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The relation between segment disclosure and earnings quality

We investigate the relation between segment disclosure and earnings quality. Using a US sample for the period 2001-2006, we find a positive relation between earnings quality and the quantity of segment disclosures. We use lead-lag tests to examine the flow of causality, and our results show that current segment disclosure is positively related to prior levels of earnings quality, while current earnings quality scores are not related to prior levels of segment disclosure. Thus, the causality flows from earnings quality to segment disclosure. Our results hold for both business and geographic segment disclosure.

1. INTRODUCTION

The objective of this paper is to investigate the causal links between earnings quality and segment disclosure. Prior research on the relation between reported numbers and disclosure finds mixed results. On the one hand, the studies that use disclosure proxies based on the counting of disclosed items that disaggregate or further explain the reported numbers find a positive (complementary) relation. This is the case in Francis et al. (2008) and Wang et al. (2011).[1] On the other hand, studies that analyze more general disclosure vehicles that provide information not necessarily related to the reported numbers (for example Tasker, 1998, who looks at conference calls), find a negative (substitutive) relation.

In this study, we provide additional evidence to this debate by focusing on segment disclosure. Academics, practitioners and regulators hold the view that segment disclosure is an important disclosure for investors (Chen and Zhang, 2003), as it decreases information asymmetries and agency costs (Greenstein and Sami, 1994; Bens and Monahan, 2004; Berger and Hann, 2007; Hope and Thomas, 2008; Hope, Thomas and Winterbotham, 2009; Wang et al., 2011). While we expect a mainly positive relation between segment disclosure and earnings quality (as in Francis et al., 2008 or Wang et al., 2011), the investigation of such relationship is an empirical issue that deserves attention. This is so as the proprietary costs of segment disclosure (that disaggregates overall earnings) increase as earnings quality increases. Given the increased costs of disclosure when earnings quality is high, this could create a negative relation between segment disclosure and earnings quality. Also, if forced to disclose comprehensive segment information, firms facing tough competition might garble the earnings signal to

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[1] A notable exception is Lang and Lundholm (1993), who find a negative relation using a count variable from the notes.

decrease proprietary costs, which would also lead to a negative relation between segment information and earnings quality. Prior research shows that proprietary costs play a key role in deciding whether to disclose segment information (Hayes and Lundholm, 1996; Harris, 1998).

A second dimension in which our study represents an improvement on previous research is that we analyze causal relationships between earnings quality and disclosure. Francis et al. (2008) and Wang et al. (2011) explicitly argue but do not test that earnings quality determines disclosure levels. The explanation for this causal relation (past earnings quality levels determine current disclosures) is that disclosure appears only once the firm commits to being transparent and not managing earnings. Only once the firm commits to not managing earnings will it provide additional disclosure. This is in line with the arguments in LaFond and Watts (2008) that an improved information environment triggers additional disclosure. This causal relation applies well to segment disclosures, as they disaggregate information already provided in the financial statements.

However, other studies argue that the causality might flow from disclosure to the quality of reported numbers. With more comprehensive disclosure, as long as the information disclosed is truthful, monitoring managerial accounting choices is easier, and thus, managing earnings is more difficult (Hunton et al., 2006). This is in line with the arguments in Jo and Kim (2007) that SEO firms that disclose more manage earnings less, and in Dyreng et al. (2012) that firms manage earnings through their foreign operations as these foreign operations tend to be more difficult to monitor. This alternative causal relation also applies well to segment reporting, as segment reporting permits better monitoring of managerial accounting choices, and would make earnings management in foreign operations more visible through the disaggregation of the information across geographic segments.

Given that both explanations are grounded on strong theoretical roots, we add to this stream of literature providing empirical evidence on which of the two effects dominates for one of the disclosures, segment reporting, that prior research highlights as very useful for investors (both for decreasing information asymmetries, as in Greenstein and Sami, 1994 or Hope et al., 2009, and also to monitor managers, as in Hope and Thomas, 2008).

Using a sample of non-regulated and non-financial firms for the period 2001-2006, we find a positive relation between the current level of earnings quality and the current level of segment disclosure. This result is robust to controls for the determinants of segment disclosure. In our main tests, we use leads-lags tests in the spirit of Granger (1969) and Sims (1972), and find that current segment disclosure is associated with past earnings quality levels, while current earnings quality levels are not associated with past segment disclosure levels. Thus, our results are more in line with the argument that a prior commitment to transparency leads first to better quality earnings and subsequently to increased segment disclosure. In robustness tests we also show that the positive relation between segment disclosure and earnings quality is attenuated or even disappears when earnings quality is too low and when proprietary costs are high.

We contribute to prior research by using empirical evidence to back up the untested common assumption (Francis et al., 2008, Wang et al. 2011) that earnings quality determines disclosure levels, and discarding the opposite explanation (supported by Hunton et al., 2006 and Jo and Kim, 2007, among others) that it is more comprehensive disclosure that creates barriers to earnings management and improves earnings quality. Finally, given that we perform our tests using a large US sample, we also overcome one

very common shortcoming in prior studies that relate accounting numbers and disclosure: the use of small samples.[2]

The remainder of the paper is structured as follows. In Section 2 we discuss the expected relations between segment disclosure and earnings quality. In Section 3 we present the research design, describing our proxy for the quantity of segment information and the method to analyze the causal links between earnings quality and segment information. In Section 4 we present the sample and in Section 5 the results. Section 6 contains the robustness tests. Finally, Section 7 summarizes and concludes.

2. SEGMENT DISCLOSURE AND EARNINGS QUALITY

Prior research puts forward, but does not formally test, two explanations for the existence of a close relation between the quality of reported numbers and disclosures that further disaggregate and explain those reported numbers. These explanations point to a different direction in the causal relationship.

The first of these two explanations is based on firms' desire to minimize the negative effects of information asymmetries. In the absence of disclosure-related costs, individuals disclose information to obtain certain benefits (Spence, 1973). In particular, firms will have incentives to voluntarily disclose relevant information to the market to reduce information asymmetries and agency costs (e.g. Jensen and Meckling, 1976; Grossman, 1981; Milgrom, 1981; Hughes, 1986; Morris, 1987). Managers can obtain these economic benefits related to the provision of information through improvements in the quality of their firms' reported numbers. However, given that reported numbers (i.e. income statement, balance sheet) are too aggregated, even if firms prepared them trying to provide a true and fair view of the situation of the firm, it is likely that they are not

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[2] For example, Francis et al. (2008) constrain their analysis to only one year given difficulties related to the creation of the disclosure score.

enough to ensure that the users of the information will make their most efficient allocation of resources. Segment disclosure is expected to help to disaggregate the information and to facilitate an efficient allocation of resources. Consistent with this expectation, previous empirical research shows that segment reporting decreases information asymmetries (e.g. Greenstein and Sami, 1994; Hope et al., 2009) and agency costs (e.g. Bens and Monahan, 2004; Berger and Hann, 2007; Hope and Thomas, 2008; Wang et al., 2011). Consequently, this first explanation for a positive association between reported numbers and disclosure argues that firms that provide high quality earnings to reduce information asymmetries and agency costs also have incentives to provide comprehensive segment information to help investors make appropriate investment decisions. This is so as managers of firms that already provide high quality earnings can additionally increase firm value (for example through decreases in either cost of capital or agency costs) expanding segment disclosures. An additional explanation supporting the fact that the causal relation flows from earnings quality to segment disclosures is that, as the information environment improves (i.e., better earnings quality), the manager has more incentives to disclose private information, since market participants are more likely to interpret nondisclosure as bad news (e.g. Dye, 1985; Jung and Kwon, 1988). This explanation is also supported by LaFond and Watts (2008) who argue that a richer information environment (more conditionally conservative accounting in their case) favors the appearance of other softer information sources.

While the prior argument points to earnings quality leading to increased segment disclosure, if we also consider proprietary costs the picture might change. Given that it is reasonable to assume that the proprietary costs of segment reporting increase with earnings quality, high quality earnings could also lead to decreased segment disclosures. This would be the case if the benefits of disclosing segment information (in terms of

decreased cost of capital, decreased agency costs etc…) do not exceed the proprietary costs. We believe that the positive effects of earnings quality on segment disclosure (driven by the desire to decrease information asymmetries and agency costs) will dominate the negative effects (driven by proprietary costs). However, which of the effects dominates is, in the end, an empirical issue.

The alternative causal link to explain an association between earnings quality and segment disclosure is that as segment disclosure increases, as long as the information disclosed is truthful, monitoring managerial accounting choices becomes easier, and thus managing earnings becomes more difficult. Hunton et al. (2006) explicitly argue, but do not test, that more transparent disclosures lead to greater detection of earnings management. This is in line with the results in Jo and Kim (2007) that SEO firms disclosing more manage earnings less and in Dyreng et al. (2012) that firms manage earnings through their foreign operations as these foreign operations tend to be difficult to monitor. This second explanation is, therefore, consistent with the causal link flowing from disclosure to earnings quality. While the relation between segment disclosure and earnings quality is also expected to be positive under this second causal link, if competition is tough, firms that provide comprehensive segment disclosures might be inclined to garble the earnings signal to decrease proprietary costs.

Given these two competing views, we empirically analyze the causality flows between earnings quality and segment disclosure. The two alternative hypotheses that we test are as follows:

H1a: Past levels of earnings quality determine current levels of segment disclosures.
H1b: Past levels of segment disclosures determine current levels of earnings quality.

