries. This resulted in the removal of some items, such as order backlog, and the addition of other items, such as exceptional items. This resulted in a list of 53 items (Appendix 1) comprising two sub-indices; the first contains 38 items relevant to operating segments, while the second includes 15 items relevant to entity-wide disclosure. The index is unweighted with an item

score of 1 if it is disclosed and 0 otherwise, with the exception of reconciliation items, which were scored as two if details were provided. To minimize applicability problems, following others (Cooke, 1989; Meek, Roberts, & Gray, 1995; Wallace & Naser, 1995), the relative disclosure score (RDI) is calculated as the percentage of the actual score awarded to the maximum possible score for each firm. For example, if there is no difference between the sum of the segment revenue and group revenue, the reconciliation item is not applicable, and the firm is not penalized for nondisclosure. Other examples include exceptional items and discontinued items, which are considered applicable only if they are disclosed in consolidated financial statements.

We employ country-specific sales to measure geographical fineness. This measure is of interest for two reasons. For the first time, IFRS 8 mandates the disclosure of revenues and assets by country of domicile and for each individual country with significant revenues and/or assets; therefore, it is more likely that this measure will capture the change in geographical fineness post-adoption of the new standard. Second, as discussed above, country-specific disclosures could be more easily integrated with external data and are therefore more likely to affect analysts' earnings forecast errors. We calculate country-specific sales as the proportion of total firm sales disclosed by individual countries, including the country of domicile. All segment information is manually collected from the annual reports.

Enforcement Measurement

Preiato, Brown & Tarca (2015) provided empirical evidence that the explanatory power of proxies measuring accounting enforcement outperform general legal enforcement proxies; therefore, we use the proxy developed by Christensen, Hail & Leuz (2013) as a measure of the quality of accounting regulation enforcement in EU countries. An advantage of this proxy is that it is a relatively updated measure of enforcement. ENFORCE takes a value of 1 for countries with strong enforcement systems and 0 otherwise, based on improvements in the accounting regulations enforcement at the country level between 2001 and 2009 (Christensen, Hail & Leuz, 2013). Using this measure, the sample represents both countries with weak enforcement systems and those with strong enforcement systems (46% versus 54%, respectively).

The study controls for a set of factors that influences analysts' earnings forecast errors. It controls for firm size based on the argument that large firms deliver more information about future

earnings and therefore are more predictable (Hope, Thomas, & Winterbotham, 2006; Hussain, 1997). Following prior studies (Firth & Gift, 1999; Lang & Lundholm, 1996; Yu, 2010), the natural logarithm of market value at the beginning of the year is used to measure firm size (LOGMV). The second control factor is the number of forecasts of future earnings (FOLLOWING); previous studies find that the number of analysts following a firm, as a proxy for the information environments, is negatively associated with analysts' earnings forecast errors (Hope, Thomas, & Winterbotham, 2006; Lang & Lundholm, 1996; Lys & Soo, 1995) The analyst following is computed as the number of estimations contained in consensus forecasts.

The third and fourth control variables are used to control for price volatility and earnings stability. As confirmed in prior studies, forecast error is expected to be larger for firms with more volatile and unstable performance (Hope, 2003b; Hope, Thomas, & Winterbotham, 2006; Jiao et al., 2012; Lang & Lundholm, 1996). Price volatility and standard deviation of ROE are employed to control for volatility and forecast difficulties. SDROE is calculated as the standard deviation of return on equity over the preceding five years. Price volatility (PV) is the measure of a stock's average annual price movement to a high or low price from a mean price at the beginning of the year. There are also more difficulties and higher uncertainty associated with forecasting loss-making firms (Berger & Hann, 2003; Brown, 2001; Byard, Li, & Weintrop, 2006). Hope, Thomas, & Winterbotham (2006) argued that analysts' incentives to make accurate forecasts for loss firms are smaller because they are less likely to generate trading revenue from these firms. Therefore, the fifth control variable to is LOSS defined as a dichotomous variable equal to 1 for firms with negative earnings and 0 otherwise. Thus, positive significant coefficients are expected for price volatility, earnings stability, and loss (PV, SDROE, and LOSS). Furthermore, the models also control for unobservable factors associated with the segments' structure and early adoption of IFRS 8. A dichotomous variable, line of business (LOB), is incorporated that is equal to 1 if the firm defined its operating segment using the business segment and 0 otherwise. Another dichotomous variable, early adoption of IFRS 8 (LOB), is incorporated that is equal to 1 if the firm adopted IFRS 8 before 2008 and 0 otherwise. We also control for the level of domestic sales (DS), measured by the percentage of domestic sales to totals sales, as forecast error is expected to be larger for firms with foreign sales than those with domestic sales.

