



Department of Business Studies

Ph.D. in Accounting

XXIX Cycle

**THREE ESSAYS ON ACCOUNTING  
RESTATEMENTS**

Felice Matozza

**Supervisor:**

Prof. Eugenio D'Amico

*University of Roma Tre, Italy*

# ***TABLE OF CONTENTS***

<b>ABSTRACT.....</b>	<b>5</b>
<b>STUDY ONE: ACCOUNTING RESTATEMENTS AND THE BOND MARKET</b>	
ABSTRACT.....	6
1. Introduction.....	7
2. Literature Review.....	8
2.1 Restatements and the Cost of Equity.....	9
2.2 Restatements and the Debt Market.....	11
3. Hypothesis Development.....	12
4. Research Design.....	13
4.1 Empirical Model.....	13
4.2 Description of the Variables.....	14
5. Sample Selection and Descriptive Statistics.....	17
6. Results.....	19
6.1 Corroborating Analysis.....	21
7. Discussion and Conclusions.....	22
REFERENCES.....	23
Table 1 – Descriptive Statistics.....	28
Table 2 – Pearson’s Correlations.....	29
Table 3 - The Impact of Restatement on the Bond Market.....	30
Table 4 - Robustness Test on a Pair-Matched Sample.....	31
Table 5 - Multilevel Regression Analysis.....	32
Table 6 - Multilevel Regression Analysis.....	33
Appendix A - Bond Rating Conversion Table.....	34
Appendix B - Variable Definitions.....	35

**STUDY TWO: HOW FIRMS RECOVER FROM A LOSS IN REPUTATION  
CAUSED BY ACCOUNTING RESTATEMENT: A STUDY OF  
ENVIRONMENTAL PERFORMANCE IN POLLUTING INDUSTRIES**

ABSTRACT.....	36
1. Introduction.....	37
2. Theoretical Background.....	39
a. Financial Restatement and Firm Reputation.....	39
b. Financial Restatement and Environmental Performance.....	40
c. Error Severity and Environmental Performance.....	41
d. Statement of Hypotheses.....	42
3. Research Design.....	42
a. Empirical Models.....	42
b. Description of the Variables.....	43
4. Sample Selection and Descriptive Statistics.....	44
5. Results.....	46
a. Additional Findings.....	48
6. Conclusions.....	49
REFERENCES.....	50
Table 1 – Descriptive Statistics.....	57
Table 2 – Pearson’s Correlations.....	58
Table 3 – Multivariate Statistics.....	59
Table 4 - Changes in Analyst Coverage.....	60
Table 5 – Additional Findings.....	61
Appendix A - Description of ASSET4 (from ASSET4 documents).....	62
Appendix B - Industry Classification.....	63
Appendix C - Time line.....	64
Appendix D - Variable Definitions.....	65

**STUDY THREE: FAMILY FIRMS AND THE SEVERITY OF RESTATEMENT:  
EVIDENCE FROM IFRS-ADOPTING COUNTRIES**

ABSTRACT.....	66
1. Introduction.....	67
2. Literature.....	68
a. Accounting Restatement and Family Firms.....	68
b. Family Involvement: Agency Theory and Socioemotional Wealth Construct.....	70
3. Hypothesis Development.....	71
4. Research Design.....	72
a. Empirical Models.....	72
b. Description of Variables.....	73
5. Sample Selection and Descriptive Statistics.....	75
6. Results.....	77
7. Conclusion.....	78
REFERENCES.....	80
Table 1 – Descriptive Statistics.....	86
Table 2 – Descriptive Statistics.....	87
Table 3 – Pearson’s Correlation Matrix.....	88
Table 4 – Multivariate Statistics.....	89
Table 5 – Robustness Tests.....	90
Appendix A - Variable Definitions.....	91

## **ABSTRACT**

This thesis is a collection of three essays examining accounting restatements from three different perspectives. The first essay provides empirical evidence regarding the negative effect of accounting restatement on firm's cost of public debt. We find that accounting restatements result in lower corporate bond ratings and higher yield spreads. Furthermore, the increase in bond yield spreads is significantly larger when the severity of error is greater. The second essay investigates whether restating firms operating in polluting industries improve environmental performance in the afterwards of accounting restatement to restore reputation. Using environmental score provided by ASSET4 database, we find significant improvements in environmental performance in the post-restatement periods. We also find that firms experiencing more severe financial restatement do not take more actions to restore credibility. In the end, additional tests reveal that analyst coverage increases for firms that take more reputation restoration activities.

The third essay compares the error severity of family and non-family public firms from 2006 to 2014 using a sample of 201 firms adopting mandatorily IFRSs. We document that family-controlled firms commit lower accounting errors than their non-family counterparts, and that for family firms, a family CEO as board chair and family ownership have a negative impact on error severity.

Since each essay investigates a different topic, I decided to structure my thesis in three different chapters. A more detailed discussion of the contributions of each paper is reported in the introduction of each chapter.

# ACCOUNTING RESTATEMENTS AND THE BOND MARKET

## ***Abstract***

*This paper examines whether the abnormal cost of accounting restatements documented in equity and private loan markets extends to the bond market. Through an empirical test on 133 bonds issued by restating firms from 26 IFRS-adopting countries, we find that due to restatements, the cost of financing increases among bonds, similar to those increases previously observed among equity and private loan. Hence, restatements signal lower firm value, as the results indicate that they impair corporate bond ratings and increase bond yield spreads. Furthermore, the increase in bond yield spreads is significantly larger when the error is more severe. Our findings suggest that rating agencies and bondholders perceive restatements as a critical determinant of the risk of debt financing. Overall, our research fills an important void in the extant restatements literature and completes the framework in corporate finance research, measuring the feasible impact of restatements on the corporate cost of bond financing.*

**Keywords:** restatement; bond market; cost of bonds; agency ratings; bond yield spread; restatement severity

## ***1. INTRODUCTION***

An accounting restatement occurs when the firm acknowledges that it released financial statements that were not in accordance with GAAP, usually because they were affected by a material omission or misstatement (Palmrose & Scholz, 2004).

Previous studies document a massive recourse to accounting restatements. For example, in 2002 in the USA, restatements involved approximately 10% of listed firms, representing a market value of roughly 2 billion US dollars. Empirical evidence shows that restatements cause a reduction in shareholder value, decreasing stock returns and increasing the cost of equity (Palmrose et al., 2004; Hribar & Jenkins, 2004; Albring et al., 2013). In a two-day window after the announcement of restatements, firms have been found to suffer an approximate 9% abnormal decrease in stock returns; in a one-month period after restatements, the cost of the equity capital increases by over 10%. Similarly, looking at the effects of restatements on private loan contracting, an 11% increase in the total loan rate has been found during the one-year period following a restatement (Graham et al., 2008).

Conclusively, restatements reduce the credibility of firm disclosure, likely reducing the value of the firm and increasing company risk (Graham et al., 2008).

Existing literature has examined the adverse consequences of accounting restatement from the perspectives of equity holders (Palmrose et al., 2004; Hribar & Jenkins, 2004) and private debt contractors (Graham et al., 2008; Park & Wu, 2009). Given that both stock and bond markets are dependent on the same underlying firm value, it could be of interest to study the effects of accounting restatements on corporate bond financing, an area that has been overlooked by the literature. This paper aims to fill this gap by providing empirical evidence of the impact of accounting restatements on bond issues.

We focus on the bond market for two primary reasons. First, corporate bond issues increased in volume and frequency in the last decade (Creditreform Rating AG, 2015) due to the decline in both bank lending and interest rates driven by the advent of the global financial crises (Tendulkar & Hancock, 2014). Second, corporate bonds complement equity and private debt in building firms' capital structure. Studying the effect of restatements on bond markets can help to provide a comprehensive framework to measure the impact of restatements on the cost of capital. Our study investigates the unexplored question of whether restatements affect bond issues and how they are perceived by credit rating agencies and bondholders, which drive the cost of bonds.

To test our predictions, we selected all restatements occurring in the period between 2006 and 2014 from listed firms that are mandatory IFRS adopters (26 countries), ultimately collecting 133 bonds issued by restating firms in the period between 2005 and 2015.

In line with our expectations, we documented that compared with bonds issued before restatement, bonds issued after restatement have lower corporate ratings. Moreover, after restatement, bondholders require a higher risk premium. We also investigated whether bond markets punish more severe restatement through a sharper decrease in bond ratings and a larger increase in yield spreads in the post-restatement period. Using principal component analysis to proxy the severity of errors, we found that firms with more severe restatements have a larger increase in yield spreads after the error announcement. Finally, studying a pair-matched sample of restating and non-restating firms, we found that the bonds of the restating firms underperform those of the non-restating firms only in the aftermath of the restatement. This paper makes several contributions.

*In primis*, our study complements the literature investigating the effects of restatement on the cost of equity (Hribar & Jenkins, 2004) and on private debt financing (Graham et al., 2008). We provide new insights from the alternative perspective of public debtholders, which are supposed to be more cash- than earnings-focused in their estimate of firm value because “payment has to be made by cash” (Standard & Poor’s Rating Services, 2014).

Second, since restatements increase information uncertainty (Dechow et al., 1996; Palmrose et al., 2004; Hribar & Jenkins, 2004), this work reinforces Lu et al.’s (2010) study, which shows that information uncertainty has a significant impact on increasing bond yield spreads. Third, to date, empirical research on restatements has examined US (Palmrose et al., 2004; Palmrose & Scholz, 2004; Srinivasan, 2005), Chinese (Firth et al. 2011; Jiang et al., 2015; Ma et al., 2015) and German (Hitz et al., 2012; Böcking et al., 2015; Strohmenger, 2014) firms, whereas research from other countries is still lacking. To our knowledge, this work is the first cross-national empirical analysis of restatements.

The rest of the paper follows the outline given below. Section 2 reviews the related literature. Section 3 develops the hypotheses that this research will test. Section 4 explains the empirical methods. Section 5 describes the sample. Section 6 presents the results, and Section 7 concludes the paper with a brief discussion.

## **2. LITERATURE REVIEW**



An accounting restatement consists of adjustments to a previously published financial statement(s) due to the occurrence of a material error(s)<sup>1</sup>. A restatement can be forced either by external auditors or by market authorities; moreover, firms themselves can voluntarily report error(s), which are typically discovered by performing an internal review process (Chung & McCracken, 2014). In accounting literature, a financial restatement that corrects previous accounting error(s) is viewed as a clear measure of poor accounting (Palmrose and Scholz, 2004) and audit (DeFond and Zhang, 2014) quality. Moreover, restatement is a proxy used to measure earnings quality, and it is more direct than discretionary accruals and other earnings quality measures (Francis, 2011; Dechow et al., 2010; DeFond & Zhang, 2014).

Restatements lead investors to reassess the quality of a firm's financial information, as they perceive a greater risk of encountering misleading information in the aftermath of restatements (Kravet & Shevlin, 2010). Extensive research has studied the adverse impacts of restatements on firm value, such as downward revisions in market value (Palmrose et al., 2004; Karpoff et al., 2008; Dechow et al., 1996), lower firm growth (Albring et al., 2013), higher auditor and board turnover (Hennes et al., 2014; Srinivasan, 2005), and an increase in audit fees (Feldmann et al., 2009).

One major stream of research demonstrated that restating firms suffer a significant increase in the cost of capital, although mainly focusing on the cost of equity.

### ***2.1 Restatements and the Cost of Equity***

Research has extensively documented that restatements cause a substantial loss of market value, with abnormal returns estimates ranging from -4% to -19% in the aftermath of restatement announcements (Dechow et al., 1996; Anderson & Yohn, 2002; Palmrose et al., 2004; Hribar & Jenkins, 2004).

Studying a sample of firms that allegedly overstated reported earnings and that were under enforcement action by the Security and Exchange Commission, Dechow et al. (1996) initiated the literature on the causes and consequences of restatements. They found that firms overstating earnings initially enjoy a lower cost of capital, but once the earnings manipulation is revealed and the restatement occurs, the firms experience significant increases in their cost of capital, proxied by the increase in short-term interest

---

<sup>1</sup> According to International Accounting Standard no. 8. par. 41, material accounting errors are revealed by adjusting the comparative figures of companies' financial statements for the prior period(s) in which the error occurred. The correction is made in the first set of financial statements authorized for issue after their discovery (IASB, 2005).

and the dispersion of analyst forecasts. Palmrose et al. (2004) first systematically studied equity market reactions to the announcement of restatements. They found that market-adjusted abnormal returns systematically decrease by 9.2% over a 2-day event window and also noticed a significant increase in the analysts' forecast dispersion at the time of the restatement announcement; this dispersion is negatively correlated with the market reaction to earnings restatement. Anderson and Yohn (2002) similarly studied how markets and dealers react to the announcement of restatements. They examined the market returns and bid-ask spread effects at the time when the accounting problem that lead to restatement is announced and found that both the markets and the dealers perceive an increase in information asymmetry for problems related to revenue recognition, consequently leading to a depreciation in firm value. Finally, Hribar and Jenkins (2004) split the estimation of the loss in market value measured by previous research into two main proxies, on the one hand measuring the decrease in expected future earnings and cash flow – the so-called “numerator effect” – representing firm value, and on the other hand measuring the reduction in the cost of equity capital – the so-called “denominator effect” (Kaszniak, 2004: 358) – representing the discount rate. Directly measuring the implied cost of capital through various valuation models, they estimated an average increase in the cost of equity that ranges from 7% to 19% in the month immediately following the restatement.

Restatements impact firms differently, as companies suffer greater financial problems when restatement is more severe. For example, Palmrose et al. (2004) found that restatements involving more negative adjustments of previously reported income are linked to more negative returns. Albring et al. (2013) similarly showed that firms with the largest corrections of prior earnings experience a larger decrease in externally financed growth after restatement. Consistently, Hennes et al. (2014) documented that error severity is an important determinant of auditor turnover after restatements. Finally, Bardos and Mishra (2014) examined the effect of litigation-triggering restatements on the cost of equity and expected future cash flows compared to restatements that are not followed by litigation. They found that the cost of equity increases after restatement for all firms, but the increase in the cost of equity is substantially greater for firms that are sued for restatement. Conclusively, previous research shows that accounting restatement is a detrimental event that negatively affects the market value of the firm, reducing both its expected earnings and cash flows and augmenting its information uncertainty, thus increasing the cost of equity capital (Palmrose et al., 2004; Hribar & Jenkins, 2004;

Dechow et al., 1996). Moreover, when the errors corrected by restatement are more severe, the impact on the financial performance of the firm is stronger (Palmrose et al., 2004; Albring et al., 2013).

## ***2.2 Restatements and the Debt Market***

Debt has a central role in firm financing, as it complements equity in building the firm's capital structure and, together with equity, is an efficient means to reduce the agency costs of the firm (Jensen, 1986).

Graham et al. (2008) and Park and Wu (2009) studied the impact of restatements on debt capital. Because restatements raise concerns about the credibility of financial statements, they increase the perceived informational asymmetry from the bank's perspective. Consequently, Graham et al. (2008) empirically showed how banks use both price and non-price terms to reduce informational asymmetry with borrowers in the aftermath of restatements. They found that banks try to monitor borrowers by using tighter contract terms and a more efficient lending structure, as private bank loans initiated after restatements have higher spreads, shorter maturity, higher fees and more stringent contract terms compared with bank loans initiated before restatements. They further found that firms continue to pay high loan spreads up to five years post-restatement.

Park and Wu (2009) analyzed the secondary loan market. They found that cumulative average abnormal loan returns were significantly negative during the restatement announcement window. Unlike the stock and bond markets, the secondary loan market includes both public and private lending contracts. In a private lending agreement, lenders have the possibility to access information about restatements earlier than the public markets. Park and Wu (2009) surprisingly found that the secondary loan market anticipates impending restatements, with downward revisions of returns starting at least 30 days before the event. Finally, they compared debt and equity secondary markets and documented that information on restatement is incorporated earlier into the cost of debt than it is into the cost of equity. These findings show that in a context where banks and institutional investors operate with the advantage of private contract agreements, including special access to information, they anticipate restatement announcements. In contrast, previous findings in the main equity market documented that sellers do not anticipate restatement announcement (Drake et al., 2015) and analysts cease coverage and revise downwards their forecasts of restating firms only in the aftermath of restatement disclosure (Griffin, 2003). Hence, due to significant differences in the

behavior of market participants in a private compared to a public context, it could be of interest to study the impact of restatement on the public debt market.