3. RESEARCH DESIGN

To analyze the relation between earnings quality and segment disclosure policy, we regress an industry-year fixed effect model of quantity of segment information *(Qtt_Seg)* on earnings quality and the determinants of disclosure. In particular, we include proxies for business and geographic diversification, which we expect to be the main drivers of segment disclosure. The model is as follows:

$$
\begin{aligned}
Qtt\_Seg_{j,t} = {} & \alpha + \beta_1 \textit{ Earnings Quality}_{j,t} + \beta_2 \textit{ Business Diversification}_{j,t} + \\
& + \beta_3 \textit{ Geographic Diversification}_{j,t} + \beta_4 \textit{ Information Asymmetries}_{j,t-1} + \\
& + \beta_5 \textit{ Size}_{j,t} + \beta_6 \textit{ Growth}_{j,t} + \beta_7 \textit{ Leverage}_{j,t} + \beta_8 \textit{ Audit Firm}_{j,t} + \qquad (1) \\
& + \beta_9 \textit{ Listing Status}_{j,t} + \beta_{10} \textit{ Proprietary Costs}_{j,t} + \\
& + \beta_{11} \textit{ New Financing}_{j,t} + \beta_{12} \textit{ Profitability}_{j,t} + \beta_{13} \textit{Age}_{j,t} + \\
& + \Sigma_k \beta_k \textit{ Control year}_{k,j,t} + \Sigma_k \beta_k \textit{ Control industry}_{k,j,t} + \varepsilon_{j,t}
\end{aligned}
$$

The main coefficient on interest in Equation (1) is β_1, which captures the relation between the quantity of segment information and earnings quality. Given that we expect a mainly positive relation between proxies for earnings quality and *Qtt_Seg*, we expect a significantly positive β_1. Following Petersen (2009), we estimate this regression in a pooled fashion and report *t*-statistics based on standard errors that are robust to heteroskedasticity, serial and cross-sectional correlation with firm level cluster (the model already includes year indicators). This is the estimation method that we use throughout all tests.

In a second set of tests, we study the flow of causality. That is, we test whether (H1a) high quality earnings affects the disclosure of additional segment information, or alternatively, (H1b) comprehensive segment disclosure affects earnings quality. To analyze this we use leads-lags tests in the spirit of Granger (1969) and Sims (1972). In particular, we use the following two equations, estimated using industry and year fixed effects:

$$
Qtt\_Seg_{,t} = \alpha + \beta_1 \textit{ Earnings Quality}_{,t-1} + \beta_2 \textit{Earnings Quality}_{,t-2} +
$$

$$+\beta_3 \text{ Earnings Quality}_{,t\text{-}3} + \beta_4 \text{ Qtt\_Seg}_{,t\text{-}1} + \beta_5 \text{ Qtt\_Seg}_{,t\text{-}2} +$$
$$+ \beta_6 \text{ Qtt\_Seg}_{,t\text{-}3} + \gamma \text{ Controls}_{,t\text{-}1} + \delta \text{Industry dummies} + \qquad (2)$$
$$+ \rho \text{ Year dummies} + \varepsilon_t$$

$$\text{Earnings Quality}_{,t} = \alpha + \beta_1 \text{ Earnings Quality}_{,t\text{-}1} + \beta_2 \text{Earnings Quality}_{,t\text{-}2} +$$
$$+\beta_3 \text{ Earnings Quality}_{,t\text{-}3} + \beta_4 \text{ Qtt\_Seg}_{,t\text{-}1} + \beta_5 \text{ Qtt\_Seg}_{,t\text{-}2} +$$
$$+ \beta_6 \text{ Qtt\_Seg}_{,t\text{-}3} + \gamma \text{ Controls}_{,t\text{-}1} + \delta \text{Industry dummies} + \qquad (3)$$
$$+ \rho \text{ Year dummies} + \varepsilon_t$$

We first estimate Equation (2) and assess the joint significance of coefficients β_1, β_2 and β_3. If the sum of the three coefficients is significant, we interpret this as consistent with earnings quality causing disclosure of additional segment information in a Granger sense. Then we estimate Equation (3) and test the joint significance of β_4, β_5, and β_6. If the sum of the coefficients is significant, we interpret this as consistent with improved segment information causing earnings quality in a Granger sense.

Next, we describe (1) our proxy for the quantity of segment disclosures, (2) the earnings quality proxies, and (3) the control variables.

To elaborate an index for the quantity of voluntary segment disclosure (*Qtt_Seg*), we proceed as follows. We take the segment data available in Compustat, and for every reported business/geographic segment in each firm, we analyze whether the segment is reported on a compulsory or on a voluntary basis. For the compulsory segments, we distinguish between the items reported compulsorily as required by SFAS 131, and the items reported on a voluntary basis. Next, we create the business/geographic segment score (*Qtt_Seg_Bus*)/(*Qtt_Seg_Geo*) by adding 1 point for every voluntarily disclosed item in every mandatory segment, and 1 point for every item in the voluntarily disclosed segments. Finally, we create the overall index of quantity of voluntary segment disclosure (*Qtt_Seg*) by adding the business and geographic segment scores. In Appendix A we provide a detailed description of how we construct *Qtt_Seg*.

Regarding the earnings quality proxies, we use four different measures of earnings quality broadly used in the literature. These four measures are based on the models proposed by Dechow and Dichev (2002), McNichols (2002), Jones (1991), and Dechow et al. (1995).[3] We take the absolute value of the residuals of each of the models and we multiply this absolute value by minus 1 so that our final measure is increasing with earnings quality. We describe the estimation details of each measure in Appendix B.

Regarding control variables, we include the following: Business diversification, Geographic diversification, Information asymmetries, Size, Growth, Leverage, Audit firm, Stock exchange status, Proprietary costs, New financing, Profitability, and Age.

We include business diversification as more diversified/complex firms are expected to report information on a larger number of business segments than less diversified ones. To create an index of business diversification, we use the primary and secondary SIC codes that Compustat assigns to each firm.[4] For every firm, we create the business diversification score by assigning 1 point for every different 2-digit SIC code assigned by Compustat to the firm as forming part of its primary or secondary activities. Regarding geographic diversification, this is measured as the number of different countries in which the firm has subsidiaries. For example, if a given company X has four subsidiaries, one in Spain, one in Italy and two in Croatia, we assign to this company a geographic diversification score of 3, as the company has subsidiaries in three different countries.[5]

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[3] Dechow et al. (2010) provide a review of how these proxies work, what they capture, their pros and cons.
[4] Compustat assigns a four-digit Primary SIC code to each firm by analyzing the product line breakdown that firms provide in each 10-K file. The assigned classification is reviewed each year when the company information is updated.
[5] An alternative measure to capture firm complexity driven by foreign operations is the ratio of foreign sales to total sales. We do not include this ratio as a control in the model as the variable *foreign sales* is not available in Compustat for most of the observations. As an additional check for complexity and geographic diversification we include *foreign ROA* and *domestic ROA* as separate explanatory variables. The inclusion of these two variables does not change the main results, but the sample is substantially reduced. Thus, in our main tests we do not include them.

With respect to information asymmetries, Healy and Palepu (2001) suggest that the demand for disclosure arises from information asymmetries and agency conflicts between managers and outside investors. Managers disclose information to reduce information asymmetries. We include the bid-ask spread as a proxy for information asymmetries.[6] Regarding Size, Growth and Leverage, the previous literature finds that corporate size is significantly and positively associated with disclosure levels. That is, larger companies disclose more (e.g. Buzby, 1975; Diamond and Verrecchia, 1991; Debreceny et al., 2002). This relation also holds for segment disclosure levels (e.g. Silhan, 1984; Leuz, 2004). We measure firm size as the natural logarithm of a firm's market value of equity, measured at the beginning of the fiscal year. We take logs to reduce the skewness of the size distribution. We also include the firm's growth, measured as the logarithm of the firm's book-to-market ratio at the beginning of the fiscal year (e.g. Debreceny et al., 2002; Nagar et al., 2003). Regarding leverage, previous studies find positive or no relations with disclosure levels (e.g. Chow and Wong-Boren, 1987; Wallace et al., 1994; Leuz and Verrecchia, 2000; Debreceny et al., 2002). Jensen and Meckling (1976) argue that leveraged firms incur larger monitoring costs. To reduce these costs, they are expected to increase disclosure. We measure leverage as the ratio of total debt to total assets.