6. Empirical results

Descriptive statistics

Table 3, panel A provides descriptive statistics for the variables employed before and after the introduction of IFRS 8. As indicated, the mean forecast error decreased from .058 to .044 from pre to post-IFRS 8. Consistent with prior studies (Crawford et al., 2012; Leung & Verriest, 2015; Nichols, Street, & Cereola, 2012) the correlation matrix in panel C shows that the adoption of IFRS 8 is associated with more county-specific disclosures and less disclosure quantity. The coefficients of correlation between IFRS 8 and both the country-specific disclosure and segment disclosure quantity (CSS and FSQ) are significant at 1%. The disaggregation of geographical information substantially increased following IFRS 8 with country-specific disclosure (CSS) increasing from 33.8% of total sales to 46.2% (t-statistic= 5.27, significant at 1%). Moreover, table 3 shows a variation in the level of country-specific disclosure in the sample (range from a maximum of 1 to a minimum of zero). This indicates some non-compliance with IFRS8 since IFRS 8 mandates the disclosure of revenues and assets by country of domicile as part of entity-wide disclosures, but it is consistent with the US evidence following the introduction of SFAS 131 (Nichols, Street, & Gray, 2000). In contrast, the total disclosure score fell from 0.363 pre-IFRS 8 to .345 post-IFRS 8 (t-statistic = 3.23, significant at 5%).

Table 3

Panel A. Descriptive statistics for regression variables across Pre-IFRS8 and Post-IFRS8 period

	Pre-IFRS 8					*Post-IFRS 8*				
	Mean	**Median**	**MAX**	**MIN**	**SD**	**Mean**	**Median**	**MAX**	**MIN**	**SD**
Analysts' forecast errors (AFE)	0.058	0.0029	0.89	0.00028	0.142	*0.044*	0.0029	0.94	0.00025	0.254
Country-specific disclosure (CSS)	0.338	0.247	1	0	0.34	*0.462*	0.443	1	0	0.336
Segment disclosure quantity (FSQ)	0.363	0.36	0.6	0.15	0.087	*0.345*	0.34	0.6	0.14	0.094
Market value (MV)	14000	7900	110000	688	16000	13000	5700	110000	425	16000
Number of estimates FOLLOWING)	25.5	24.2	42.1	13.2	6.76	*19.7*	19	43	1	7.26
Price volatility (PV)	25.5	24.2	42.1	13.2	6.76	*26.8*	25.5	46.3	15	7.05
Earning stability (SDROE)	9.14	5.62	61	.032	9.53	9.22	6.09	59.7	0.065	9.47
Loss (LOSS)	0.237	0	1	0	0.426	*0.241*	0	1	0	0.428
Line of business (LOB)	0.74	1	1	0	0.439	0.742	1	1	0	0.438
Domestic sales percentage (DS)	0.361	0.331	1	0.00	0.286	*0.314*	0.244	1	0.042	0.286
Enforcement (ENFORCE)	0.52	1	1	0	0.5	0.515	1	1	0	0.5

