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ASSESSING EARNINGS MANAGEMENT IN EUROPEAN PUBLICLY TRADED FIRMS

Antonio Cerqueira
University of Porto
School of Economics and Management, Department of Management

Claudia Pereira
Center for Studies in Business and Legal Sciences
School of Accounting and Administration of Porto, Polytechnic Institute of Porto

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Abstract

We investigate if investors may benefit from using the accruals quality measure to assess the level of earnings management exercised by firms when preparing their accounting statements. More earnings management is expected to be associated with high information asymmetry among stock market participants because it makes earnings information less precise, thus providing an information advantage to informed investors relative to liquidity traders. Our results based on a sample of European publicly traded firms are consistent with a positive association between earnings management and information asymmetry. However, given some previous studies suggesting that accruals based measures may be noisy indicators of earnings management we further develop and test a method to enhance the performance of accruals quality in detecting earnings management.

1. Introduction

In this research we propose a market based approach to investigate if the accruals quality measure allows investors to identify firms with more earnings management. In addition, we analyze whether combining accruals quality and managers' incentives for using accruals results in a better measure for earnings management. Our study aims to provide some insights into the highly topical issue of earning management. The importance of this line of research has been highlighted by the number and economic impact of recent corporate financial scandals, for example those in the early 2000s. Many of the accounting scandals have involved extreme forms of accounting data manipulation.

We build the rationale behind our research on microstructure theory, in particular on the Easley and O'Hara (2004) contribution, suggesting that in the case of firms with poor public information, informed investors get an informational advantage relative to liquidity traders. At the market level, those differences in the composition of information between public and private information influence the characteristics of the trading process, in particular increasing information asymmetry among market participants. Therefore, we empirically study the association between our measure of earnings management and information asymmetry in European stock markets.

Prior empirical literature documents a positive association between measures of earnings management and information asymmetry, for example Jayaraman (2008) and Bhattacharya et al. (2013) for the US and Cerqueira and Pereira (2015) for Europe. Consistent with the prior reported evidence, our results suggest that firms with more earnings management tend to exhibit higher levels of information asymmetry.

However, because earnings management is not directly observable, several proxies have been used in literature[1]. Several studies analyse accrual-based models for detecting earnings management, for example Dechow et al. (1995), Dechow and Dichev (2002), Kothari et al. (2005), Dechow et al. (2010), Dechow et al. (2012) and Perotti and Wagenhofer (2014). Another stream of research investigates the impact of accrual-based proxies on the cost of capital, Francis et al. (2005), Francis et al. (2008) and Bhattacharya et al. (2012). Research by Teoh et al. (1998), Ball and Shivakumar (2008) and Chen et al. (2013) analyze accrual-based earnings management at initial public offerings. Accrual-based management influences information asymmetry among stock market participants, Jayaraman (2008), Bhattacharya et al. (2013) and Cormier et al. (2013).

While our study investigates the impact of earnings management on information asymmetry our main contribution consists in developing and testing a method to enhance the performance of accrual-based measures in detecting earnings management. Prior literature argues that accrual-based measures are noisy indicators of earnings management in particular because their performance depends on managers' motivations to use accruals. Accrual accounting serves for the purpose of conveying managers' information, thus accounting standards should allow managers to exercise their judgment in financial reporting, Healy and Whalen (1999). However, managers can also use discretion to bias contractual outcomes that depend on accounting numbers or to hide a firm's poor performance from outsiders, Healy and Whalen (1999). Therefore, some studies find evidence consistent with the information perspective, Subramanyam (1996), Louis and Robinson (2005), Badertscher et al. (2012) and Chen et al. (2013). However, most of prior research assumes that accruals tend to be used for

[1] Prior literature has been using indicators based on accruals as measures of earnings quality or to detect accrual-based earnings management. It is commonly assumed that higher levels of earnings management results in poor earnings quality. For example, Dechow et al. (1995) and Dechow et al. (2012) refer to discretionary accruals as a measure of earnings management, while accrual-based measures are included as proxies of earnings quality in Dechow et al. (2010). Recent trend in the literature tends to use the form measures of earnings management, Dechow et al. (2012) and Kothari et al. (2016).

opportunistic earnings management, Teoh et al. (1998), Dechow and Skinner (2000), Leuz et al. (2003), Cheng and Warfield (2005), Burgstahler et al. (2006), Badertscher (2011) and Dichev et al. (2013).

We build our study on the argument that the degree to which accrual-based measures capture earnings management depends crucially on both the level of flexibility allowed by accounting standards and on managers' motivations when producing the firm's financial statements. Regarding accounting standards, our sample includes firms reporting their financial performance under IFRS. While the adoption of IFRS relies on the assumption that the use of these standards provides superior information to market participants there are a number of concerns regarding if this goal has been met. For example, Ball (2006) develops the argument that the fair value orientation of IFRS could add volatility to financial statements and thus increase the potential for managers' discretion. Kvaal and Nobes (2010) state that because the IFRS are based on principles rather than rules they lead to different interpretations which may be the reason for a higher level of flexibility in financial reporting. Given the presumed increase in flexibility, it is important to understand the incentives underlying managers' decisions when preparing a firm's financial statements. For most of prior research the level of discretion exercised by managers is reflected in accounting accruals.

In order to explain how to separate firms by managers' incentives to exercise discretion let us assume the case of a firm whose accruals characteristics are consistent with more earnings management. However, assume that those accruals were actually used by managers as a mean to communicate value relevant information to outside investors and that managers do not have incentives to opportunistically manage earnings[2]. Under these assumptions, managers should disclose additional information in order to provide a reliable signal to outside investors reflecting the true and fair value of the firm, Dye (1985)[3], Verrecchia (1990)[4]. Hence, if managers succeed in conveying their private information to the market then information asymmetry among market participants is expected to be low. High disclosure quality reduces information asymmetry by decreasing the likelihood that investors discover and trade on private information, Brown and Hillegeist (2007). We propose a way to detect the situation just described above that involves the dispersion in financial analysts' forecasts. Because analysts follow all information disclosed by the firm then their forecasts must reflect the convergence between information provided in reported earnings and other pieces of information about the firm. Therefore, poor accruals quality associated with a low dispersion in analysts' forecasts may indicate firms whose abnormal accruals are essentially informative. For those firms we do not expect to find a high level of information asymmetry among stock market participants. But, managers may have incentives to manipulate earnings either to mislead financial statement users or to bias contractual outcomes. In such case the accuracy of the additional disclosed information is expected to be lower and one potential implication would be an increased dispersion in analysts' forecasts. So, poor accruals quality associated with a high dispersion in analysts' forecasts may identify firms with opportunistic earnings management. For these firms the level of information asymmetry must be high.

Our results suggest that for non-financial European listed firms accruals quality may be useful as an indicator of earnings management because we find empirical evidence of a significant positive association between poor accruals quality and high information asymmetry. Moreover, such association also holds for the three countries in our sample with the larger number of firm-year observations. Our findings also confirm our research hypothesis that

[2] We assume an endogenous relation between earnings quality and voluntary disclosure, Francis et al. (2008).