Regarding the Audit firm, previous research shows that being audited by a Big Four audit firm has an impact on disclosure levels (e.g. Copley, 1991; Wallace et al., 1994; Hope, 2003). Large and well-known audit firms pressure their clients for better disclosure. To capture variations in pressure for additional disclosure coming from the auditing firms, we include an auditor dummy variable taking the value of 1 if the auditor

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[6] Measured as: $|bid_{j,t} - ask_{j,t}| / [(bid_{j,t} + ask_{j,t})/2]$, where: $bid_{j,t}$ is the firm j's annual mean of the monthly bid prices for year t, and $ask_{j,t}$ is the firm j's annual mean of the monthly ask prices for year t.

is a Big Four firm, and 0 otherwise. Regarding where the firm is listed, Wallace et al. (1994) and Leuz and Verrecchia (2000), among others, find a significant relation between disclosure and the firm's listing status. We control for this effect including a dummy variable taking the value of 1 if the firm is listed on the NYSE or on NASDAQ, and 0 otherwise. Proprietary costs influence segmental disclosures (e.g. Hayes and Lundholm, 1996; Harris, 1998; Cormier and Magnan, 1999, 2003; Botosan and Stanford, 2005; Wang et al., 2011). As proprietary costs are essentially third party constraints, firms could have competitive disadvantages if they disclose information to their competitors and to regulators. They could also suffer disadvantages with both suppliers and consumers, and also, litigation risk increases with enhanced disclosure. We include the Herfindahl industry concentration index as a proxy for proprietary costs.[7]

Regarding New financing, we expect that if the firm is looking for additional capital funds, managers will be more likely to provide additional disclosure in an attempt to reduce the cost of the new funds.[8] For instance, Ettredge et al. (2002) find that firms disclose more through their corporate web sites when they need external capital. Accordingly, we include a dummy variable taking the value of 1 if the firm raised new capital funds or increased debt in a given year, and 0 otherwise. Additionally, we include profitability, measured as return on assets (e.g. Eng and Mak, 2003), and firm age, measured as the difference between the current year and the first year in which the firm appears in CRSP (e.g. Hollander et al., 2010).

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[7] $Herf_j = \sum_{i=1}^{N} \left(\frac{S_{ij}}{S_j} \right)^2$, where S_{ij} = Business i's sales (segment i's sales) in industry j, as defined by two-digit SIC code; S_j = The sum of sales for all businesses in industry j; S_{ij}/S_j = Business i's market j share; N = The number of businesses in industry j.

[8] Dhaliwal et al. (1983), Barry and Brown (1984, 1985, 1986), Sengupta (1998), Healy et al. (1999), Easley and O'Hara (2004), Gietzmann and Ireland (2005).

4. SAMPLE AND DESCRIPTIVE STATISTICS

We extract non-financial and non-regulated firms from the Compustat annual files, for the period 2001 to 2006, with the necessary data to calculate the earnings quality measures and all variables needed for our disclosure tests. The number of subsidiaries, used to calculate our proxy for geographic diversification, is extracted from BvD Osiris.[9] Our final sample comprises 10,002 firm-year observations with data on all variables to run all of our tests. We exclude observations with missing data from any of the variables needed. To mitigate the undesirable effect of outliers, we delete the top and bottom percentile of the distributions of all variables.

[Insert Table 1 about Here]

The mean (median) number of items reported by our sample firms is 42.25 (39), with a standard deviation of 20.29 (Table 1). Note that the standard deviation is high, but it is mainly due to the different number of reported segments among firms. The minimum number of items disclosed is 10 while the maximum is 149 (not tabulated). There is, therefore, a substantial variation in voluntary segment disclosure levels across the sample firms. Regarding accruals quality, the mean and median values are slightly larger than those reported in previous studies (i.e., the mean and median abnormal discretionary accruals using the modified Jones model in Francis et al. (2008) are, 0.0159 and 0.0123 respectively, while in our study they are -0.0743 and -0.0349, where the values are negative because we multiply the absolute discretionary accruals by -1). Mean leverage is 20.19%, indicating that our sample firms are relatively low leveraged, but are issuing

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[9] We assume that the number of subsidiaries does not change if the data are not available for one year. (i.e., if a firm has no data for 2004, we assume that the number of subsidiaries is equal to that of 2005). Results are robust to the use of a smaller sample in which we drop firms with no available data on the number of subsidiaries in all the years of the sample.

new debt or equity to finance their projects (mean value of Newfin=0.88). Also, most of our sample firms are audited by Big-4 firms, and are listed on the NYSE or Nasdaq.

5. RESULTS

[Insert Table 2 about Here]

In Table 2 we show the pairwise correlations between *Qtt_Seg*, earnings quality, and firm characteristics. Earnings quality is significantly and positively related to *Qtt_Seg* (21.78% for the modified Jones case). This provides preliminary evidence consistent with a positive relation between earnings quality and quantity of voluntary disclosure. Much as expected, business diversification and geographic diversification are very strongly correlated with *Qtt_Seg* (31% and 10% respectively). Also, information asymmetry (the bid-ask spread) is, as expected, positively correlated with *Qtt_Seg* (2.8%).

[Insert Table 3 about Here]

In Table 3 we show the results of an industry fixed-effect regression of *Qtt_Seg*, our proxy for the quantity of segment disclosure, on the determinants of segment disclosure. In the first column, we only include the controls. We find that the quantity of segment disclosure (*Qtt_Seg*), as expected, increases with firm size, the book-to-market ratio, leverage, being audited by a big-four firm, being listed on the NYSE or NASDAQ, issuing new financing, and firm age, and decreases with profitability and industry concentration. All of the controls are significantly associated with the quantity of segment information at conventional levels. These results corroborate that our index of voluntary segment information (*Qtt_Seg*) is a valid measure of disclosure.

In the second, third, fourth and fifth columns of Table 3, we show, respectively, the results of estimating Equation (1), where we regress *Qtt_Seg* on earnings quality and the determinants of segment disclosure, for each of our proxies for earnings quality (Dechow-Dichev, McNichols, Jones and Modified-Jones). For all measures of earnings quality, β_1 is positive and significant. This is consistent with the expected positive relation between earnings quality and segment disclosure. The economic effect is such that an increase of one standard deviation in earnings quality (for the Dechow-Dichev measure) leads to an increase in segment disclosure of 0.9 items (2.1% increase). We compare this economic effect with an increase of one standard deviation in business diversification, which leads to an increase in segment disclosure of 6.2 items (14.7% increase). An increase of one standard deviation in geographic diversification leads to an increase in segment disclosure of 1.1 items (2.6% increase). Finally, we find that firms with higher information asymmetries provide more segment information. In particular, an increase of one standard deviation in information asymmetries leads to an increase in segment disclosure of 0.4 items (1% increase). Our results are robust to the use of other earnings quality measures,[10] and to the use of the geographic and business segment quantity measures separately instead of the aggregate measure *Qtt_Seg*. Regarding the fitness of the model, the results show that the determinants of disclosure that we consider explain a significant amount of the variation in *Qtt_Seg* (around 30%).

[Insert Table 4 about Here]

In Table 4 we study whether earnings quality influences segment information quantity or vice versa. Table 4 shows that, regardless of the earnings quality measure that we use, the p-value of $\beta_1 = 0$, $\beta_2 = 0$, and $\beta_3 = 0$ equals 0.00, and the p-value of ($\beta_1 + \beta_2 +$

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[10] Based on the standard deviation of the residuals of the Jones, modified Jones, and Dechow and Dichev models, calculated at the firm level using rolling five year windows, as in Francis et al. (2004). The results are also robust to the use of signed measures of accruals quality.

$β_3$) = 0 equals 0.00. This is initial evidence that earnings quality causes segment information quantity in a Granger sense. The p-value of $β_4 = 0$, $β_5 = 0$, and $β_6 = 0$, ranges between 0.60 and 0.64 depending on the earnings quality measure that we use, and the p-value of $β_4 + β_5 + β_6 = 0$ ranges between 0.27 and 0.41. This evidence indicates that segment information does not cause earnings quality in a Granger sense.

These results are consistent with earnings quality causing segment information quantity in a Granger sense and not vice versa[11]. The results presented in Table 4 are based on levels of segment information quantity and earnings quality. To overcome the potential problem of omitted correlated variables, we repeat the tests using changes. The results (not tabulated) are also consistent with earnings quality causing segment information quantity in a Granger sense and not vice versa.[12]

6. ROBUSTNESS TESTS

We perform four different sets of robustness tests: a) we study whether the relation between earnings quality and segment disclosure is inherently different for high/low levels of earnings quality; b) we replicate our main tests using different estimation methods; c) we analyze separately business lines and geographic segment information; and d) we study whether the relation between segment disclosure and earnings quality can be significantly affected by proprietary costs. This last set of tests on proprietary costs will help us in identifying contexts where the relation between segment disclosure and earnings quality is not necessarily positive. Next, we explain each of the four sets of tests.

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[11] The results are robust to the use of one and two lagged periods of Earnings Quality and Qtt_Seg in Equations (2) and (3).
[12] The results of the test using changes are robust to the use of one or two lagged periods of Earnings Quality and Qtt_Seg.

In our first set of robustness tests, we analyze whether the relation between earnings quality and segment reporting is inherently different for firms with high/low levels of earnings quality. We expect the association between earnings quality and segment disclosure to hold only above some given level of earnings quality. In the presence of poor quality earnings we expect no relation between earnings quality and disclosure, as the incentives to provide additional disclosure disappear. As in Francis et al. (2008), we expect that the first order effect contributing to reduce information asymmetries is the provision of high quality earnings, while the provision of additional disclosure is a second order effect. Given that additional disclosure, in this case segment disclosure, is only a second order effect (no effect if earnings are not good enough to decrease information asymmetries), the incentives to provide additional segment disclosure disappear if earnings quality is not good enough to decrease information asymmetries.

[Insert Table 5 about Here]

In the first two columns of Table 5 we show the results of forming two portfolios according to earnings quality to test whether the relation between earnings quality and segment disclosure is stronger when firms provide better earnings quality. First, we form two portfolios based on the median of earnings quality by sector and year. Firms above the median are classified as "good earnings quality", while firms below the median are classified as "poor earnings quality". Results based on the modified Jones model (we obtain similar inferences with the other three earnings management proxies) show that earnings quality leads to more pronounced increases in the levels of segment disclosure for firms with earnings quality above the median (the coefficient on earnings quality goes from 47.84 for "good earnings quality" firms, to 3.96 for "poor earnings quality" firms.