### **3. HYPOTHESIS DEVELOPMENT**

This paper examines the effect of restatements on the bond markets. Similar to Hribar and Jenkins (2004), we disentangle the bond price effect of restatements into changes in the expected cash flows and changes in the cost of debt. The assumption behind this approach is that the intrinsic value of the firm should be estimated considering both the “numerator effect” of the expected earnings and cash flows and the “denominator effect” of the discount rate.

We adopt credit ratings as a proxy for expected future earnings and cash flows (the “numerator effect”). Credit ratings assigned to bond issues may play a crucial role in enabling companies to raise additional capital, directly providing a measure that can be utilized by investors when making investment decisions. In formulating a rating for an individual corporate bond, rating agencies often take into account both issuer creditworthiness and the credit quality of the bond issue (Standard & Poor’s Ratings Services, 2014) and further evaluate the current and historical financial information of the issuer. Moreover, an agency may adjust the credit rating of an issue when identifying factors that could impact the level of credit risk (Standard & Poor’s Ratings Services, 2014). Restatements inform credit rating agencies that they were using erroneous accounting numbers when they originally assessed the firm’s credit risk, increasing suspicions regarding the current and future financial reliability of the restating company. Hence, restatements may impact investors’ beliefs about a firm’s future ability to generate cash flow (Graham et al., 2008; Hribar & Jenkins, 2004) because previously disclosed financial statement information was affected by material error(s). In this context, a negative reaction from rating agencies is expected, with a revised and downgraded credit rating of the firm in the aftermath of the error announcement. The following hypothesis is therefore formulated and tested:

*Hypothesis 1: Bonds issued after restatements have lower ratings than bonds issued before restatements.*

As a second hypothesis, we suppose that restatements may affect projections, also impacting the cost of debt. Restatements undermine firms’ perceived ability to meet bond principal payments and interest, as bondholders consider the restatement to be a sign of poor

accounting and audit quality. The best way to compensate for additional credit risk is to require higher risk premiums; therefore, we expect the following:

*Hypothesis 2: Bonds issued after restatements have higher yield spreads than bonds issued before restatements.*

Finally, we extend the literature by exploring how error severity affects bond ratings and risk premiums. We investigate whether rating agencies and bondholders simply view an error announcement as an adverse event, or whether they instead consider information about the severity of the error in detail and consequently adjust the bond ratings and risk premium. Previous research shows that accounting errors with more serious effects on financial statements bring the competence of management into question (Huang & Scholz, 2012), as severe restatements often contain opportunistic managerial manipulation (Palmrose et al., 2004; Hennes et al., 2008). The more severe the materiality of restatement, the greater the adverse consequences faced by firms (Graham et al., 2008; Albring et al., 2013; Huang and Scholz, 2012; Hennes et al., 2014; Hitz et al., 2012; Palmrose & Scholz, 2004; Bardos et al., 2014). Hence, in line with previous works, we test the following hypothesis:

*Hypothesis 3: A greater severity in the restatement causes lower bond ratings and a greater increase in bond yield spreads.*

#### **4. RESEARCH DESIGN**

This paper empirically investigates the impact of restatements on the bond market. We use two alternate measures of the cost of bond financing, consistent with prior research (Jiang, 2008; Liu & Jiraporn, 2010). We test Hypotheses 1 and 3 using corporate bond ratings as proxies for expected earnings and cash flows from the bond investment; we test Hypothesis 2 and 3 using bond yield spreads as a proxy for the discount rate of the investment.

##### **4.1 Empirical Model**

Similar to prior literature (Crabtree et al., 2014; Crabtree & Maher, 2009), we test whether rating agencies incorporate restatements into the assigned bond ratings (i.e., Hypothesis 1) using the ordered probit regression analysis described in Equation (1).

$$\begin{aligned}
 RATING = & \alpha_0 + \beta_1 POST + \gamma_1 SUB + \gamma_2 SIZE + \gamma_3 MATURITY + \gamma_4 INCOME + \gamma_5 CFO + \gamma_6 LEV + \\
 & + \gamma_7 ASSETS + \gamma_8 PPE + \gamma_9 ROA\_D + \gamma_{10} RET\_D + \gamma_{11} BIG4 + \eta_j Industry + \eta_k Country + \varepsilon
 \end{aligned}
 \tag{1}$$

We subsequently examine the relation between accounting restatement and yield spreads. A potential problem with *RATING* is that it may contain information regarding restatement and control variables. To mitigate collinearity concerns when testing Hypothesis 2 and examining the effect of restatements on bond pricing, we implement a two-stage regression procedure, similar to Anderson et al. (2004) and Mansi et al. (2011). Consequently, we rename the vector of the residuals ( $\epsilon$ ) from Equation (1) as *RESID* and regress Equation (2) as a second stage of the regression contained in Equation (1), adopting the ordinary least squares procedure. *RESID* in Equation (2) incorporates credit rating information without the influence of restatement and other control variables.

$$YLDSPREAD = \alpha_0 + \beta_1 POST + \beta_2 RESID + \gamma_1 SUB + \gamma_2 SIZE + \gamma_3 MATURITY + \gamma_4 INCOME + \gamma_5 CFO + \gamma_6 LEV + \gamma_7 ASSETS + \gamma_8 PPE + \gamma_9 ROA\_D + \gamma_{10} RET\_D + \gamma_{11} BIG4 + \eta_j Industry + \nu \quad (2)$$

Finally, to test how bond ratings and bond pricing change for various levels of restatement severity (Hypothesis 3), we adopt an interaction model, and Equations (1) and (2) are respectively changed into the following Equations (3) and (4):

$$RATING = \alpha_0 + \beta_1 POST + \beta_3 SEVERITY + \beta_4 POST * SEVERITY + \gamma_1 SUB + \gamma_2 SIZE + \gamma_3 MATURITY + \gamma_4 INCOME + \gamma_5 CFO + \gamma_6 LEV + \gamma_7 ASSETS + \gamma_8 PPE + \gamma_9 ROA\_D + \gamma_{10} RET\_D + \gamma_{11} BIG4 + \eta_j Industry + \eta_k Country + \nu \quad (3)$$

$$YLDSPREAD = \alpha_0 + \beta_1 POST + \beta_2 RESID + \beta_3 SEVERITY + \beta_4 POST * SEVERITY + \gamma_1 SUB + \gamma_2 SIZE + \gamma_3 MATURITY + \gamma_4 INCOME + \gamma_5 CFO + \gamma_6 LEV + \gamma_7 ASSETS + \gamma_8 PPE + \gamma_9 ROA\_D + \gamma_{10} RET\_D + \gamma_{11} BIG4 + \eta_j Industry + \nu \quad (4)$$

For all regressions, we utilized robust standard errors to correct for heteroscedasticity and firm clustering, in line with the previous literature (Ge & Liu, 2015; Ge & Kim, 2014).

## 4.2 Description of the Variables

In Equations (1) and (3), the dependent variable *RATING* is the ordinal representation of each issue's initial rating provided by Standard and Poor's. When Standard and Poor's ratings are missing, we use Moody's ratings (Liu & Jiraporn, 2010). Rating agencies provide an independent assessment of firm credit quality based on inside information. The issue is assigned to a rating category that ranges from AAA, indicating the highest credit quality, to D, the poorest quality, according to the scale provided by Standard and Poor's. We follow bond rating conversion adopted by Liu and Jiraporn (2010), in which *RATING* takes on a value of 22 for AAA-rated bonds and a score of 1 for D-rated bonds (Appendix A).

In Equations (2) and (4), the dependent variable is *YLDSPREAD*, which is the difference between the corporate bond yield at issuance and a Treasury bond yield with comparable maturity (Jiang, 2008; Ge & Liu, 2015).

To test whether restatement in our sample influences bond credit ratings and yield spreads, we adopt the explanatory variable *POST*, which is a dummy variable that equals 1 if a bond is issued after a restatement announcement, and 0 otherwise. In line with Hypothesis 1, we expect a negative relationship between *POST* and *RATING* in Equation (1), whereas Hypothesis 2 predicts that *POST* will be positively associated with *YLDSPREAD* in Equation (2).

To test Hypothesis 3, in Equations (3) and (4) we include *SEVERITY* and the interaction between *POST* and *SEVERITY* in the model, examining whether *RATING* and *YLDSPREAD* are sensitive to *SEVERITY* after the restatement. A number of factors can measure the severity of restatement, such as the magnitude of market reaction to the error announcement (Hennes et al., 2014; Wilson, 2008), the absolute value of the error amount scaled by total assets (Huang & Scholz, 2012; Srinivasan, 2005), the number of years restated (Huang & Scholz, 2012; Palmrose et al., 2004), the number of accounts misstated (Palmrose et al., 2004; Palmrose & Scholz, 2004), the reasons for restatement (Wilson, 2008; Palmrose et al., 2004; Palmrose & Scholz, 2004), whether restatements involved earnings (Wiedman & Hendricks, 2013), and whether restatements were due to irregularities (intentional misapplication of GAAP) or to errors (unintentional misreporting) (Chen et al., 2014; Albring et al., 2013; Hennes et al., 2008). In line with previous empirical analysis (Hennes et al., 2014; Burks, 2010; Hitz et al., 2012), in this study, *SEVERITY* is based on a principal component analysis of multiple restatement measures. It is a linear combination of three measures: (1) the natural logarithm of the number of years the firm restated; (2) the direction of the restatement, which is a

categorical variable that equals 1 for downwards restatements and 0 for upwards restatements; and (3) the magnitude of the restatement, which is the absolute value of the error amount divided by total assets at the first fiscal year-end before the restatement announcement. Higher values for this factor represent a more severe restatement. Prior research suggests that restatements with greater negative income effects are of greater concern to market participants (Palmrose et al., 2004).

Based on prior research on the determinants of the cost of debt (Crabtree et al., 2014; Liu et al., 2010; Ge & Kim, 2014; Crabtree & Maher, 2009; Jiang, 2008), we included in the model several bond- and firm-control variables. The bond-control variables are *SUB*, *SIZE* and *MATURITY*. *SUB* is a binary variable that equals 1 if the issue is of subordinated bonds, 0 otherwise. Subordinated bonds are expected to be associated with higher risk, thus exhibiting a negative relationship with bond rating and a positive relationship with bond yield spreads (Crabtree & Maher, 2009). *SIZE* is the natural logarithm of the bonds' issue amount. *MATURITY* is the natural logarithm of the bonds' maturity (in years) and should be negatively related to *RATING* and positively related to *YLDSPREAD* (Ge and Kim, 2014).

The firm control variables in our model are *INCOME*, *CFO*, *LEV*, *ASSETS*, *PPE*, *ROA\_D*, *RET\_D*, and *BIG4*. *INCOME* is measured as operating income for the year divided by total assets. It controls for firm productivity, and we expect that it is positively related to *RATING* but negatively related to *YLDSPREAD*, as higher *INCOME* indicates a lower default risk for bonds. We included *CFO* (Crabtree & Maher, 2009; Jiang, 2008), which is cash flow from operations scaled by total assets, controlling for firm liquidity. *CFO* is expected to have a positive relationship with *RATING* and a negative relationship with *YLDSPREAD* because firms with greater cash flow are more likely to repay debt. We also controlled for firm leverage (*LEV*) measured as total debt divided by total assets. The greater the leverage, the higher the probability of default, so we predict *LEV* to be positively associated with *YLDSPREAD* and negatively associated with *RATING*. *ASSETS* controls for firms' size and is the natural logarithm of total assets. Since issuers with greater assets are perceived to be less risky, we predict that *ASSETS* will be positively linked to *RATING* and negatively related to *YLDSPREAD*. In addition, we included *PPE*, which is gross property, plant, and equipment scaled by total assets, to account for differences in firms' capital intensity (Liu et al., 2010; Liu & Jiraporn, 2010; Crabtree & Maher, 2009). *ROA\_D* is the standard deviation of return on assets (net income/total assets) for the past five years (Crabtree et al., 2014). It controls for firms'



normal profitability and the impact of extraordinary items on the growth of the firm, thereby measuring the volatility of earnings. We further control for firm risk by measuring the annualized standard deviation of daily stock returns for the past year (*RET\_D*) (Anderson et al., 2004; Jiang, 2008). We adopted a control for firms' corporate governance, measuring the quality of external auditing by adopting the binary variable *BIG4*, which equals 1 if the auditor is a Big 4 audit company, and 0 otherwise (Becker et al., 1998; Teoh & Wong, 1993). Lastly, we included country and industry indicators based on one-digit SIC code (Graham et al., 2008) to control for country and industry effects.<sup>2</sup>

We measured all firm-control variables at the fiscal year-end prior to the bond issue to ensure that the information is publicly available to bondholders at the time of the issue.

## **5. SAMPLE SELECTION AND DESCRIPTION**

We examined a sample of listed companies that restated their financial statements over the period between 2006 and 2014. We begin the sample collection procedure by including all listed firms from countries that mandatorily adopted IFRS as of 31/12/2005, excluding banks (Standard Industrial Classification codes 6000-6199), in line with previous work (Stanley & Sharma, 2011; Perols & Lougee, 2011). Similar to Daske et al. (2008), the countries involved in our study are Australia, Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Ireland, Italy, Luxemburg, the Netherlands, Norway, the Philippines, Poland, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, the United Kingdom and Venezuela. We used the Datastream database from Thomson Reuters to identify firms that restated annual financial statements prepared in accordance with the IFRS. We manually collected information about the direction of restatement, the amount of accounting errors and the number of years restated using the annual reports available both on corporate websites and in the Osiris database provided by Bureau van Dijk. We also complemented these data by collecting from other sources, e.g., we gathered information about auditors from the Eikon database from Thomson Reuters, bond data from the Deal Analytics app, provided by Eikon, and the remaining data came from Datastream. We found 362 restating firms and restricted the final sample to restating firms with at least one bond issue between 2005 and 2015. After merging data sources and

---

<sup>2</sup> To avoid redundancy we do not include country dummies in Equations (2) and (4) since *YLDSREAD* controls for macroeconomic factors (Ge & Liu, 2015; Ge & Kim, 2014) and is a direct measure of a firm's incremental cost of public debt (Sengupta, 1998; Jiang, 2008).

dropping observations with missing values, our final sample contains 133 restatements from 28 firms.<sup>3</sup> The 28 issuing firm sample does not differ in error severity or general firm characteristics from the 334 non-issuing firms sample, as documented by a test of equality in means. This test is omitted here for brevity, but it is available from the authors on demand. Table 1 presents the descriptive statistics for our observations.

-----  
Please, insert Table 1 about here  
-----

On average, 44% of the bonds in our sample were issued in the aftermath of restatements ( $mean(POST)=0.44$ ). The average credit rating ( $RATING$ ) for the observations is 14.9, ranging from 8 to 18. The average bond yield spread ( $YLDSPREAD$ ) is approximately 206. This value is very similar to values found in previous research, e.g., 224 found by Liu et al. (2010), 226 by Ge and Kim (2014), and 247 by Mansi et al. (2004). Almost 20% of bond issues are subordinated ( $mean(SUB)=0.20$ ). The average offering amount ( $SIZE$ ) is € 693 million, with an average maturity of 21 years. On average, the firms in our sample have low productivity ( $mean(INCOME)=0.04$ ), low liquidity ( $mean(CFO)=0.06$ ), and are highly indebted ( $mean(LEV)=0.26$ ). There is considerable variation in firm size, as average total assets is approximately € 127 million, whereas the median total assets is less than 48 € million, and more than 40% of assets is invested in property, plants and equipment ( $mean(PPE)=0.42$ ). The activity of these firms slightly deviates from the normal flows ( $mean(ROA\_D)=0.01$ ), and the stock market is fairly volatile, as the standard deviation of the daily stock returns over the year is approximately 30% ( $mean(RET\_D)=0.30$ ). Finally, more than 93% of the restated annual statements were controlled by a Big 4 audit company ( $mean(BIG4)=0.93$ ).

Table 2 provides the Pearson correlations of the variables used in the models.

---

<sup>3</sup> Our sample size is comparable with those used in previous studies addressing restatements. For example, Hitz et al. (2012) analyzed a sample of 45 observations, Nahar Abdullah et al. (2010) included 31 firm-years of companies that restated their annual reports, DeFond & Jiambalvo (1991) examined 41 firm-years of companies that overstated prior year earnings, and Bardos & Zaiats (2012) found that 28 out of 436 US restating firms issued bonds in the restatement period, and their number of debt issuances (128) is similar to our sample (133). In addition, relatively small sample sizes are frequent in previous works regarding bond markets. E.g., Sengupta (1998) uses 114 new bond issues and Shi (2003) uses 132 new bonds issues.

