

# Managers' segment disclosure choices under IFRS8: EU evidence

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## Abstract

We examine the impact of proprietary and agency cost motives on segment disclosure quality and quantity and how the adoption of the principle IFRS 8 affects this impact. By using hand-collected data, our results show that proprietary and agency costs play a relevant role in determining the quality and quantity of segment disclosure. We find that proprietary costs are a particularly relevant reason for providing lower segment disclosure quality post-IFRS 8. Our results also suggest that firms' segment disclosure choice is dependent on disclosure dimension. These results contribute to the ongoing debate regarding IFRS 8 and have valuable implications for accounting regulators.

## Keywords

IFRS 8, agency cost, proprietary cost, management approach, segment disclosure quality.

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## 1. Introduction

Managers have to decide on the appropriate level of segmental information to disclose based on a tradeoff between the benefits and costs of reporting this information to the public and in relation to regulatory constraints (Lang & Sul, 2014; Darrough, 1993; Darrough & Stoughton, 1990; Verrecchia, 1983). Managers may decide to report segment information broadly to avoid competitive harm (proprietary costs) or to preclude or combine segments to avoid monitoring or accomplish personal benefits (agency costs) (i.e. André, Filip, & Moldovan, 2016; Bens, Berger & Monahan 2011; Botosan & Harris, 2000; Harris, 1998). This study addresses segment disclosure choices in the European Union (EU) context; notably, most of the related research has been conducted in the context of the United States (US) (Nichols, Street, & Tarca, 2013). In particular, we examine the impact of the proprietary and agency cost motives on the quality and quantity of segment disclosures (SDQuality and SDQuantity) by using the largest firm in the EU.<sup>1</sup> We also investigate the moderating impact of the adoption of the principle-based International Financial Reporting Standard 8 (IFRS 8) on these relationships by using data covering 4 years (2 years pre-IFRS 8 and two years post-IFRS 8).

The institutional environment in Europe differs from that in the US.<sup>2</sup> The literature has demonstrated that the severity of the agency problem differs worldwide for various reasons (Shi, Magnan & Kim 2012; Shleifer & Vishny, 1997). For instance, the agency problem was observed to be less severe in countries with a more concentrated corporate ownership structure (Shi, Magnan & Kim 2012; Shleifer & Vishny, 1997), and the strength of legal protection and external

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<sup>1</sup> In this study, we use the level of geographical disaggregation to measure the quality dimension based on the argument that disaggregated disclosures provide more useful information than disclosures provided at a more aggregated level (FASB, 1997; IASB, 2006)

<sup>2</sup> The institutional differences include and are not limited to the level of ownership concentration, public enforcement, governance system, or the role of security regulatory organizations.

governance mechanisms influence the severity of agency problems between controlling insiders and outside investors (La Porta et al., 2002, 2006). The literature has also provided evidence on the variation of management reporting choices among countries; for instance, Liao, Sellhorn & Skaife (2012) revealed that German and French managers' accounting and estimates choices significantly differed after implementing IFRS.

Similarly, institutional factors have been found to diminish or increase insider's incentives to manage earnings (Burgstahler, Hail & Leuz, 2006; Chung, Firth & Kim., 2002; Leuz, Nanda, & Wyszoki 2003), and early studies have found significant differences in how financial executives in US and United Kingdom (UK) perceive the net costs of disclosure, such as competitive disadvantage and potential litigation costs (Gray, Radebaugh & Roberts, 1990). Moreover, the objective of financial reporting, according to the joint framework of the International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB), draws heavily from the work of the FASB and has a strong decision-usefulness orientation (Whittington, 2008). This objective has been heavily criticised in the European context because stewardship has been folded into the overall objective and not presented as a separate objective (Zeff, 2013). The Proactive Accounting Activities in Europe initiative (PAAinE) has demonstrated that although stewardship and accountability are linked to agency theory, the notion is broader than resource allocation and should be a separate objective of financial reporting (PAAinE, 2007, p 16).<sup>3</sup> In particular, for segment disclosure, users, on average, worry that IFRS 8 may help management to act in their own self-interest and manipulate segment reporting and argue that stewardship is more difficult and the objectivity of the reported information is questionable when a standard is based on the

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<sup>3</sup> The PAAinE group comprises representatives from European Financial Reporting Advisory Group (EFRAG) and standard-setters from France, Germany, Netherlands, Poland, Spain, Sweden, and the UK. They have agreed to pool some resources and collaborate more closely so that Europe, as a whole, can participate more effectively in the global accounting debate.

management approach ( Aboud, Roberts & Zalata, 2018; Crawford et al. 2012; Berger and Hann 2003). Thus, we consider reporting disincentives by using a sample from the EU to add to the understanding of segment disclosure reporting choices based on the substantial institutional differences between the US and Europe.

Generally, IFRSs are a set of principle-based accounting standards that provide greater reporting discretion than rules-based accounting standards. IFRS 8 has increased the discretion and reporting choices, compared with its predecessor (IAS 14R). IFRS 8 replaced the modified risk and returns approach with the management approach; the core principle of the management approach is to report segment information based on the perspective of management (for details: Nichols, Street, & Tarca, 2013). Segmental disclosure is a unique area for examining the examination of disclosure disincentives because segmental disclosure is more focused on choosing not to disclose (Berger & Hann, 2007; Harris, 1998). Such a jurisdiction provides a setting to examine the moderating effect of IFRS 8 with greater discretion on the relationship between segment disclosures quality or quantity and reporting disincentives. The standard setters believe that the management approach improves the quality of financial reporting because users can view an entity's operations through the perspective of management (FASB, 1997; IASB 2006).

The FASB and IASB have conducted post-implementation reviews (PIRs), and a coherent conclusion was reached despite their differences, namely, the management approach resulted in the harmonisation of segment regulation and improvement in segmental reporting quality (FAF, 2012; IASB, 2013).<sup>4</sup> The principal sources of this evidence are public consultation (i.e. preparers, users, accounting firms and accountancy bodies, standard setters, and regulators and government

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<sup>4</sup> For instance, the US Financial Accounting Foundation's (FAF) review addressed the management approach 15 years after its adoption, whereas the IASB review was conducted after 2 years.

agencies), outreach, and review of academic research<sup>5</sup>. Notably, after introducing any new standard, time is necessary to develop research on the effect of its application; thus, at first, final conclusions are based on a limited number of academic studies (IASB, 2013, p15).

Moreover, according to the post-implementation reviews released by the FASB and IASB, stakeholders believed that some firms might use aggregation criteria or high discretion to avoid disclosing competitively sensitive information (proprietary cost motive) or information on declining businesses (i.e. agency cost motive) (FAF, 2012; IASB 2013). The principle-based IFRS 8 introduces new disclosure requirements more likely to be associated with competitive harm or possible increases external monitoring. The standard requires the disclosure of revenues and noncurrent assets for individual material countries and from major customers with 10% or greater in entity sales. Therefore, the proprietary costs are more likely to increase if firms comply with this disclosure requirement. Nevertheless, managers may use the discretion inherent in the new standard to decrease the quality and quantity of disclosure for proprietary or agency reasons. For instance, IFRS 8 provides no clear guidelines on the materiality threshold related to the geographic disclosures of sales information by individual countries. Hope, Ma and Thomas (2013) and Akamah, Hope and Thomas (2018) have indicated that managers use the vague country-level materiality guidelines to aggregate geographic disclosures and mask tax-avoidance practices.