This difference is significant at conventional levels).[13] Diversification of the firm leads to higher levels of segment information in a similar way for both types of firms, so both business and geographic diversification are determinants of the quantity of segment information, regardless of the quality of earnings. Finally, information asymmetries contribute to increase the levels of segment disclosure more pronouncedly in firms with good quality earnings (the coefficient on information asymmetries goes from 4.18 for "good earnings quality" firms, to 1.48 (not significant) for "poor earnings quality" firms. This difference is significant at conventional levels). One possible reason for this difference is that companies will not have incentives to provide comprehensive segment information when the reported numbers are not reliable. To ensure the robustness of these results we create the portfolios of earnings quality using other techniques, instead of just looking at the industry median. In particular, we create two clusters according to the Euclidean distance in earnings quality to the group of firms, and the results (third and fourth columns of Table 5) are robust. In this case, we find that for low levels of earnings quality there is no relation between segment disclosure and earnings quality (coefficient 4.3087, p-value 0.203).[14]

In our second set of robustness tests, we replicate our main findings using alternative estimation methods. In particular, we use an ordered logit model[15] and a bootstrapped quantile regression.[16] Using these alternative estimation techniques we obtain results in line with our basic regressions, confirming the robustness of the positive relation between the quantity of segment information and earnings quality. Moreover,

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[13] We also find a significant effect when we include in the basic model a dummy variable that takes value 1 if earnings quality is above the median, and zero otherwise.

[14] The results are also robust to the use of several different numbers of portfolios, and to the use of other criteria to divide the sample (i.e., mean, squared euclidean distance and Chebychev distance).

[15] To apply this methodology, we divide *Qtt_Seg* into 50 fractiles.

[16] The regression curve provides a brief summary for the averages of the distributions corresponding to the set of independent variables. With the bootstrapped quantile regression, we go further and compute several different regression curves corresponding to the various percentage points of the distributions.

firm diversification seems to be a critical determinant of the quantity of segment information, as well as information asymmetries in the precedent year.

In a third set of robustness checks, we replicate all the tests distinguishing between business lines and geographic segment information.

[Insert Table 6 about Here]

In Table 6 we show the results of a fixed effect regression of *Qtt_Seg_Bus*, our proxy for the quantity of business segment disclosure, on the determinants of segment disclosure. In the first column, we only include the controls to test the validity of our index of voluntary business segment disclosure. We find that the quantity of business segment disclosure (*Qtt_Seg_Bus*) increases with firm size, the book-to-market ratio, leverage, being audited by a big-four firm, being listed on the NYSE or NASDAQ, issuing new financing, and age, and decreases with profitability and industry concentration. All of the firm controls are significantly associated with quantity of segment information at conventional levels. In the second, third, fourth and fifth columns of Table 6 we show the results of estimating Equation (1) for the business segment disclosure score. The results confirm that firms providing better earnings quality also provide higher levels of business segment information. The economic effect is such that an increase of one standard deviation in earnings quality (for the Dechow-Dichev measure) leads to an increase in segment disclosure of 0.7 items. As in the global index analysis, we find that firms operating in more sectors provide more comprehensive segment information and that firms with higher information asymmetries in the preceding year provide more business segment information.[17] The results show that the determinants of disclosure explain a significant amount of the variation in *Qtt_Seg_Bus* (around 27%). Results from forming

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[17] An increase of one standard deviation in business diversification leads to an increase in information about business segments of 6.3 items. An increase of one standard deviation in information asymmetries leads to an increase in segment disclosure of 0.3 items.

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portfolios according to earnings quality (not tabulated) also confirm that below a given level of earnings quality, there is no relation between the business segment disclosure score and earnings quality.

[Insert Table 7 about Here]

Finally, in the first column of Table 7 we show the results of a firm-year fixed effect regression of *Qtt_Seg_Geo*, our proxy for the quantity of geographic segment disclosure, on the determinants of segment disclosure. We find that the quantity of segment disclosure (*Qtt_Seg_Geo*) increases with firm size, being audited by a big-four firm, being listed on the NYSE or NASDAQ, issuing new financing, and age, and decreases with profitability and proprietary costs. All of the firm controls are significantly associated with quantity of segment information at conventional levels, except age. In the second, third, fourth and fifth columns of Table 7 we show the results of estimating Equation (1) for the geographic segment index. Our results again confirm a complementary relation between segment disclosure and earnings quality. However, the relation is weaker than when firms disaggregate information by business lines. Results also point out that geographic disclosures increase with geographic diversification. In this case, we find that geographic segment disclosure increases as information asymmetries increase, but this relation is not as strong as in the global index analysis and in the business segment disclosure analysis. The R^2 of the model is also lower, implying that there might be other forces driving the decision to disclose additional information by geographic segments. The economic effects are as follows: an increase of one standard deviation in earnings quality, geographic disclosure or information asymmetries, leads, alternatively, to an increase in geographic segment disclosures of 0.2, 0.7 or 0.1 items, respectively.

As in our previous tests, we also form two portfolios according to earnings quality to test whether the relation between geographic segment disclosure and earnings quality

also holds below a given level of earnings quality. The results (not tabulated) show no relation between earnings quality and segment information for firms providing low earnings quality as the incentives for disaggregating accounting numbers disappear.

In our final set of robustness tests, we divide the sample into quartiles of proprietary costs (proxied by industry concentration). Untabulated results show that the positive relation between segment disclosure and earnings quality disappears for firms in the quartile with largest proprietary costs. These untabulated results are consistent with proprietary costs triggering a negative effect between segment disclosure and earnings quality, or at least hindering the positive relation.

7. SUMMARY AND CONCLUSIONS

We analyze the causal links between earnings quality and segment reporting. Our results provide empirical support to the untested common assumption in the previous literature that earnings quality causes segment disclosure and discard the alternative explanation, also argued but untested in such prior research, that it is disclosure that determines earnings quality. We also find that the relation between earnings quality and segment disclosure is positive, discarding the alternative argument that because of proprietary costs, the relation could be negative. Using a large US sample and leads-lags tests we find that the current level of segment disclosure is associated with past levels of earnings quality, while the current level of earnings quality is not associated with past segment information disclosure. We interpret our evidence as consistent with the untested arguments in Francis et al. (2008), LaFond and Watts (2008), and Wang et al. (2011) that better information in the income statement leads to increased disclosure.

Our results confirm the positive relation between earnings quality and segment disclosure, and we also show that this relation is weaker when earnings quality is too low and when proprietary costs are high. One very likely explanation for this positive relation

is that to facilitate access to funds and to improve the terms of financing, firms first provide improved numbers in the income statement, and then, more comprehensive segment reporting. Given this, a natural extension of our study would be to analyze whether firms with increased earnings quality and more comprehensive segment disclosure improve their ability to raise capital and lower their costs of financing.

APPENDIX A

Creation of an index of quantity of voluntary segment disclosure (Qtt_Seg)

To elaborate an index for the quantity of voluntary segment disclosure (*Qtt_Seg*), we proceed as follows. We take the segment data available in Compustat, and for every reported business/geographic segment in each firm, we analyze whether the segment is reported on a compulsory or on a voluntary basis. For the compulsory segments, we distinguish between the items reported compulsorily as required by SFAS 131, and the items reported on a voluntary basis. Next, we create the business/geographic segment score (*Qtt_Seg_Bus*)/(*Qtt_Seg_Geo*) by adding 1 point for every voluntarily disclosed item in every mandatory segment, and 1 point for every item in the voluntarily disclosed segments. Finally, we create the overall index of quantity of voluntary segment disclosure (*Qtt_Seg*) by adding the business and geographic segment scores. We then describe how we distinguish between compulsory and voluntary segments, and between compulsory and voluntary items.

A. Distinguishing between mandatory and voluntary segment information

A.1. Identifying business segments reported mandatorily.

To identify which business segments are reported mandatorily, we analyze whether the business segments reported by the firm meet the quantitative thresholds, according to paragraph 18 of SFAS 131:

"a. Its reported revenue, including both sales to external customers and intersegment sales or transfers, is 10 percent or more of the combined revenue, internal and external, of all operating segments.

b. The absolute amount of its reported profit or loss is 10 percent or more of the greater, in absolute amount, of (1) the combined reported profit of all operating segments

that did not report a loss or (2) the combined reported loss of all operating segments that did report a loss.

c. Its assets are 10 percent or more of the combined assets of all operating segments."

If any given reported segment meets any of these thresholds, we consider the segment as reported mandatorily. If the firm reports segments that do not meet any of the thresholds in paragraph 18, to analyze whether these additional business segments are compulsorily or voluntarily reported, we study the requirements of paragraph 20 of SFAS 131: "If total of external revenue reported by operating segments constitutes less than 75 percent of total consolidated revenue, additional operating segments shall be identified as reportable segments (even if they do not meet the criteria in paragraph 18) until at least 75 percent of total consolidated revenue is included in reportable segments." Given this, we sum the revenues of the segments that meet any of the quantitative thresholds according to paragraph 18. If they account for 75% of consolidated revenue, we consider all the other reported segments as reported voluntarily. If they do not account for 75% of consolidated revenue, we consider additional segments as compulsorily reported until all of the segments considered as compulsorily reported account for 75% of consolidated revenue. All other reported segments are considered as reported voluntarily. We also consider as being segments reported mandatorily on a given year those segments considered as reportable (according to paragraphs 18 and 20) in the previous year, and include those in the calculation of the 75%.