-----  
Please, insert Table 2 about here  
-----

As expected, *POST* is negatively and significantly related to *RATING* ( $\rho=-0.36$ ) and positively and significantly correlated with *YLDSPREAD* ( $\rho=0.22$ ). This provides initial evidence that rating agencies and bondholders perceive accounting restatements negatively. Moreover, *POST* is significantly and negatively correlated with *CFO*, which proxies firms' liquidity ( $\rho=-0.17$ ). As expected, *RATING* is correlated with *ASSETS*, *LEV*, *ROA\_D*, *RET\_D* and *PPE*, higher bond ratings being associated respectively with larger firm size ( $\rho=0.46$ ), higher indebtedness ( $\rho=-0.38$ ), lower volatility in net income ( $\rho=-0.51$ ), lower volatility in daily stock returns ( $\rho=-0.23$ ) and higher flexibility in asset structure ( $\rho=-0.27$ ). Consistent with our predictions, *RATING* correlates highly and negatively with *YLDSPREAD* ( $\rho=-0.67$ ). Finally, as expected, *YLDSPREAD* is positively and significantly correlated to the volatility in stock returns, measured by *RET\_D* ( $\rho=0.26$ ); to the dummy *SUB* ( $\rho=0.25$ ), indicating a subordinated issue; to *LEV* ( $\rho=0.15$ ), controlling for debt-dependence; and to *ROA\_D* ( $\rho=0.15$ ); but it is negatively and significantly correlated to the size of the firm as measured by *ASSETS* ( $\rho=-0.20$ ).

## 6. RESULTS

Table 3 reports the results of the regression analysis.<sup>4</sup>

-----  
Please, insert Table 3 about here  
-----

Column (1) shows the effect of restatements on corporate bond ratings, as described in Equation (1).

---

<sup>4</sup> The database in this study is composed of bonds issued by a single firm in the same fiscal year; this violates the assumption of independence in the residuals, so the standard errors from the ordinary least squares procedures may be biased. To circumvent this problem and avoid spurious correlation, we used Hierarchical Linear Models (HLM) for robustness. HLM use the maximum likelihood method to estimate coefficients and are widely used in social science research to address potential multilevel observation problems (Seibert et al., 2004). The results are available in Table 5 and Table 6.

We find a significant negative impact of *POST* on *RATING* ( $\beta_1 < 0$ ;  $p < 0.01$ ). This relationship validates Hypothesis 1, supporting the expectation that credit rating agencies perceive restatement announcements as a factor that reduces expected earnings and future cash flows, thereby increasing credit risk. All control variables have the expected signs for their coefficients. We find that *SUB* ( $\gamma_1 < 0$ ;  $p < 0.10$ ), *MATURITY* ( $\gamma_3 < 0$ ;  $p < 0.05$ ), *LEV* ( $\gamma_6 < 0$ ;  $p < 0.10$ ), and *ROA\_D* ( $\gamma_9 < 0$ ;  $p < 0.01$ ) affect *RATING* negatively, whereas *INCOME* ( $\gamma_4 > 0$ ;  $p < 0.01$ ) and *CFO* ( $\gamma_5 > 0$ ;  $p < 0.01$ ) have a positive impact. Consequently, consistent with our expectations, we find that more profitable firms and companies with a higher liquidity receive better credit ratings, whereas highly leveraged firms and more risky and volatile investments receive lower ratings. Finally, corporate governance control positively impacts *RATING* ( $\gamma_{11} > 0$ ;  $p < 0.01$ ), supporting that firms supervised by a Big 4 audit company receive higher ratings compared to counterparts. Overall, the results for our control variables support the findings of prior studies (Crabtree et al., 2014; Liu & Jiraporn, 2010).

Column (3) of Table 3 lists the results of Equation (2), studying the impact of the restatement on the bond yield spreads.

The coefficient of *POST* is positive and significant ( $\beta_1 > 0$ ;  $p < 0.05$ ), suggesting that bondholders perceive restatements as a credit risk-increasing factor and thus require higher risk premiums. We document that after the restatement announcement, the yield spreads increase on average by nearly 57 basis points. This documents the economic relevance of the restatement, as on average a bond issued in the post-restatement period results in nearly 4 million € additional cost of debt.<sup>5</sup> As expected, *SUB* ( $\gamma_1 > 0$ ;  $p < 0.01$ ) is positively associated with *YLDSREAD*. In regard to firm-level controls, the coefficients of *LEV* ( $\gamma_6 > 0$ ;  $p < 0.10$ ) and *RET\_D* ( $\gamma_{10} > 0$ ;  $p < 0.01$ ) are positive and significant, showing that more highly leveraged and more volatile firms pay higher bond yield spreads. Finally, *ASSETS* is negatively associated with *YLDSREAD* ( $\gamma_7 < 0$ ;  $p < 0.10$ ), suggesting that smaller firms issue bonds at a higher cost. Overall, the results for these control variables are consistent with those from prior studies (Ge and Liu, 2015; Liu et al., 2010).

Columns (2) and (4) in Table 3 show the results of the analysis from Equations (3) and (4), respectively, studying the effect of the severity of restatements on bond ratings and bond yield spreads. While the interaction term *POST\*SEVERITY* is not significant when *RATING* is the dependent variable, it positively and significantly influences yield spreads, indicating

---

<sup>5</sup> Using the average dimension of the bond issue ( $mean(SIZE)=692.6$ ), as displayed in Table 1, and the coefficient  $\beta_1=56.77$ , as displayed in Table 3 Column (3), we find that the increase in the cost of debt capital (i.e., cost of the bonds) is measured as follows:  
 $\Delta = 692.6 \times 0.5677 / 100 = 3.93$

that firms with more severe accounting errors suffer a larger increase in risk premiums after restatement disclosure. These findings partly validate our prediction under Hypothesis 3 since we report that the market is more efficient than financial analysts when they measure the severity of a restatement, because the market downgrades the opinions about investment in restating firms, whereas, surprisingly, the rating agencies seem to be unable to fully understand the financial information on error severity provided by issuers.

The *Pseudo-R*<sup>2</sup> of Equations (1) and (3) are approximately 40%; the *Adjusted-R*<sup>2</sup> of Equations (2) and (4) are greater than 50%; these results support the overall satisfactory empirical explanatory power of the adopted models.

### 6.1 Corroborating Analysis

We corroborated the empirical findings by checking whether the results hold when comparing restating firms to a matched sample of non-restating firms. We used a pair-matched sample design, where each restating firm is matched by country, stock exchange, industry and size to a non-restating (control) firm<sup>6</sup>, in line with previous works (Albring et al., 2013; Chen et al., 2013). We regressed the sample, which included both the restatement and the pair-matched firms, and included the variable *RESTATING*, an indicator that equals 1 for the bonds issued by restating firms, and 0 for bonds issued by the control sample. The results are displayed in Table 4.

-----  
Please, insert Table 4 about here  
-----

The main results ( $\beta_1$ ) remain unchanged although *RESTATING* has no statistical significance. This unexpected result shows that the restating firms behave similarly to the matched firms in the pre-restatement period. Moreover, consistent with previous findings, the interaction term *POST\*SEVERITY* ( $\beta_4 > 0$ ;  $p < 0.05$ ) displayed in Table 4 is

---

<sup>6</sup> More specifically, we created a matched sample where the matched firm: (1) issued at least a bond between 2005 and 2015; (2) had no error restatement; (3) were listed in the same country as the comparison firm; (4) had the same three-digit SIC code as the comparison firm (when unavailable two-digit SIC, otherwise one-digit SIC); and (5) had the nearest total assets to the comparison firm in the year before the restatement announcement. We did not identify a suitable match for 3 firms and thus we did not match any firm with them. The final sample is made of 264 observations (i.e., 264 bonds issued by 25 out of the 28 restating firms and the 25 pair-matched firms), 129 restatement observations and 135 non-restatement observations.

still significant and holds the predicted sign. Apparently, there is no impact from restatements on the evaluation of bond issues until the restatement occurs, as  $\beta_5$  is generally not significant in Table 4.

## **7. DISCUSSION AND CONCLUSIONS**

Several studies have documented that restatements have serious consequences on the equity and private loans markets, but no study to date has analyzed the economic consequences of restatements on the bond market. This paper adds to the accounting literature by empirically demonstrating how restatements affect the decisions of the rating agencies and bond market participants. After firms announce restatements, Graham et al. (2008) found that private loan spreads increase by approximately one half (49%); we found that public loan spreads increase by approximately 57 basis points. Conclusively, restatement leads to a downgrading of bond ratings and increases the cost of the bond financing on average by nearly € 4 million, documenting that firms committing an accounting error suffer a reduction in firm value and an increase in the cost of public debt capital. We further find that firms with greater restatement severity are associated with a larger increase in bond yield spreads, demonstrating that the materiality of restatement aggravates the rise of risk premiums. Surprisingly, we documented that the rating agencies price the restatement *per se* and do not appear to care about the severity of the restatement. Hence, we can state that the market seem to be more efficient than the rating agencies in evaluating accurately the severity of the error that caused the restatement event by adapting the yield spreads accordingly.

In addition, our study is of fundamental importance from a corporate finance perspective, as our results highlight that restatement increases the perceived risk of the bonds, and augments the magnitude of the risk premium. The extra-cost of bond financing in the post-restatement period, measured through bond yield spreads, could clearly influence firms' capital structure decisions.

Our study has practical implications for the accounting choices by CEOs and CFOs. Given that restatements are negatively perceived by rating agencies and bond market participants, they should consider the risk of supporting larger cost of debt for issuing bonds in the aftermath of a restatement.

## **REFERENCES**

- Albring, S. M., Huang, S. X., Pereira, R., & Xu, X. (2013). The effects of accounting restatements on firm growth. *Journal of Accounting and Public Policy*, 32(5), 357-376.
- Anderson, R. C., Mansi, S. A., & Reeb, D. M. (2004). Board characteristics, accounting report integrity, and the cost of debt. *Journal of Accounting and Economics*, 37(3), 315-342.
- Anderson, K. and T. Yohn. (2002). *The Effect of 10-K Restatements on Firm Value, Information Asymmetries, and Investors' Reliance on Earnings*. Working paper, Georgetown University.
- Bae, K. H., & Goyal, V. K. (2009). Creditor rights, enforcement, and bank loans. *The Journal of Finance*, 64(2), 823-860.
- Bardos, K. S., & Mishra, D. (2014). Financial restatements, litigation and implied cost of equity. *Applied Financial Economics*, 24(1), 51-71.
- Bardos, K. S., & Zaiats, N. (2012). Equity and debt issuance by firms violating GAAP. *Accounting and Finance*, 52(s1), 77-108.
- Bardos, K. S., Golec, J., & Harding, J. P. (2013). Litigation risk and market reaction to restatements. *Journal of Financial Research*, 36(1), 19-42.
- Becker, C., DeFond, M., Jiambalvo, J., & Subramanyam, K.R. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, 15(1), 1-24.
- Böcking, H. J., Gros, M., & Worret, D. (2015). Enforcement of accounting standards: how effective is the German two-tier system in detecting earnings management? *Review of Managerial Science*, 9(3), 431-485.
- Burks, J. J. (2010). Disciplinary measures in response to restatements after Sarbanes–Oxley. *Journal of Accounting and Public Policy*, 29(3), 195-225.
- Chen, X., Cheng, Q., & Lo, A. K. (2013). Accounting Restatements and External Financing Choices. *Contemporary Accounting Research*, 30(2), 750-779.
- Chen, X., Cheng, Q., & Lo, A. K. (2014). Is the decline in the information content of earnings following restatements short-lived?. *The Accounting Review*, 89(1), 177-207.
- Chung, J., & McCracken, S. (2014). Understanding the restatement process. *Accounting Perspectives*, 13(4), 253-281.
- Crabtree, A., & Maher, J. J. (2009). The influence of differences in taxable income and book income on the bond credit market. *Journal of the American Taxation Association*, 31(1), 75-99.

Crabtree, A., Maher, J. J., & Wan, H. (2014). New debt issues and earnings management. *Advances in Accounting*, 30(1), 116-127.

Creditreform Rating AG (2015). *Corporate bonds in Europe 2005-2014*. Available at [http://www.creditreform-rating.de/fileadmin/user\\_upload/creditreform-rating.de/Dokumente/Fachpublikationen/Creditreform\\_Rating\\_Corporate\\_Bonds\\_in\\_Europe.pdf](http://www.creditreform-rating.de/fileadmin/user_upload/creditreform-rating.de/Dokumente/Fachpublikationen/Creditreform_Rating_Corporate_Bonds_in_Europe.pdf)

Daske, H., Hail, L., Leuz, C., & Verdi, R. (2008). Mandatory IFRS reporting around the world: Early evidence on the economic consequences. *Journal of Accounting Research*, 46(5), 1085-1142.

Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research*, 13(1), 1-36.

Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, 50(2), 344–401.

DeFond, M. L., & Jiambalvo, J. (1991). Incidence and circumstances of accounting errors. *The Accounting Review*, 66(3), 643-655.

DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, 58(2), 275–326.

Drake, M. S., Myers, L. A., Scholz, S., & Sharp, N. Y. (2015). Short selling around restatement announcements: When do bears pounce? *Journal of Accounting, Auditing & Finance*, 30(2), 218–245.

Feldmann, D. A., Read, W. J., & Abdolmohammadi, M. J. (2009). Financial restatements, audit fees, and the moderating effect of CFO turnover. *Auditing: A Journal of Practice & Theory*, 28(1), 205–223.

Firth, M., Rui, O. M., & Wu, W. (2011). Cooking the books: Recipes and costs of falsified financial statements in China. *Journal of Corporate Finance*, 17(2), 371–390.

Francis, J. R. (2011). A framework for understanding and researching audit quality. *Auditing: A Journal of Practice & Theory*, 30(2), 125-152.

Ge, W., & Kim, J. B. (2014). Real earnings management and the cost of new corporate bonds. *Journal of Business Research*, 67(4), 641-647.

Ge, W., & Liu, M. (2015). Corporate social responsibility and the cost of corporate bonds. *Journal of Accounting and Public Policy*, 34(6), 597-624.



- Graham, J. R., Li, S., & Qiu, J. (2008). Corporate misreporting and bank loan contracting. *Journal of Financial Economics*, 89(1), 44-61.
- Griffin, P. A. (2003) A league of their own? Financial analysts' responses to restatements and corrective disclosures. *Journal of Accounting, Auditing and Finance*, 18(4),479–517.
- Hennes, K. M., Leone, A. J., & Miller, B. P. (2008). The importance of distinguishing errors from irregularities in restatement research: The case of restatements and CEO/CFO turnover. *The Accounting Review*, 83(6), 1487-1519.
- Hennes, K. M., Leone, A. J., & Miller, B. P. (2014). Determinants and market consequences of auditor dismissals after accounting restatements. *The Accounting Review*, 89(3), 1051-1082.
- Hitz, J.M., Ernstberger, J., & Stich, M. (2012). Enforcement of accounting standards in Europe: Capital-market-based evidence for the two-tier mechanism in Germany. *European Accounting Review*, 21(2), 253-281.
- Hribar, P., & Jenkins, N. T. (2004). The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review of Accounting Studies*, 9(2-3), 337-356.
- Huang, Y., & Scholz, S. (2012). Evidence on the association between financial restatements and auditor resignations. *Accounting Horizons*, 26(3), 439-464.
- IASB – International Accounting Standards Board (2005). *International Accounting Standard (IAS) no. 8 – Accounting Policies, Changes in Accounting Estimates and Errors*, December 2005: London.
- Jensen, M. C. (1986). Agency cost of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76: 323–329.
- Jiang, H., Habib, A., & Zhou, D. (2015). Accounting restatements and audit quality in China. *Advances in Accounting*, 31(1), 125-135.
- Jiang, J. (2008). Beating earnings benchmarks and the cost of debt. *The Accounting Review*, 83(2), 377-416.
- Kaszniak, R. (2004). Discussion of “The effect of accounting restatements on earnings revisions and the estimated cost of capital”. *Review of Accounting Studies*, 9(2-3), 357–367.
- Karpoff, J. M., Lee, D. S., & Martin, G. S. (2008a). The consequences to managers for financial misrepresentation. *Journal of Financial Economics*, 88(2), 193-215.
- Karpoff, J. M., Lee, D. S., & Martin, G. S. (2008b). The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis*, 43(3), 581-612.