André, Filip, and Moldovan (2016) examined the incentives of segment disclosure quantity and quality under IFRS 8 and found support for the proprietary cost motive; André, Filip, and Moldovan (2016) used the cross-segment variability in return;<sup>6</sup> and our study uses the geographical disaggregation characteristic to measure the quality dimension and, in particular, the

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<sup>5</sup> For details on the post implementation process and output: <https://www.ifrs.org/-/media/project/pir-ifrs-8/educational-material/pir-ifrs-8-operating-segments-feedback-statement.pdf>

<sup>6</sup> We calculated the cross segment variability and we found no significant changes following the introduction of IFRS 8.

disaggregation of sales information on a country basis. The disclosure of sales information on an individual country basis represents the highest possible level of disaggregation and provides information regarding specific sources of risk and returns that enable users to differentiate between potential risk, return, and growth prospects (Doupnik & Seese, 2001; Aboud, Roberts & Zalata, 2018). In addition, we measure the SDQuantity by using an index to produce a relative score for each firm.<sup>7</sup>

Such measures should provide a unique setting to examine the role of agency and proprietary cost motives in shaping the firms' segment disclosure choices under the principle-based IFRS 8 for two reasons. First, the literature has provided clear support for the changes in the quantity of segment information and disaggregation of geographical disclosure after the implementation of IFRS 8 (Crawford et al., 2012; Leung & Verriest, 2015; Nichols, Street, & Tarca, 2013). Therefore, an investigation of these two attributes should provide relevant and timely evidence on the firm-level compliance with IFRS 8. The discretionary nature of the disclosure requirement under IFRS 8 is the second reason. Under IFRS 8, the disclosure of key line items, such as segment revenue from external customers, interest revenue, interest expense, and depreciation and amortisation expense, are linked to the concept of what is reviewed by a company's chief operating decision maker (CODM); thus, IFRS 8 permits non-disclosure if the information is not reviewed by the CODM. Moreover, although IFRS 8 provides more guidelines on geographical disaggregation than IAS 14R, it mandates the disclosure of sales information on a country basis only when material.

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<sup>7</sup> Our disclosure index includes both operating segments information and entity-wide disclosure.

Our results indicate that firms with greater proprietary costs provide lower-quality segment disclosure under IFRS 8. These results suggest that managers use the discretion of the principle-based IFRS 8 to provide lower segment disclosure quality to avoid competitive harm. Therefore, although the quality of segment disclosure increased in post-IFRS 8 periods, IFRS 8 fails to force these firms with higher proprietary costs to increase their segment disclosure quality. We also find that firms with greater agency conflict, measured by the level of free cash flow, are more likely to report a lower segment disclosure quality and higher segment disclosure quantity. Managers choose to provide a higher quantity of disclosure to convey to shareholders that their actions are in the shareholders' interest and to maximise capital market benefits, while at the same time they disseminate lower-quality segment information to hide inefficient decisions and facilitate empire building for their benefit.

These results contribute to the discretionary disclosure literature by addressing the role of agency and proprietary motives in shaping segment reporting choices under the principle-based IFRS 8 by examining a sample from the EU. The results also provide feedback to the regulatory bodies in Europe regarding the role of segmental reporting quality in assessing the stewardship and accountability of management. In particular, the results are consistent with the notion that segment information is pivotal for the accountability of directors of a business entity to its owners and the public and suggests the necessity of stewardship as a separate objective of financial reporting. For instance, Akamah, Hope and Thomas (2018) indicated that firms with tax-avoidance practices provide less transparent geographic disclosures to avoid monitoring and accountability. The results also provided evidence regarding IFRS 8 compliance and asserted the significance of country-by-country reporting.

The remainder of the paper is organised as follows. Section 2 provides the background. Section 3 presents a literature review and hypotheses development. Section 4 explains the research design, and section 5 presents the main empirical findings. Section 6 shows the additional analyses, and section 7 concludes.

## **2. Background**

The IASB introduced IFRS 8 as part of a short-term convergence project with the FASB to replace the revised IAS 14R for the annual periods beginning on or after 1 January 2009, with earlier application permitted.<sup>8</sup> The objective of IFRS 8 was to have firms disclose information that would enable users of its financial statements to evaluate the nature and financial effects of the different business activities it engages in and the economic environments in which it operates (IASB, 2006, para. 1).

IFRS 8 followed the US Statement of Financial Accounting Standard (SFAS) 131 in using the full management approach. In the full management approach, financial information must be reported on the same basis as that used internally for evaluating operating segment performance and deciding how to allocate resources to operating segments (IASB, 2006). IFRS 8 has an advantage over its predecessor (IAS 14R) because the information used by the internal management should be disclosed to external users, which would enhance relevance attributes. Notably, IFRS 8, as a principle-based standard, allows much more discretion than IAS14R, which could be abused by management.

IFRS 8 requires reportable segments be identified on the basis of internal reports regarding the components of the entity regularly reviewed by the CODM (IASB, 2006). Therefore,

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<sup>8</sup> For details on the road to convergence and IFRS 8 and a historical perspective of segment reporting standards (Nichols, Street, & Cereola, 2012; Nichols, Street, & Tarca, 2013)

reportable segments may be based on lines of business, geographic location, or a combination of the two (mixed). IFRS 8 requires disclosure on reportable segments and entity-wide disclosures. For each reportable segment, information on profit or loss and total assets should be disclosed. Other items, such as revenue from external customers, revenue from transactions with other operating segments of the same entity, interest revenue, interest expense, and depreciation, are required when included in either the measure of segment profit or loss or otherwise regularly provided to the CODB (IASB, 2006).

In addition, IFRS 8 requires entity-wide disclosures, such as narrative information on products or services, revenue and noncurrent assets by country of domicile and individual foreign country if material, and revenues from transactions with major customers subject to the condition of 10% or more of an entity's total revenues (IASB, 2006). Notably, IFRS 8 permits the non-disclosure of entity-wide information when the necessary information is unavailable, and the cost of development would be excessive (IASB, 2006). Although IFRS 8 provides an explicit threshold for defining when an operating segment or major customer is reportable, the determination of materiality regarding individual countries is left to management's judgement (Cereola et al., 2017; Douppnik & Seese, 2001).

Several attributes make segmental disclosure a fertile environment for examining management disclosure choices, such as its discretionary nature (Berger & Hann, 2003; Hope & Thomas, 2008; Nichols, Street, & Tarca, 2013). The literature has documented the agency and proprietary costs as the two dominant motives for precluding segment disclosures (Berger & Hann, 2003, 2007; Ettredge et al., 2006; Harris, 1998; Nichols, Street, & Tarca, 2013). Under the agency motive, managers are motivated to hide segment information to achieve personal benefits or engage in strategic reporting that limits the monitoring and usefulness of accounting information

(Bens, Berger & Monahan 2011; Wang et al., 2011). In other words, managers are motivated to preclude segment information as a method of covering up inefficient decisions and avoiding external monitoring (Hope & Thomas, 2008; Cho, 2010). Hope, Ma and Thomas (2013) documented that managers avoid voluntary disclosure of geographical earnings to mask tax-avoidance behaviour following SFAS 131. Likewise, Akamah, Hope and Thomas (2018) observed that multinational firms with tax-avoidance practices tend to aggregate their geographic disclosures. Therefore, geographic disclosures and, in particular, country-level disclosures would be key in solving issues related to stewardship and accountability of multinational firms.