[3] In the case of good private information, managers are encouraged to disclose that information to distinguish it from the worst information that they could possibly have. However, managers may suppress bad information because investors' knowledge of managers' information is incomplete, Dye (1985).

[4] Managers holding high quality private information tend to disclose more information, Verrecchia (1990).

adding managers' incentives to accruals quality enhances the discriminatory power of this indicator. Such evidence is consistent with investors being able, at least in part, to interpret correctly accruals used by managers to communicate private information.

Our contribution to the literature on earnings management is fourfold. Firstly, using non-financial listed European firms, we provide empirical evidence on the association between accruals quality and investors' reactions as reflected in information asymmetry, which is consistent with accruals quality being an indicator of earnings management. Such study is important because it provides insights into several issues that are of interest to investors, managers, regulators, practitioners and academics. Secondly, we add to previous literature by showing that including managers' incentives, as captured by analysts' forecasts dispersion, enhances the discriminatory power of accruals quality. This finding is relevant given prior literature suggesting that accruals based measures are noisy indicators of earnings management. We show that the combination of accruals quality and analysts' forecasts dispersion enhances the performance of accruals quality as an indicator of earnings management. Thirdly, we find evidence that, even at the country level, taking into account managers' incentives enhances the performance of the earnings management indicator. Fourthly, the empirical tests suggest that, in the case of European stock markets, larger firms, more liquid stocks and firms with higher stock prices tend to exhibit lower levels of information asymmetry.

The remainder of the paper is organized as follows. Section 2 exhibits a brief literature review and develops the hypotheses analyzed in the study. Section 3 describes the proxies for earnings management, information asymmetry and the specifications of the empirical model. Section 4 presents sample selection procedures and sample characteristics. Section 5 documents some descriptive statistics and reports the results of the empirical tests. Concluding remarks are provided in section 6.

2. Literature Review and Hypotheses Development

We investigate the usefulness of accruals quality as a measure of earnings management for stock market participants. To examine the performance of this measure we use a market-based approach that consists in exploiting the likely relation between earnings management and information asymmetry among stock market investors. Perotti and Wagenhofer (2014) also apply a market-based method to assess the performance of several proxies of earnings management. However, while we study the impact of earnings management on the characteristics of investor's expectations, they analyze the impact on securities mispricing that depends on investors' expectations.

To assess the expected impact of earnings management on information asymmetry we rely on insights provided by rational expectations and market microstructure models. We consider a market with two types of investors: informed and uninformed investors. Uninformed investors form their expectation about a firm's expected cash flows based on public information, while informed investors have access to private information. Information asymmetry is defined as the difference in information precision[5] between informed and uninformed investors, Lambert et al. (2012). Assuming that a firm increases the precision of public information, without influencing private information, this implies an expected reduction in information asymmetry. This is consistent with the results of the analytical model developed by Easley and O'Hara (2004) that making public some of informed investors' private information reduces their information advantage, because it increases information precision for uniformed investors while leaving unchanged the precision for informed investors.

However, earnings management is a non observable construct and thus a variety of measures have been proposed in extant literature, see Schipper and Vincent (2003) and Dechow et al. (2012). Previous works split accruals into two components, a first component reflecting a firm's economic conditions and a residual component called abnormal accruals.

[5] Information precision is the reciprocal of the variance of beliefs about a firm's future cash flows, Lambert et al. (2012).

Measures based on abnormal accruals have been widely adopted in extant literature to detect earnings management as in Francis et al. (2005) and Batacharya et al., (2013). When selecting a proxy of earnings management the relevance of each measure must be evaluated in the context of a specific decision model, Dechow et al. (2010). In our model, the indicator of earnings management is expected to be related with differences in the precision of investors' beliefs about a firm's prospects. Given that we are using a market-based approach, we rely on the Perotti and Wagenhofer (2014)[6] finding on the superiority of accruals based measures, particularly accruals quality. Additionally, the selection of accruals quality follows a trend in recent literature that uses measures based on the variability of discretionary accruals over time.

Our main proxy for earnings management is accruals quality. This measure reflects the degree to which earnings map into cash flows. More specifically accruals quality is measured by the standard deviation of the residuals obtained by regressing total current accruals on a firm's cash flows and other economic variables. In a robustness test we also apply discretionary accruals, which measure the difference between observed total accruals and their expected values. Discretionary accruals have been widely employed to assess earnings management activities. In our study we use a version of the modified Jones model, Dechow et al. (1995), with lagged return-on-assets proposed by Kothari et al. (2005).

To analyze the relevance of accruals quality as a measure of earnings management we empirically study the association between accruals quality and information asymmetry, measured by the spread[7]. This method relies on estimating the impact of earnings management on variables reflecting the market reaction to information, for example Perotti and Wagenhofer (2014) study the impact of earnings management on the absolute value of the difference between actual returns and expected future returns.

Market microstructure posits that both in quote and limit order driven markets the bid-ask spread has three components: order processing costs, inventory costs and adverse selection component. The adverse selection component is associated with information asymmetry among market participants, and reflects the expected losses of liquidity providers when trading with informed investors. We develop the argument that more earnings management results in poor public information implying an increase in the level of information asymmetry because of the informational advantage of informed investors. Thus, we expect to find a positive association between poor public information and the spread, and we formalize the following hypothesis,

H1: Earnings management, as measured by poor accruals quality, implies high information asymmetry.

Accruals make financial reports more informative because if accruals had no informational content then investors would prefer cash flows to earnings. For example, when forecasting future cash flows a certain degree of earnings stability is required in past and current earnings. By including accruals, managers can offset some of the cash flow volatility making earnings smoother, because earnings volatility is an obstacle to predictability, Gajewsky and Quéré (2013). Therefore, managers may use smoothing to incorporate into earnings their private information about future cash flows. This is in line with the Graham et al. (2005) reported evidence that managers associate lower earnings volatility with a positive market premium. This branch of the literature argues that managers exercise discretion in reporting their financial performance in order to communicate private information to outside investors,

[6] Specifically, Perotti and Wagenhofer (2014) propose a stock-price-based measure for assessing the quality of several proxies for earnings quality.

[7] The adverse selection component of the quoted spread is equal to the revision in the expectations of the market maker conditional on the precision of private information and on the probability that the trader is an informed investor. Hence, such proxy is expected to capture both information precision and information asymmetry.

Subramanyam (1996), Louis and Robinson (2005), Badertscher et al. (2012) and Chen et al. (2013). However most of prior literature suggests that managers have opportunistic motivations when reporting earnings, Jones (1991), Francis et al. (2005), Francis et al. (2008), Rajgopal and Venkatachalam (2011), Bhattacharya et al. (2013). We propose that in a given market there are two types of firms: firms where the informational component outweighs the earnings management component and firms where the earnings management component prevails. Thus, a positive association between accruals quality and the spread is expected for firms where the earnings management component prevails. Assuming a market with both types of firms, the relationship between accruals and information asymmetry may be positive, negative or even negligible.