Panel B Descriptive Statistics for regression variables by country

Country	N	Stats	LOGAFE	CSS	FSQ	MV	FOLLOWING	PV	SDROE	DS	LOSS	LOB	ENFORCE
Austria	19	Mean	0.029	0.432	0.333	3900	12.2	31.5	6.52	0.355	0.105	1	0
Belgium	21	Mean	0.055	0.342	0.329	11000	17.1	25.3	4.66	0.213	0	0.476	0
Czech Republic	8	Mean	0.0067	0.737	0.374	14000	14.9	27.9	4.47	0.406	0	0.375	0
Denmark	36	Mean	0.05	0.094	0.311	7200	17.3	28.4	11	0.371	0.472	0.556	0
France	147	Mean	0.066	0.342	0.346	13000	19.3	26.5	8.16	0.346	0.218	0.755	0
Greece	8	Mean	0.021	0.724	0.325	6500	19.6	23.2	13.5	0.571	0	1	0
Italy	30	Mean	0.059	0.499	0.323	19000	23.4	22.3	4.43	0.506	0.067	0.533	0
Netherlands	53	Mean	0.043	0.402	0.337	11000	19.1	26.7	10.3	0.249	0.321	0.736	0
Poland	6	Mean	0.113	0.946	0.347	4600	11.2	24.8	7.59	0.49	0.167	1	0
Portugal	17	Mean	0.0021	0.805	0.404	6800	15.8	22.6	13	0.399	0	0.529	0
Spain	43	Mean	0.083	0.698	0.427	17000	20.3	23	8.93	0.5	0.14	0.837	0
Finland	25	Mean	0.043	0.484	0.394	14000	22.4	28.2	9.41	0.248	0.4	1	1
Germany	97	Mean	0.208	0.299	0.359	15000	23.4	27.2	8.83	0.336	0.371	0.794	1
Hungary	4	Mean	0.196	0	0.285	8300	14.3	28.5	6.75	0.356	0	1	1
Ireland	12	Mean	0.0021	0.188	0.31	7100	10.3	29.7	3.11	0.222	0.083	1	1
Sweden	80	Mean	0.019	0.426	0.353	8700	19.8	27.8	8.23	0.242	0.087	0.787	1
UK	227	Mean	0.01	0.456	.365	17000	18.2	25.1	10.5	0.331	0.198	0.661	1

Panel C Pearson correlations between dependent and independent variables.

	LOGAFE	IFRS 8	CSS	FSQ	LOGMV	FOLLOWING	PV	SDROE	DS	LOSS	LOB	ENFORCE
LOGAFE	1											
IFRS 8	-0.0084	1										
CSS	-0.0664**	0.1809***	1									
FSQ	0.002	-0.1014***	0.1098***	1								
LOGMV	-0.0181	-0.0359	0.0567*	0.0236	1							
FOLLOWING	0.0056	0.0889***	0.0669**	0.0595*	0.5154***	1						
PV	0.1494***	0.0989***	-0.0876***	0.0038	-0.2398***	-0.1542***	1					
SDROE	0.0195	0.0187	0.0593*	-0.0056	-0.0074	-0.0832**	0.0856**	1				
DS	0.0049	0.0845***	0.2093***	0.0517	-0.066***	-0.0923***	-0.1876***	0.0029	1			
LOSS	0.1211***	0.0275	-0.0286	-0.0178	0.0917***	0.0951***	-0.0168	0.0286	-0.0223	1		
LOB	0.0876***	0.011	-0.028	0.1639***	-0.0698***	-0.0262	0.0706***	-0.0061	0.0048	0.0367	1	
ENFORCE	0.0049	-0.0118	-0.0323	0.0622*	0.0769**	0.0649*	0.0335	0.0523	-0.107***	0.0293	0.0336	1

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3, Panel A shows the descriptive statistics for all variables. Panel B shows the descriptive statistics for all variables at a country level, and Panel C presents the correlation matrix. Any significant differences between Pre-IFRS 8 and Post-IFRS8 are highlighted by italicizing the means of Post-IFRS8 in Table 3, Panel A.

Variables definition

LOGAFE is defined as the natural logarithm of AFE, where AFE is the squared error in a median forecast (actual earnings−mean forecast) [2] scaled by stock price. IFRS 8 is a dichotomous variable equal to 1 if time t is post the adoption of IFRS 8 and 0 otherwise. CSS is country-specific sales. FSQ is full segment quantity. LOGMV is the natural logarithm of market value. FOLLOWING is the number of estimates. PV is price volatility, calculated as the stock's average annual price movement to a high or low price from a mean price at the beginning of the year. SDROE is the standard deviation of five years' return on equity. DS is defined as the percentage of domestic sales to totals sales. LOSS is a dichotomous variable equal to 1 if firm "i" has negative earnings and 0 otherwise. LOB is a dichotomous variable equal to 1 if firm "i" is defined as LOB and 0 otherwise. ENORCE is a dichotomous variable equal to 1 if firm "i" is from a country with strong enforcement and 0 otherwise.

Main Results

We examined the impact of the changes in the geographical fineness and quantity of segment information after IFRS 8 on analysts' earnings forecast errors. The regression results are presented in tables 4 and 5. The adjusted R-squares are 21.5% and 22.6%, suggesting that these models explain a reasonable amount of the variation in analysts' earnings forecast errors and that they are also consistent with the results of prior studies of analysts' forecasts for European firms (Yu, 2010; Vanstraelen, Zarzeski & Robb, 2003).