- Kräussl, R. (2005). Do credit rating agencies add to the dynamics of emerging market crises?. *Journal of Financial Stability*, 1(3), 355-385.
- Kravet, T., & Shevlin, T. (2010). Accounting restatements and information risk. *Review of Accounting Studies*, 15(2), 264-294.
- Liu, Y., & Jiraporn, P. (2010). The effect of CEO power on bond ratings and yields. *Journal of Empirical Finance*, 17(4), 744-762.
- Liu, Y., Ning, Y., & Davidson III, W. N. (2010). Earnings management surrounding new debt issues. *The Financial Review*, 45(3), 659-681.
- Lu, C. W., Chen, T. K., & Liao, H. H. (2010). Information uncertainty, information asymmetry and corporate bond yield spreads. *Journal of Banking & Finance*, 34(9), 2265-2279.
- Ma, C., Zhang, J., & Yang, B. (2015). Financial restatement and auditor dismissal. *China Journal of Accounting Studies*, 3(3), 209-229.
- Mansi, S. A., Maxwell, W. F., & Miller, D. P. (2004). Does auditor quality and tenure matter to investors? Evidence from the bond market. *Journal of Accounting Research*, 42(4), 755-793.
- Mansi, S. A., Maxwell, W. F., & Miller, D. P. (2011). Analyst forecast characteristics and the cost of debt. *Review of Accounting Studies*, 16(1), 116-142.
- Nahar Abdullah, S., Zalina Mohamad Yusof, N., & Naimi Mohamad Nor, M. (2010). Financial restatements and corporate governance among Malaysian listed companies. *Managerial Auditing Journal*, 25(6), 526-552.
- Palmrose, Z. V., & Scholz, S. (2004). The accounting causes and legal consequences of non-GAAP reporting: evidence from restatements. *Contemporary Accounting Research*, 21(1), 139-180.
- Palmrose, Z. V., Richardson, V. J., & Scholz, S. (2004). Determinants of market reactions to restatement announcements. *Journal of Accounting and Economics*, 37(1), 59-89.
- Park, J. C., & Wu, Q. (2009). Financial restatements, cost of debt and information spillover: Evidence from the secondary loan market. *Journal of Business Finance & Accounting*, 36(9-10), 1117-1147.
- Perols, J. L., & Lougee, B. A. (2011). The relation between earnings management and financial statement fraud. *Advances in Accounting*, 27(1), 39-53.
- Seibert, S. E., Silver, S. R., & Randolph, W. A. (2004). Taking empowerment to the next level: A multiple-level model of empowerment, performance, and satisfaction. *Academy of Management Journal*, 47(3), 332-349.

- Sengupta, P. (1998). Corporate disclosure quality and the cost of debt. *The Accounting Review*, 73(4), 459-474.
- Shi, C. (2003). On the trade-off between the future benefits and riskiness of R&D: A bondholders' perspective. *Journal of Accounting and Economics*, 35(2), 227-254.
- Stanley, B. W., & Sharma, V. I. (2011). To cheat or not to cheat how bank debt influences the decision to misreport. *Journal of Accounting, Auditing & Finance*, 26(2), 383-414.
- Srinivasan, S. (2005). Consequences of financial reporting failure for outside directors: Evidence from accounting restatements and audit committee members. *Journal of Accounting Research*, 43(2), 291-334.
- Standard & Poor's Ratings Services (2014). *Guide to credit rating essentials*. New York, NY: Standard & Poor's
- Strohmeier, M. (2014). Enforcement Releases, Firm Characteristics, and Earnings Quality: Insights from Germany's Two-tiered Enforcement System. *Journal of International Financial Management & Accounting*, 25(3), 271-304.
- Teoh, S. H., & Wong, T. J. (1993). Perceived auditor quality and the earnings response coefficient. *The Accounting Review*, 68(2), 346-366.
- Tendulkar, R., & Hancock, G. (2014). *Corporate Bond Markets: A Global Perspective* (Vol. 1). Staff Working Paper of the IOSCO Research Department. IOSCO. Available at <http://www.iosco.org/research/pdf/swp/SW4-Corporate-Bond-Markets-Vol-1-A-global-perspective.pdf>
- Wiedman, C. I., & Hendricks, K. B. (2013). Firm accrual quality following restatements: A signaling view. *Journal of Business Finance & Accounting*, 40(9-10), 1095-1125.
- Wilson, W. M. (2008). An empirical analysis of the decline in the information content of earnings following restatements. *The Accounting Review*, 83(2), 519-548.

**Table 1**  
**Descriptive Statistics**

<i>Variables</i>	<i>Min.</i>	<i>Median</i>	<i>Mean</i>	<i>Max.</i>	<i>N</i>
<b>RATING</b>	8.000	15.00	14.90	18.00	133
<b>YLDSPREAD</b>	1.000	161.0	205.8	858.0	133
<b>POST</b>	0.000	0.000	0.443	1.000	133
<b>SEVERITY</b>	-1.414	0.451	0.408	2.825	133
<b>RESID</b>	-2.768	0.000	0.000	2.137	133
<b>SUB</b>	0.000	0.000	0.195	1.000	133
<b>SIZE<sup>§</sup> §§</b>	90.68	600.0	692.6	2,398	133
<b>MATURITY<sup>§</sup></b>	2	9	21	100	133
<b>INCOME</b>	-0.002	0.042	0.046	0.117	133
<b>CFO</b>	-0.014	0.064	0.062	0.156	133
<b>LEV</b>	0.014	0.247	0.269	0.689	133
<b>ASSETS<sup>§</sup> §§</b>	913.2	47,930	126,800	761,800	133
<b>PPE</b>	0.001	0.421	0.422	1.056	133
<b>ROA_D</b>	0.001	0.012	0.018	0.063	133
<b>RET_D</b>	0.119	0.264	0.309	1.125	133
<b>BIG4</b>	0.000	1.000	0.939	1.000	133

<sup>§</sup> Data before logarithmic transformation

<sup>§§</sup> Data in millions €

**Table 2**  
**Pearson's correlations**

<i>Variables</i>	<i>1. RATING</i>	<i>2.</i>	<i>3.</i>	<i>4.</i>	<i>5.</i>	<i>6.</i>	<i>7.</i>	<i>8.</i>	<i>9.</i>	<i>10.</i>	<i>11.</i>	<i>12.</i>	<i>13.</i>	<i>14.</i>	<i>15.</i>
<i>2.YLDSPREAD</i>	<b>-0.67</b>														
<i>3. SEVERITY</i>	-0.10	0.07													
<i>4. POST</i>	<b>-0.36</b>	<b>0.22</b>	-0.10												
<i>5. RESID</i>	<b>0.44</b>	<b>-0.40</b>	-0.13	0.00											
<i>6. SUB</i>	-0.02	<b>0.25</b>	<b>-0.26</b>	0.06	0.00										
<i>7. SIZE</i>	-0.01	0.01	<b>0.23</b>	0.03	0.00	<b>0.18</b>									
<i>8. MATURITY</i>	-0.04	0.12	<b>-0.25</b>	0.01	0.00	<b>0.76</b>	0.11								
<i>9. INCOME</i>	-0.03	-0.11	<b>0.18</b>	-0.07	0.00	<b>-0.43</b>	0.08	<b>-0.39</b>							
<i>10. CFO</i>	0.01	-0.13	<b>0.35</b>	<b>-0.17</b>	0.00	<b>-0.46</b>	0.05	<b>-0.36</b>	<b>0.76</b>						
<i>11. LEV</i>	<b>-0.38</b>	<b>0.15</b>	<b>0.39</b>	0.01	0.00	<b>-0.46</b>	0.09	<b>-0.31</b>	<b>0.46</b>	<b>0.55</b>					
<i>12. ASSETS</i>	<b>0.46</b>	<b>-0.20</b>	0.13	-0.11	0.00	<b>0.46</b>	<b>0.24</b>	<b>0.38</b>	<b>-0.45</b>	<b>-0.33</b>	<b>-0.52</b>				
<i>13. PPE</i>	<b>-0.27</b>	0.07	<b>0.43</b>	0.11	0.00	<b>-0.45</b>	0.07	<b>-0.39</b>	<b>0.50</b>	<b>0.63</b>	<b>0.73</b>	<b>-0.48</b>			
<i>14. ROA_D</i>	<b>-0.51</b>	<b>0.15</b>	<b>0.29</b>	0.02	0.00	<b>-0.36</b>	0.08	<b>-0.30</b>	<b>0.52</b>	<b>0.41</b>	<b>0.52</b>	<b>-0.57</b>	<b>0.46</b>		
<i>15. RET_D</i>	<b>-0.23</b>	<b>0.26</b>	0.07	-0.04	0.00	-0.09	0.11	-0.03	0.10	0.09	<b>0.14</b>	-0.04	0.08	<b>0.15</b>	
<i>16. BIG4</i>	0.12	0.10	-0.02	-0.03	0.00	0.12	-0.05	0.08	-0.16	<b>-0.21</b>	-0.08	<b>0.16</b>	-0.13	<b>-0.27</b>	-0.06

*Significant correlations ( $p < 0.10$ ) are bolded.*

**Table 3**  
**The impact of restatement on the bond market**

Variable	Coef.	(1) RATING	(2) RATING	(3) YLDSREAD	(4) YLDSREAD
<i>POST</i>	$\beta_1$	1.08*** (-3.77)	-1.19*** (-3.28)	56.77** (2.30)	40.75** (2.24)
<i>RESID</i>	$\beta_2$	-	-	-72.33*** (-6.13)	-67.19*** (-7.49)
<i>SEVERITY</i>	$\beta_3$	-	-0.56*** (-2.83)	-	5.65 (0.37)
<i>POST*SEVERITY</i>	$\beta_4$	-	-0.18 (-0.70)	-	49.54*** (3.94)
<i>SUB</i>	$\gamma_1$	-0.64* (-1.95)	-0.72** (-2.03)	226.06*** (3.49)	225.25*** (3.45)
<i>SIZE</i>	$\gamma_2$	0.18 (0.86)	0.21 (1.11)	-14.88 (-1.12)	-12.57 (-0.90)
<i>MATURITY</i>	$\gamma_3$	-0.48** (-2.22)	-0.53** (-2.39)	-38.68* (-1.85)	-30.88 (-1.52)
<i>INCOME</i>	$\gamma_4$	35.75*** (5.46)	33.29*** (4.06)	-1100.78 (-1.31)	-1215.26 (-1.57)
<i>CFO</i>	$\gamma_5$	14.89*** (2.70)	16.18** (2.55)	367.09 (0.70)	534.00 (1.12)
<i>LEV</i>	$\gamma_6$	-3.15* (-1.93)	-1.00 (-0.47)	254.81* (1.73)	191.77 (1.36)
<i>ASSETS</i>	$\gamma_7$	0.22 (0.90)	0.69* (1.83)	-25.74* (-1.92)	-47.00*** (-2.83)
<i>PPE</i>	$\gamma_8$	-0.48 (-0.60)	-0.49 (-0.70)	13.72 (0.19)	-32.60 (-0.49)
<i>ROA_D</i>	$\gamma_9$	-65.35*** (-3.80)	-53.37*** (-3.29)	1125.03 (1.23)	630.03 (0.61)
<i>RET_D</i>	$\gamma_{10}$	-0.45 (-0.41)	-0.68 (-0.61)	269.27*** (5.24)	265.71*** (4.80)
<i>BIG 4</i>	$\gamma_{11}$	1.23*** (3.48)	1.34*** (3.35)	65.74*** (3.32)	57.63*** (2.72)
<i>Industry dummies</i>		Included	Included	Included	Included
<i>Country dummies</i>		Included	Included	No	No
<i>Adj-R<sup>2</sup> %</i>		43.09	45.79	52.85	56.85
<i>Observations</i>		133	133	133	133

*Note:* This table presents the estimates of Equations (1) and (2) in Columns (1) and (3) and Equations (3) and (4) in Columns (2) and (4), respectively. Adj-R<sup>2</sup> is McFadden's Pseudo-R<sup>2</sup> in Columns (1) and (2). Estimates are corrected for firm clustering and heteroscedasticity. The constant is omitted.

\*, \*\*, and \*\*\* denote statistical significance respectively at the 0.10, 0.05 and 0.01 levels.

**Table 4**  
**Robustness test on a pair-matched sample**

Variable	Coef.	(1) RATING	(2) RATING	(3) YLDSPREAD	(4) YLDSPREAD
<i>POST</i>	$\beta_1$	-0.73*** (-3.11)	-0.76*** (-3.27)	51.29** (1.99)	42.81** (2.36)
<i>RESID</i>	$\beta_2$	-	-	-43.18*** (-6.80)	-42.68*** (-7.39)
<i>SEVERITY</i>	$\beta_3$	-	-0.19 (-1.46)	-	13.53 (1.22)
<i>POST*SEVERITY</i>	$\beta_4$	-	-0.11 (-0.73)	-	42.38** (2.42)
<i>RESTATING</i>	$\beta_5$	0.40 (0.98)	0.49 (1.19)	-29.13 (-1.31)	-35.96* (-1.67)
<i>SUB</i>	$\gamma_1$	-0.81** (-2.28)	-0.80** (-2.09)	266.92*** (4.75)	264.23*** (4.98)
<i>SIZE</i>	$\gamma_2$	0.27** (2.12)	0.28** (2.15)	-17.56 (-1.43)	-19.02* (-1.67)
<i>MATURITY</i>	$\gamma_3$	-0.27* (-1.95)	-0.30** (-2.16)	-30.99 (-1.60)	-25.76 (-1.43)
<i>INCOME</i>	$\gamma_4$	9.25* (1.89)	9.29* (1.93)	-538.73 (-1.55)	-661.43* (-1.89)
<i>CFO</i>	$\gamma_5$	3.16 (0.76)	3.19 (0.75)	85.28 (0.24)	167.11 (0.50)
<i>LEV</i>	$\gamma_6$	-4.38*** (-4.10)	-3.97*** (-3.62)	257.96** (2.43)	181.84* (1.75)
<i>ASSETS</i>	$\gamma_7$	0.25** (2.00)	0.32*** (2.64)	-25.65** (-2.32)	-37.08*** (-3.28)
<i>PPE</i>	$\gamma_8$	0.56 (0.87)	0.63 (0.97)	-22.41 (-0.49)	-39.78 (-0.91)
<i>ROA_D</i>	$\gamma_9$	-16.69** (-2.12)	-15.68** (-2.15)	869.51* (1.77)	799.61 (1.64)
<i>RET_D</i>	$\gamma_{10}$	-1.10*** (-2.67)	-1.04** (-2.59)	293.63*** (6.83)	277.17*** (5.86)
<i>BIG 4</i>	$\gamma_{11}$	0.34 (1.19)	0.29 (1.07)	78.68*** (3.20)	82.65*** (3.24)
<i>Industry dummies</i>		Included	Included	Included	Included
<i>Country dummies</i>		Included	Included	No	No
<i>Adj-R<sup>2</sup> %</i>		22.21	22.66	49.92	52.04
<i>Observations</i>		264	264	264	264

*Note:* This table presents the impact of restatement on the bond ratings and bond yield spreads in restating firms compared with a non-restating pair-matched sample. Respectively the estimates of Equations (1) and (2) are displayed in Columns (1) and (3), and Equations (3) and (4) in Columns (2) and (4). Adj-R<sup>2</sup> is McFadden's Pseudo-R<sup>2</sup> in Columns (1) and (2).

Estimates are corrected for firm clustering and heteroscedasticity. The constant is omitted.

\*, \*\*, and \*\*\* denote statistical significance respectively at the 0.10, 0.05 and 0.01 levels.