Finally, we take into account that in paragraph 24, SFAS 131 recommends including only a maximum of 10 reportable segments, even if doing so breaches the limits established in paragraphs 18 and 20. Consequently, we consider that only 10 segments are reported mandatorily. Any segment in addition to 10 will be considered as voluntary.

For firms reporting more than 10 segments, we classify the 10 segments with the largest revenues as compulsory.

A.2. Identifying mandatory items for mandatory business segments

Compustat identifies a maximum of 30 items of information for each business segment. From these 30 items, we analyze whether they are reported by the firm on a compulsory or on a voluntary basis. If they are described as compulsory by paragraphs 26 to 31 of SFAS 131, then we consider them as compulsory. Otherwise, we consider them voluntary. The following items we consider mandatory out of the 30 total items:

1. Business segment name (as the general information required in paragraph 26)

2. Identifiable assets per segment.

3. Depreciation, depletion and amortization per segment.

4. Equity in earnings per segment.

5. Operating profit per segment.

6. Sales to principal customer per segment.

7. Sales of principle product per segment.

8. Customer name per segment.

9. Investment at equity per segment.

A.3. Voluntary business segment information

We consider as voluntary business segment information the other items for mandatorily reported segments, and all items for segments reported voluntarily.

B. Mandatory vs. voluntary geographic segment information.

SFAS 131, paragraph 38, states "An enterprise shall report the following geographic information unless it is impracticable to do so:

a. Revenues from external customers (1) attributed to the enterprise's country of domicile and (2) attributed to all foreign countries in total from which the enterprise derives revenues. If revenues from external customers attributed to an individual foreign country are material, those revenues shall be disclosed separately. An enterprise shall disclose the basis for attributing revenues from external customers to individual countries.

b. Long-lived assets other than financial instruments, long-term customer relationships of a financial institution, mortgage and other servicing rights, deferred policy acquisition costs, and deferred tax assets (1) located in the enterprise's country of domicile and (2) located in all foreign countries in total in which the enterprise holds assets. If assets in an individual foreign country are material, those assets shall be disclosed separately."

Given the above, as reportable geographic segments we consider all geographic segments available in Compustat (11 items of information for each geographic segment), and as mandatory items we consider the following for each reportable segment:

1. Net sales per segment (as required in paragraph 38-a).

2. Identifiable assets per segment (as required in paragraph 38-b).

As voluntary geographic segment information we consider the other available items for every reportable geographic segment.

APPENDIX B

Estimation of the earnings quality measures:

B1) The Dechow and Dichev (2002) measure

Our first proxy is based on Dechow and Dichev (2002). They propose a model that explains current working capital accruals with lagged, current and future cash flow from operations. The unexplained portion of the variation in cash flows (the residuals of the model) is an inverse measure of accruals quality. The intuition behind this measure is that working capital accruals should shift or adjust the recognition of operating cash flows over a short period of time (t-1, t and t+1).[18] We denote these residuals as *EQ1(DD)* . We estimate Equation (4) using data from 2000 to 2007.

$$\frac{TCA_{j,t}}{Assets_{j,t}} = \varphi_{0,j} + \varphi_{1,j} \frac{CFO_{j,t-1}}{Assets_{j,t}} + \varphi_{2,j} \frac{CFO_{j,t}}{Assets_{j,t}} + \varphi_{3,j} \frac{CFO_{j,t+1}}{Assets_{j,t}} + \upsilon_{j,t} \qquad (4)$$

where: j and t are the firm and year indicators, and $TCA_{j,t}$ = total current working capital accruals = $\Delta CA_{j,t}$ -$\Delta CL_{j,t}$ -$\Delta Cash_{j,t}$ +$\Delta STDEBT_{j,t}$; $Assets_{j,t}$ = average total assets (Compustat #6) in year t and t-1; $CFO_{j,t}$ = cash flow from operations, measured as $NIBE_{j,t}$ -$TA_{j,t}$; $TA_{j,t}$ = total accruals, measured as $\Delta CA_{j,t}$ -$\Delta CL_{j,t}$ -$\Delta Cash_{j,t}$ +$\Delta STDEBT_{j,t}$-$DEPN_{j,t}$; $\Delta CA_{j,t}$= change in current assets (Compustat #4) between year t-1 and year t; $\Delta CL_{j,t}$= change in current liabilities (Compustat #5) between year t-1 and year t; $\Delta Cash_{j,t}$= change in cash (Compustat #1) between year t-1 and year t; $\Delta STDEBT_{j,t}$= change in debt in current liabilities (Compustat #34) between year t-1 and year t; $DEPN_{j,t}$= depreciation and amortization expense (Compustat #14); $NIBE_{j,t}$ = net income before extraordinary items (Compustat #18).

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[18] Dechow and Dichev (2002) assume that any working capital accrual that is not explained by CFO in t-1, t or t+1 is not responding to economic fundamentals. Thus, higher abnormal accruals (higher residuals) are indicative of lower accruals quality.

We use the absolute values of *EQ1(DD)*, multiplied by minus one, so that larger values of *EQ1(DD)* correspond to better accruals quality.

B2) The McNichols (2002) measure

Our second measure of accruals quality is the one proposed by McNichols (2002). As a proxy for accruals quality she uses the residuals from a model relating current accruals to lagged, current and future cash flow from operations, change in net sales in year t, and gross property, plant and equipment in year t. The unexplained portion of the variation in working capital accruals is an inverse measure of accruals quality. The intuition behind this measure is the same as in Dechow and Dichev (2002), but McNichols (2002) also takes into account that working capital accruals are also a function of changes in revenues and PPE (Jones, 1991). We denote these residuals as *EQ2(McN)*. We estimate Equation (5) using data from 2000 to 2007.

$$\frac{TCA_{j,t}}{Assets_{j,t}} = \varphi_{0,j} + \varphi_{1,j}\frac{CFO_{j,t-1}}{Assets_{j,t}} + \varphi_{2,j}\frac{CFO_{j,t}}{Assets_{j,t}} + \varphi_{3,j}\frac{CFO_{j,t+1}}{Assets_{j,t}} + $$
$$+\varphi_{4,j}\frac{\Delta \operatorname{Re}v_{j,t}}{Assets_{j,t}} + \varphi_{5,j}\frac{PPE_{j,t}}{Assets_{j,t}} + \upsilon_{j,t} \tag{5}$$

where: *TCA_{j,t}* and *CFO_{j,t}* are defined as in the Dechow Dichev Measure; *ΔREV_{j,t}*= firm j's change in revenues (Compustat #12) between year t-1 and t; *PPE_{j,t}*= firm j's gross property, plant and equipment (Compustat #7) in year t.

We use the absolute values of *EQ2(McN)*, multiplied by minus one, so that *EQ2(McN)* increases with accruals quality.

B3) Jones and Jones Modified Measures

Our last measures are based on the Jones (1991) model, and its modified version as defined by Dechow et al. (1995). We denote them as *EQ3(J)* and *EQ4(JM)*, respectively. The intuition behind these models is that accruals are explained with changes in revenues (both changes in receivables and payables, and changes in inventory,

are a function of change in revenues) and the level of PPE in the firm (depreciation is a function of PPE). One implicit assumption of the Jones (1991) model is that revenues are nondiscretionary. Dechow et al. (1995) relax this, and assume that discretion could be exercised over revenues. Both models assume that the accruals generating process is similar within each industry. We estimate Equation (6) using data from 2000 to 2006 for each 2-digit SIC industry group.

$$\frac{TA_{j,t}}{Assets_{j,t-1}} = \alpha_{i,j}\left[\frac{1}{Assets_{j,t-1}}\right] + \beta_{i,j}\left[\frac{\Delta REV_{j,t}}{Assets_{j,t-1}}\right] + \gamma_{i,j}\left[\frac{PPE_{j,t}}{Assets_{j,t-1}}\right] + \varepsilon_{j,t} \qquad (6)$$

where: $TA_{j,t}$ is firm j's total accruals in year t, $Assets_{j,t}$ is firm j's total assets (Compustat #6) at the beginning of year t; $\Delta REV_{j,t}$ is firm j's change in revenues (Compustat #12) between year t-1 and t; $PPE_{j,t}$ is firm j's gross property, plant and equipment (Compustat #7) in year t.

Next, for each firm j, we calculate its discretionary accruals as:

$$EQ3(J)_t = \frac{TA_{j,t}}{Assets_{j,t-1}} - \left(\hat{\alpha}_{i,j}\left[\frac{1}{Assets_{j,t-1}}\right] + \hat{\beta}_{i,j}\left[\frac{\Delta REV_{j,t}}{Assets_{j,t-1}}\right] + \hat{\gamma}_{i,j}\left[\frac{PPE_{j,t}}{Assets_{j,t-1}}\right]\right) \qquad (7)$$

$$EQ4(JM)_t = \frac{TA_{j,t}}{Assets_{j,t-1}} - \left(\hat{\alpha}_{i,j}\left[\frac{1}{Assets_{j,t-1}}\right] + \hat{\beta}_{i,j}\left[\frac{\Delta REV_{j,t} - \Delta AR_{j,t}}{Assets_{j,t-1}}\right] + \hat{\gamma}_{i,j}\left[\frac{PPE_{j,t}}{Assets_{j,t-1}}\right]\right) \qquad (8)$$

where: $\hat{\alpha}, \hat{\beta}, \hat{\gamma}$ = the fitted coefficients from model (6); $\Delta AR_{j,t}$= the change in account receivables for firm j (Compustat #2) in year t.