To assess the expected impact of accruals quality on information asymmetry we rely on the underlying managers' incentives for using accruals. To empirically distinguish managers' incentives we assume that both earnings management and managers' voluntary disclosure influence investors' beliefs about a firm's future performance. Investors construct their beliefs about firm value based on public and private information, particularly on information reflected in financial reports. The informational content of voluntary disclosure has been investigated in the form of a number of information items disclosed in the annual reports, Francis et al. (2008) and Mouselli et al. (2012) and items disclosed in 10-K fillings, Francis et al. (2008). When managers rely on accruals for opportunistic earnings management, substantial differences can occur between the informational content of the accruals quality indicator and voluntary information disclosure. One implication of this is a higher degree of uncertainty in investors' beliefs and an increased dispersion in analysts' forecasts. We propose that the dispersion in analyst's forecasts can partially reveal managers' underlying incentives for using accruals. Therefore, poor accruals quality associated with a high (low) dispersion in analysts' forecasts may indicate firms with opportunistic (informative) earnings management. Although in the context of Initial Public Offerings (IPO), Chen et al. (2013) provide evidence that high discretionary accruals are associated with informative earnings management in the case of firms with low information uncertainty. Thus, we propose that combining accruals quality and the dispersion in analysts' forecasts provides a better indicator of earnings management than accruals quality solely and we posit the following hypothesis:

H2: The positive association between poor accruals quality and information asymmetry is stronger for firms with opportunistic earnings management, as detected by combining poor accruals quality and a high dispersion in analysts' forecasts.

Previous studies report that managers associate firms with low earnings volatility with better information disclosure Graham et al. (2005) and that earnings smoothness is a favorable attribute of earnings Perotti and Wagenhofer (2014). Although investigating a different research topic, we also assume that investors find more difficult to interpret information contained in earnings when abnormal accruals are highly variable over time. Given that the accruals quality measure reflects the volatility of abnormal accruals we propose that high volatilities are likely to identify firms with poor public information and consequently high levels of information asymmetry. Thus, the association between accruals quality and the spread is expected to be stronger for firms with worst accruals quality anticipating a nonlinear relationship between accruals quality and the spread, leading to the following hypothesis:

H3: The positive association between poor accruals quality and information asymmetry is nonlinear and such association is stronger for firms with higher earnings management.

3. Proxies and Empirical Model

3.1 Proxies for Earnings management

Accruals Quality

Information about earnings measured by accrual accounting provides a better basis for assessing the entity's past and future performance than information about current cash flows. Specifically, accruals are assumed to be useful for investors and other economic agents to the extent that they could help in anticipating future cash flows. However, IFRS provide managers with a certain degree of flexibility when reporting a firm's financial performance. Therefore, a proxy for earnings management should be able to capture the level of discretion exercised by managers, as it is the case of the accrual quality measure proposed by Dechow and Dichev (2002), as modified by McNichols (2002) in the operational form proposed by Francis et al. (2005). Dechow and Dichev (2002) measure the quality of accruals by the extent to which current accruals map into past, current and future cash flows, more specifically by the standard deviation of the residuals of the regression of currents accruals on cash flows (estimated at the firm level or at the sector level). McNichols (2002) include in the estimation of residuals the variables current year property, plant and equipment and change in net sales, which are the fundamental variables in the Jones (1991) model. Francis et al. (2005) investigate the impact of this measure on the cost of capital. Specifically, they estimate the regression residuals cross-sectionally, by year, within each of the 48 Fama and French (1997) industry classifications.

To measure accruals quality, we begin by computing total current accruals as the change in non-cash working capital,

$$TCA_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDebt_{i,t} \quad (1)$$

Where ΔCA is the change in current assets, ΔCL is the change in current liabilities, $\Delta Cash$ is the change in cash, $\Delta STDebt$ represents the change in short term debt.

Accruals quality is measured by the standard deviation of the residuals obtained by regressing total current accruals on operating cash flow in the current period, prior period and future period, change in revenues and gross value of property plant and equipment.

$$TCA_{i,t} = \alpha_0 + \alpha_1 CFO_{i,t-1} + \alpha_2 CFO_{i,t} + \alpha_3 CFO_{i,t+1} + \alpha_4 PPE_{i,t} + \alpha_5 \mathrm{Re}v_{i,t} + e_{i,t} \quad (2)$$

All variables are scaled by average total assets.

We estimate cash flow from operations as the difference between net income before extraordinary items and total accruals (TA),

$$CFO_{i,t} = NIBE_{i,t} - TA_{i,t} \quad (3)$$

Where TA is defined as the change in non-cash working capital minus depreciation and amortization expense,

$$TA_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta Cash_{i,t} + \Delta STDebt_{i,t} - Depn_{i,t} \quad (4)$$

In order to obtain the residuals $e_{i,t}$ for firm i and year t, equation (2) is cross-sectionally estimated in year t at the Fama and French's (1997) industry level. Accruals quality in year t refers to the standard deviation of a firm's residuals calculated over year t-4 through t.

Discretionary Accruals

To examine the robustness of our results we also run tests using the discretionary accruals measure. While accruals quality represents the standard deviation of the total accruals regression residuals, the discretionary accruals measure captures the absolute value of abnormal accruals period by period. Both measures have been used in literature in the context of market based approaches. For example, Chen et al. (2012) attributes idiosyncratic return volatility to discretionary accrual volatility, while Bhattacharya et al. (2013) explains information asymmetry in stock markets by accruals quality.

The discretionary accruals measure is based on the modified Jones model, Jones (1991) and Dechow et al. (1995), with the contribution of Kothari et al. (2005), which consists in including the explanatory variable lagged return-on-assets in the residual estimation.

To estimate discretionary accruals we begin with total accruals, obtained as in equation (4). Then, using firm-year observations on total accruals we estimate cross-sectional regressions at the Fama and French's (1997) industry group level,

$$TAcc_{i,t} = \alpha_0 + \alpha_1\left(\frac{1}{Assets_{i,t-1}}\right) + \alpha_2\left(\Delta Sales_{i,t} - \Delta AR_{i,t}\right) + \alpha_3 PPE_{i,t} + \alpha_4 ROA_{i,t-1} + e_{i,t} \quad (5)$$

Where $TAcc_{i,t}$ is total accruals scaled by lagged total assets, $\Delta Sales$ is the change in sales scaled by lagged total assets ($Assets_{i,t-1}$), ΔAR is the change in accounts receivable[8] scaled by lagged total assets, PPE is net property, plant and equipment scaled by lagged total assets and ROA represents return on assets in period t-1. Discretionary accruals are defined as the residuals of equation (5). These residuals represent the component of total accruals left after controlling for firm performance, firm economic activity and investment in Plant, Property and Equipment.

3.2 Proxies for Information Asymmetry

There are a number of information differences across investors in securities markets. This information asymmetry is a concern to market participants and securities regulators. One problem is that uninformed investors might be reluctant to invest if they fear to lose in their trading against informed investors. In addition, uninformed traders might demand a return premium for investing in securities exhibiting high level of information asymmetry (Lambert et al., 2012).

A strand in previous literature uses the bid-ask spread as a proxy for information asymmetry. The spread has three components: the order-processing cost, the inventory holding cost and the adverse selection component. The order-processing costs are, for example, those associated with providing the market maker service such as rents, labour costs and equipment, Bollen et al. (2004). The inventory holding cost represents the market maker compensation for the price risk associated with a suboptimal inventory position, Bollen et al. (2004). The Adverse selection component of the spread represents the market maker compensation for the losses incurred when trading with investors who are better informed about the true security value.