The impact of the changes in segment information following IFRS 8 on analysts' earnings forecast errors

The results presented in table 4[4] show that the quantity and quality of segment information affect the precision of analysts' forecasts, and this impact is more obvious post-IFRS 8. Regarding H1, we expect a significant association between the quantity of segment information and analysts' earnings forecast errors after the introduction of IFRS 8, but without a predicted sign. Consistent with H1, the results suggest that there is a significant association between the quantity of segment information after IFRS 8 and analysts' earnings forecast errors. Moreover, the findings indicate that the coefficient of the interaction between IFRS 8 and segment information quantity (FSQ) is negative and significant at 5%, suggesting smaller analysts' earnings forecast errors after the adoption of IFRS8.

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[4] The findings remain the same when only firms with complete data for each time period are included.

Table 4

Regression Analysis of the relationship between segment information and analysts' earnings forecast errors under IFRS 8.

Variables [a]	Exp.	Mode(1)
CSS		-0.139
FSQ		0.46**
IFRS 8		-0.163
IFRS 8 * FSQ	H1 (-/+)	-0.496***
IFRS 8 * CSS	H2 (-)	-0.363**
Control variables		
LOGMV		-0.037
FOLLOWING		0.033
PV		0.169*
SDROE		0.104
LOSS		2.08***
LOB		0.76***
Earlyadopt.		-0.13
DS		-0.292
ENFORCE		-0.629***
Number of observations		843
adj. R-sq		0. 215
Time Effect		Yes
Industry Effect		Yes
Firm Clustered SE		Yes

Note: Table 4 presents the findings of the regression analysis examining the impact of the changes in segment information after IFRS 8 on analysts' earnings forecast errors (H1 and H2).
The parameter estimates are based on the following model:

$LOGAFE = \alpha + \beta_{it} CSS + \beta_{it} FSQ + \beta_{it} IFRS8 + + \beta_{it} IFRS 8*FSQ + \beta_{it} IFRS 8*CSS + \beta_{it} LOGMV + \beta_{it} FOLLOWING + \beta_{it} PV + \beta_{it} SDROE + \beta_{it} LOSS + \beta_{it} LOB + + \beta it Earlyadopt + \beta_{it} DS + \beta_{it} ENFORCE$

* Statistical significance at the 10% level (two-tailed).
** Statistical significance at the 5% level (two-tailed).
*** Statistical significance at the 1% level (two-tailed).

[a] Variable definition:

LOGAFE is defined as the natural logarithm of AFE, where AFE is the squared error in a median forecast (actual earnings−mean forecast) [2] scaled by stock price. CSS is country-specific sales. FSQ is full segment quantity. IFRS 8 is a dichotomous variable equal to 1 if time t is post the adoption of IFRS 8 and 0 otherwise. LOGMV is the natural logarithm of market value. FOLLOWING is the number of estimates. PV is price volatility, calculated as the stock's average annual price movement to a high or low price from a mean price at the beginning of the year. SDROE is the standard deviation of five years' return on equity. LOSS is a dichotomous variable equal to 1 if firm "i" has negative earnings and 0 otherwise. LOB is a dichotomous variable equal to 1 if firm "i" is defined as LOB and 0 otherwise.DS is defined as the percentage of domestic sales to totals sales. Earlyadopt is a dichotomous variable equal to 1 if firm "i" adopted IFRS8 early and 0 otherwise. ENORCE is a dichotomous variable equal to 1 if firm "i" is from a country with strong enforcement and 0 otherwise. The remaining variables are interaction variables.

These results imply that FSQ post-IFRS 8 includes a higher proportion of relevant items and therefore reduces the potential harm of noisy disclosures. Financial statement users are constrained in the amount of information they can process; thus, the omission of excess disclosure could lead to clearer communication and greater focus on meaningful and relevant disclosures

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(Bloomfield, 2012; Paredes 2003; ICAS 2011). For instance, Miller (2010) found that disclosure could lead to suboptimal decision-making due to the inability to absorb the volume and complexity of the disclosure. Similarly, the 2014 KPMG survey indicated that the volume of mandated disclosures is the main reason for disclosure overload, and footnotes are the most significant source of this.