**Table 5**  
**Multilevel Regression Analysis**

Variable	Coef.	(1)	(2)	(3)	(4)
		<b>RATING</b>	<b>RATING</b>	<b>YLDSPREAD</b>	<b>YLDSPREAD</b>
<b>POST</b>	$\beta_1$	-1.33*** (-4.40)	-1.33*** (-4.27)	39.62** (2.05)	28.58 (1.46)
<b>RESID</b>	$\beta_2$	-	-	-65.87*** (-6.47)	-63.96*** (-6.58)
<b>SEVERITY</b>	$\beta_3$	-	-0.61 (-1.24)	-	12.37 (0.72)
<b>POST*SEVERITY</b>	$\beta_4$	-	-0.25 (-1.03)	-	47.25*** (2.90)
<b>SUB</b>	$\gamma_1$	-1.17** (-2.15)	-1.11** (-2.03)	177.21*** (4.43)	177.94*** (4.62)
<b>SIZE</b>	$\gamma_2$	0.19 (0.92)	0.16 (0.78)	-13.94 (-0.89)	-10.80 (-0.71)
<b>MATURITY</b>	$\gamma_3$	-0.55*** (-2.76)	-0.56*** (-2.78)	-18.12 (-1.23)	-15.48 (-1.08)
<b>INCOME</b>	$\gamma_4$	29.98*** (2.72)	27.62** (2.50)	-1447.82** (-1.99)	-1364.18* (-1.95)
<b>CFO</b>	$\gamma_5$	12.99* (1.74)	9.71 (1.25)	-40.88 (-0.08)	308.87 (0.63)
<b>LEV</b>	$\gamma_6$	-2.73 (-1.04)	-2.71 (-1.06)	152.17 (1.17)	138.24 (1.15)
<b>ASSETS</b>	$\gamma_7$	1.13*** (2.69)	1.26*** (3.02)	-42.37*** (-2.66)	-56.60*** (3.68)
<b>PPE</b>	$\gamma_8$	-0.09 (-0.06)	0.93 (0.62)	-34.90 (-0.57)	-87.66 (-1.48)
<b>ROA_D</b>	$\gamma_9$	-37.88*** (-3.08)	-36.59*** (-2.96)	311.49 (0.37)	151.63 (0.18)
<b>RET_D</b>	$\gamma_{10}$	-0.55 (-0.66)	-0.70 (-0.84)	230.22*** (3.71)	238.02*** (3.96)
<b>BIG 4</b>	$\gamma_{11}$	1.15* (1.89)	1.18* (1.92)	38.32 (0.92)	36.46 (0.91)
<b>Industry dummies</b>		Included	Included	Included	Included
<b>Country dummies</b>		Included	Included	No	No
<b>Adj-R<sup>2</sup> %</b>		39.57	41.20	51.39	53.90
<b>Observations</b>		133	133	133	133

*Note:* This table presents the estimates of Equations (1) and (2) in Columns (1) and (3) and Equations (3) and (4) in Columns (2) and (4), respectively. The constant is omitted. Adj-R<sup>2</sup> is Pseudo-R<sup>2</sup> in Columns (1) and (2). \*, \*\*, and \*\*\* denote statistical significance respectively at the 0.10, 0.05 and 0.01 levels.



**Table 6**  
**Multilevel Regression Analysis**

<i>Variable</i>	<i>Coef.</i>	(1)	(2)	(3)	(4)
		<i>RATING</i>	<i>RATING</i>	<i>YLDSPREAD</i>	<i>YLDSPREAD</i>
<i>POST</i>	$\beta_1$	-1.00*** (-4.00)	-0.94*** (-3.55)	45.99** (2.55)	31.70* (1.66)
<i>RESID</i>	$\beta_2$	-	-	-44.88*** (-8.59)	-44.19*** (-8.55)
<i>SEVERITY</i>	$\beta_3$	-	0.17 (0.31)	-	-8.68 (-0.49)
<i>POST*SEVERITY</i>	$\beta_4$	-	-0.13 (-0.62)	-	39.87** (2.49)
<i>RESTATING</i>	$\beta_5$	0.44 (0.62)	0.40 (0.56)	-46.08* (-1.88)	-37.89 (-1.53)
<i>SUB</i>	$\gamma_1$	-1.61*** (-3.57)	-1.59*** (-3.49)	237.21*** (7.16)	228.27*** (6.93)
<i>SIZE</i>	$\gamma_2$	0.37*** (2.63)	0.37*** (2.60)	-19.82* (-1.88)	-18.62* (-1.78)
<i>MATURITY</i>	$\gamma_3$	-0.42*** (-2.77)	-0.43*** (-2.81)	-22.36* (-1.89)	-19.63* (-1.68)
<i>INCOME</i>	$\gamma_4$	19.97*** (4.01)	20.22*** (4.05)	-746.01*** (-2.65)	-817.82*** (-2.93)
<i>CFO</i>	$\gamma_5$	17.99*** (4.02)	17.49*** (3.84)	126.09 (0.42)	220.22 (0.74)
<i>LEV</i>	$\gamma_6$	-9.13*** (-4.67)	-9.24*** (-4.68)	202.55** (2.26)	190.54** (2.13)
<i>ASSETS</i>	$\gamma_7$	0.39 (1.59)	0.38 (1.50)	-35.31*** (-3.72)	-38.74*** (-3.96)
<i>PPE</i>	$\gamma_8$	-0.62 (-0.62)	-0.57 (-0.55)	-78.23* (-1.93)	-89.47** (-2.20)
<i>ROA_D</i>	$\gamma_9$	-7.63 (-1.53)	-7.68 (-1.53)	877.81** (2.35)	873.10** (2.36)
<i>RET_D</i>	$\gamma_{10}$	-0.17 (-0.30)	-0.16 (-0.28)	266.64*** (6.03)	262.77*** (6.01)
<i>BIG 4</i>	$\gamma_{11}$	1.15** (2.54)	1.14** (2.53)	71.83** (2.21)	71.58** (2.23)
<i>Industry dummies</i>		Included	Included	Included	Included
<i>Country dummies</i>		Included	Included	No	No
<i>Adj-R<sup>2</sup> %</i>		20.38	22.34	50.14	52.34
<i>Observations</i>		264	264	264	264

*Note:* This table presents the impact of restatement on the bond ratings and bond yield spreads in restating firms compared with a non-restating pair-matched sample. Respectively the estimates of Equations (1) and (2) are displayed in Columns (1) and (3), and Equations (3) and (4) in Columns (2) and (4).

The constant is omitted. Adj-R<sup>2</sup> is Pseudo-R<sup>2</sup> in Columns (1) and (2).

\*, \*\*, and \*\*\* denote statistical significance respectively at the 0.10, 0.05 and 0.01 levels.

## Appendix A. Bond Rating Conversion Table

<i>Conversion number</i>	<i>Standard and Poor's ratings</i>	<i>Moody's ratings</i>
22	AAA	Aaa
21	AA+	Aa1
20	AA	Aa2
19	AA-	Aa3
18	A+	A1
17	A	A2
16	A-	A3
15	BBB+	Baa1
14	BBB	Baa2
13	BBB-	Baa3
12	BB+	Ba1
11	BB	Ba2
10	BB-	Ba3
9	B+	B1
8	B	B2
7	B-	B3
6	CCC+	Caa1
5	CCC	Caa2
4	CCC-	Caa3
3	CC	Ca
2	C	C
1	D	D

## Appendix B. Variable Definitions

<i>Variable names</i>	<i>Variable definitions</i>
<b>RATING</b>	Ordinal representation of the issue's initial rating
<b>YLDSPREAD</b>	Spread between the issue yield and its duration-matched Treasury equivalent at issuance
<b>POST</b>	1 for bonds issued after restatement announcement; 0 otherwise.
<b>SEVERITY</b>	Scores obtained through principal component analysis of three measures: a) $error_t / total\ assets_{t-1}$ b) 1 for downwards restatement; 0 for upwards restatement; c) the natural logarithm of number of years restated
<b>RESID</b>	Residual bond ratings, measured as the residuals from Equation (1)
<b>SUB</b>	1 if the issue is subordinated; 0 otherwise
<b>SIZE</b>	The natural logarithm of bond offering amount (in thousands of €)
<b>MATURITY</b>	The natural logarithm of years to final maturity
<b>INCOME</b>	Operating income / total assets
<b>CFO</b>	Cash flow from operations / total assets
<b>LEV</b>	Total debt / total assets
<b>ASSETS</b>	The natural logarithm of total assets (in thousands of €)
<b>PPE</b>	Gross plant, property, and equipment / total assets
<b>ROA_D</b>	The standard deviation of net income / total assets for the past 5 years
<b>RET_D</b>	The annualized standard deviation of daily stock returns for the past year
<b>BIG4</b>	1 if the auditor is a Big 4 audit firm; 0 otherwise
<b>RESTATING</b>	1 for bonds issued by restating firms; 0 otherwise
<b>Industry</b>	Industry dummies based on one-digit SIC code
<b>Country</b>	Country dummies

# **HOW FIRMS RECOVER FROM A LOSS IN REPUTATION CAUSED BY ACCOUNTING RESTATEMENT: A STUDY OF ENVIRONMENTAL PERFORMANCE IN POLLUTING INDUSTRIES**

## **Abstract.**

*In this article, we examine whether restating firms operating in environmentally sensible industries improve environmental performance in the post-restatement period in order to recover from a loss in reputation. Using a sample of firms listed in 12 IFRS-adopting countries we find that, after accounting restatement, restating firms engage more in environmental responsible practices. We also highlight that the increase in environmental performance is not significantly larger for firms incurred in more severe accounting restatement.*

*In the end, we investigate whether the improved environmental performance influences analyst coverage. The results indicate that analyst following only increases for restating firms taking more environmental responsible activities, suggesting that firms' efforts to regain their reputation are valued in the aftermath of restatement event.*

**KEYWORDS:** restatement; environmental performance; reputation repair; corporate reputation.

## ***1. INTRODUCTION***

Corporate reputation is essential for firms' success (Lange et al., 2011; Rhee & Valdez, 2009). A body of literature highlights that high corporate reputation brings several advantages to companies, including superior financial performance (Roberts & Dowling, 2002), easier access to capital (Stuart et al., 1999), and greater ability to attract more qualified applicants (Turban & Cable, 2003).

Corporate reputation, however, is not a static quality since business misconducts often lead to reputational penalties (Karpoff, 2012; Pfarrer et al., 2008). An accounting restatement, representing a form of firm misconduct, results from a violation of appropriate application of accounting practices. Accounting restatement reflects managers' incentive to obtain short-term benefits (Efendi et al., 2007), investors and regulators are seriously concerned about the nature of accounting errors as managerial intent is not observable and firm disclosure is not clear many times (Hennes et al., 2008). Financial restatements therefore harm stakeholder trust.

While numerous scholars have focused their attention on the adverse implications caused by financial restatement (Palmrose et al., 2004; Graham et al., 2008; Hribar & Jenkins, 2004), relatively little research examined how firm might recover from a loss in reputation (Chakravarthy et al., 2014).

The aim of this paper is to empirically examine whether firms in polluting sectors utilized environmental responsible activities as a way to repair firm reputation in the post-restatement period, or firms simply follow the current trend of environmental responsible engagement without any true intention of restoring firm reputation. We also provide insights on whether the severity of restatement has an impact on the extent to which firms implement remedial actions.

We test our hypotheses in a sample of restating and non-restating (control) firms listed in 12 IFRS-adopting countries. We matched restating firms with a group of control firms on country of stock exchange, industry, year and size.

In line with our expectations, we document that reputation concerns motivate companies to engage in social environmental practices. Chakravarthy et al. (2014) find that investors view reputation-building actions as value-increasing since remedial actions taken by firms help to restore reputational capital after the restatement announcement.

Furthermore, contrary to our expectations, we do not find statistical evidence that management of firms with more severe restatement take more actions in the years following restatement announcements.

The contributions of our paper are manifold.

*In primis*, with this paper we reply to recent calls for research on how firms manage and protect their reputation in the aftermath of a reputational-damaging event (Karpoff, 2012). Empirical research on accounting restatement has focused primarily on studying the adverse impacts of accounting restatements on firms such as market penalties (Palmrose et al., 2004; Karpoff et al., 2008; Hitz et al., 2012), lower firm growth (Albring et al., 2013), auditor and board turnover (Hennes et al., 2014; Srinivasan, 2005), and increases in audit fees (Feldmann et al., 2009) while our contribution is related to the growing field of studies exploring how companies respond to revealed accounting failures (Chakravarthy et al., 2014; Farber, 2005; Cheng & Farber, 2008).

Secondly, to gain a better understanding of firms' reactions to restatements, our paper extends prior literature by examining whether firms experiencing more serious reputation damaging events are engaged in more substantive reputation repair actions. As Rhee & Kim (2012) theorized, events that more significantly damage firm's reputation are more likely to result in significant restoration efforts. This study complements past research that have investigated firm-specific remedial actions (Chakravarthy et al., 2014), without taking into account the severity of restatements.

Thirdly, we examine the relation between improvements that restating firms undertake in their environmental performance and the corresponding response of financial analysts. We document that environmental responsible activities, attracting more analyst coverage, are effective in helping firms to restore their reputation.

A key design choice in our work is the study of accounting restatement, representing a common source of corporate misconduct, along with environmental violations (Karpoff, 2012). Karpoff et al. (2008) show that accounting restatements undermine the reputation of listed companies. Accounting restatement also leads to increases in the cost of capital (Graham et al., 2008; Hribar & Jenkins, 2004) and high executive turnover (Arthaud-Day et al., 2006) while early studies failed to present empirical evidence associating environmental irresponsibility with corporate reputation damage (Jones & Rubin, 2001; Karpoff et al., 2005; Cho et al., 2012). Moreover, compared to Chakravarthy et al. (2014), we include in our sample design strategy restatements categorized as unintentional manipulations for several reasons. Firstly, we consider financial restatement as an event with clear potential to ruin firm reputation, in line with previous studies (Desai et al., 2006; Gomulya & Boeker, 2014). Secondly, firms have wider discretion over reputation-building actions taken when the restatement is not the result of intentional manipulations. Lastly, it is important to extend

our focus on firms' reactions to accounting restatements not classified as frauds since the majority of restatements are categorized as unintentional manipulations (Hennes et al., 2008).

Corporate environmental performance may be more important in particular industries and with specific customer groups (Brammer & Pavelin, 2006). Since environmental reputation is more likely to be an important resource for companies whose operations are subject to greater political scrutiny (Patten, 1992; Hackston & Milne, 1996), we focus our analysis on firms operating in environmental sensitive sectors.

This paper proceeds as follows. Section 2 examines the existing literature on the relationship between environmental performance and financial restatement, and shows the hypotheses tested through the empirical analysis. Section 3 describes the research model and the variables adopted. Section 4 displays the sample and Section 5 reports and discusses results. Lastly, Section 6 briefly concludes the paper.

## **2. THEORETICAL BACKGROUND**

### ***a. Financial Restatement and Firm Reputation***

We focus our attention on accounting restatements due to accounting errors that “*include the effects of mathematical mistakes, mistakes in applying accounting policies, oversights or misinterpretations of facts, and fraud*” (IAS 8, par. 5).

IAS 8, paragraph 42, requires companies to correct accounting errors after their discovery. Normally the auditors, the national enforcers, companies themselves or any combination of them can identify material prior period error(s) then corrected by restating comparative information. Accounting restatement represents not only a visible deficiency in financial reporting system (Dechow et al., 2010; DeFond & Zhang, 2014), but also an ethics failure (Staubus, 2005). Restatement seems to be driven by managerial manipulation of the accounting numbers. For instance, Ettredge et al. (2010) evidence that managers manipulate earnings in years preceding the misstatement period and Harris & Bromiley (2007) find that a large proportion of stock options increases the likelihood of financial restatement.

Past studies documented higher turnover rate of directors and audit committee members (Srinivasan, 2005; Arthaud-Day et al., 2006), reduced employment prospects for managers of restating firms (Desai et al., 2006), and increases in audit fees following restatements (Feldmann et al., 2009). Palmrose et al. (2004) find that accounting restatement impact negatively on firm value. Restating firms also experience a decrease

in expected future earnings and an increase in the cost of capital (Hribar & Jenkins, 2004; Graham et al., 2008).

Even though past research has mainly focused on the negative consequences of financial restatement on firm reputation, a series of empirical accounting studies have examined firms' remedial actions regarding corporate governance and reporting quality implemented with intent to repair post-restatement reputation.

Farber (2005) examines the impact of the revelation of fraud on future changes to board composition. The author documents that governance improvements implemented following the detection of financial statement fraud are valued by stock market. Mande & Son (2012) evidence a positive relationship between financial restatements and auditor changes, explicitly linking this action to reputation repair, and Cheng & Farber (2008) find that firms respond to restatements by reducing the option-based compensation.

In the end, previous research documents that, after the occurrence of a financial restatement, firms signal to markets an improvement of their financial statement credibility by lowering significantly the level of earnings management activity (Wiedman & Hendricks, 2013) and increasing accounting conservatism (Ettredge et al., 2012).

### ***b. Financial Restatement and Environmental Performance***

Gertsen et al. (2006) argue that detailed explanations of restatement issues are effective in restoring public trust. However, beyond the communication of details, after reputational-damaging events firms are expected to take significant, decisive actions to re-establish firm reputation (Pfarrer et al., 2008).

Although a stream of research has highlighted that companies implement corporate governance changes in the aftermath of accounting restatement (Srinivasan, 2005; Arthaud-Day et al., 2006), organizations could also consider environmental responsible practices as value driver through which improving business reputation (Porter & Kramer, 2006; Siegel, 2009). Corporate environmental responsibility represents one of the most important areas of corporate social responsibility (Welford et al., 2008). In addition, according to Porter & Kramer (2006, 2011), social responsible activities focused on corporate reputation that intersect with core business can create social and business benefits. Consequently, firms in polluting industries can utilize environmental social responsible activities in order to repair firm reputation. Prior research suggests that corporate environmental responsible activities generate favourable attitude of consumers towards firm's products (Brunk, 2010).