We use the absolute values of *EQ3(J)* and *EQ4(JM),* multiplied by minus one. Larger values correspond to better accruals quality, that is, less discretionary accruals.

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Table 1

Descriptive statistics

Variable	N	Mean	Std. Dev.	10%	25%	Median	75%	90%
Qtt_Seg	10,002	42.2542	20.2906	20	27	39	53	69
Qtt_Seg_Bus	10,002	23.3837	17.4141	8	9	18	33	47
Qtt_Seg_Geo	10,002	18.8705	9.0299	11	11	17	24	31
EQ1(DD)	10,002	-0.0645	0.0839	-0.1459	-0.0781	-0.0291	-0.0247	-0.0131
EQ2(McN)	10,002	-0.0642	0.0839	-0.1460	-0.0783	-0.0292	-0.0248	-0.0131
EQ3(J)	10,002	-0.0927	0.1216	-0.2474	-0.1292	-0.0530	-0.0056	-0.0000
EQ4(JM)	10,002	-0.0743	0.1118	-0.2097	-0.0970	-0.0349	-0.0000	-0.0000
BusDiversif	10,002	1.9679	1.1461	1	1	2	2	3
GeoDiversif	10,002	3.0755	4.2204	1	2	2	3	5
Spread	10,002	0.1504	0.1475	0.0225	0.0458	0.1041	0.2076	0.3416
Mve	10,002	4,771	11,669	121	317	923	3,162	11,670
Bm	10,002	0.5211	0.4632	0.162	0.262	0.419	0.635	0.943
Leverage	10,002	20.1953	18.8044	0	1.633	17.971	31.9905	45.5055
Auditor	10,002	0.9153	0.2784	1	1	1	1	1
StockExch	10,002	0.9696	0.1716	1	1	1	1	1
Herf	10,002	10.4644	9.5428	4.0059	4.9259	7.8234	11.1554	20.8409
Newfin	10,002	0.8802	0.3247	0	1	1	1	1
Roa	10,002	0.0140	0.1497	-0.1346	-0.0042	0.0444	0.0846	0.1284
Age	10,002	13.5585	10.2824	4	6	10	18	32

The sample consists of 10,002 firm-year observations for the period 2001-2006. Qtt_Seg = the number of voluntary disclosure elements found in the sample firms for segment disclosure; Qtt_Seg_Bus = the number of voluntary disclosure elements found in the sample firms for business segment disclosure; Qtt_Seg_Geo = the number of voluntary disclosure elements found in the sample firms for geographic segment disclosure; EQ1(DD) = The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the Dechow Dichev Model); EQ2(McN) The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, as well as the year t change in revenues and year t property, plant, and equipment (PP&E) (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the McNichols model); EQ3(J) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the Jones (1991) accruals model as applied to total accruals; EQ4(JM) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the modified version of the Jones (1991) accruals model (Dechow et al. 1995), as applied to total accruals; BusDiversif = number of the different sectors in which the firm operates. GeoDiversif = number of the different countries where the firm operates. Spread = bid-ask spread, calculated as $\frac{|bid - ask|}{(bid + ask)/2}$ measured in t-1. MVE = the firm's market value of equity measured

at the beginning of fiscal year for 2001-2006; BM = the firm's book-to-market ratio measured at the beginning of fiscal year 2001-2006; Leverage = debt

to total assets ratio in percentage. Auditor = 1 if auditor is a Big-Four firm and 0 otherwise. StockExch = 1 if the firm is listed on the NYSE or NASDAQ and 0 otherwise. Herf = Herfindahl index in percentage, calculated as $Herf_j = \sum_{i=1}^{N} \left(\frac{S_{ij}}{S_j} \right)^2$. NewFin= 1 if the firm has issued new debt or equity and 0 otherwise. Roa = return on assets. Age = the difference between the first year when the firm appears in CRSP and the current year.

Table 2
Pairwise correlations between segment disclosure (Qtt_Seg), earnings quality, diversification, information asymmetries and control variables (p=0.05)

Variable	Qtt_Seg	EQ1(DD)	EQ2(McN)	EQ3(J)	EQ4(JM)	BusDiversif	GeoDiversif	Spread	Ln mve	Ln bm	leverage	auditor	StockExch	Herf	NewFin	Roa
Qtt_Seg																
EQ1(DD)	**0.1670**															
EQ2(McN)	**0.1664**	**0.9997**														
EQ3(J)	**0.1809**	**0.2590**	**0.2588**													
EQ4(JM)	**0.2178**	**0.3265**	**0.3263**	**0.7480**												
BusDiversif	**0.3122**	**0.1283**	**0.1282**	**0.1106**	**0.1299**											
GeoDiversif	**0.1053**	**0.0224**	**0.0220**	**0.0312**	**0.0488**	**0.0536**										
Spread	**0.0283**	**0.0200**	**0.0203**	**0.0249**	**0.0221**	-0.0038	0.0172									
Ln mve	**0.3399**	**0.1833**	**0.1843**	**0.2469**	**0.2932**	**0.2234**	**0.0269**	-0.0183								
Ln bm	**0.0482**	**0.0692**	**0.0699**	**0.0738**	**0.0703**	**0.0625**	0.0147	**0.0212**	**-0.2792**							
Leverage	**0.1178**	**0.1042**	**0.1075**	**0.1493**	**0.1494**	**0.1368**	**0.0419**	**0.0525**	**0.1125**	0.0082						
Auditor	**0.1318**	**0.0475**	**0.0471**	**0.0726**	**0.0659**	**0.0708**	0.0049	0.0172	**0.1903**	-0.0170	**0.0287**					
StockExch	**0.1180**	**0.1422**	**0.1420**	**0.2811**	**0.2703**	**0.0464**	**0.0207**	0.0195	**0.1131**	-0.0232	0.0199	**0.0382**				
Herf	**-0.0674**	**0.1011**	**0.0997**	**0.1173**	**0.0869**	**0.0807**	0.0010	-0.0012	-0.0080	**0.0843**	**0.0993**	0.0101	**0.0403**			
NewFin	**0.1096**	**0.1155**	**0.1156**	**0.0958**	**0.1080**	**0.0786**	**0.0221**	0.0094	**0.1918**	**-0.0861**	**0.1344**	**0.0548**	0.0262	**0.0453**		
Roa	**0.0504**	**0.1521**	**0.1512**	**0.1137**	**0.1350**	**0.0232**	0.0092	-0.0184	**0.3834**	**-0.3257**	**-0.1637**	0.0240	**0.0569**	**0.0670**	**0.3164**	
Age	**0.1943**	**0.1166**	**0.1155**	**0.1328**	**0.1597**	**0.1821**	0.0152	**-0.0190**	**0.2420**	0.0002	**0.0697**	**0.0521**	-0.0228	0.0080	**0.0785**	**0.1472**

Bold numbers are significant at p-value 0.05.

The sample consists of 10,002 firm-year observations for the period 2001-2006. Qtt_Seg = the number of voluntary disclosure elements found in the sample firms for segment disclosure; EQ1(DD) = The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the Dechow Dichev Model); EQ2(McN) The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, as well as the year t change in revenues and year t property, plant, and equipment (PP&E) (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the McNichols model); EQ3(J) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the Jones (1991) accruals model as applied to total accruals; EQ4(JM) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the modified version of the Jones (1991) accruals model (Dechow et al. 1995), as applied to total accruals; BusDiversif = number of the different sectors in which the firm operates. GeoDiversif = number of the different countries where the firm operates. Spread = bid-ask spread, calculated as $\frac{|bid - ask|}{(bid + ask)/2}$ measured in t-1. MVE = the firm's market value of equity measured at the beginning of fiscal year for 2001-2006; BM = the firm's book-to-market ratio measured at the beginning of fiscal year 2001-2006; Leverage = debt to total assets ratio in percentage. Auditor = 1 if auditor is a Big-Four firm and 0 otherwise. StockExch = 1 if firm is listed on the NYSE or NASDAQ and 0 otherwise. Herf = Herfindahl index in percentage, calculated as $Herf_j = \sum_{i=1}^{N}\left(\frac{S_{ij}}{S_j}\right)^2$. NewFin= 1 if the firm has issued new debt or equity and 0 otherwise. Roa = return on assets. Age = the difference between the first year when the firm appears in CRSP and the current year.