A recent stream of literature uses intraday data based measures of information asymmetry, for example the probability of information-based trading (PIN) developed by Easley et al. (2002) used by Brown and Hillegeist (2007), Jayaraman (2008), Bhattacharya et al. (2013) and the Price Impact of trade used by Glosten and Milgrom (1985) and Bhattacharya et al. (2013).

[8] Dechow et al. (1995) propose a modified Jones model where they assume that changes in credit sales are the result of Earnings Management.

However, for most of the European firms in our sample databases with such type of data are not available. Thus, in our study we use the Corwin and Schultz (2012) estimator because these authors argue that the estimator can be used both with daily or intraday data and found empirical evidence of a similar performance of the spread estimator as compared to alternative measures based on high-frequency data for U.S. markets. This estimator uses the daily high and low prices to estimate the relative spread. The basic idea is that the spread is the same over a single day period or over one two-day period, while the variance increases proportionally with the period length. To estimate the spread we denote the actual high (low) stock price in day t by H_t^A $\left(L_t^A\right)$. Representing by S the relative bid-ask spread, the observed high (low) stock price in day t is, $H_t^0 = H_t^A\left(1+\frac{S}{2}\right)$, $L_t^0 = L_t^A\left(1-\frac{S}{2}\right)$. Corwin and Schultz (2012) show that the relative spread S can be estimated as:

$$S = \frac{2\left(e^{\alpha}-1\right)}{1+e^{\alpha}} \tag{6}$$

$$\alpha = \frac{\sqrt{2\beta}-\sqrt{\beta}}{3-2\sqrt{2}} - \sqrt{\frac{\gamma}{3-2\sqrt{2}}} \tag{7}$$

$$\gamma = \left[\ln\left(\frac{H_{t,t+1}^0}{L_{t,t+1}^o}\right)\right]^2,\ \beta = \left[\ln\left(\frac{H_{t,t}^0}{L_{t,t}^o}\right)\right]^2 + \left[\ln\left(\frac{H_{t,t+1}^0}{L_{t,t+1}^o}\right)\right]^2 \tag{8}$$

The estimator is adjusted for overnight returns and negative estimates are set to zero. To estimate the spread on an annual basis, we estimate spreads separately for each two-day period and calculate the average across all overlapping two-day periods in the year.

3.3 Empirical Models

In this section, we develop the empirical models used to investigate the impact of earnings management on information asymmetry. In a first model, we use accruals quality to measure earnings management and the high-low spread estimator for information asymmetry. Previous studies identify a number of highly significant factors in explaining information asymmetry. Thus, we include in our model a number of control variables that are known to influence the spread and we get the following equation,

$$\begin{aligned} HL\_S_{i,t} = {} & \alpha_0 + \alpha_1 AQ_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 ILLIQ_{i,t} + \alpha_4 INV\_PRI_{i,t} \\ & + \alpha_5 TURN_{i,t} + \alpha_6 ANALYSTS_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{9}$$

HL_S is the annual average of the daily high-low spread estimator S, defined above.

AQ is the accruals quality measure given by the standard deviation of residuals from Francis et al. (2005) regression model, also defined above. We expect to find higher levels of information asymmetry for firms with poor informational environment. If poor accruals quality indicates poor public information then a positive sign is expected for the AQ regression coefficient.

$SIZE$ denotes the logarithm of market capitalization. Because larger firms tend to produce more information and to disclose such information faster this must reduce information asymmetry, Chae (2005). Thus we expect to find a negative association between spread and size.

Market microstructure models propose three components of the spread: order processing costs, inventory costs and adverse selection. As we intend to use the adverse selection component to represent information asymmetry, we must remove the remaining components. To take into account the order processing costs component we include turnover (TURN), following Bollen et al. (2004), Acker et al. (2002). TURN is defined as the ratio of shares traded over year t, divided by the total number of shares outstanding. It is expected that these costs decrease with turnover, implying an expected negative regression coefficient. To account for the inventory holding component of spread we follow Amihud (2002) and Hasbrouck (2009) that propose a measure for illiquidity (ILLIQ) defined as the annual average of the ratio between the absolute value of the daily stock return and the corresponding daily trading volume. We expect that more illiquidity means higher spread, leading to a predicted positive regression coefficient

INV_PRI which represents the inverse of stock price is used by Jayaraman (2008) as an explanatory variable for spread. This variable is used in microstructure models to take into account the effect of price discreteness due to the minimum tick size, Bollen et al. (2004). Firms with lower stock prices tend to have larger relative bid-ask spreads, implying an expected positive regression coefficient for the inverse of stock price.

$ANALYSTS$ represents analyst coverage, measured by total number of annual analysts' estimates. On the one hand, firms with more earnings management and, consequently, high information asymmetry, tend to attract more analysts' estimates because the value of private information is greater. On the other hand, more analysts' estimates increase information production thus reducing information asymmetry, Lobo et al. (2012). We propose a negative association between analyst coverage and information asymmetry. However, prior literature reports conflicting results about this relationship, Van Ness et al. (2001).

In order to take into account managers' incentives we further develop the basic model by including a dummy variable *DISP* set equal to one for values of the dispersion in analysts' forecasts higher than the 33rd percentile and zero otherwise. The dispersion in analysts' forecasts is defined as the standard deviation in analysts' forecasts scaled by the median forecast. Such development aims at identifying firms that are likely to use accruals mainly for earnings management, thus we expect to find a stronger positive association between AQ and HL_S.

$$HL\_S_{i,t} = \alpha_0 + \alpha_1 AQ_{i,t} + \alpha_2 DISP_{i,t} \times AQ_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_4 ILLIQ_{i,t} + \alpha_5 INV\_PRI_{i,t} + \alpha_6 TURN_{i,t} + \alpha_7 ANALYSTS_{i,t} + \varepsilon_{i,t} \quad (10)$$

To test the nonlinear specification of our basic model we rank firms by the accruals quality measure and split the sample into quintiles. We include in the regression model four quintile dummies Q2, Q3, Q4 and Q5, identifying firms in accruals quality quintiles except for quintile one. For example Q2 is set to one if the firm is included in quintile one and zero otherwise. We expect to find larger spreads especially for the fourth and fifth quintiles.

$$HL\_S_{i,t} = \alpha_0 + \alpha_1 Q2_{i,t} + \alpha_2 Q3_{i,t} + \alpha_3 Q4_{i,t} + \alpha_4 Q5_{i,t} + \alpha_5 SIZE_{i,t} + \alpha_6 ILLIQ_{i,t} + \alpha_7 INV\_PRI_{i,t} + \alpha_8 TURN_{i,t} + \alpha_9 ANALYSTS_{i,t} + \varepsilon_{i,t} \quad (11)$$

In a robustness test to our results, the basic model was estimated using discretionary accruals as a different proxy for earnings management.

$$HL\_S_{i,t} = \alpha_0 + \alpha_1 ACC\_DISC_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 ILLIQ_{i,t} + \alpha_4 INV\_PRI_{i,t} + \alpha_5 TURN_{i,t} + \alpha_6 ANALYSTS_{i,t} + \varepsilon_{i,t} \quad (12)$$

4. Data and Sample Selection

Our sample consists of firms listed in eighteen European stock markets, over the period from 2003 to 2011. The sample includes firms from seventeen European Monetary Union countries and the United Kingdom. Our primary source of data is the Thomson Reuters Datastream database. Additionally, we collect the number of analysts providing earnings per share estimates for the next financial year and the standard deviation of analysts' earnings per share estimates from I/B/E/S.