Furthermore, previous literature highlights that positive environmental reputation may enable firms to alleviate some of the negative consequences associated with financial restatements. Environment concerned firms are viewed as more attractive by employees than companies without this attitude (Bauer & Aiman-Smith, 1996; Dögl & Holtbrügge 2014). Besides, environmental responsible firms enjoy higher financial performance and market value (Russo & Fouts, 1997; Guenster et al., 2011; Wahba, 2008). Recent studies also find that corporate environmental responsibility engagement can reduce firm's cost of equity and the cost of private debt (El Ghoul et al., 2011; Chava, 2014). In the end, environmental practices reduce unsystematic stock market risk (Bansal & Clelland, 2004).

### *c. Error Severity and Environmental Performance*

To better understand the relationships amongst financial restatement, reputation loss and firm's remedial actions we also consider whether error severity influences firm environmental behaviour after restatement revelation.

Although Devers et al. (2009) claim that reactions to illegal practices may vary based on their severity, previous works have rarely examined whether firms react differently to more serious reputation-damaging events (Gomulya & Boeker, 2014).

Previous research highlights that restatements range in severity from unintentional accounting errors to visible frauds. A stream of literature evidences that companies suffer greater financial problems when restatement is more severe. Palmrose et al. (2004) find that firms suffer more negative returns when restatement involves more negative adjustment of previously reported income. Additionally, Albring et al. (2013) document that firms with the largest corrections of prior earnings experience a larger decrease in externally financed growth after restatements.

For firms in which the restatement is not severe, boards may be inclined to implement no reputation repair activities. However, with evidence of possible fraud, it seems highly probable that boards will take more steps to restore credibility.

Previous works show that firms take more actions as the severity of the restatement increases. Hennes et al. (2014) and Srinivasan (2005) find that error severity affects positively external auditor and board turnover and Gomulya & Boeker (2014) report that firms incurred in more severe restatements are more likely to cause boards to hire a better-qualified CEO.

#### ***d. Statement of Hypotheses***

On the basis of the background described above, in this paper we test whether firms in polluting sectors are motivated in engaging strategies to improve environmental performance in order to reduce the impact of reputational damage and send messages to stakeholders and to the broader public about firm's efforts to regain their reputation. Therefore, the following hypothesis is proposed:

*H<sub>1</sub>: Firms ameliorate their environmental performance in the aftermath of an accounting restatement.*

We also hypothesize that a stronger perception of firm responsibilities for a reputational damaging event should result in more reputation-repairing activities. Our second hypothesis is stated as follows:

*H<sub>2</sub>: Firms with more severe restatement engage in higher environmental performance.*

### **3. RESEARCH DESIGN**

#### ***a. Empirical Models***

We examine whether environmental performance improves in the afterwards of accounting restatement using the following equation:

$$\begin{aligned} ENV_{i,t} = & \alpha_0 + \beta_1 POST_{i,t} + \beta_2 RESTATING_{i,t} + \beta_3 POST_{i,t} * RESTATING_{i,t} + \gamma_1 ASSETS_{i,t} \\ & + \gamma_2 RESEARCH_{i,t} + \gamma_3 LEV_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 CFO_{i,t} + \gamma_6 CORPGOV_{i,t} + \gamma_{7-18} \text{Country} \\ & \text{dummies}_i + \gamma_{19-29} \text{Year dummies}_i + \varepsilon_{i,t} \end{aligned} \quad (1)$$

To test whether environmental performance changes at various levels of error severity (Hypothesis 2), Equation (1) is changed into the following:

$$\begin{aligned} ENV_{i,t} = & \alpha_0 + \beta_2 RESTATING_{i,t} + \beta_4 SEVERITY_{i,t} + \beta_5 SEVERITY_{i,t} * RESTATING_{i,t} + \\ & \gamma_1 ASSETS_{i,t} + \gamma_2 RESEARCH_{i,t} + \gamma_3 LEV_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 CFO_{i,t} + \gamma_6 CORPGOV_{i,t} + \gamma_{7-} \\ & 18 \text{Country dummies}_i + \gamma_{19-29} \text{Year dummies}_i + \varepsilon_{i,t} \end{aligned} \quad (2)$$

For all regressions, we utilized robust standard errors to correct for heteroscedasticity (White, 1980), as well as firm and year clustering. We adopt ordinary least squares procedure to estimate both Equations (1) and (2).

### ***b. Description of the Variables***

In Equations (1) and (2), the dependent variable *ENV* is the environmental score provided by ASSET4 database (Appendix A). In order to test whether restatement in our sample influences environmental performance we adopt the explanatory variable *POST*, a dummy variable equals 1 in the post-restatement period (year  $t+1$  and year  $t+2$ ), and 0 otherwise. Furthermore, we include the variable *RESTATING*, that is an indicator variable equals 1 for restating firm-year observations, and 0 for control firm-year observations. To test whether, after restatement announcements, environmental performance are higher for restatement firms than for matching firms we add the interaction between *POST* and *RESTATING*. We expect *POST\*RESTATING* to be positively and significantly related to *ENV*.

To test Hypothesis 2, in Equation (2), we include *SEVERITY* and the interaction between *SEVERITY* and *RESTATING*. A number of factors can measure the severity of restatement, such as the magnitude of market reaction to error announcement (Hennes et al., 2014; Wilson, 2008), the absolute value of error amount scaled by total assets (Huang & Scholz, 2012; Srinivasan, 2005), the number of years restated (Huang & Scholz, 2012; Palmrose et al., 2004), and whether restatements were due to irregularities (intentional misapplication of GAAP) or errors (unintentional misreporting) (Albring et al., 2013; Hennes et al., 2008).

In this study, *SEVERITY* equals the error amount divided by total assets at the first fiscal year-end before the announcement of the restatement in years  $t+1$  and  $t+2$ , and 0 in years  $t-1$  and  $t-2$ . Higher values of the *SEVERITY* represents more severe restatements. Prior research suggests that restatement with more negative income effects are of greater concern to market participants (Palmrose et al., 2004). Therefore, we expect that *SEVERITY\*RESTATING* positively influences *ENV*.

Based on prior research regarding the determinants of environmental performance (Walls et al., 2012; Lys et al., 2015), we included in Equations (1) and (2) several control variables.

The control variables employed in our model are *ASSETS*, *RESEARCH*, *LEV*, *ROA*, *CFO*, *CORPGOV*, and country and year dummies. *ASSETS* controls for firm size, it is

the natural logarithm of total assets in thousands €. Since larger firms may have greater resources and are subject to stronger pressure to improve environmental performance (Berrone & Gomez-Mejia, 2009; Darnall et al., 2010), we predict *ASSETS* to be positively associated with *ENV*. *RESEARCH* is measured as research and development expense for the year divided by total assets<sup>7</sup>. We expect *RESEARCH* to be positively related to *ENV* as firms with higher expenditures in this area invest more in corporate social responsibility (McWilliams & Siegel, 2000). We also include firm leverage (*LEV*), measured as total debt divided by total assets, to control for debt-dependence (Walls et al., 2012; Lys et al., 2015). We include *ROA*, which is earnings before interest and taxes scaled by total assets, to account for firm profitability. The evidence regarding the relationship between environmental responsibility and profitability is opposing. While some works documented a positive association (Spicer, 1978; Russo & Fouts, 1997; Guenster et al., 2011), other works revealed a negative relationship (Jaggi and Freedman, 1992; Wagner et al., 2002). Consequently, we refrain from making a directional hypothesis. We included *CFO*, which is cash flow from operations scaled by total assets, to control for firm liquidity, as firms with greater resources are more likely to undertake social investments (Campbell, 2007). Consequently, we predict *CFO* to be positively related to *ENV*. We adopt *CORPGOV*, a summary measure regarding overall firm's corporate governance provided by ASSET4, similarly to Lys et al. (2015), since Walls et al. (2012) suggest that corporate governance plays an important role in environmental performance. Therefore, we predict that *CORPGOV* positively influences *ENV*. Lastly, we included country and year indicators to control for country and year effects.

#### **4. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS**

We examined a sample of listed companies that restated their financial statements over the period between 2006 and 2014. We begin the sample collection procedure by including all listed firms from countries mandatorily adopting IFRS since at least 31/12/2005. Similarly to Daske et al. (2008), the countries involved in our study are Australia, Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Ireland, Italy, Luxemburg, the Netherlands, Norway, Philippines, Poland, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, the United Kingdom and Venezuela.

---

<sup>7</sup> Due to missing data in research and development expense, we imputed zero values if data were missing. We conducted a robustness check by adding a dummy variable equals one for imputed values, and 0 otherwise. Results remain unchanged.

Our data are provided by Datastream and ASSET4 databases. We used Datastream database by Thompson Reuters to identify firms that restated the annual financial statements prepared in accordance with the IFRSs. We manually collected information about the amount of errors using the annual reports available both on corporate websites and in Osiris database provided by Bureau van Dijk. We also complemented the data collection from other sources, e.g. environmental responsibility data are provided by ASSET4. We found 362 restating firms. First, we restrict the sample to restating firms operating in polluting sectors. Our classification is consistent with Salama et al. (2012, p. 24), identifying “*energy supply, extraction and mining, contracting, chemicals, aerospace and defence, steel and auto parts, medical and telecom equipment, food processing (manufacture, packing or canning of vegetable, dairy or animal products)*” as environmentally-sensitive industries (Further information reported in Appendix B).

Secondly, we drop firms correcting an upwards restatement since they do not reflect aggressive accounting practices (Srinivasan, 2005).

Thirdly, to investigate changes in environmental performance after restatements, we compare the two fiscal years before restatement announcements and the two fiscal years afterwards (Appendix C). In our analysis we exclude the year in which restatement occurred ( $t$ ) since it is difficult to make predictions for this year. We require environmental and financial data at least one year prior and at least one year following the restatement announcement year in order to permit fair comparison of environmental performance before and after accounting restatement. We find 29 restating firms. The 29 restating firms do not differ in terms of error severity from the 193 firms, as reported by the test of equality in means omitted here for brevity reasons, but available from the authors on demand. Besides, firms are similar in terms of performance and debt structure, but sample firms are larger than non-sample firms.

In line with previous studies (Chen et., 2013; Gomulya & Boeker, 2014), we employ a matched sample design, where each restating firm is matched by country of stock exchange, industry, year, and size to a control firm that committed no error restatement<sup>8</sup>. The final sample is made up of 58 firms (209 firm-year observations).

---

<sup>8</sup> More specifically, we created a matched sample where the matched firm: (1) was listed in the same country as the comparison firm; (2) had the same three-digit SIC code as the comparison firm (when unavailable two-digit SIC, otherwise one-digit SIC); (3) had financial and environmental data available on Datastream and ASSET4 in the years around the restatement announcement of comparison firm ( $t$ ); (4) had not restated its financial statement due to accounting error(s); and (5) had the nearest total assets to the comparison firm in the year of the restatement announcement ( $t$ ). We identified a suitable match for all of the 29 restating firms.

Table 1 presents the descriptive statistics for our firm-year observations.

-----  
Insert Table 1 about here  
-----

The average environmental performance (*ENV*) for the firm-year observations is 56.17, ranging from 8.81 to 94.73. The mean value of *POST* reports that the majority of firm-year observations were collected in the pre-restatement period ( $mean(POST)=0.4976$ ). There is a considerable variation in firm size, as average total assets is 7.402 € billion, whereas median total assets is slightly more than 2.5 € billion. The mean (median) value of *RESEARCH* is 1.8368% (0.3708%). Sample firms are highly indebted ( $mean(LEV)=0.254$ ) and, generally, not highly profitable, considering that they have an *ROA* that is on average equals to 2.968%. On average, firms in our sample have a scarce liquidity ( $mean(CFO)=0.07553$ ). The mean (median) value of *CORPGOV* is 55.52 (54.89). Table 1, Panel B presents a breakdown of our sample firms based on countries. It indicates that firms are listed in 12 different countries, and that the majority of them are listed in Australia. Firms listed in France, Germany and Italy account for 33% of our firm-year observations.

Table 2 provides the Pearson correlations of variables used in the models.

-----  
Insert Table 2 about here  
-----

*ASSETS* is negatively correlated with *SEVERITY* ( $\rho=-0.28$ ), but positively related to *LEV* ( $\rho=0.29$ ), *ROA* ( $\rho=0.20$ ), *CFO* ( $\rho=0.21$ ) and *CORPGOV* ( $\rho=0.22$ ). *RESEARCH* is negatively and significantly correlated with *RESTATING* ( $\rho=-0.17$ ), *LEV* ( $\rho=-0.12$ ), and *CFO* ( $\rho=-0.14$ ) indicating that restating firms, highly indebted firms and firms with poor liquidity are less likely to invest in research and development. *LEV* is negatively related to *SEVERITY* ( $\rho=-0.21$ ), *ROA* ( $\rho=-0.23$ ), and *CFO* ( $\rho=-0.13$ ), indicating that highly leveraged firms have low liquidity and profitability. Lastly, as expected, *ROA* is highly correlated with *CFO* ( $\rho=0.61$ ).

## 5. RESULTS

Table 3 reports the results of the regression analysis.

-----  
Insert Table 3 about here  
-----

The Column (1) shows the effect of restatement on environmental performance, as described in Equation (1).

Coefficient  $\beta_1$  captures the changes in environmental performance for matching firms from the pre- to the post-restatement period, coefficient  $\beta_2$  captures the difference between restatement and control firms in the pre-restatement period, and coefficient  $\beta_3$  captures the incremental change in environmental performance for restatement firms in Equation (1).

We find a significant positive impact of *POST\*RESTATING* on *ENV* ( $\beta_3 > 0$ ;  $p < 0.05$ ). This relationship validates Hypothesis 1, supporting the expectation that environmental performance are higher after restatement announcements for restatement firms than for matched firms.

We report that *ASSETS* ( $\gamma_1 > 0$ ;  $p < 0.01$ ) affects *ENV* positively. Consequently, consistent with our expectations, we find that larger firms have better environmental performance. Apart from *CFO*, all of the control variables tabulated have the expected signs for their coefficients though they do not affect significantly *ENV*.

Column (2), Table 3, shows the results of the analysis regarding the effect of restatement severity on environmental performance. The interaction term *SEVERITY\*RESTATING* is positive, but insignificant ( $\beta_5 > 0$ ;  $p > 0.10$ ). Therefore, we cannot validate Hypothesis 2, we find no statistical evidence that restating firms incurred in more severe accounting restatement take more steps to improve business reputation. These results contrast with previous evidence highlighting that firm's efforts to restore its reputation depend on the severity of the reputational damage (Gomulya & Boeker, 2014).

Probably, the motivations of the environmental engagement of polluting companies are related to their need to reverse the negative impact caused by the public revelation of accounting restatement, independently of the seriousness of financial misconduct.

As robustness tests, in Equations (1) and (2) we drop year dummies to reduce multicollinearity concerns. The results are displayed in Table 3, Columns (3) and (4) respectively. Our robustness tests validate our findings since *POST\*RESTATING* ( $\beta_3 > 0$ ;  $p\text{-value} < 0.05$ ) retains its sign and statistical significance while *SEVERITY\*RESTATING* does

not affect significantly  $ENV$  ( $\beta_5 > 0$ ;  $p > 0.10$ ).  $Adjusted-R^2$  is more than 60% for Equations (1), (2), (3) and (4), supporting an overall satisfying empirical explanatory power of the models.

### ***a. Additional Findings***

We further investigate whether financial analysts take into consideration the improved environmental performance. We obtained data on analysts following from I/B/E/S (Thomson Reuters) and assume a firm as having lost all analyst coverage when the firm, previously covered on I/B/E/S, receives no earnings forecasts.

On the one hand, Jo & Harjoto (2014) find that corporate social responsibility positively affects analyst following. On the other hand, it is possible that financial analysts may overlook environmental improvements made by restating firms since the restatement event has deeply damaged firms' reputation. Literature has evidenced that analysts cease coverage of fraud firms even before the public revelation (Young & Peng, 2013) and that analyst following declines after firms financial improprieties (Griffin, 2003). Results of our analyses are displayed in Table 4 and in Table 5.