From a proprietary motive perspective, segmental reporting provides insights into the risk and return facing each part of the business (i.e. activities and markets). Thus, managers may engage in strategic reporting to avoid revealing strategic or proprietary information to competitors (Clinch & Verrecchia, 1997; Verrecchia, 2001). Consequently, this study has two objectives: to investigate the proprietary and agency motives as incentives for reporting lower segment disclosure quantity and quality by using the largest EU firms and address the moderating effect of IFRS 8 on the relationship between reporting disincentives and segment disclosure quantity and quality.

### **3. Literature review and hypothesis development**

#### *3.1 Segmental disclosure and proprietary cost*

Discretionary disclosure theory suggests that proprietary cost is an important reason for withholding material information and introducing it extends the possible interpretations of information withholding (Clinch & Verrecchia, 1997; Verrecchia, 1983, 2001). Regarding the empirical perspective, several studies have examined the association between proprietary cost and segment disclosures. In an early study, Harris (1998) showed that operations in less-competitive industries are less likely to be reported as industry segments. Ettredge (2002) found that large firms

operating in highly concentrated industries report highly aggregated segment information under SFAS 14 and their lobbying position against SFAS 131 is motivated by the proprietary cost hypothesis. Similarly, Ettredge et al. (2006) and Wang et al. (2011) showed that proprietary cost acts as a motive to conceal the cross-segment variability of earnings and its growth.

Specifically, Tsakoumis et al. (2006) revealed that firms with higher potential competitive costs provide less-detailed geographical disclosures, and Ellis, Fee & Thomas (2012) reported strong evidence that firms with a high proprietary cost are more likely to mask the identities of their major customers. By using an international sample, Nichols and Street (2007) found a significant negative relationship between disaggregation of segment information and abnormal return and suggested that managers used discretion in segment standards (IAS 14R) to protect excess profit. Consistent with these studies, the following hypothesis is stated:

**H1: There is a negative relationship between segment disclosure quantity/quality and proprietary cost.**

### *3.2 Segmental disclosures and agency cost*

A second incentive for masking segment information is agency conflict. Conflict of interest, according to the agency theory, infers that managers do not always act in the best interests of the principal (Jensen & Meckling, 1976). The literature has also established that multi-segment firms' poor performance may result from inefficient and even deliberately poor allocation of internally generated funds (Berger & Ofek, 1995; Martin & Sayrak, 2003). For instance, Stultz (1990) revealed that inefficient decisions, such as overinvestment and underinvestment, occur due to an information gap between managers and shareholders (i.e. agency problem) and the inefficient use of free cash flow. Berger and Hann (2007) and Bens, Berger & Monahan (2011) used different

methodologies and measures and consistently revealed that in the presence of the agency problem, managers aggregate segments to mask information regarding poorly performing segments or to suppress information on inefficient internal capital transfers. Furthermore, Wang et al. (2011) concluded that the presence of an agency problem is a motive to cover the differences in segment earnings growth or, at least, to reveal small differences.

By using a sample from Europe, André, Filip, and Moldovan (2016) supported the agency cost proposition, but only when comparing under-disclosers with box-ticker groups.<sup>9</sup> Similarly, we intend to provide insights into the role of the agency motive after the introduction of IFRS 8 by using a sample from the EU covering 4 successive years, which contrasts with the majority of similar research conducted using US data. Consistent with the literature, we expect a lower quality and quantity of segment disclosure when the agency cost motive is present. Therefore, the following hypothesis is stated:

**H2: There is a negative relationship between segment disclosure quantity/quality and agency cost.**

### *3.3 Effect of IFRS 8 on the explanatory power of proprietary and agency costs*

The principle-based IFRS 8 adopts the management approach that focuses on relevance and judgement, rather than detailed guidelines. Generally, IFRS 8 has increased the level of discretion and reporting choices compared with its predecessor (IAS 14R); the core principle of IFRS 8 is to report segment information through the perspective of management (IASB, 2006).

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<sup>9</sup> André, Filip, and Moldovan (2016) defined box-tickers as those that stick strictly to the standard's suggestions and disclose the same number of line items as mentioned in the standard.

The standard mandates the disclosure of profit or loss measures and assets for each reportable segment and allows for the non-disclosure of all other items if this information is not regularly reviewed by the CODM or the preparation cost is excessive (IASB, 2006). By contrast, the standard requires the disclosure of sales and noncurrent assets by an individual country, but only when an individual country is material, which again suggests greater discretion and flexibility under IFRS 8.

André, Filip, and Moldovan (2016) examined the determinants of segment disclosure quantity and quality under IFRS 8 and found support for the proprietary cost motive. Nevertheless, their study covers only 1 year of data and ignores the managers' incentives in pre-IFRS 8. Our study addresses how the principle-based IFRS 8 shapes the role of reporting incentives by using data for 4 successive years and considering the pre- and post-IFRS 8 periods.<sup>10</sup> Furthermore, we measure segment information quality differently. André, Filip, and Moldovan (2016) used the cross-segment variability in return,<sup>11</sup> but our study uses the geographical disaggregation characteristic to measure the quality dimension and, in particular, the disaggregation of sales information on a country basis.

Although the quantity and quality of segment disclosures have changed significantly since the implementation of IFRS 8 (Crawford et al., 2012; Leung & Verriest, 2015; Nichols, Street, & Cereola, 2012), these changes do not eliminate managers' proprietary or agency motives to conceal segment disclosures. Lee, Walker, & Christensen (2008) argued and found that preparers' incentives are more relevant to the quality of financial communication than accounting standards,

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<sup>10</sup> Their findings were reported only when the sample was divided into three groups (High, Avg., and Low disclosers). André, Filip, and Moldovan (2016) found no significant associations with agency costs and proprietary costs when continuous measures of segment information quantity and quality were employed.

<sup>11</sup> We calculated the cross-segment variability and found no significant changes following the introduction of IFRS 8.

and Ball, Robin, and Wu (2003) found that high-quality accounting standards produce low financial reporting quality in East Asian countries in the presence of preparer incentives. Furthermore, Ahmed, Neel, and Wang (2013) argued that IFRSs are of lower quality if managerial discretion is increased, given that managers have incentives to exercise their discretion in their interests. Christensen, Hail, and Leuz (2015) demonstrated that reporting incentives dominate accounting standards in determining accounting quality, and that the adoption of IFRS has not led to higher quality accounting when the preparers have incentives to not disclose certain information.

The agency and proprietary cost motives are major concerns for users and preparers under IFRS 8, and their influences on firms' segment disclosure choices under IFRS 8 remain unclear (Nichols, Street, & Tarca, 2013). A major concern of the management approach is the requirement to disclose information that has been prepared and measured for internal management decisions, rather than information prepared in accordance with IFRSs for stewardship and external user decisions (Crawford et al., 2012). The post-implementation reviews of the IASB and FASB indicate that some investors disputed the management approach, arguing that it may help managers mask or hide loss-making and poorly performing segments (FAF, 2012; IASB, 2013). In addition, the management approach of IFRS 8 depends on the discretion of the CODM to decide the structure and level of segments' disaggregation and how certain items are to be measured and reported. Thus, we expect that the high discretion levels under IFRS 8 make it easier for managers with reporting disincentives to decrease the quality and quantity of disclosures and thus the explanatory power of agency and proprietary costs would increase in post-IFRS 8 periods. The following two hypotheses are stated:

**H3: The negative relationship between segment disclosure quantity/quality and proprietary cost increased after IFRS 8 implementation (became more negative).**

**H4: The negative relationship between segment disclosure quantity/quality and agency cost increased after IFRS 8 implementation (became more negative).**

#### **4. Research method**

##### *4.1 Sample selection*

The main objective of this study is to examine the impact of managers' reporting choices on the quality and quantity of segment information in the EU and how the adoption of the principle-based IFRS 8 affects this impact. The final sample of the study consists of the top 208 nonfinancial firms in the EU after exclusion of early adopters, based on the Financial Times list as of 30 March 2011. We exclude firms that adopted IFRS 8 prior to its mandatory application date for several reasons. Firstly, the inclusion of early adopters would mean adding 2 further years (namely 2005 and 2006) to represent pre-IFRS 8, which increases the factors that could confound the findings. Secondly, this will add to the complexity of identifying pre- and post-IFRS 8 periods because some firms have a non-December year end. Furthermore, the number of observations in these 2 years are expected to be relatively few, compared with the other years, which might also affect the robustness of the results. The period of study is from 2007–2010 because IFRS 8 became effective for annual reporting periods beginning on or after 1 January 2009. Therefore, the pre-periods are 2007 and 2008 and post-periods are 2009 and 2010.