In order to allow comparison we include in our sample firm-year observations if their financial reports are based on IFRS accounting standards. While the mandatory IFRS adoption for listed firms in European Union was made effective from 2005, many firms voluntary adopt IFRS few years before. Thus, we also include in our sample years 2003 and 2004, but in order to ensure that only firm-year observations reported under IFRS were included in estimations we use the Thomson Reuters Datastream key item Accounting Standards Followed.

For a number of firms included in our sample some variable are not available over the full sampling period. In order to avoid excluding too many firms we define as a minimum criterion that firms have at least three full years of data. After applying this restriction the number of firms in the sample drops to 1,999. Additionally, we exclude firms with missing industry code classification, financial firms and utilities (Fama and French industry codes 31, 44, 45, 46, 47 and 48) because they are subject to specific regulations, reducing the number of firms to 1607. After this procedure, four countries were excluded from the sample: Cyprus, Luxembourg, Malta and Slovakia.

The number of firm-year observations depends on the specific regression being estimated. As indicative of the order of magnitude, the number of firm-year observations used to estimate the basic regression is 8,469. This regression includes the spread as the dependent variable, accruals quality and control variables. In a similar regression estimation firm-year observations for UK, France and Germany are 3,425 (40.4%), 1,395 (16.5%) and 1,119 (13.2%), respectively. These three markets together represent 70.1% of the full sample.

5. Empirical Results

5.1 Descriptive Statistics and Correlations

Table 1 gives descriptive statistics of the variables used to measure information asymmetry, earnings management and other explanatory variables for information asymmetry. To mitigate the effect of potential outliers, the variables are winsorized at the first and ninety-ninth percentile.

Table 1: Descriptive Statistics for Selected Variables

	Mean	Median	Std. Dev.	Minimum	Maximum
HL_S	1.4401	1.2088	0.8542	0.3474	7.1859
AQ	0.0341	0.0263	0.0288	0.0010	0.4746
SIZE	12.5836	12.4831	2.0497	7.7082	18.0228

ILLIQ	0.0883	0.0013	0.3734	7.7E-08	5.6706
INV_PRI	0.1033	0.0280	0.2419	0.0005	3.0394
TURN	0.6855	0.4336	0.7313	0.0004	4.7113
ANALYSTS	7.9985	5.0	7.5518	1.0	54.0

Source: authors' calculations

Notes: Variable definitions: HL_S = annual variable defined as the average of the Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. AQ = accruals quality measure given by the standard deviation of residuals from the Francis et al. (2005) regression model. SIZE = log of market capitalization in € thousands. ILLIQ = calculated as one hundred times the annual average of daily unsigned stock return divided by trading volume. INV_PRI = inverse of stock price. TURN = ratio of shares traded over the year divided by the total number of shares outstanding. ANALYSTS = analyst coverage, measured by total number of annual analysts' estimates.

Our primary variables are accruals quality and the HL spread estimator. The mean value of AQ is 0.0341 which is similar to the 0.0442 reported by Francis et al. (2005) for US markets and for the period from 1970 to 2001. In our tests the variable for information asymmetry is the HL spread estimator multiplied by one hundred. We find a mean value of the spread measure in European markets of 1.4401 which is slightly lower than that reported for US markets. Specifically, the mean value of the HL spread estimator multiplied by one hundred reported by Corwin and Schultz (2012) is 2.10 for the period from 1993 to 2006.

Table 2 describes the mean and standard deviation of the main regression variables for the three major markets. The selection of the three major markets is based on the number of firm-year observations. France has both the lower mean value of HL_S and AQ, which seems consistent with lower earnings management (low AQ) implying lower information asymmetry (low HL_S). However, such evidence is not conclusive because these results do not take into account the impact of control variables on the spread estimator.

Table 2: Descriptive Statistics for the three Major Markets

	United Kingdom		France		Germany	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
HL_S	1.5867	1.0012	1.2901	0.7398	1.4597	0.6259
AQ	0.0381	0.0305	0.0287	0.0224	0.0388	0.0376

Source: authors' calculations

Notes: Variable definitions: HL_S = annual variable defined as the average of the Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. AQ = accruals quality measure given by the standard deviation of residuals from the Francis et al. (2005) regression model.

Table 3 contains the Pearson's correlation coefficients of the variables used to measure information asymmetry, earnings management and other explanatory variables for information asymmetry. Correlations between AQ and HL_S are positive (0.213) and statistically significant at the 1% level. This result is consistent with the shares of firms with poor accruals quality exhibiting a high level of information asymmetry. The spread estimator is negatively correlated with firm size, meaning that larger firms exhibit lower levels of information asymmetry. The results show high absolute values of this coefficient consistent with firm size being a main explanatory variable of information asymmetry. Illiquidity and inverse of stock price are positively correlated with the spread estimator, consistent with higher spreads for illiquid stocks and stocks with low prices.

Table 3: Correlations

	HL_S	AQ	SIZE	ILLIQ	INV_PRI	TURN	ANALYSTS
HL_S	1						
AQ	0.213***	1					

SIZE	-0.420***	-0.279***	1				
ILLIQ	0.291***	0.064***	-0.211***	1			
INV_PRI	0.243***	0.115***	-0.175***	0.355***	1		
TURN	-0.057***	0.025**	0.414***	-0.180***	-0.100***	1	
ANALYSTS	-0.150***	-0.176***	0.771***	-0.158***	-0.145***	0.482***	1

Source: authors' calculations

Notes: ***, ** indicate significance at the 1 percent and 5 percent levels, respectively.
Variable definitions: HL_S = annual variable defined as the average of the Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. AQ = accruals quality measure given by the standard deviation of residuals from the Francis et al. (2005) regression model. SIZE = log of market capitalization in € thousands. ILLIQ = calculated as one hundred times the annual average of daily unsigned stock return divided by trading volume. INV_PRI = inverse of stock price. TURN = ratio of shares traded over the year divided by the total number of shares outstanding. ANALYSTS = analyst coverage, measured by total number of annual analysts' estimates.

We also find a significant correlation between the independent variables firm size, turnover and the number of analysts which may influence the explanatory power of the variables in the regression model.

In order to anticipate the association between accruals quality and the spread we split the sample into five groups after ranking firms based on accruals quality quintiles[9]. Firms in the top quintile are those with the worst accruals quality. Firms in the bottom quintile are those with the best accruals quality. If accruals quality has explanatory power for the spread, then the mean spread must be higher for firms in the top quintile. Table 4 shows the mean spread by quintile.