-----  
Insert Table 4 about here  
-----

Specifically, in the first step, we simply test whether restating firms experience an increase in analyst coverage ( $ANALYSTS$ ) in the post-restatement period. Panel A, Table 4, presents the results of paired t test of  $ANALYSTS$  for restating firms in the post- versus pre-restatement periods and Panel B presents the results of paired t test of  $ANALYSTS$  for restating firms from  $t+2$  to  $t+4$ . We report that the  $ANALYSTS$  remained virtually unchanged over the periods analyzed, except for year  $t+3$ , where we find a drop ( $t-stat = -2.18$ ,  $p < 0.05$ ). Finally, Panel C presents matched-pair differences for the restating versus control firms in the pre-restatement periods and in the post-restatement periods. We find that  $ANALYSTS$  is significantly larger in restating compared to control firms in year  $t+4$  ( $t-stat = 2.51$ ,  $p < 0.05$ ). In sum, we find that  $ANALYSTS$  for restating firms in the post-restatement periods are relatively stable in comparison with: (1) restating firms in the periods preceding the restatement announcement, and (2) matched firms in the same periods.



Thus, we document that credibility seem to be a concern for restating firms in the aftermath of accounting restatement. Following that, we utilize multivariate statistics to investigate whether restating firms with higher environmental performance have wider analyst coverage in the post-restatement. We estimate the following regression:

$$ANALYSTS_{i,t+1} = \alpha_0 + \beta_1 POST_{i,t} + \beta_6 ENV_{i,t} + \beta_7 POST_{i,t} * ENV_{i,t} + \gamma_1 ASSETS_{i,t} + \gamma_2 RESEARCH_{i,t} + \gamma_3 LEV_{i,t} + \gamma_4 ROA_{i,t} + \gamma_5 CFO_{i,t} + \gamma_6 CORPGOV_{i,t} + \gamma_{30} INSTOWN\%_{i,t} + \gamma_{7-18} \text{Country dummies}_i + \varepsilon_{i,t+1} \quad (3)$$

For Model (3) we adopt negative binomial regression model (Rock et al., 2000) and adjust standard errors for firm and year clustering and heteroscedasticity. In Model (3) we add a further control variable, *INSTOWN%*, to account for the percentage of institutional ownership (Rock et al., 2000). We restrict the sample to restating firms to avoid collinearity issues. Results are tabulated in Table 5.

-----  
 Insert Table 5 about here  
 -----

Our test variable *POST\*ENV* is positive and statically significant ( $\beta_7 > 0$ ;  $p < 0.01$ ), we highlight that the more the number of reputation repair actions implemented by restating firms in the post-restatement period, the more the analysts coverage. Therefore, we document that restating firms with better environmental performance restore credibility faster.

## 6. CONCLUSIONS

Whereas high priority in literature regarding company reputation has been dedicated to the creation and maintaining of firms' reputation, there is relatively little research examining how organizations respond after a loss in reputation (Rhee & Kim, 2012). In this paper we tested two hypotheses regarding how firms repair their reputation based on extant theoretical and empirical research on reputation-rebuilding actions both in accounting and management literature.

Our paper contributes to literature on accounting restatement and corporate environmental responsibility in several ways.

While internal actions undertaken by restating firms have been extensively studied (Farber, 2005; Mande & Son, 2012; Cheng & Farber, 2008), the key focus of this article is to understand whether firms implement external actions to convey positive message to their shareholders. We document that firms operating in polluting industries use strategically social responsible policy (Porter & Kramer, 2006; Porter & Kramer, 2011) to regain firm reputation in the post-restatement period.

Additionally, we investigate whether restating firms consider the magnitude of error, and consequently take more actions to remedy to more serious trust-destroying events, or they do not differentiate between error restatements on the basis of their severity, simply viewing accounting errors as adverse events. We report that materiality of restatement does not push firms into taking more reputation-repair actions.

In the end, this work casts light on the efficacy of post-recovery strategy. Specifically, we evidence that improvements in environmental performance, influencing positively analyst coverage, help polluting firms to regain their credibility after restatement revelation.

## **REFERENCES**

- Albring, S. M., Huang, S. X., Pereira, R., & Xu, X. (2013). The effects of accounting restatements on firm growth. *Journal of Accounting and Public Policy*, 32(5), 357-376.
- Arthaud-Day, M. L., Certo, S. T., Dalton, C. M., & Dalton, D. R. (2006). A changing of the guard: Executive and director turnover following corporate financial restatements. *Academy of Management Journal*, 49(6), 1119-1136.
- Bansal, P., & Clelland, I. (2004). Talking trash: Legitimacy, impression management, and unsystematic risk in the context of the natural environment. *Academy of Management Journal*, 47(1), 93-103.
- Bauer, T. N., & Aiman-Smith, L. (1996). Green career choices: The influence of ecological stance on recruiting. *Journal of Business and Psychology*, 10(4), 445-458.
- Berrone, P., & Gomez-Mejia, L. R. (2009). Environmental performance and executive compensation: An integrated agency-institutional perspective. *Academy of Management Journal*, 52(1), 103-126.
- Brammer, S. J., & Pavelin, S. (2006). Corporate reputation and social performance: The importance of fit. *Journal of Management Studies*, 43(3), 435-455.
- Brunk, K. H. (2010). Exploring origins of ethical company/brand perceptions- A consumer perspective of corporate ethics. *Journal of Business Research*, 63(3), 255-262.
- Cameron, A. C., Gelbach, J. B., & Miller, D. L. (2012). Robust inference with multiway clustering. *Journal of Business & Economic Statistics*, 29(2), 238-249.
- Campbell, J. L. (2007). Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy of Management Review*, 32(3), 946-967.
- Chakravarthy, J., DeHaan, E., & Rajgopal, S. (2014). Reputation repair after a serious restatement. *The Accounting Review*, 89(4), 1329-1363.
- Chava, S. (2014). Environmental externalities and cost of capital. *Management Science*, 60(9), 2223-2247.
- Chen, X., Cheng, Q., & Lo, A. K. (2013). Accounting Restatements and External Financing Choices. *Contemporary Accounting Research*, 30(2), 750-779.
- Cheng, Q., & Farber, D. B. (2008). Earnings restatements, changes in CEO compensation, and firm performance. *The Accounting Review*, 83(5), 1217-1250.

- Cho, C. H., Guidry, R. P., Hageman, A. M., & Patten, D. M. (2012). Do actions speak louder than words? An empirical investigation of corporate environmental reputation. *Accounting, Organizations and Society*, 37(1), 14-25.
- Darnall, N., Henriques, I., & Sadorsky, P. (2010). Adopting proactive environmental strategy: The influence of stakeholders and firm size. *Journal of Management Studies*, 47(6), 1072-1094.
- Daske, H., Hail, L., Leuz, C., & Verdi, R. (2008). Mandatory IFRS reporting around the world: Early evidence on the economic consequences. *Journal of Accounting Research*, 46(5), 1085-1142.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research*, 13(1), 1-36.
- Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, 50(2), 344-401.
- DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, 58(2), 275-326.
- Desai, H., Hogan, C. E., & Wilkins, M. S. (2006). The reputational penalty for aggressive accounting: Earnings restatements and management turnover. *The Accounting Review*, 81(1), 83-112.
- Devers, C. E., Dewett, T., Mishina, Y., & Belsito, C. A. (2009). A general theory of organizational stigma. *Organization Science*, 20(1), 154-171.
- Dögl, C., & Holtbrügge, D. (2014). Corporate environmental responsibility, employer reputation and employee commitment: An empirical study in developed and emerging economies. *The International Journal of Human Resource Management*, 25(12), 1739-1762.
- Efendi, J., Srivastava, A., & Swanson, E. P. (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics*, 85(3), 667-708.
- El Ghouli, S., Guedhami, O., Kwok, C. C., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital?. *Journal of Banking & Finance*, 35(9), 2388-2406.
- Ettredge, M., Huang, Y., & Zhang, W. (2012). Earnings restatements and differential timeliness of accounting conservatism. *Journal of Accounting and Economics*, 53(3), 489-503.

- Ettredge, M., Scholz, S., Smith, K. R., & Sun, L. (2010). How do restatements begin? Evidence of earnings management preceding restated financial reports. *Journal of Business Finance & Accounting*, 37(3-4), 332-355.
- Farber, D. B. (2005). Restoring trust after fraud: Does corporate governance matter?. *The Accounting Review*, 80(2), 539-561.
- Feldmann, D. A., Read, W. J., & Abdolmohammadi, M. J. (2009). Financial restatements, audit fees, and the moderating effect of CFO turnover. *Auditing: A Journal of Practice & Theory*, 28(1), 205-223.
- Gertsen, F. H., van Riel, C. B., & Berens, G. (2006). Avoiding reputation damage in financial restatements. *Long Range Planning*, 39(4), 429-456.
- Gomulya, D., & Boeker, W. (2014). How firms respond to financial restatement: CEO successors and external reactions. *Academy of Management Journal*, 57(6), 1759-1785.
- Graham, J. R., Li, S., & Qiu, J. (2008). Corporate misreporting and bank loan contracting. *Journal of Financial Economics*, 89(1), 44-61.
- Griffin, P. A. (2003). A league of their own? Financial analysts' responses to restatements and corrective disclosures. *Journal of Accounting, Auditing & Finance*, 18(4), 479-517.
- Guenster, N., Bauer, R., Derwall, J., & Koedijk, K. (2011). The economic value of corporate eco-efficiency. *European Financial Management*, 17(4), 679-704.
- Hackston, D., & Milne, M. J. (1996). Some determinants of social and environmental disclosures in New Zealand companies. *Accounting, Auditing & Accountability Journal*, 9(1), 77-108.
- Harris, J., & Bromiley, P. (2007). Incentives to cheat: The influence of executive compensation and firm performance on financial misrepresentation. *Organization Science*, 18(3), 350-367.
- Hennes, K. M., Leone, A. J., & Miller, B. P. (2008). The importance of distinguishing errors from irregularities in restatement research: The case of restatements and CEO/CFO turnover. *The Accounting Review*, 83(6), 1487-1519.
- Hennes, K. M., Leone, A. J., & Miller, B. P. (2014). Determinants and market consequences of auditor dismissals after accounting restatements. *The Accounting Review*, 89(3), 1051-1082.
- Hitz, J.-M., Ernstberger, J., & Stich, M. (2012). Enforcement of Accounting Standards in Europe: Capital- Market-Based Evidence for the Two-Tier Mechanism in Germany. *European Accounting Review*, 21(2), 253-281.

- Hribar, P., & Jenkins, N. T. (2004). The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review of Accounting Studies*, 9(2-3), 337-356.
- Huang, Y., & Scholz, S. (2012). Evidence on the association between financial restatements and auditor resignations. *Accounting Horizons*, 26(3), 439-464.
- IASB – International Accounting Standards Board (2005). *International Accounting Standard (IAS) no. 8 – Accounting Policies, Changes in Accounting Estimates and Errors*, December 2005: London.
- Jaggi, B., & Freedman, M. (1992). An examination of the impact of pollution performance on economic and market performance: pulp and paper firms. *Journal of Business Finance & Accounting*, 19(5), 697-713.
- Jo, H., & Harjoto, M. (2014). Analyst coverage, corporate social responsibility, and firm risk. *Business Ethics: A European Review*, 23(3), 272-292.
- Jones, K., & Rubin, P. H. (2001) Effects of harmful environmental events on reputations of firms, in (ed.) *Advances in Financial Economics* (Advances in Financial Economics, Volume 6) Emerald Group Publishing Limited, 161-182.
- Karpoff, J. M. (2012). Does reputation work to discipline corporate misconduct? In the *Oxford Handbook of Corporate Reputation*, edited by M. L. Barnett, & T. G. Pollock (Eds.). Oxford: Oxford University Press.
- Karpoff, J. M., Lee, D. S., & Martin, G. S. (2008). The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis*, 43(03), 581-611.
- Karpoff, J. M., Lott Jr, J. R., & Wehrly, E. W. (2005). The reputational penalties for environmental violations: Empirical evidence. *Journal of Law and Economics*, 48(2), 653-675.
- Lange, D., Lee, P. M., & Dai, Y. (2011). Organizational reputation: A review. *Journal of Management*, 37(1), 153-184.
- Lys, T., Naughton, J. P., & Wang, C. (2015). Signaling through corporate accountability reporting. *Journal of Accounting and Economics*, 60(1), 56-72.
- Mande, V., & Son, M. (2012). Do financial restatements lead to auditor changes?. *Auditing: A Journal of Practice & Theory*, 32(2), 119-145.
- McWilliams, A., & Siegel, D. (2000). Corporate social responsibility and financial performance: Correlation or misspecification? *Strategic Management Journal*, 21(5), 603-609.
- Palmrose, Z. V., Richardson, V. J., & Scholz, S. (2004). Determinants of market reactions to restatement announcements. *Journal of Accounting and Economics*, 37(1), 59-89.

- Patten, D. M. (1992). Exposure, legitimacy, and social disclosure. *Journal of Accounting and Public Policy*, 10(4), 297-308.
- Pfarrer, M. D., Decelles, K. A., Smith, K. G., & Taylor, M. S. (2008). After the fall: Reintegrating the corrupt organization. *Academy of Management Review*, 33(3), 730-749.
- Porter, M. E., & Kramer, M. R. (2006). The link between competitive advantage and corporate social responsibility. *Harvard Business Review*, 84(12), 78-92.
- Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard Business Review*, 89(1/2), 62-77.
- Rhee, M., & Kim, T. (2012). After the collapse: A behavioral theory of reputation repair. In the *Oxford Handbook of Corporate Reputation*, edited by M. L. Barnett, & T. G. Pollock (Eds.). Oxford: Oxford University Press.
- Rhee, M., & Valdez, M. E. (2009). Contextual factors surrounding reputation damage with potential implications for reputation repair. *Academy of Management Review*, 34(1), 146-168.
- Roberts, P. W., & Dowling, G. R. (2002). Corporate reputation and sustained superior financial performance. *Strategic Management Journal*, 23(12), 1077-1093.
- Rock, S., Sedo, S., & Willenborg, M. (2000). Analyst following and count-data econometrics. *Journal of Accounting and Economics*, 30(3), 351-373.
- Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, 40(3), 534-559.
- Salama, A., Dixon, R., & Habbash, M. (2012). An Examination of Environmental Disclosures in UK Corporate Annual Reports. *Journal of Accounting, Business & Management*, 19(1), 19-42.
- Siegel, D. S. (2009). Green management matters only if it yields more green: An economic/strategic perspective. *The Academy of Management Perspectives*, 23(3), 5-16.
- Spicer, B. H. (1978). Investors, corporate social performance and information disclosure: An empirical study. *The Accounting Review*, 53(1), 94-111.
- Srinivasan, S. (2005). Consequences of financial reporting failure for outside directors: Evidence from accounting restatements and audit committee members. *Journal of Accounting Research*, 43(2), 291-334.
- Staubus, G. J. (2005). Ethics failures in corporate financial reporting. *Journal of Business Ethics*, 57(1), 5-15.

- Stuart, T. E., Hoang, H., & Hybels, R. C. (1999). Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly*, 44(2), 315-349.
- Turban, D. B., & Cable, D. M. (2003). Firm reputation and applicant pool characteristics. *Journal of Organizational Behavior*, 24(6), 733-751.
- Wagner, M., Van Phu, N., Azomahou, T., & Wehrmeyer, W. (2002). The relationship between the environmental and economic performance of firms: an empirical analysis of the European paper industry. *Corporate Social Responsibility and Environmental Management*, 9(3), 133-146.
- Wahba, H. (2008). Does the market value corporate environmental responsibility? An empirical examination. *Corporate Social Responsibility and Environmental Management*, 15(2), 89-99.
- Walls, J. L., Berrone, P., & Phan, P. H. (2012). Corporate governance and environmental performance: Is there really a link?. *Strategic Management Journal*, 33(8), 885-913.
- Welford, R., Chan, C., & Man, M. (2008). Priorities for corporate social responsibility: a survey of businesses and their stakeholders. *Corporate Social Responsibility and Environmental Management*, 15(1), 52-62.
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4), 817-838.
- Wiedman, C. I., & Hendricks, K. B. (2013). Firm Accrual Quality Following Restatements: A Signaling View. *Journal of Business Finance & Accounting*, 40(9-10), 1095-1125.
- Wilson, W. M. (2008). An empirical analysis of the decline in the information content of earnings following restatements. *The Accounting Review*, 83(2), 519-548.
- Young, S. M., & Peng, E. Y. (2013). An analysis of accounting frauds and the timing of analyst coverage decisions and recommendation revisions: Evidence from the US. *Journal of Business Finance & Accounting*, 40(3-4), 399-437.