Regarding H2, we expect that more country-specific disclosure under IFRS 8 will be associated with smaller analyst's earnings forecast errors. Consistent with H2, the findings indicate that the coefficient of the interactions between IFRS 8 and country-specific disclosure (CSS) is significant and negative (significant at 5%). These findings suggest that the fineness of geographical information is negatively associated with forecast errors post-IFRS 8. The greater disaggregation of geographical entity-wide information post-IFRS 8 helps analysts better understand and assess the risks and returns, after which forecasts can be made using more specific forecast factors, resulting in greater forecast precision (Herrmann & Thomas, 2000b).

This facilitates the incorporation of country-level external forecast factors such as GDP and inflation growth with firm-level disclosures. This finding supports the proposition that that disaggregated information is important to financial statement users and to financial analysts in particular (Abraham, Marston, & Darby 2012, PwC 2007).

In total, these findings suggest that the changes in segment information after IFRS 8 (i.e., increase in CSS and decrease in FSQ) have improved the predictability of earnings[5]. Thus, our results support the IASB view that more relevant information is disseminated following the adoption of the management approach. Using these findings, it could be established that the standard-setters' policy choices of emphasizing relevance and judgment over detailed guidance have improved the overall disclosure environment of multinational firms, at least in terms of the predictive ability of earnings. This evidence contrasts with Leung & Verriest (2015) and André,

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[5] The findings after the exclusion of countries with very high/low CSS score (Portugal, Poland and Hungry) are consistent with the reported results.

Filip, & Moldovan (2016) who document that the adoption of IFRS8 has no impact on analysts' earnings forecast errors[6].

For control variables, as expected, the coefficients of price volatility (PV), loss (LOSS), and line of business (LOB) are positive and significant. Firm size, standard deviation of return on equity (SDROE) are the number of estimates (FOLLOWING) are instead all insignificant.

The role of Accounting Regulation Enforcement

As discussed in section four, we expect enforcement to affect the relationship between segment disclosure and analysts' earnings forecast errors after IFRS 8. Table 5 presents the results for the role of the enforcement. The interaction between enforcement, IFRS 8 and segment information quantity (IFRS 8 * FSQ* ENFORCE) is used to test H3. Similarly, the interaction between enforcement, IFRS 8 and country-specific disclosure (IFRS 8 * CSS* ENFORCE) is used to test H4. We expect the impact of the changes in segment information after IFRS 8 to be more obvious in countries with strong enforcement.

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[6] Our study uses a longer period and a different measure of segment disclosure quality, as discussed in the literature section.

Table 5

Regression analysis of the role of accounting regulation enforcement in shaping the impact of IFRS 8 on analysts' earnings forecast errors

Variables [a]	Exp. Sign	Model 2
CSS		-0.153
FSQ		*0.44**
IFRS8		-0.135
ENFORCE		*-0.563***
ENFORCE * CSS		0.111
ENFORCE * FSQ		-0.198
ENFORCE * IFRS 8		-0.103
IFRS 8 * FSQ	H1 (-/+)	-0.46*
IFRS 8 * CSS	H2 (-)	-0.36*
IFRS 8 * FSQ* ENFORCE	H3 (-)	-0.016
IFRS 8 * CSS* ENFORCE	H4 (-)	-0.766**
LOGMV		-0.302**
FOLLOWING		0.19
PV		0.057*
SDROE		0.17
LOSS		2.04***
LOB		0.978***
Earlyadopt		0.207
DS		-0.223
Number of observations		*843*
adj. R-sq		*0.226*
Time Effect		*Yes*
Industry Effect		*Yes*
Firm Clustered SE		*Yes*

Note: Table 5 presents an analysis of the role of Accounting Regulation Enforcement in shaping the impact of IFRS 8 on analysts' earnings forecast errors.

Analyst Forecast Error (LOGAFE) it =

α + β_{it} CSS + β_{it} FSQ + β_{it} IFRS 8 + β_{it} LOGMV + β_{it} LOSS + β_{it} FOLLOWING + β_{it} SDROE + β_{it} PV + β_{it} LOB + β_{it} DS+ β_{it} Earlyadopt+ β_{it} ENFORCE + β_{it} IFRS 8*FSQ + β_{it} IFRS 8*CSS + β_{it} IFRS 8 * FSQ+ β_{it} IFRS 8 * CSS+ β_{it} ENFORCE * FSQ+ β_{it} ENFORCE * CSS+ β_{it} ENFORCE * IFRS 8 + β_{it} ENFORCE * IFRS 8 * FSQ+ β_{it} ENFORCE * IFRS 8 * CSS.
* Statistical significance at the 10% level (two-tailed).
** Statistical significance at the 5% level (two-tailed).
*** Statistical significance at the 1% level (two-tailed).