Segment information was manually collected from the annual reports of the firms. The sample includes firms from 15 countries, with the majority from the UK, France, Germany, and Sweden, and this distribution is consistent with the sample distribution in prior cross-country studies (e.g. Daske et al. 2008; Leung & Verriest, 2015). The number of observations used in the regressions is 540 firm-year observations (Panel B). The firm-year observations are equally

distributed between pre- and post-IFRS 8 and firms are matched over the two periods. Table 1 shows the sample distributions across countries (Panel B) and industries (Panel C).

**Table 1: Sample size****Panel (A) Number of observations used in regression**

	No. of Firm Years
Sample	
Initial sample	832
Less: Firms' years with non-December year-ends	132
Less: Missing observations	160
Final number of observations used in the regression*	540

\* The final number of observations are equally distributed between pre- and post-IFRS 8 and firms matched over the two periods.

**Panel (B) Sample distributions across country**

Country	No. of firm's years
Austria	12
Belgium	16
Denmark	20
Finland	8
France	100
Germany	60
Greece	8
Ireland	16
Italy	32
Netherlands	24
Poland	8
Portugal	12
Spain	32
Sweden	52
UK	140
Total	540

**Panel (C) Sample distributions across industry.**

Sector	No. of firm's years
Basic Material	84
Consumer Goods	88
Customer Service	60
Health Care	28
Industrial	152
Oil & Gas	36
Technology	20
Telecommunication	24
Utilities	48
Total	540

**Notes:** Table 1, panel (A) presents the construction process for the final number of observations used in regressions. Panel B presents the distribution of the sample across countries. Panel C presents the distribution of the sample across industry.

#### 4.2 Research models and variables measurements

The following regression models address the disincentives of SDQuantity and SDQuality under IFRS 8:<sup>12</sup>

$$\begin{aligned} SDquantity_{it} = & \alpha \\ & + \beta_1 IFRS8_{it} + \beta_2 MVGROWTH_{it} + \beta_3 CAPINTEN_{it} + \beta_4 AGENCY_{it} + \beta_{13} IFRS8MVGROWTH_{it} \\ & + \beta_{14} IFRS8CAPINTEN + \beta_{15} IFRS8AGENCY + \beta_5 COMPLEX_{it} + \beta_6 LOB_{it} + \beta_7 MANUF_{it} \\ & + \beta_8 SIZE_{it} + \beta_9 PROFIT_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} ENFORCE + \beta_{12} PROTECT_{it} \varepsilon_{it} \end{aligned}$$

**Model (1)**

$$\begin{aligned} SDquality_{it} = & \alpha \\ & + \beta_1 IFRS8_{it} + \beta_2 MVGROWTH_{it} + \beta_3 CAPINTEN_{it} + \beta_4 AGENCY_{it} + \beta_{13} IFRS8MVGROWTH_{it} \\ & + \beta_{14} IFRS8CAPINTEN + \beta_{15} IFRS8AGENCY + \beta_5 COMPLEX_{it} + \beta_6 LOB_{it} + \beta_7 MANUF_{it} \\ & + \beta_8 SIZE_{it} + \beta_9 PROFIT_{it} + \beta_{10} LEVERAGE_{it} + \beta_{11} ENFORCE + \beta_{12} PROTECT_{it} \varepsilon_{it} \end{aligned}$$

**Model (2)**

The main variables of interest are the proprietary cost (thereafter MVGROWTH and CAPINTEN), agency cost (AGENCY), and their interactions with IFRS 8. The models control for IFRS 8 impact (IFRS 8), firm size (SIZE), leverage (LEVERAGE), profitability (PROFIT), segment structure (LOB), complexity (COMPLEX), and country-level enforcement and protection (ENFORCE and PROTECT). Table (2) summarises the definitions of the variables in our models.

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<sup>12</sup> The robust cluster technique by company is used as suggested in Petersen (2009).

**Table 2: Variables definitions**

<b>Variable</b>	<b>Definition</b>	<b>Source</b>
<i>Dependent variables</i>		
SDQuality	Proportion of firm sales disclosed by individual country.	Annual Report
SDQuantity	Disclosure score based on the total number of items reported in the segmental notes.	Annual Report
<i>Proxies for proprietary cost</i>		
MVGROWTH	Market value growth measured as 1-year market capitalisation growth, current year's market capitalisation/last year's market capitalisation – 1) * 100.	DataStream
CAPINTEN	Weighted average of property, plant, and equipment for all firms in the same industry scaled by total assets; market share, calculated as the ratio of firm sales to industry aggregate sales, is used as the weight. This an inverse measure of proprietary cost.	DataStream
<i>Proxies for agency cost</i>		
AGENCY	Agency cost measured by the free cash flow per share represents the cash earnings per share, net of capital expenditures, and total dividends paid by the firm.	DataStream
<i>Control variables</i>		
IFRS 8	A dichotomous variable equal to 1 if time t is post the adoption of IFRS 8 and 0 otherwise.	Annual Report
COMPLEX	Average of the number of segments: (business segments + geographic segments)/2.	Annual Report
LOB	A dichotomous variable equal to 1 if firm 'i' defined as LOB and 0 otherwise.	Annual Report
SIZE	Natural logarithm of total assets at the end of t.	DataStream

PROFIT	Natural logarithm of operating income represents the difference between sales and total operating expenses.	DataStream
MANUF	A dichotomous variable equal to 1 if firm 'i' is manufacturing and 0 otherwise.	DataStream
LEVERAGE	Ratio of total debt/total assets.	DataStream
ENFORCE	Index of public enforcement aggregating whether suspect corporate transactions can lead to fines or jail sentences for wrongdoers or approving bodies; high values indicate a high intensity of public enforcement.	Djankov et al. (2008)
PROTECT	Antidirector rights index. An aggregate measure of minority shareholder rights that ranges from 0 –5.	Djankov et al. (2008)

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#### *4.3 Segment information measurement*

Disclosure index is used to measure the SDQuantity. The selection of items was based on 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 pilot test resulted in the removal of items such as order backlog and the addition of other items such as exceptional items. This removal and addition resulted in a list of 53 items comprising two subindices: the first contains 38 items relevant to operating segments, and the second includes 15 items relevant for entity-wide disclosures<sup>13</sup>. The index is unweighted with an item scoring 1 if it is disclosed and 0 otherwise, except for reconciliation items, which were scored as two if detailed items were provided.