Table 4: Mean Spreads by Accruals Quality Quintiles

	Q1	Q2	Q3	Q4	Q5	Q2-Q1	Q3-Q2	Q4-Q3	Q5-Q4
HL_S	1.195	1.257	1.367	1.43	1.66	0.062***	0.110***	0.060**	0.229***
AQ	0.010	0.018	0.026	0.038	0.077				

Source: authors' calculations

Notes: ***,** indicate significance at the 1 percent and 5 percent levels, respectively
Variable definitions: HL_S = annual variable defined as the average of the Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. AQ = accruals quality measure given by the standard deviation of residuals from the Francis et al. (2005) regression model.

As predicted the mean of the spread estimator is larger for firms in the top quintile. The results in table 4 also show a statistically significant positive difference between the mean spread for a given quintile and that of the previous one, consistent with an increase in information asymmetry for firms with more earnings management. It is noteworthy that the mean AQ strongly increases for the firms in the top quintile meaning that it includes firms with the highest levels of earnings management. The analysis by quintiles shows evidence of a market reaction to changes in earnings management, particularly evident in the observed change in the mean spread between quintiles four and five.

In order to investigate if these results are biased by specific market data we run this procedure for the UK that represents about forty percent of the full sample observations.

Table 5: Mean Spreads by Accruals Quality Quintiles for UK

	Q1	Q2	Q3	Q4	Q5	Q2-Q1	Q3-Q2	Q4-Q3	Q5-Q4

[9] Even if the term quintile refers to a cut-off point, hereafter quintile denotes a group of firms, for example the first quintile corresponds to firms whose magnitude of AQ is lower than the 20th percentile.

HL_S	1.250	1.381	1.592	1.534	1.796	0.131***	0.211***	- 0.059	0.262***
AQ	0.011	0.021	0.029	0.042	0.086				

Source: authors' calculations

Notes: ***,** indicate significance at the 1 percent and 5 percent levels, respectively
Variable definitions: HL_S = annual variable defined as the average of the Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. AQ = accruals quality measure given by the standard deviation of residuals from the Francis et al. (2005) regression model.

The results reported in table 5 for the UK are similar to those reported for the full sample, except for the change between quintiles three and four. The observed change in AQ is 0.013 while the corresponding change in the spread estimator is not statistically significant. As in the case of the full sample, the analysis by quintiles for the UK shows that information asymmetry increases with the increase in earnings management, which is especially clear when observing the difference of mean spread values between quintiles four and five.

5.2. Regression Estimations

5.2.1. Regression of the spread estimator on accruals quality and control variables

Our empirical study proceeds with the estimation of a multivariate regression to analyze the association between earnings management as measured by accruals quality and the spread as a proxy for information asymmetry. In our regression we also include a number of independent variables that are known to influence the spread. Specifically, we use as control variables the logarithm of market capitalization, illiquidity, the inverse of the stock price, turnover and analyst coverage.

In spread regressions we use panel data because combining time series and cross sections increases the number of observations and may offer a solution to the problems caused by unobserved heterogeneity. In regression estimations we use both cross-sectional fixed effects at the firm level and time fixed effects.

The results in table 6, panel A show a positive association between AQ and HL_S and such association is statistically significant at the 1% level for the sample including all firms. As expected, the estimated coefficient for AQ is always positive meaning that lower earnings management (low AQ) reduces information asymmetry among market participants.

Regarding control variables, the coefficient for size is negative and statistically significant at the 1% level, suggesting that larger firms exhibit lower spreads. Another statistically significant variable at the 1% level is illiquidity whose regression coefficient is positive, consistent with more liquid stocks having lower spreads. A third variable with explanatory power at the 1% level is the inverse of stock price. Because there is a minimum price variation allowed for quoting, such variation affects more the relative spread of stocks with low prices. So, low stock prices are associated with high relative spreads. The sign of the estimated coefficients for turnover and analysts is positive while both predicted signs are negative. We suggest that this has something to do with the use of the spread estimator, because when running the same tests using the closing bid-ask spread to measure information asymmetry the observed signs match those predicted. This finding is consistent with the results reported by Van Ness et al. (2001) that the sign of the association between the number of analysts and information asymmetry depends on the model used to estimate the adverse selection component of the spread.

Table 6: Regression of the spread estimator on accruals quality and control variables

PANEL A: FULL SAMPLE

	Pred. sign	Coefficient	t-statistic	p-value

INTERCEPT			3.984***	28.397	0.000
AQ		+	1.575***	5.941	0.000
SIZE		-	-0.229***	-21.384	0.000
ILLIQ		+	0.726***	21.244	0.000
INV_PRI		+	0.213***	4.103	0.000
TURN		-	0.194***	16.162	0.000
ANALYSTS		-	0.007***	4.432	0.000
Num.Obser v.	8,46 9				
Adj.R-squa.	0.65				

PANEL B: UK, FRANCE AND GERMANY

	Pred. sign	UK		France		Germany	
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
INTERCEPT		4.221***	18.064	1.260***	3.883	1.138***	2.865
AQ	+	1.057**	2.224	3.720***	5.804	0.963**	2.413
SIZE	-	-0.267***	-14.447	-0.034	-1.429	-0.010	-0.344
ILLIQ	+	14.509***	5.663	0.861***	13.465	0.521***	10.303
INV_PRI	+	8.444***	11.793	0.900***	6.906	1.005***	6.252
TURN	-	0.259***	12.852	0.331***	10.911	0.242***	9.116
ANALYSTS	-	0.019***	5.175	-0.004	-1.058	-0.000	-0.064
Num.Observ.		3,425		1,395		1,119	
Adj.R-squa.		0.67		0.68		0.69	

Source: authors' calculations

Notes: ***, ** indicate significance at the 1 percent and 5 percent levels, respectively.
This table reports the results of the regression of the spread estimator on accruals quality measure (AQ). Variable definitions: HL_S = annual variable defined as the average of the Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. AQ = accruals quality measure given by the standard deviation of residuals from the Francis et al. (2005) regression model. SIZE = log of market capitalization in € thousands. ILLIQ = calculated as one hundred times the annual average of daily unsigned stock return divided by trading volume. INV_PRI = inverse of stock price. TURN = ratio of shares traded over the year divided by the total number of shares outstanding. ANALYSTS = analyst coverage, measured by total number of annual analysts' estimates.

In table 6, panel B, we report the results of our tests in the case of the three countries with the higher number of firm-year observations. These results show that accruals quality has always significant explanatory power. In the case of the UK and Germany the level of statistical significance is five percent and in the case of France is one percent. This is consistent with accruals quality being an indicator of earnings management for investors at the individual market level, despite the lower number of observations. In the case of the UK all control variables are statistically significant at the one percent level, although the estimated coefficient for turnover and analyst coverage have signs are different from those predicted as in the case of the full sample. The most intriguing result in the case of France and Germany is that the estimated coefficients for Size lose significance. We suggest that this may be due to the reduced number of observations. In these two countries the estimated coefficients for analyst coverage are not statistically significant, and the coefficients for turnover have the opposite sign relative to that predicted. Overall, our results confirm our hypothesis H1, that high AQ is positively associated with high spreads. Thus, lower earnings management is associated with lower information asymmetry among market participants in European stock markets. Accruals quality, size, illiquidity and the inverse of stock price appear to be the main factors explaining the spread, while the estimated coefficients for turnover and number of analysts have the opposite sign to that expected.