Table 3
Industry fixed-effect regression of segment disclosure on earnings quality and controls

Variable	Expected sign	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)
EQ1(DD)	+		10.7867 (0.000)			
EQ2(McN)	+			10.6426 (0.000)		
EQ3(J)	+				7.3726 (0.000)	
EQ4(JM)	+					8.0612 (0.000)
BusDiversif	+		5.4034 (0.000)	5.4038 (0.000)	5.2825 (0.000)	5.2727 (0.000)
GeoDiversif	+		0.2693 (0.000)	0.2693 (0.000)	0.2583 (0.000)	0.2532 (0.000)
Spread	+		3.1141 (0.007)	3.1171 (0.007)	2.9445 (0.013)	2.9581 (0.013)
Ln mve	+	4.5303 (0.000)	3.8769 (0.000)	3.8779 (0.000)	3.9662 (0.000)	3.9419 (0.000)
Ln bm	+	4.3421 (0.000)	3.7574 (0.000)	3.7598 (0.000)	3.9790 (0.000)	3.9496 (0.000)
Leverage	+	0.1006 (0.000)	0.0822 (0.000)	0.0823 (0.000)	0.0854 (0.000)	0.0844 (0.000)
Auditor	+	2.7050 (0.000)	2.3803 (0.000)	2.3813 (0.000)	2.3905 (0.000)	2.3874 (0.000)
StockExch	+	8.4118 (0.000)	7.5772 (0.000)	7.5845 (0.000)	6.3565 (0.000)	6.4297 (0.000)
Herf	-	-0.6394 (0.000)	-0.6138 (0.000)	-0.6137 (0.000)	-0.4777 (0.000)	-0.4776 (0.000)
Newfin	+	2.1688 (0.000)	1.3351 (0.026)	1.3366 (0.000)	1.6655 (0.006)	1.6418 (0.000)
Roa	+/-	-0.0373 (0.000)	-0.0276 (0.001)	-0.0275 (0.001)	-0.0292 (0.000)	-0.0301 (0.000)
Age	+	0.1941 (0.000)	0.1137 (0.000)	0.1138 (0.000)	0.1181 (0.000)	0.1173 (0.000)
Cons		7.2229 (0.000)	2.7340 (0.105)	2.7008 (0.109)	2.2695 (0.195)	2.4034 (0.173)
R^2		0.1700	0.2788	0.2787	0.2959	0.2958

The sample consists of 10,002 firm-year observations for the period 2001-2006. Qtt_Seg = the number of voluntary disclosure elements found in the sample firms for segment disclosure; EQ1(DD) = The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the Dechow Dichev Model); EQ2(McN) The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, as well as the year t change in revenues and year t property, plant, and equipment (PP&E) (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the McNichols model); EQ3(J) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the Jones (1991) accruals model as applied to total accruals; EQ4(JM) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the modified version of the Jones (1991) accruals model (Dechow et al. 1995), as applied to total accruals; BusDiversif = number of the different sectors in which the firm operates. GeoDiversif = number of the different countries where the firm operates. Spread = bid-ask spread, calculated as $\frac{|bid - ask|}{(bid + ask)/2}$ measured in t-1. MVE = the firm's market value of equity measured at the beginning of fiscal year for 2001-2006; BM = the firm's book-to-market ratio measured at the beginning of fiscal year 2001-2006; Leverage = debt to total assets ratio in percentage. Auditor = 1 if auditor is a Big-Four firm and 0 otherwise. StockExch = 1 if firm is listed on the NYSE or NASDAQ and 0 otherwise. Herf = Herfindahl index in percentage, calculated as $Herf_j = \sum_{i=1}^{N} \left(\frac{S_{ij}}{S_j} \right)^2$. NewFin= 1 if the firm has issued new debt or equity and 0 otherwise. Roa = return on assets. Age = the difference between the first year when the firm appears in CRSP and the current year.

Table 4
Granger test on the relation of earnings quality and segment disclosure

Variable		Qtt_Seg Coef. (p-value)	EQ1(DD) Coef. (p-value)	Qtt_Seg Coef. (p-value)	EQ2(McN) Coef. (p-value)	Qtt_Seg Coef. (p-value)	EQ3(J) Coef. (p-value)	Qtt_Seg Coef. (p-value)	EQ4(JM) Coef. (p-value)
EQ_{t-1}	β_1	3.3340 (0.005)	0.6322 (0.000)	4.7162 (0.006)	0.6309 (0.000)	5.8143 (0.026)	0.4492 (0.000)	6.0913 (0.008)	0.4930 (0.000)
EQ_{t-2}	β_2	3.8951 (0.014)	0.1233 (0.000)	3.7295 (0.011)	0.1241 (0.000)	2.4363 (0.376)	0.1657 (0.000)	2.6934 (0.397)	0.1904 (0.000)
EQ_{t-3}	β_3	2.7162 (0.119)	0.0791 (0.000)	1.7233 (0.130)	0.0792 (0.000)	3.2373 (0.101)	0.0297 (0.035)	4.4604 (0.111)	0.0273 (0.040)
Qtt_Seg_{t-1}	β_4	0.8714 (0.000)	-0.0001 (0.388)	0.8715 (0.000)	-0.0001 (0.360)	0.8623 (0.000)	0.0003 (0.405)	0.8625 (0.000)	0.0002 (0.402)
Qtt_Seg_{t-2}	β_5	0.0656 (0.000)	0.0001 (0.455)	0.0655 (0.000)	0.0001 (0.450)	0.0709 (0.000)	-0.0002 (0.582)	0.0694 (0.000)	-0.0001 (0.509)
Qtt_Seg_{t-3}	β_6	0.0288 (0.036)	0.0001 (0.803)	0.0289 (0.035)	0.0001 (0.759)	0.0318 (0.024)	0.0002 (0.721)	0.0327 (0.020)	0.0001 (0.716)
$Controls_{t-1}$		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control year		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control industry		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
p-value β_1=0, β_2=0, β_3=0		0.0016		0.0018		0.0001		0.0001	
p-value $\beta_1 + \beta_2 + \beta_3$=0		0.0003		0.0003		0.0000		0.0000	
p-value β_4=0, β_5=0, β_6=0			0.6402		0.6029		0.6054		0.6236
p-value $\beta_4 + \beta_5 + \beta_6$=0			0.4056		0.3886		0.3125		0.2721

The sample consists of 10,002 firm-year observations for the period 2001-2006. Qtt_Seg = the number of voluntary disclosure elements found in the sample firms for segment disclosure; EQ1(DD) = The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the Dechow Dichev Model); EQ2(McN) The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, as well as the year t change in revenues and year t property, plant, and equipment (PP&E) (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the McNichols model); EQ3(J) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the Jones (1991) accruals model as applied to total accruals; EQ4(JM) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the modified version of the Jones (1991) accruals model (Dechow et al. 1995), as applied to total accruals; Controls: BusDiversif = number of the different sectors in which the firm operates. GeoDiversif = number of the different countries where the firm operates. Spread = bid-ask spread, calculated as $\dfrac{|bid - ask|}{(bid + ask)/2}$ measured in t-1. MVE = the firm's market value of equity measured at the beginning of fiscal year for 2001-2006; BM = the firm's book-to-market ratio measured at the beginning of fiscal year 2001-2006; Leverage = debt to total assets ratio in percentage. Auditor = 1 if auditor is a Big-Four firm and 0 otherwise. StockExch = 1 if firm is listed on the NYSE or NASDAQ and 0 otherwise. Herf = Herfindahl index in percentage, calculated as $Herf_j = \sum_{i=1}^{N} \left(\dfrac{S_{ij}}{S_j} \right)^2$.

NewFin= 1 if the firm has issued new debt or equity and 0 otherwise. Roa = return on assets. Age = the difference between the first year when the firm appears in CRSP and the current year.

Table 5

Industry fixed-effect regression of segment disclosure on earnings quality and controls for two portfolios of earnings quality

Variable	Expected sign	High earnings quality (criteria: median) Coef. (p-value)	Low earnings quality (criteria: median) Coef. (p-value)	High earnings quality (criteria: cluster) Coef. (p-value)	Low earnings quality (criteria: cluster) Coef. (p-value)
EQ4(JM)	+	47.8394 (0.099)	3.9633 (0.055)	18.0708 (0.000)	4.3087 (0.203)
BusDiversif	+	4.7856 (0.000)	6.1443 (0.000)	5.2806 (0.000)	5.1446 (0.000)
GeoDiversif	+	0.2168 (0.000)	0.2933 (0.000)	0.2448 (0.000)	0.2889 (0.002)
Spread	+	4.1836 (0.016)	1.4808 (0.350)	3.6153 (0.005)	-1.6332 (0.558)
Ln mve	+	3.9260 (0.000)	3.7787 (0.000)	3.9883 (0.000)	2.8572 (0.000)
Ln bm	+	4.3045 (0.000)	3.5601 (0.000)	4.1041 (0.000)	2.1544 (0.000)
Leverage	+	0.0800 (0.000)	0.0810 (0.000)	0.0772 (0.000)	0.0733 (0.004)
Auditor	+	3.8493 (0.000)	1.6914 (0.025)	2.9292 (0.000)	1.0022 (0.402)
StockExch	+	6.8353 (0.000)	7.0567 (0.000)	7.8663 (0.000)	4.9971 (0.002)
Herf	-	-0.5349 (0.000)	-0.4422 (0.000)	-0.5050 (0.000)	0.1115 (0.629)
Newfin	+	3.1793 (0.002)	0.3825 (0.595)	1.9811 (0.004)	0.5468 (0.611)
Roa	+/-	-0.0575 (0.000)	-0.0064 (0.504)	-0.0431 (0.000)	0.0070 (0.631)
Age	+	0.0704 (0.007)	0.1991 (0.000)	0.1124 (0.000)	0.1749 (0.001)
Cons		2.8340 (0.366)	0.3774 (0.864)	1.4155 (0.501)	2.9162 (0.421)
N		5,000	5,002	6,913	3,089
R^2		0.2046	0.3606	0.2867	0.2751

The sample consists of 10,002 firm-year observations for the period 2001-2006. Qtt_Seg = the number of voluntary disclosure elements found in the sample firms for segment disclosure; EQ4(JM) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the modified version of the Jones (1991) accruals model (Dechow et al. 1995), as applied to total accruals; BusDiversif = number of the different sectors in which the firm operates. GeoDiversif = number of the different countries where the firm operates. Spread = bid-ask spread, calculated as $\frac{|bid - ask|}{(bid + ask)/2}$

measured in t-1. MVE = the firm's market value of equity measured at the beginning of fiscal year for 2001-2006; BM = the firm's book-to-market ratio measured at the beginning of fiscal year 2001-2006; Leverage = debt to total assets ratio in percentage. Auditor = 1 if auditor is a Big-Four firm and 0 otherwise. StockExch = 1 if firm is listed on the NYSE or NASDAQ and 0 otherwise. Herf = Herfindahl index in percentage, calculated as

$Herf_j = \sum_{i=1}^{N} \left(\frac{S_{ij}}{S_j} \right)^2$. NewFin= 1 if the firm has issued new debt or equity and 0 otherwise. Roa = return on assets. Age = the difference between the first

year when the firm appears in CRSP and the current year. High earnings quality (criteria: median): EQ4(JM) above the median; Low earnings quality (criteria: median): EQ4(JM) below the median; High earnings quality (criteria: cluster): The group with high earnings quality resulting from two median clusters on EQ4(JM) using Euclidean Distance; Low earnings quality (criteria: cluster): The group with low earnings quality resulting from two median clusters on EQ4(JM) using Euclidean Distance.