To minimise applicability problems (Cooke, 1989; Lopes & Rodrigues, 2007; Meek, Roberts & Gray, 1995; Raffournier, 1995; Wallace & Naser, 1995), the relative disclosure score

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<sup>13</sup> The disclosure index is available upon request.

(RDI) is calculated as the percentage of actual score awarded to the maximum possible score for each firm. For example, if no difference is observed between the sum of segment revenue and group revenue, the reconciliation item is not applicable, and the firm is not penalised for non-disclosure. Other examples include exceptional items and discontinued items, which are considered applicable if disclosed in the consolidated financial statements.

A large body of research has viewed the level of disaggregation as an appropriate proxy for disclosure quality by arguing that the utility of segment information is positively related to the number of segments reported or disaggregation of the information provided (i.e. Aboud, Roberts & Zalata, 2018; Bens & Monahan, 2004; Emmanuel et al., 1999). The main objective of segment reporting is to provide users with incremental information beyond firm-wide information. Therefore, the disaggregation of segment information is important, that is, disaggregated information is more likely to enable users to evaluate the nature and financial effect of business activities and the economic environment in which they operate (Berger & Hann, 2003; Douppnik & Seese, 2001; IASB, 2006). In addition, the disaggregation measures involve using various objective calculation rules and have been widely used as a proxy for disclosure quality (Aboud, Roberts & Zalata, 2018; Bens & Monahan, 2004; Bens, Berger & Monahan 2011; Berger & Hann, 2003, 2007; Harris, 1998; Nichols & Street, 2007). Furthermore, the literature has theorised that disaggregation of segment information improves the predictability of earnings and sales information (i.e. Herrmann; 1996; Herrmann & Thomas, 1997; Hussain 1997).

This study uses the country-level disaggregation of sales information. Country-specific information represents the highest possible level of disaggregation and its usefulness may be observed in the demand of financial analysts and others for country-by-country information (Aboud, Roberts & Zalata, 2018; Douppnik & Seese, 2001; FASB, 1997; IASB, 2006). For

example, knowing that 60% of sales are from one named country is likely to be more important to than knowing, for a second firm, that each of three named countries account for 10% of sales. Therefore, this study employs the country-level disclosures (SDQuality) to measure the quality of segment information.<sup>14</sup> Segment disclosure quality (SDQuality) is calculated as the proportion of firm sales disclosed by an individual country.<sup>15</sup> The finest information set would be when 100% of firm sales are disclosed by individual countries. All segment information was manually collected from the annual reports.

#### *4.4 Independent variables' measurement*

The measurement of proprietary cost is complicated, and several measures have been used in the literature (Bozanic Dietrich & Johnson, 2017, André, Filip & Moldovan 2016, Wang et al., 2011; Li 2010; Berger & Hann 2007; Bamber and Cheon 1998; Ali, Klasa & Yeung.2014; Lang & Sul, 2014). In this study, we use two proxies. The first proxy is MVGROWTH, and Bamber and Cheon (1998, p. 171) argued that proprietary cost is positively associated with firm-specific growth opportunities. Growth opportunities indicate the availability of profitable investments; therefore, firms with high growth are more likely to suffer from competitive harm if they disclose information of a proprietary nature. Thus, this study hypothesises that managers of firms with higher growth are more likely to conceal information that could harm that growth. We define growth as market capitalisation growth, that is, 1-year growth in market capitalisation, and extract the data from DataStream<sup>16</sup>.

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<sup>14</sup> We measure country-level disclosures regardless of whether the firms define operating segments based on lines of business (LOB) or geographic location. For companies that do not define operating segments based on geographic location, IFRS 8 requires information about geographic areas to be provided as part of entity-wide disclosures.

<sup>15</sup> Companies with domestic sales only or that operate in only one country were excluded.

<sup>16</sup> One-year market capitalization growth is calculated as the current year's market capitalization/last year's market capitalization – 1)\*100 (DataStream: WC08579).

Similar to Li (2010), the second measure is the weighted average of property, plant, and equipment for all firms in the same industry scaled by total assets (thereafter CAPINTEN)<sup>17</sup>. This second measure has been frequently used in the literature as a proxy for entry barriers (e.g. DeFond & Hung, 2003; Li, 2010; Wang et al., 2011; Karuna, 2007) and measures the minimal investment required to enter a product market and is positively related to entry barriers. The CAPINTEN is an inverse measure of proprietary cost; higher CAPINTEN indicates higher entry costs and a less-competitive environment. This study expects a negative sign for MVGROWTH and a positive sign for CAPINTEN.<sup>18</sup>

We use free cash flow to test the agency cost hypotheses (Smith & Pennathur, 2017; Astami et al. 2017; Gul & Tsui 1997; Chiang and Ko 2009; De Jong & Van Dijk, 2007; Chung, Firth & Kim., 2005; Griffin, Long & Sun, 2010; Wang et al., 2011; Jensen 1986). Early research has suggested that dividends to shareholders act as a mechanism for reducing agency costs, that is, it reduces the resources under the managers' control and the managers' power. They also keep them subject to monitoring by capital markets (Jensen 1986, Easterbrook 1984, Jensen 1988). Jensen (1986) developed a free cash flow proposition that hypothesises that managers endowed with free cash flow will invest it in negative net present value projects, rather than pay the funds out to shareholders. Managers prize investment because their privileges increase even when the firm invests in negative net-present-value projects (Jensen, 1986; Stultz, 1990). This is consistent with the empire-building proposition, that is, managers may engage in opportunistic behaviour and value-destroying activities to achieve personal benefit (Hope & Thomas, 2008). Thus, managers of firms with high free cash flow are more likely to be associated with an agency problem and

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<sup>17</sup> This is an industry weighted measure. Market share, calculated as the ratio of firm sales to industry aggregate sales, is used as the weight. A two-digit SIC code is used to identify the industry and all listed firms in the sample countries (Thomson Reuters database).

<sup>18</sup> CAPITINTEN is an inverse measure of proprietary cost.

conflict of interest and less likely to provide high-quality and SDQuantity. Thus, free cash flow per share is used to test the agency cost hypotheses, and the data are collected from the DataStream database.

This study controls for a set of factors that influence segment disclosures. The models control for IFRS 8 impact, firm size (SIZE), industry (MANUF), leverage (LEVERAGE), profitability (PROFIT), segment structure (LOB), complexity (COMPLEX), and country-level enforcement and protection (ENFORCE and PROTECT). The models consider two other variables that potentially reflect the attributes of firm segmental structure (LOB and COMPLEX). For IFRS 8, this study expects a positive sign is for SDQuality and a negative sign for SDQuantity (Aboud, Roberts & Zalata, 2018; Crawford et al., 2012; Leung & Verriest, 2015; Nichols, Street, & Tarca, 2013). Consistent with the literature, (Singhvi & Desai, 1971; Raffournier, 1995; Watson, Shrivies & Marston., 2002), we expect a positive sign for LEVERAGE and SIZE. As the literature has provided mixed results on the relationship between profitability and disclosure, this study prefers not to provide a sign for the variable PROFIT (Ahmed & Courtis, 1999; Kelly, 1994; Meek, Roberts & Gray, 1995). For a complexity variable, we expect firms with a complex segment structure (i.e. operate in many activities or a complex environment) to provide a greater number of segment disclosures. By contrast, the coefficient of LOB is more likely to be negative for the SDQuality; firms that report their operating segments using geographical regions are more likely to provide higher geographical disaggregation. Consistent with the literature (i.e. Daske et al., 2008; Francis, Schipper & Vincent., 2005; Glaum et al., 2013; Miller & Reisel, 2012), this study expects a positive relationship among the level of investor protection (PROTECT), enforcement (ENFORCE), and segment disclosure. Table 2 provides a summary of definitions of the variables used in our models.