[a] Variables definition

LOGAFE is defined as the natural logarithm of AFE, where AFE is the squared error in a median forecast (actual earnings−mean forecast) [2] scaled by stock price. CSS is country-specific sales. IFRS 8 is a dichotomous variable equal to 1 if time t is post the adoption of IFRS 8 and 0 otherwise. FSQ is full segment quantity. LOGMV is the natural logarithm of market value. FOLLOWING is the number of estimates. PV is price volatility, calculated as the stock's average annual price movement to a high or low price from a mean price at the beginning of the year. SDROE is the standard deviation of five years' return on equity. DS is defined as the percentage of domestic sales to totals sales. Earlyadopt is a dichotomous variable equal to 1 if firm "i" adopted IFRS8 early and 0 otherwise. LOSS is a dichotomous variable equal to 1 if firm "i" has negative earnings and 0 otherwise. LOB is a dichotomous variable equal to 1 if firm "i" is defined as LOB and 0 otherwise. ENFORCE is a dichotomous variable equal to 1 if firm "i" is from a country with strong enforcement and 0 otherwise. The remaining variables are interaction variables. IFRS 8 * FSQ* ENFORCE: represents the impact of FSQ after IFRS 8 in countries with strong enforcement on analysts' earnings forecast errors (Hypothesis 3). IFRS 8 * CSS* ENFORCE represents the impact of CSS after IFRS8 in countries with strong enforcement on analysts' earnings forecast errors (Hypothesis 4).

The results demonstrate the importance of an adequate accounting regulation enforcement system: the coefficient of enforcement (ENFORCE), which is reported table 5, is negative and significant at 5%, suggesting smaller earnings forecast error in countries with strong enforcement. Regarding H3, the coefficient of the interaction between enforcement, IFRS 8 and segment disclosure quantity (IFRS 8*FSQ* ENFORCE) is negative, as expected, but not significant. While the coefficient of interaction between IFRS 8 and country-specific disclosure (IFRS 8 * CSS* ENFORCE) is negative and significant at 5%. This is consistent with hypothesis 4 in that more country-specific disclosure is associated with smaller forecast error in countries with strong enforcement systems. These findings are consistent with prior research in that the benefits associated with disclosure quality and regulation changes are higher in strong-enforcement countries (Byard, Li, & Yu, 2011; Christensen, Hail & Leuz, 2013; Daske et al., 2008; Dhaliwal et al., 2012; Li, 2010). Dhaliwal et al. (2012) found that the relationship between corporate social responsibility disclosure and analysts' earnings forecast errors is stronger in countries that have strong enforcement systems. Likewise, Byard, Li, & Yu (2011) find that the adoption of IFRS in the EU is associated with smaller forecast errors for countries with strong enforcement.

7. Conclusions

This paper documents an improvement in analysts' earnings forecast errors after the adoption of IFRS 8 using a sample of the largest firms in the EU. The findings support the fineness theorem in that more disaggregated information is associated with an improvement in earnings forecast accuracy. We find that the adoption of the management approach is associated with more country-specific disclosures but fewer items of disclosure, which resulted in smaller forecast errors. These findings suggest that by moving towards a more principle based approach whilst also requiring some disclosures by country, IFRS 8 has provided more relevant information than its predecessors and, therefore, the standard-setters' policy choices has improved the overall disclosure environment of multinational firms, at least in terms of the predictive ability of analysts' earnings forecasts.

Furthermore, the results document the importance of country-level enforcement in shaping the impact of IFRS 8 on analysts' earnings forecast errors. The findings suggest that enforcement is a complement to disclosure quality. We find that employing a measure of enforcement strengthens the relationship between disclosures and predictability of earnings under IFRS 8.

This evidence expands our understanding of the impact of IFRS 8 on the quality of financial reporting outcomes. It provides feedback of pivotal interest to the European Commission, which has raised several concerns about the quality of segmental information under IFRS 8. It also provides timely evidence about the usefulness of country-by-country reporting. In July 2013, the EP approved EU Transparency and Accounting Directives, which follows the Dodd Frank Act Section in the US. On a country-by-country basis, these pieces of legislation provide mandates for firms that are active in extractive industries and banking sectors.