5.2.2. Regression of the spread estimator on accruals quality, managers' incentives and control variables

We further development our study by analysing the association between accruals quality and the spread conditional on managers' incentives. To proxy for managers' incentives we assume that when managers have incentives to manipulate earnings they provide less expansive disclosure and this implies a higher degree of uncertainty in investors' beliefs and an increased dispersion in analysts' forecasts. We formulate our hypothesis H2 based on assumption that the association between accruals quality and spread is stronger for firms with high analysts' forecast dispersion.

We split our sample into three subsamples, using 33rd and 66th percentiles after ranking firms based on the dispersion in analysts' forecasts. We consider that firms with lower analysts' forecast dispersion are likely to use accruals mainly for informative purposes. This is so because when managers rely on accruals to communicate their private information they use all means to communicate the true firm performance to investors. Thus, we expect to find a lower dispersion in investors' beliefs even with high AQ relative to the case where accruals are used mainly for earnings manipulation. We include in our regression a dummy variable, DISP, which is set to one for firms with analysts' forecast dispersion higher than 33rd percentile and set to zero for the remaining firms. Firms with DISP equal to one are likely to use accruals mainly for earnings management, thus we expect to find a stronger positive association between AQ and HL_S. We include in our regression a variable, DISP*AQ that results from multiplying accruals quality and the dummy variable DISP. If our hypothesis H2 is true, the coefficient of this variable should be positive and statistically significant. Our results show strong evidence that the coefficients for firms that are likely to use accruals for opportunistic earnings management are significantly larger (1.086) than the coefficients for the remaining firms.

The results in table 7 panel A show a positive association between AQ and HL_S and such association is stronger for the subsample of firms with high analysts' forecast dispersion. In fact, the coefficient of the variable DISP*AQ is positive and statistically significant at the one percent level providing strong evidence that the coefficients for firms that are likely to use accruals for opportunistic earnings management are significantly larger (1.086) than the coefficients for the remaining firms. These results are consistent with our hypothesis H2 that the association between accruals quality and spread is stronger for firms with high analysts' forecast dispersion. Our evidence shows that combining accruals quality and the dispersion in analysts' forecasts provides a better indicator of earnings management.

Regarding control variables, we find similar results to those described in the basic regression.

Table 7: Regression of the spread estimator on accruals quality, dummy and control variables

PANEL A: FULL SAMPLE

	Pred. sign	Coeff.	t-stat.	p-value
INTERCEPT		3.392***	24.810	0.000
AQ	+	0.702**	2.125	0.034
DISP*AQ	+	1.086***	3.985	0.000
SIZE	-	-0.181***	-17.924	0.000
ILLIQ	+	0.788***	19.505	0.000
INV_PRI	+	0.290***	5.363	0.000
TURN	-	0.190***	17.811	0.000
ANALYSTS	-	0.005***	3.838	0.000
Num.Obser v.	7,122			

Adj.R-squa.	0.67

PANEL B: UK, FRANCE AND GERMANY

	Pred. sign	UK		France		Germany	
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
INTERCEPT		3.925***	17.547	1.057***	3.309	0.747**	1.779
AQ	+	-0.266	-0.494	0.773	0.892	0.215	0.386
DISP*AQ	+	1.232***	2.863	1.956***	2.802	0.764	1.553
SIZE	-	-0.235***	-13.878	-0.018	-0.765	0.017	0.565
ILLIQ	+	6.450**	2.344	1.188***	12.210	0.605***	9.522
INV_PRI	+	9.616***	9.373	1.231***	2.389	1.266***	6.236
TURN	-	0.284***	16.938	0.285***	9.818	0.234***	9.128
ANALYSTS	-	0.008***	2.774	-0.001	-0.330	-0.000	-0.324
Num.Observ.		2,714		1,198		977	
Adj.R-squa.		0.71		0.71		0.72	

Source: authors' calculations

Notes: ***, ** indicate significance at the 1 percent and 5 percent levels, respectively.

This table reports the results of the regression of the spread estimator on the accruals quality measure taking into account managers' incentives.

Variable definitions: HL_S = annual variable defined as the average of Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. AQ = accruals quality measure given by the standard deviation of residuals from the Francis et al. (2005) regression model. DISP = dummy variable which is set to one for firms with analysts' forecast dispersion higher than 33rd percentile and set to zero otherwise. SIZE = logarithm of market capitalization in € thousands. ILLIQ = calculated as one hundred times the annual average of daily unsigned stock return divided by trading volume. INV_PRI = inverse of stock price. TURN = ratio of shares traded over the year divided by the total number of shares outstanding. ANALYSTS = analyst coverage, measured by total number of annual analysts' estimates.

In table 7, panel B, we report the results for UK, France and Germany. In the case of the UK the estimated coefficient of the variable obtained multiplying AQ by DISP is positive and statistically significant at the one percent level, while the estimated coefficient for accruals quality is not statistically significant. This result is consistent with investors interpreting correctly accruals used by managers to communicate private information. Thus, only accruals associated with high analyst dispersion influence significantly information asymmetry. The results regarding control variables are similar to those reported for the full sample, except for illiquidity that is significant at the five percent level. The results for France are similar to those reported for UK, except that the coefficients for size and analyst coverage are not statistically significant. In the case of Germany, most of the relevant variables have estimated coefficients that are not statistically significant. We suggest this may be the result of the reduced number of observations.

5.2.3. Testing the nonlinear specification model of the spread

In the descriptive statistics section firms are ranked by accruals quality and assigned to quintiles, so that the first quintile includes firms with the lowest values of AQ, which means lower earnings management. After, we compute the mean values of both AQ and HL_S for each quintile. We observe an increase in the mean values of HL_S along with the increase in the mean values of AQ from the first to the fifth quintile. Moreover, we find a large increase in both the mean AQ and the mean HL_S in the fifth quintile relative to the fourth quintile.

To test the nonlinear specification of our spread model we include four dummy variables Q2, Q3, Q4 and Q5, identifying firms in accruals quality quintiles except for quintile one. We investigate if the estimated coefficients increase from the bottom quintile to the top quintile.

Table 8: Testing the nonlinear specification model of the spread

FULL SAMPLE

		Pred. sign	Coefficient	t-statistic	p-value
INTERCEPT			4.013***	28.658	0.000
Q2		+	-0.003	-0.157	0.875
Q3		+	0.029	1.634	0.102
Q4		+	0.046**	2.437	0.015
Q5		+	0.134***	6.127	0.000
SIZE		-	-0.230***	-21.573	0.000
ILLIQ		+	0.726***	21.256	0.000
INV_PRI		+	0.212***	4.086	0.000
TURN		-	0.196***	16.362	0.000
ANALYSTS		-	0.007***	4.429	0.000
Num.Obser v.	8,469				
Adj.R-squa.	0.65				

Source: authors' calculations

Notes: This table reports the results of the regression of the spread estimator on accruals quality quintiles (Q2 to Q5).