## 5. Results

### 5.1 Descriptive statistics

Table 3 presents the descriptive statistics of segment disclosures and their determinants. Panel A shows that segment disclosure quantity and quality changed after IFRS 8. The number of items disclosed decreased under IFRS 8, and the quality of segment disclosure substantially increased after IFRS 8. Consistently, the correlation matrix indicates a significant negative correlation between IFRS 8 and SDQuantity and a positive correlation between IFRS 8 and SDQuality with IFRS 8. These findings are consistent with the literature on the impact of IFRS 8 on the level of segment disclosures (Aboud, Roberts & Zalata, 2018; Crawford et al., 2012; Leung & Verriest, 2015; Nichols, Street, & Tarca, 2013). One of the main characteristics of our sample is it incorporates 2 years following IFRS 8. In the second year after the adoption of IFRS 8, the results imply nonsignificant changes for SDQuantity and SDQuality<sup>19</sup>. These results suggest that most firms do not significantly change what they report after fully adjusting for the standard, which occurred in 2009.

**Table 3:** Descriptive statistics

**Panel A:** Descriptive statistics in the Pre-SFAS 131 and Post-SFAS 131 periods

	N	Mean	Median	p25	p75	SD
<b>Pre- IFRS 8</b>						
SDQuality	270	0.318	0.241	0	0.543	0.328
SDQuantity	270	0.362	0.356	0.316	0.395	0.083
MVGROWTH	270	13.6	22.2	9.95	44.5	42.1
CAPINTEN	270	0.294	0.261	0.127	0.419	0.2
AGENCY	270	1.21	0.38	-0.092	1.6	2.74
COMPLEX	270	4.27	4	3	5.5	1.58
LOB	270	0.767	1	1	1	0.423
MANUF	270	0.682	1	0	1	0.467
SIZE	270	16.1	15.9	15	17.1	1.33
PROFIT	270	13.6	13.5	12.8	14.4	1.12

<sup>19</sup> The mean scores of SDquantity and SDQuality are .46 and .34 in 2009 and .455 and .349 in 2010. Using parametric and non-parametric tests, we find insignificant changes in segment disclosure quantity and quality between 2009 and 2010.

LEVERAGE	270	0.268	0.248	0.161	0.367	0.154
ENFORCE	270	0.523	0.5	0	1	0.421
PROTECT	270	2.97	3	2	4	1.43
<b>Post-IFRS 8</b>						
SDQuality	270	0.448	0.424	0.141	0.75	0.341
SDQuantity	270	0.354	0.351	0.298	0.414	0.093
MVGROWTH	270	36.1	25.9	5.28	58.8	45.3
CAPINTEN	270	0.304	0.261	0.123	0.45	0.218
AGENCY	270	1.03	0.325	-0.163	1.72	2.64
COMPLEX	270	4.55	4.5	3.5	5.5	1.75
LOB	270	0.766	1	1	1	0.424
MANUF	270	0.706	1	0	1	0.456
SIZE	270	16.1	16	15.2	17.1	1.35
PROFIT	270	13.5	13.3	12.7	14.2	1.18
LEVERAGE	270	0.266	0.256	0.15	0.366	0.15
ENFORCE	270	0.516	0.5	0	1	0.429
PROTECT	270	2.92	3	2	4	1.44

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Panel B: Correlation matrix

	SDQuality	SDQuantity	IFRS 8	MVGROWTH	CAPINTEN	AGENCY	COMPLEX	LOB	MANUF	SIZE	PROFIT	LEVERAGE	ENFORCE	PROTECT
SDQuality	1													
SDQuantity	0.059*	1												
IFRS 8	0.186***	-0.113***	1											
MVGROWTH	0.022	-0.089**	0.536***	1										
CAPINTEN	-0.004	0.097**	-0.013	0.006	1									
AGENCY	-0.039	-0.015	-0.071**	0.032	-0.002	1								
COMPLEX	0.168***	0.161***	0.070**	0.059*	-0.089**	-0.016	1							
LOB	-0.094	0.121	-0.002	0.023	0.020	-0.025	0.215	1						
MANUF	-0.065*	0.057*	0.0059	0.032	0.014	0.031	0.167***	0.131***	1					
SIZE	0.128***	0.255***	0.019	-0.125***	-0.001	-0.131***	0.202***	-0.031	0.170***	1				
PROFIT	0.039	0.100***	-0.054**	-0.086***	0.011	-0.091***	0.067**	-0.106***	0.066**	0.723***	1			
LEVERAGE	-0.025	0.023	0.006	-0.068*	0.056	0.002	-0.063*	-0.050	0.004	0.142***	0.119***	1		
ENFORCE	0.030	0.060*	-0.002	-0.043	-0.031	0.052	0.042	0.073**	0.142***	0.006	-0.119	-0.045	1	
PROTECT	0.110***	0.100***	-0.001	0.020	0.049	-0.050	-0.053	0.026	-0.092***	-0.064**	0.076**	-0.001	-0.46	1

Table (3) presents the descriptive statistics. Panel (A) describes the variables for the full sample. Panel B shows the Pearson correlations between the variables. Variables definitions table (2)

## 5.2 Main results

Table 4 shows the impact of proprietary and agency motives on the quantity and quality of the reported segment information and how the introduction of the principle-based IFRS 8 shapes this impact. The quantity of segment disclosure (SDQuantity) is measured by the disclosure index and quality is measured by the level of geographical information disaggregation. The overall explanatory powers of the multivariate analysis show reasonable  $R^2$  (15.6% and 15.1%) for the models, and this result is consistent with the disclosure literature and, in particular, the segment-reporting literature (e.g. Prather-Kinsey, 2004; Tsakumis, Douppnik & Seese 2006).

**Table 4:** Impact of proprietary and agency motives on the quantity and quality of the reported segment information.

	1. SDQuality	2.SDQuantity	3.SDQuality with interaction	4.SDQuantity with Interaction
IFRS 8	0.156***	-0.013	0.164***	-0.012
MVGROWTH	-0.092***	-0.0026	-0.002	-0.005
CAPINTEN	0.0462**	0.0310	0.043	0.029
AGENCY	-0.011**	0.03**	-0.014**	0.003**
IFRS 8* MVGROWTH			-0.001**	0.005
IFRS 8* CAPINTEN			-0.012	0.004
IFRS 8*AGENCY			0.008	-0.002
COMPLEX	0.052***	0.002	0.054***	0.002
LOB	-0.081**	0.015*	-0.080**	0.014*
MANUF	-0.087***	0.003	-0.087***	0.003
SIZE	0.0319**	0.031***	0.031**	0.030***
PROFIT	-0.035**	-0.021***	-0.036**	-0.021***
LEVERAGE	-0.124	-0.023	-0.132	-0.023
ENFORCE	0.080**	0.036***	0.078**	0.036***
PROTECT	0.033***	0.014***	0.033***	0.014***
Cons	0.096	0.0656	0.125	0.0645
N	540	540	540	540
adj. R-sq	0.151	0.156	0.155	0.159
Robust cluster SE	Yes	Yes	Yes	Yes

**Notes:** Table 4 presents the findings of pooled regression that examine the impact of proprietary and agency costs on segment disclosures' quantity and quality. The standard errors are clustered by firm to account for heteroscedasticity and autocorrelation problems<sup>20</sup>. Variables definitions table (2)

### 5.2.1 Effect of proprietary and agency cost on segment disclosures' quantity and quality

We regressed the proprietary cost proxies against the quantity and quality of segment disclosures. Two proxies are introduced to account for the proprietary cost: MVGROWTH and CAPINTEN. The results are presented in Table 4, columns 1 and 2. Regarding SDQuality, the results suggest that firms with larger proprietary costs are less likely to disclose high-quality segment disclosures because the coefficients of MVGROWTH and CAPINTEN are significant in column 1 at 1% and 5%, respectively.<sup>21</sup> By contrast, the two proxies of proprietary cost are not

<sup>20</sup> When we employ the standard errors clustered by country, the main findings are qualitatively similar.