It is important to acknowledge certain limitations of our study. First, the sample distribution may be influencing the results given that the majority of top firms in the EU are based in only three countries, the UK, France and Germany. However, this applies to all EU-based studies (Armstrong et al., 2010; Daske et al., 2013). We examined the impact of IFRS 8 on two important dimensions of disclosure, geographical fineness and number of items disclosed; however, the new standard may have an impact on other dimensions of disclosure. For example, Troberg, Kinnunen & Seppänen (2010) asserted that the diversity in returns and risks across the reported segments is a key characteristic of segment reporting. Our study uses a self-constructed index to measure the volume of information. Despite the use of several procedures chosen to reduce subjectivity, in particular the use of an unweighted index and the avoidance of any classification of disclosures into mandatory and voluntary items, we cannot assert that the study is free of all subjectivity.

We only investigated the implications of segmental disclosures and IFRS 8 for earnings forecasts. Future research is needed to examine other consequences of segmental disclosures such as information asymmetry and firm values. Whilst information asymmetry might be expected to decrease following the adoption of IFRS 8 because the gaps between outsiders and insiders or managers and between privately informed and normal investors are narrowed because segmental

information is reported through the eyes of management, evidence is lacking on this. In the same vein, if firms under IFRS 8 provide more disaggregated information about the allocation of resources between segments, it is likely that these firms' values will change.

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Appendix (1)

Disclosure index

Category one: Operating segments	Source
Description of factors used to identify segments	IFRS 8 , Para.21
Description of type of products and services offered by each segment	IFRS 8 , Para.21
Revenue from external customers	IFRS 8 , Para.23
Intersegment revenue	IFRS 8 , Para.23
Basis of intersegment revenue pricing	IFRS 8 , Para.27a
Interest revenue	IFRS 8 , Para.21
Interest expense	IFRS 8 , Para.21
Net interest income or expense	Pilot study
Depreciation and amortization	IFRS 8 , Para.23
Operating costs	Pilot study
Non cash material items (e.g. impairment)	IFRS 8 , Para.23
Income tax expense	IFRS 8 , Para.23
Share of profit of associates and joint ventures	IFRS 8 , Para.24a
Segments result (1)	IFRS 8 , Para.23
Segments result (2) (some companies present more than profit measure such as OI, Ebit, NI)	Pilot study
Minority interest or non-controlling interest	IFRS 8 , Para.24b
Exceptional items	Pilot study
Discontinued operations	Pilot study
Cash per segment	Street el al 2002
Detailed cash information (Investing - operating - financing cash flows)	Street et al 2002
Current assets	IFRS 8 , Para.23
Noncurrent assets	IFRS 8 , Para.23
Intangible assets	IFRS 8 , Para.23
Investment in associate or/and joint ventures	IFRS 8 , Para.23
Total assets	IFRS 8 , Para.23
Capital expenditure	IFRS 8 , Para.2
Current liabilities	IFRS 8 , Para.21a
Long term liabilities	IFRS 8 , Para.21a
Borrowings	Pilot study
Total liabilities	IFRS 8 , Para.21a
Reconciliation of liabilities	IFRS 8 , Para.27d
Reconciliation of profit	IFRS 8 , Para.27b
Reconciliation of revenue	IFRS 8 , Para.27b
Reconciliation of assets	IFRS 8 , Para.27c

Number of employees by segment	Gray et al 1995
Performance ratios (profitability ratios)	Gray et al 1995
Production volume information	Gray et al 1995
Research and development expenses	Herrmann & Thomas 2000
Category two: Entity wide disclosures	
Revenue by destination	Crawford et al 2012
Revenue by origin	Crawford et al 2012
Earnings	IAS 14
Current assets	IAS14
Noncurrent assets	IAS 14
Total assets	Pilot study
Current liabilities	Pilot study
Long term liabilities	Pilot study
Borrowing by segments	Pilot study
Amortization and depreciation	IAS14
Total liabilities	IAS14
Capital expenditure	IAS14
Sales per product	IFRS 8
Major customers or statement that none exist	IFRS 8
Matrix format	IFRS 8
Full segment information (Category one + Category two)	