Table 6

Industry fixed-effect regression of business segment disclosures on earnings quality and controls

Variable	Expected sign	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)
EQ1(DD)	+		8.3385 (0.000)			
EQ2(McN)	+			8.2617 (0.000)		
EQ3(J)	+				5.5197 (0.000)	
EQ4(JM)	+					5.5324 (0.000)
BusDiversif	+		5.5363 (0.000)	5.5366 (0.000)	5.4718 (0.000)	5.4634 (0.000)
Spread	+		2.0133 (0.048)	2.0151 (0.048)	1.8898 (0.068)	1.9122 (0.065)
Ln mve	+	3.3392 (0.000)	2.6696 (0.000)	2.6701 (0.000)	2.6994 (0.000)	2.6884 (0.000)
Ln bm	+	3.3865 (0.000)	2.8118 (0.000)	2.8131 (0.000)	2.8279 (0.000)	2.8164 (0.000)
Leverage	+	0.0845 (0.000)	0.0652 (0.000)	0.0653 (0.000)	0.0657 (0.000)	0.0654 (0.000)
Auditor	+	2.0181 (0.000)	1.6664 (0.002)	1.6671 (0.002)	1.6180 (0.003)	1.6170 (0.003)
StockExch	+	5.3019 (0.000)	4.4394 (0.000)	4.4432 (0.000)	3.2619 (0.001)	3.3996 (0.000)
Herf	-	-0.5463 (0.000)	-0.5121 (0.000)	-0.5120 (0.000)	-0.3719 (0.000)	-.03720 (0.000)
Newfin	+	1.5430 (0.004)	0.9533 (0.069)	0.9541 (0.069)	1.1945 (0.024)	1.1781 (0.026)
Roa	+/-	-0.0261 (0.000)	-0.0157 (0.024)	-0.0156 (0.024)	-0.0172 (0.014)	-0.0177 (0.000)
Age	+	0.1843 (0.000)	0.1109 (0.000)	0.1109 (0.000)	0.1075 (0.000)	0.1072 (0.000)
Cons		-1.2237 (0.385)	-5.5407 (0.000)	-5.5592 (0.000)	-6.0851 (0.000)	-6.1860 (0.000)
R^2		0.1175	0.2590	0.2590	0.2780	0.2791

The sample consists of 10,002 firm-year observations for the period 2001-2006. Qtt_Seg_Bus = the number of voluntary disclosure elements found in the sample firms for business segment disclosure; EQ1(DD) = The absolute value, multiplied by minus one, of the residual of a regression of the firm's year

t working capital accruals on year t, t−1, and t+1 cash flows from operations, (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the Dechow Dichev Model); EQ2(McN) The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, as well as the year t change in revenues and year t property, plant, and equipment (PP&E) (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the McNichols model); EQ3(J) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the Jones (1991) accruals model as applied to total accruals; EQ4(JM) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the modified version of the Jones (1991) accruals model (Dechow et al. 1995), as applied to total accruals; BusDiversif = number of the different sectors in which the firm operates. GeoDiversif = number of the different countries where the firm operates. Spread = bid-ask spread, calculated as $\frac{|bid - ask|}{(bid + ask)/2}$ measured in

t-1. MVE = the firm's market value of equity measured at the beginning of fiscal year for 2001-2006; BM = the firm's book-to-market ratio measured at the beginning of fiscal year 2001-2006; Leverage = debt to total assets ratio in percentage. Auditor = 1 if auditor is a Big-Four firm and 0 otherwise.

StockExch = 1 if firm is listed on the NYSE or NASDAQ and 0 otherwise. Herf = Herfindahl index in percentage, calculated as $Herf_j = \sum_{i=1}^{N} \left(\frac{S_{ij}}{S_j} \right)^2$.

NewFin= 1 if the firm has issued new debt or equity and 0 otherwise. Roa = return on assets. Age = the difference between the first year when the firm appears in CRSP and the current year.

Table 7
Industry fixedeffect regression of geographic segment disclosures on earnings quality and controls

Variable	Expected sign	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)	Coef. (p-value)
EQ1(DD)	+		2.5431 (0.046)			
EQ2(McN)	+			2.4815 (0.051)		
EQ3(J)	+				1.8775 (0.025)	
EQ4(JM)	+					2.7109 (0.003)
GeoDiversif	+		0.1686 (0.000)	0.1686 (0.000)	0.1635 (0.000)	0.1619 (0.000)
Spread	+		1.0285 (0.079)	1.0295 (0.079)	0.9991 (0.096)	0.9889 (0.099)
Ln mve	+	1.1911 (0.000)	1.1644 (0.000)	1.1648 (0.000)	1.2225 (0.000)	1.2062 (0.000)
Ln bm	+	0.9555 (0.000)	0.8773 (0.000)	0.8783 (0.000)	1.0751 (0.000)	1.0511 (0.000)
Leverage	+	0.0161 (0.004)	0.0149 (0.013)	0.0150 (0.013)	0.0169 (0.006)	0.0162 (0.009)
Auditor	+	0.6869 (0.026)	0.7200 (0.022)	0.7204 (0.022)	0.7721 (0.016)	0.7699 (0.016)
StockExch	+	3.1099 (0.000)	3.0359 (0.000)	3.0390 (0.000)	2.9931 (0.000)	2.8994 (0.000)
Herf	-	-0.0930 (0.005)	-0.0981 (0.007)	-0.0981 (0.007)	-0.0988 (0.008)	-0.0988 (0.008)
Newfin	+	0.6258 (0.027)	0.4432 (0.142)	0.4437 (0.141)	0.5274 (0.085)	0.5175 (0.091)
Roa	+/-	-0.0111 (0.003)	-0.0122 (0.002)	-0.0121 (0.002)	-0.0124 (0.002)	-0.0128 (0.002)
Age	+	0.0097 (0.266)	0.0035 (0.700)	0.0036 (0.697)	0.0109 (0.248)	0.0101 (0.282)
Cons		8.4467 (0.000)	8.5447 (0.000)	8.5315 (0.000)	8.4429 (0.000)	8.7212 (0.000)
R^2		0.0592	0.0685	0.0684	0.0835	0.0847

The sample consists of 10,002 firm-year observations for the period 2001-2006. Qtt_Seg_Geo = the number of voluntary disclosure elements found in the sample firms for geographic segment disclosure; EQ1(DD) = The absolute value, multiplied by minus one, of the residual of a regression of the firm's

year t working capital accruals on year t, t−1, and t+1 cash flows from operations, (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the Dechow Dichev Model); EQ2(McN) The absolute value, multiplied by minus one, of the residual of a regression of the firm's year t working capital accruals on year t, t−1, and t+1 cash flows from operations, as well as the year t change in revenues and year t property, plant, and equipment (PP&E) (all variables scaled by total assets), where the regression is estimated using data from t = 2000–2007 (It is the McNichols model); EQ3(J) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the Jones (1991) accruals model as applied to total accruals; EQ4(JM) = The absolute value, multiplied by minus one, of discretionary accruals calculated as the residual of the modified version of the Jones (1991) accruals model (Dechow et al. 1995), as applied to total accruals; BusDiversif = number of the different sectors in which the firm operates. GeoDiversif = number of the different countries where the firm operates. Spread = bid-ask spread, calculated as $\dfrac{|bid - ask|}{(bid + ask)/2}$ measured in

t-1. MVE = the firm's market value of equity measured at the beginning of fiscal year for 2001-2006; BM = the firm's book-to-market ratio measured at the beginning of fiscal year 2001-2006; Leverage = debt to total assets ratio in percentage. Auditor = 1 if auditor is a Big-Four firm and 0 otherwise.

StockExch = 1 if firm is listed on the NYSE or NASDAQ and 0 otherwise. Herf = Herfindahl index in percentage, calculated as $Herf_j = \sum_{i=1}^{N}\left(\dfrac{S_{ij}}{S_j}\right)^2$.

NewFin= 1 if the firm has issued new debt or equity and 0 otherwise. Roa = return on assets. Age = the difference between the first year when the firm appears in CRSP and the current year.