<sup>21</sup> CAPINTEN is an inverse measure of proprietary cost.

significant for SDQuantity and imply that managers are less likely to consider proprietary costs as a motive for decreasing the volume of segment information (column 2).

Therefore, the findings are partially consistent with H1 and suggest that proprietary cost is a motive for providing only lower segment disclosure quality. The quality of segment disclosure, measured by country-level disclosure, is of a high proprietary nature that could help rivals beat the incumbent firm and provides precise information regarding sources of profit and firms' diversification strategy. This is consistent with the discretionary disclosure theory, that is, management disclosure choices, namely, aggregation decisions, are driven by the proprietary costs (Clinch & Verrecchia, 1997; Verrecchia, 1983, 2001). The findings also indicate that the management disclosure choice depends on the segment disclosure dimensions. The results suggest that proprietary cost is a disincentive for only SDQuality and firms that anticipate competitive harm are less likely to decrease segment disclosure quantity.

### *5.2.2 Effect of agency cost on segment disclosures' quantity and quality*

We investigate the relationship between agency problem, proxy by free cash flow (AGENCY), and segment disclosure quantity and quality. The findings show that the coefficients of AGENCY are significant for the quantity and quality dimensions (Table 4, columns 1 and 2). Notably, although the coefficient of AGENCY is positive and significant for SDQuantity at 5%, the same coefficient is negative and significant, as predicted for SDQuality at 5%. These findings suggest that in the presence of the agency problem, firms are more likely to report lower SDQuality and a higher SDQuantity.

Although this finding is partially against the prediction in H2, it is consistent with agency theory. Management segment disclosure choices are a function of cost benefits' trade off, and the agency cost has a substantial role in explaining this phenomenon. In the presence of agency costs, managers tend to increase the quantity of information reported to demonstrate that their actions in the interest of shareholders and obtain the potential capital market benefits associated with disclosure. By contrast, managers decrease the quality of segment disclosures through reporting less country-specific information to mitigate external monitoring and hide inefficient allocation of resources that might be used to achieve empire building, as argued by Hope and Thomas (2008). Our findings are consistent with the literature in the US context: managers use the vague country-level materiality guidelines to aggregate geographic disclosures (Hope, Ma and Thomas, 2013; Akamah, Hope and Thomas, 2018; Cereola et al., 2017)

Regarding the control variables, the coefficients of size (SIZE) are positive and significant, suggesting that large firms provide SDQuality and SDQuantity. The coefficient of PROFIT is negative and significant. The coefficients of LOB are positive and significant in the SDQuantity models and negative in the SDQuality models. This result implies that firms that define operating segments by using a line of business have the highest SDQuantity and lowest SDQuality, as

measured by geographical disaggregation. In addition, the quality of segment information varies based on the industry because the coefficient of MANUF is negative and significant. The results also suggest that SDQuality is higher on average for firms with complex activities and that operate in a variety of regions because the coefficient of COMPLEX is positive and significant.

Furthermore, the regression analysis incorporates a dummy variable, IFRS 8, with a value of 1 for post-IFRS 8 and 0 for pre-IFRS 8, to control for the impact of regulation. The results show that the adoption of IFRS 8 is associated with an increase in SDQuality and agree with the literature from the UK and EU (Aboud, Roberts & Zalata, 2018; Crawford et al., 2012; Nichols, Street, & Tarca, 2013). For cross-country variables, the coefficients of ENFORCE and PROTECT are positive and significant at 1% in SDQuality, and SDQuantity models suggested greater segment disclosure quality and quantity in countries with strong enforcement and investor protection systems.

### *5.2.3 Role of IFRS 8 in shaping the impact of proprietary and agency cost on the quality and quantity segment disclosures*

We expect the negative relationship between the reporting disincentives (i.e. agency and proprietary costs) and segment disclosures to be more recognisable or dominant post IFRS 8 due to the high discretion inherent in IFRS 8. Notably, the findings (Table 4, columns 3 and 4) indicate that only the coefficient of the interaction between IFRS 8 and MVGROWTH is negative and significant at 5%, for SDQuality. This negative significant coefficient suggests that the association between proprietary cost and segment disclosures' quality increased after the adoption of IFRS 8; additionally, it implies that managers of firms with high proprietary costs use the discretion of IFRS 8 (i.e. aggregation criteria and materiality level of country-level disclosure) to report a lower quality of segment disclosures; thus, proprietary costs limit the anticipated benefits of IFRS 8.

These findings are consistent with Lee, Walker, & Christensen (2008) and Christensen, Hail, and Leuz (2015), that is, reporting incentives are more relevant than accounting standards in determining accounting quality, and the adoption of IFRS may not lead to higher quality accounting when the preparers have incentives to not disclose certain information. The interactions between IFRS 8 and both capital intensity and agency cost are not significant.

## **6. Additional analysis**

The question of how to report segment information has been controversial. Disclosure quality is a tricky concept and its measurement is complex in general. Beyer et al. (2010, p.311) asserted that a sensible economic definition and direct measure of financial reporting quality are missing from the literature. The literature has introduced various definitions and measures of segment disclosure quality (Rennie & Emmanuel 1992; Berger & Hann 2003; Ettredge et al 2006; Wang et al 2011; Tsakumis, Douppnik & Seese 2006; Nichols, Street, & Cereola, 2012; André, Filip & Moldovan 2016; Aboud, Roberts & Zalata, 2018). In this study, we use the country-specific disclosures to measure the segment disclosure quality because country-level disclosure provides the finest and, potentially, most useful information. Nevertheless, a variety of alternative levels of disaggregation have been observed. For instance, subcontinental disclosures have privilege over continental or more aggregated disclosures. Additionally, some firms provide country-specific information and aggregate the remaining results into one segment such as ‘other;’ other firms report only the named continent segments, such as ‘Americas’ or ‘Europe.’ In these cases, the overall disaggregation of segmental reporting may be greater for firms with fewer pieces of country-specific information.

Therefore, consistent with Kou and Hussain (2007), Douppnik and Seese (2001), and Hussain (1997), an alternative proxy is used to measure the overall disaggregation of the

geographical information. This proxy is computed as the sum of individual segment sales, divided by total sales, and multiplied by the appropriated weight for that type of segment as follows:

$$\sum_{N=1}^N \frac{Gi's\ sales}{TGS} * GWi$$

Where N: number of geographical areas/segments

Gi's: revenue for geographic area/segment i

GW<sub>i</sub>: geographical weight

TGS: total segments/areas revenues

Consistent with the literature, the finest level of disclosure is country, which is weighted by a scale of three. A scale of two is applied to continent or sub-continent segments, such as 'The Americas' or 'North America.' A scale of one is for multi-continent segments, such as 'Europe and Asia.' A scale of 0 is for unspecified segments such as 'other.' Using this proxy, the results are reported in Table 5. The reported results are consistent with the main results.