Variable definitions: HL_S = annual variable defined as the average of the Corwin and Schultz (2012) bid-ask spread estimator multiplied by one hundred. Qi = accruals dummy variable set to one for firms in quintile "i" and zero otherwise. SIZE = log of market capitalization in € thousands. ILLIQ = calculated as one hundred times the annual average of daily unsigned stock return divided by trading volume. INV_PRI = inverse of stock price. TURN = ratio of shares traded over the year divided by the total number of shares outstanding. ANALYSTS = analyst coverage, measured by total number of annual analysts' estimates.

The estimated coefficients relative to the quintile dummies (Q2 to Q5) are all positive and statistically significant, except for Q2. Given that these estimated parameters reflect differences in the mean spread relative to the Q1 group then all groups, except for Q2, exhibit higher mean spreads than Q1. Moreover, the relationship between AQ and the spread is nonlinear because we observe a non significant change in the spread between the first and the second quintile while there is a substantial increase in the spread for other quintiles, especially for the fourth and fifth quintiles.

Thus, the results are consistent with our hypothesis H3 that the positive association between AQ and information asymmetry is stronger for firms in higher level quintiles, because these firms are likely to use accruals mainly for earnings management. Therefore, accruals quality is an effective indicator of earnings management because firms with high values of AQ, which represent more volatile abnormal accruals, exhibit higher levels of information asymmetry. This means that high volatile abnormal accruals identify firms with poor public information which provides an informational advantage to informed investors. In addition, we suggest that this high level of AQ results from earning management activities, otherwise managers would disclose additional information in order to reduce information asymmetry among market participants.

5.3. Robustness test regression of the spread estimator on discretionary accruals and control variables

In this section we aim to analyze if the results are sensitive to changes in the proxy used to measure earnings management. Table 9, panel A contains the results of the regressions when discretionary accruals are used instead of accruals quality. For the full sample, the estimated coefficient for discretionary accruals has a positive sign and it is statistically significant at the one percent level. This result is consistent with that obtained when using accruals quality.

However, when analyzing the results at the country level, the estimated coefficients for discretionary accruals are not statistically significant for the UK and France, while these coefficients are statistically significant for the three countries, when using accruals quality. Our results suggest that both measures are valuable indicators of earnings management, because they have significant impact on information asymmetry. However, the results at the country level suggest that accruals quality is a better measure of earnings management than discretionary accruals.

Table 9: Regression of the spread estimator on discretionary accruals and control variables

PANEL A: Without the dummy for managers' incentives

	Pred. sign	Full sample	UK	France	Germany
INTERCEPT		4.416***	4.559***	1.829***	1.559***
ACC_DISC	+	0.292***	0.143	0.275	0.678***
SIZE	-	-0.260***	-0.292***	-0.070***	-0.038
ILLIQ	+	0.563***	16.551***	0.786***	0.288***
INV_PRI	+	0.219***	7.564***	0.737***	0.717***
TURN	-	0.186***	0.235***	0.309***	0.254***
ANALYSTS	-	0.010***	0.0213***	-0.001	0.001
Num.Observ.		9,779	4,026	1,606	1,299
Adj.R-squa.		0.64	0.67	0.69	0.64

PANEL B: Including the dummy for managers' incentives

	Pred. sign	Full sample	UK	France	Germany
INTERCEPT		3.628***	4.032***	1.254***	1.063***
ACC_DISC	+	-0.197	-0.286	-0.315	-0.108
DISP* ACC_DISC	+	0.472***	0.447**	0.609**	0.609*
SIZE	-	-0.198***	-0.244***	-0.029	-0.005
ILLIQ	+	0.726***	7.762***	0.922***	0.567***
INV_PRI	+	0.368***	9.861***	1.413***	1.123***
TURN	-	0.181***	0.263***	0.291***	0.239***
ANALYSTS	-	0.008***	0.011***	-0.001	0.001
Num.Observ.		7,860	3,056	1,296	1,072
Adj.R-squa.		0.67	0.70	0.72	0.71

Source: authors' calculations

Notes: ***, **, * indicate significance at the 1 percent, 5 percent and 10 percent levels, respectively.

This table reports the results of the regression of the spread estimator on discretionary accruals (ACC_DISC) taking into account managers' incentives.

Variable definitions: HL_S = annual variable defined as the average of Corwin and Schultz (2012) bid-ask spread estimator multiplies by one hundred. ACC_DISC = absolute value of discretionary accruals given by the Kothari et al. (2005) version of the Jones Model. SIZE = logarithm of market capitalization in € thousands. ILLIQ = calculated as one hundred times the annual average of daily unsigned stock return divided by trading volume. INV_PRI = inverse of stock price. TURN = ratio of shares traded over the year divided by the total number of shares outstanding. ANALYSTS = analyst coverage, measured by total number of annual analysts' estimates.

Table 9, panel B reports the results of the robustness test that uses discretionary accruals instead of accruals quality to measure earnings management and includes a dummy variable for managers' incentives. These results show that the estimated coefficient of discretionary accruals is larger for the subsample of firms with higher analysts' forecast dispersion, consistent with those reported when using accruals quality. Thus, the association between the earnings management measure and information asymmetry is stronger for firms that are likely to use accruals for non-informative reasons.

6. Conclusions

A first conclusion of this study is that using the full sample we found evidence of a significant and positive association between earnings management and information asymmetry. Therefore, our study emphasizes the relevance of accruals quality to assess earnings management and that reducing earnings management tends to decrease information asymmetry.

Moreover, another relevant finding is that combining accruals quality and the dispersion in analysts' estimates, which we use as a proxy for the underlying managers' incentives, increases the performance of accruals quality as an indicator of earnings management. Accruals may be used to communicate private information, thus reducing information asymmetry. But accruals may also be used for opportunistic earnings management, thus increasing information asymmetry. Assuming a market with both types of firms, the relationship between accruals quality and information asymmetry may be positive, negative or even negligible. In the case of European firms, we find evidence that the earnings management component of accruals tends to outweigh the informational component, in line with the results reported for the U.S. case.

Our results are consistent with a nonlinear relationship between earnings management and information asymmetry, because the association between the two variables is stronger for firms with worst accruals quality. This enhances the finding that accruals quality is an effective indicator of earnings management.

In addition, our results also show a slightly change in the explanatory power of accruals quality in some countries, namely UK and Germany. We suggest that this may be the result of differences in the relative importance of the earnings management component and the informational component of accruals at the country level.

Our results are robust to changes in the proxy used to measure earnings management, because we obtain similar regression results either using accruals quality or discretionary accruals.

Another important conclusion of this study is about the performance of the high-low spread estimator as a proxy of information asymmetry, in line with the evidence provided by Corwin and Schultz (2012) about the accuracy of this estimator as an alternative to intraday data based measures.

This study also provides important results regarding the impact of control variables. Our tests show that, in the case of European stock markets, larger firms, more liquid stocks and firms with higher stock prices tend to exhibit lower information asymmetry as it was expected.

Our finding that combining accruals quality with the dispersion in analysts' forecasts provides a better indicator of earnings management can be useful for a number of economic agents including investors in general, managers, auditors, regulators, policy makers and academics.

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