**Table (5)** Effect of proprietary and agency motives on the quality of the reported segment information by using an overall geographical disaggregation score.

	SDQuality	SDQuality with interaction
IFRS 8	0.163***	0.165**
MVGROWTH	-0.082**	-0.00145
CAPINTEN	0.159**	-0.0986

AGENCY	-0.152*	-0.0318**
IFRS 8* MVGROWTH		-0.0815*
IFRS 8* CAPINTEN		-0.012
IFRS 8* AGENCY		-0.0347
COMPLEX	0.183***	0.183***
LOB	-0.361***	-0.356***
MANUF	-0.172***	-0.172***
SIZE	0.0022	0.00477
PROFIT	-0.0521	-0.0545
LEVERAGE	-0.302*	-0.298
ENFORCE	0.276***	0.271***
PROTECT	0.0419**	0.0423**
Cons	2.151***	2.141***
N	540	540
adj. R-sq	0.228	0.228
Robust cluster SE	Yes	Yes

Notes: Table 5 presents the findings of pooled regression that examine the impact of proprietary and agency costs on segment disclosures' quality by using an overall geographical disaggregation score. The standard errors are clustered by firm to account for heteroscedasticity and autocorrelation problems. Variables definitions table (2)

Our results support the notion that segment disclosure quality varies even under a common accounting standard, and strong investor protection and enforcement systems is associated with greater quantity and quality of segment disclosure. Notably, the impact of interaction between regulatory intervention, reporting incentives, and institutional factors on segment disclosure practices remains controversial (Ahmed, Neel, & Wang, 2013; Ball, 2006; Lee, Walker, & Christensen 2008). In line with these arguments, we introduce three level interactions between the country-level proxies (ENFORCE and PROTECT), the principle-based IFRS 8, and the reporting disincentives (agency and proprietary cost). The results indicate that none of the interactions are significant (not tabulated).

## 7. Conclusion

This study addresses the role of reporting disincentives in determining SDQuality and SDQuantity. In particular, this study examines the role of agency and proprietary motives in precluding

segmental disclosures by using a sample of the largest firms in the EU during 4 successive years. Consistent with proprietary cost being a key factor in disclosure quality choice, the findings suggest that firms with anticipated competitive harm are more likely to provide lower-quality disclosures and less likely to decrease segment disclosure quantity. The findings also indicate that the introduction of IFRS 8 increased the chance of withholding or reporting lower-quality segment information for proprietary reasons. These findings are consistent with the argument that the anticipated benefits of a principle-based standard such as IFRS 8 could be limited due to the level of managerial discretion it affords (Ahmed, Neel, & Wang, 2013; Christensen, Hail, & Leuz, 2015). The findings also imply that reporting incentives such as proprietary cost motives dominate accounting standards when determining accounting quality, which is consistent with the findings of Ball and Shivakumar (2005), Burgstahler, Hail, and Leuz (2006), and Christensen, Hail, and Leuz (2015).

Agency theory suggests that managers tend to increase disclosures with the objective of diminishing agency costs, and managers under the self-interest concept are likely to withhold information. We observe that managers react to their personal incentives by providing lower segment disclosure quality to avoid external monitoring or mask inefficient decisions. In the meantime, they are aware of the importance of disclosure for mitigating agency cost; therefore, they increase the SDQuantity instead.

These findings make three contributions to the segmental disclosure literature. First, the findings add to the understanding of the impact of proprietary cost and opportunistic behaviour on segmental reporting choices, given that few studies have investigated the agency and proprietary cost of segmental information outside the US (Nichols, Street, & Tarca, 2013).

Second, the findings provide empirical evidence of the impact of the interaction between the principle-based IFRS 8 and the reporting disincentives regarding segment disclosure of quality and quantity. The analysis showed that the negative association between proprietary costs and segmental reporting quality is stronger under a principle-based IFRS 8, suggesting that managers may consider engaging in strategic reporting that limits anticipated competitive harm easier. By contrast, the empirical results based on US data have suggested that the effects of proprietary costs and agency costs on companies' segment reporting quality have not changed after the implementation of FAS 131 (Ettredge et al 2006; Wang et al 2011)<sup>22</sup>

Third, the findings show how reporting incentives affect the segment disclosure quality and quantity choices differently. For example, although segment disclosure quality is significantly important when testing agency and proprietary costs, the quantity of information is either nonsignificant or presents different conclusions. These findings suggest that the findings in the literature may have been dependent on the disclosure dimension employed

Our research has implications for policymakers and financial statement users. Firstly, this study provides feedback on the debatable IFRS 8, given that it has been approved after further investigation and analysis by the European Commission. Consistent with IASB post-implementation review, our findings indicate that the quality of segmental reporting improved following IFRS 8. Our findings suggest that the disclosure by country has improved, and the number of line items has decreased. These findings also inform financial statement users concerns

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<sup>22</sup> Ettredge et al (2006) and Wang et al (2011) used cross segment variability to measure segment reporting quality, but we employ the level of geographical disaggregation as a proxy for segment reporting quality.

regarding the quality of geographical disclosure acknowledged in the post-implementation review of IFRS 8.

Secondly, our results extend the literature by indicating that the anticipated benefits of IFRS 8 are limited when the preparers have incentives to not disclose (i.e. high proprietary costs). The aggregation criterion and materiality are two vital issues that could cause practical problems for preparers and auditors (IASB, 2013). IFRS 8 allows managers to use a high materiality threshold for purposes of individual country disclosures (see, Akamah, Hope and Thomas, 2018; Cereola et al., 2017). In addition, investors believe that too much discretion regarding the aggregation of segments and materiality decision could limit the usefulness of the information (IASB, 2013). For instance, Cereola et al. (2017) observed mixed results regarding materiality threshold and concluded that management may be interpreting the vague wording of ‘material’ to either disclose or conceal information about specific countries, depending on management’s view of the benefit or detriment to the company (p.128). Therefore, we assert that users of segmental information may benefit from clear guidance when identifying a material threshold for country-specific disclosure.

Thirdly, the findings support the argument of the European Financial Reporting Advisory Group and European Standard Setters: the assessment of stewardship should take a place alongside decision-usefulness to ensure that the provided information helps decision-making related to stewardship, such as efficiency or capability of management, and an assessment of whether remuneration is excessive or unjust (ASB, 2007). Segmental information has been considered an important tool to control corporate managers because it requires them to justify the results of their stewardship; further, segmental information may help to improve or eliminate substandard operations, to the ultimate benefit of the stockholders and the economy in general (SEC, 1967).

Segmental information reveals information about firms' diversification strategies and the extent of resource transfers between segments (Berger & Hann 2003; Bens & Monahan, 2004; Hope & Thomas, 2008). Therefore, such information could lead to a reduction in information asymmetry and facilitates improved external monitoring of managers (Berger & Hann 2003; Bens & Monahan, 2004; Hope & Thomas, 2008).

We employ two proxies of proprietary cost, but the measurement of proprietary cost is a complicated and debatable topic (i.e. Bozanic, Dietrich & Johnson.2017, André, Filip & Moldovan 2016, Wang et al., 2011; Li 2010; Berger & Hann 2007; Bamber and Cheon 1998; Ali, Klasa & Yeung.2014; Lang & Sul, 2014). Thus, the measurement of proprietary and agency costs is a limitation for our study. Further research could examine the same topic by using different proxies of proprietary and agency costs.

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