**Table 1**  
**Descriptive Statistics**

<b>PANEL A</b>							
<i>Variables</i>	<i>Min.</i>	<i>1<sup>st</sup> Qu.</i>	<i>Median</i>	<i>Mean</i>	<i>3<sup>rd</sup> Qu.</i>	<i>Max.</i>	<i>N</i>
<i>ENV</i>	8.81	24.68	58.03	56.17	89.82	94.73	209
<i>POST</i>	0	0	0	0.4976	1	1	209
<i>RESTATING</i>	0	0	1	0.5072	1	1	209
<i>SEVERITY</i>	0	0	0	0.007312	0.006577	0.077790	209
<i>ASSETS</i>	20.431	807.364	2,549.673	7,402.286	6,814	89,130	209
<i>RESEARCH</i>	0	0	0.003708	0.018368	0.024304	0.239874	209
<i>LEV</i>	0.0000	0.1193	0.2518	0.2540	0.3557	1.2612	209
<i>ROA</i>	-1.16152	0.01183	0.06976	0.02968	0.10265	0.72980	209
<i>CFO</i>	-0.41774	0.04701	0.07533	0.07553	0.10336	0.43910	209
<i>CORPGOV</i>	6.71	37.91	54.89	55.52	76.49	96.95	209
<b>PANEL B</b>							
<i>Countries</i>	<i># of firm-years</i>		<i>% of firm-years</i>				
<i>AUSTRALIA</i>	74		35.41				
<i>DENMARK</i>	6		2.87				
<i>FRANCE</i>	23		11.00				
<i>GERMANY</i>	30		14.35				
<i>HONG KONG</i>	8		3.83				
<i>IRELAND</i>	8		3.83				
<i>ITALY</i>	16		7.66				
<i>NORWAY</i>	8		3.83				
<i>POLAND</i>	8		3.83				
<i>THE NETHERLANDS</i>	6		2.87				
<i>THE UK</i>	16		7.66				
<i>SOUTH AFRICA</i>	6		2.87				
<i>TOTAL</i>	209		100.00				

*Note: ASSETS is not log-transformed and reported in millions €.*

**Table 2**  
**Pearson's Correlations**

<i>Variables</i>	<i>POST [1]</i>	<i>[2]</i>	<i>[3]</i>	<i>[4]</i>	<i>[5]</i>	<i>[6]</i>	<i>[7]</i>	<i>[8]</i>
<i>RESTATING [2]</i>	0.00 (0.94)							
<i>SEVERITY [3]</i>	<b>0.51</b> <b>(0.00)</b>	-0.01 (0.93)						
<i>ASSETS [4]</i>	-0.01 (0.92)	0.08 (0.27)	<b>-0.28</b> <b>(0.00)</b>					
<i>RESEARCH [5]</i>	-0.06 (0.39)	<b>-0.17</b> <b>(0.01)</b>	-0.01 (0.87)	-0.09 (0.18)				
<i>LEV [6]</i>	0.01 (0.85)	-0.11 (0.13)	<b>-0.21</b> <b>(0.00)</b>	<b>0.29</b> <b>(0.00)</b>	<b>-0.12</b> <b>(0.08)</b>			
<i>ROA [7]</i>	<b>-0.14</b> <b>(0.04)</b>	0.00 (0.98)	-0.04 (0.59)	<b>0.20</b> <b>(0.00)</b>	-0.10 (0.13)	<b>-0.23</b> <b>(0.00)</b>		
<i>CFO [8]</i>	-0.04 (0.54)	-0.09 (0.22)	-0.08 (0.23)	<b>0.21</b> <b>(0.00)</b>	<b>-0.14</b> <b>(0.04)</b>	<b>-0.13</b> <b>(0.06)</b>	<b>0.61</b> <b>(0.00)</b>	
<i>CORPGOV [9]</i>	0.04 (0.54)	0.00 (1.00)	-0.01 (0.87)	<b>0.22</b> <b>(0.00)</b>	0.08 (0.23)	-0.09 (0.19)	-0.08 (0.24)	-0.02 (0.72)

*Note:* Significant correlations ( $p < 0.10$ ) are bolded,  $p$ -values in brackets.

**Table 3**  
**Multivariate Statistics**

<i>Variables</i>	<i>Coef.</i>	<i>(1)</i> <i>ENV</i>	<i>(2)</i> <i>ENV</i>	<i>(3)</i> <i>ENV</i>	<i>(4)</i> <i>ENV</i>
<b>POST</b>	$\beta_1$	-10.06 (-1.33)	-	-4.06 (-1.12)	-
<b>RESTATING</b>	$\beta_2$	-1.31 (-0.29)	2.66 (0.47)	-1.19 (-0.26)	2.76 (0.51)
<b>POST*RESTATING</b>	$\beta_3$	8.41** (2.06)	-	8.49** (2.18)	-
<b>SEVERITY</b>	$\beta_4$	-	-168.98* (-1.76)	-	-97.60 (-0.93)
<b>SEVERITY*RESTATING</b>	$\beta_5$	-	29.61 (0.22)	-	31.59 (0.22)
<b>ASSETS</b>	$\gamma_1$	9.12*** (3.70)	8.59*** (3.33)	8.92*** (3.56)	8.74*** (3.39)
<b>RESEARCH</b>	$\gamma_2$	-3.28 (-0.08)	-1.12 (-0.03)	-3.88 (-0.10)	-5.37 (-0.14)
<b>LEV</b>	$\gamma_3$	5.53 (0.39)	2.68 (0.18)	6.10 (0.42)	3.98 (0.26)
<b>ROA</b>	$\gamma_4$	-0.38 (-0.04)	-0.05 (-0.00)	-0.02 (-0.00)	-1.07 (-0.10)
<b>CFO</b>	$\gamma_5$	-11.59 (-0.35)	-14.97 (-0.43)	-10.07 (-0.29)	-9.74 (-0.29)
<b>CORPGOV</b>	$\gamma_6$	0.16 (1.11)	0.17 (1.18)	0.18 (1.43)	0.19 (1.45)
<b>Country dummies</b>		Included	Included	Included	Included
<b>Year dummies</b>		Included	Included	No	No
<b>Adj-R<sup>2</sup> %</b>		64.59	64.13	64.00	63.65
<b>Observations</b>		209	209	209	209
<b>Firms</b>		58	58	58	58

*Note:* This table presents respectively the estimates of Equation (1) in Column (1) and Equation (2) in Column (2). The results of the robustness tests are tabulated in Columns (3) and (4), respectively. To correct for heteroscedasticity and serial correlation, we calculate all *t*-stats using Huber White robust standard errors (White, 1980). We also adjust for firm and year clustering. We force the variance-covariance matrix to be positive semidefinite by correcting the eigenvalues of the matrix in Equation (1) and Equation (2) (Cameron et al., 2012). Coefficients for intercept, industry and year dummies omitted to conserve space.

\*, \*\*, and \*\*\* denote statistical significance at the 0.10, 0.05 and 0.01 levels (two-sided, respectively).

**Table 4**  
**Changes in Analyst Coverage**

**Panel A: Differences in ANALYSTS between Post-Restatement and Pre-Restatement  
Periods for Restating Firms**

<i>Avg. Difference Between</i>	<i>(t+1) – (t-1)</i>	<i>(t+2) – (t-2)</i>
<b>ANALYSTS</b>	-0.57 (-0.66)	-0.58 (-0.38)

**Panel B: Differences in ANALYSTS between t+2 versus t+1, t+3 versus t+2, and t+4  
versus t+3 for Restating Firms**

<i>Avg. Difference Between</i>	<i>(t+2) – (t+1)</i>	<i>(t+3) – (t+2)</i>	<i>(t+4) – (t+3)</i>
<b>ANALYSTS</b>	-0.13 (-0.18)	-1.00** (-2.18)	0.11 (0.11)

**Panel C: Differences in ANALYSTS in the Pre-Restatement Periods and Post-  
Restatement Periods between Restating Firms and Matched Firms**

<i>Avg. Difference Between</i>	<i>(t-2) – Ctrl t</i>	<i>(t-1) – Ctrl t</i>	<i>(t+1) – Ctrl t</i>	<i>(t+2) – Ctrl t</i>	<i>(t+3) – Ctrl t</i>	<i>(t+4) – Ctrl t</i>
<b>ANALYSTS</b>	-0.95 (-0.44)	0.57 (0.21)	0.43 (0.16)	-0.29 (-0.12)	1.33 (0.51)	5.88** (2.51)

*Note:* \*, \*\*, \*\*\* indicate significant differences at  $p < 0.10$ ,  $p < 0.05$ , and  $p < 0.01$  based on two-tailed tests, respectively. T-stats in brackets.

**Table 5**  
**Additional Findings**

<i>Variables</i>	<i>Coef.</i>	<i>ANALYSTS</i>
<i>POST</i>	$\beta_1$	-0.43*** (-2.92)
<i>ENV</i>	$\beta_6$	0.00 (0.14)
<i>POST*ENV</i>	$\beta_7$	0.00*** (3.40)
<i>ASSETS</i>	$\gamma_1$	0.10 (0.74)
<i>RESEARCH</i>	$\gamma_2$	-1.92 (-0.43)
<i>LEV</i>	$\gamma_3$	0.57 (0.89)
<i>ROA</i>	$\gamma_4$	0.36 (0.83)
<i>CFO</i>	$\gamma_5$	1.87** (2.06)
<i>CORPGOV</i>	$\gamma_6$	0.01 (1.40)
<i>INSTOWN%</i>	$\gamma_{30}$	0.35 (0.58)
<i>Country dummies</i>		Yes
<i>Year dummies</i>		No
<i>Log-likelihood</i>		-594.243
<i>Observations</i>		106
<i>Firms</i>		28

*Note:* This table presents the estimates of Equation (3). To correct for heteroscedasticity and serial correlation, we calculate all z-scores using Huber White robust standard errors (White, 1980). We also adjust for firm and year clustering. Coefficient for intercept omitted for brevity.

\*, \*\*, and \*\*\* denote statistical significance at the 0.10, 0.05 and 0.01 levels (two-sided, respectively).

## **Appendix A. Description of ASSET4 (from ASSET4 documents)**

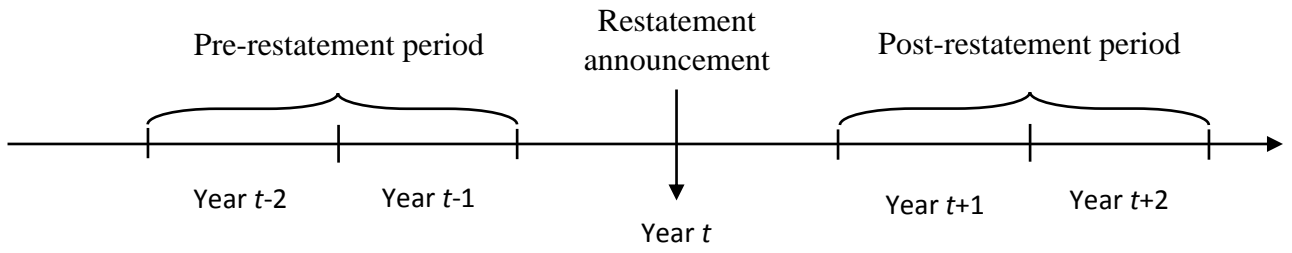
- **Emission Reduction:** The emission reduction category measures a company's management commitment and effectiveness towards reducing environmental emission in the production and operational processes. It reflects a company's capacity to reduce air emissions (greenhouse gases, F-gases, ozone-depleting substances, NOx and SOx, etc.), waste, hazardous waste, water discharges, spills or its impacts on biodiversity and to partner with environmental organisations to reduce the environmental impact of the company in the local or broader community.
- **Resource Reduction:** The resource reduction category measures a company's management commitment and effectiveness towards achieving an efficient use of natural resources in the production process. It reflects a company's capacity to reduce the use of materials, energy or water, and to find more eco-efficient solutions by improving supply chain management.
- **Product Innovation:** The product innovation category measures a company's management commitment and effectiveness towards supporting the research and development of eco-efficient products or services. It reflects a company's capacity to reduce the environmental costs and burdens for its customers, and thereby creating new market opportunities through new environmental technologies and processes or eco-designed, dematerialized products with extended durability.

## Appendix B. Industry Classification

<i>Environmentally-sensitive Industries</i>
Resources: Oil and Gas Exploration and Production
Resources: Oil, Integrated
Resources: Other Mineral Extractors and Mines
Utilities: Electricity
Utilities: Gas Distribution
Utilities: Water
General Industries: Aerospace
General Industries: Auto Parts
General Industries: Builders Merchants
General Industries: Building and Construction Materials
General Industries: Chemicals Advanced Materials
General Industries: Chemicals, Commodity
General Industries: Chemicals, Speciality
General Industries: Defence
General Industries: Electronic Equipment
General Industries: Engineering General
General Industries: House Building
General Industries: Steel
Consumer Goods: Food Processors
Consumer Goods: Medical Equipment and Supplies
Consumer Goods: Other Healthcare
Consumer Goods: Pharmaceuticals
Consumer Goods: Telecom Equipment

*Note:* Table reported in Salama et al. (2012)'s paper.

## Appendix C. Time line





## Appendix D. Variable Definitions

<i>Variable names</i>	<i>Variable definitions</i>
<i>ENV</i>	Environmental score provided by ASSET4
<i>POST</i>	1 in the post-restatement period; 0 otherwise
<i>RESTATING</i>	1 for restating firm-year observations; 0 otherwise
<i>SEVERITY</i>	$\text{Error}_t / \text{total assets}_{t-1}$
<i>ASSETS</i>	The natural logarithm of total assets
<i>RESEARCH</i>	Research and development expense / total assets
<i>LEV</i>	Total debt / total assets
<i>ROA</i>	Earnings before interest and taxes / total assets
<i>CFO</i>	Cash flow from operations / total assets
<i>CORPGOV</i>	Corporate governance score provided by ASSET4
<i>ANALYSTS</i>	The number of analysts providing an EPS forecast for a firm
<i>INSTOWN%</i>	The percentage of institutional ownership
<i>Country dummies</i>	Country dummies
<i>Year dummies</i>	Year dummies

**FAMILY FIRMS AND THE SEVERITY OF ACCOUNTING  
RESTATEMENT: EVIDENCE FROM IFRS-ADOPTING  
COUNTRIES.**

**Abstract.**

*In this study, we examine the relationship between family firms and the severity of accounting restatement relative to non-family firms. Using a cross-national sample of firms listed in 23 IFRS-adopting countries, we document that family firms exhibit less severe financial restatements than non-family firms. Further investigation suggests that high familial involvement in ownership and management refrain family firms from committing more severe financial restatements. Our results are consistent with the socioemotional wealth argument that family members tend to avoid the negative reputational consequences that result from accounting restatement. Our study contributes to the extant literature on family firms by providing insight into the understudied research area regarding accounting failure.*

**KEYWORDS:** accounting restatement; error severity; family firms; socioemotional wealth.

## ***1. INTRODUCTION***

Accounting restatement occurs when material errors regarding previously released financial statements are discovered in a subsequent period, and these prior period errors are corrected in the comparative information presented in the financial statements for that subsequent period (IAS 8, par. 41).

Accounting restatement results in stock price decline (Palmrose et al., 2004; Hitz et al., 2014), higher cost of capital (Hribar & Jenkins, 2004; Graham et al., 2008) and auditor resignation (Huang & Scholz, 2012).

In spite of a stream of research examined the adverse consequences of financial restatement, there is relatively little attention focusing on the role of the controlling shareholders in accounting failure. The aim of this paper is to fill this gap in literature by analysing whether the severity of accounting errors differs between family firms and non-family firms. Moreover, we investigate the unexplored questions of whether family involvement in ownership and in management influences restatement severity. Drawing on Gomez-Mejia et al. (2011; 2014), we expect that managers in family firms commit less serious financial restatement since they try to preserve firm value for future generations. Previous literature based on socioemotional wealth documents that family firms exhibit lower level of earnings management activity compared to non-family firms (Martin et al., 2016; Achleitner et al., 2014). In addition, in line with socioemotional wealth theory, we expect that large family involvement in ownership and management should refrain family firms from committing more serious accounting restatements.

We test our hypotheses using a sample of 201 firms listed in 23 IFRS-adopting countries that restated their financial statements between 2006 and 2014. Our findings show that accounting errors are less severe for family firms compared to non-family firms. In addition, we document that a family CEO that serves as a board chair prevents losses of socioemotional wealth when family owners have large equity stake in the firm.

Our analysis makes several contributions to literature.

*In primis*, our study extends previous literature that explores the propensity of family firms to engage in accounting restatement (Ma et al., 2016; Tong, 2007). More specifically, since restatements range in seriousness from unintended accounting errors to outright frauds, compared with previous studies we utilize a more refined proxy that let us to examine the differences in magnitude of accounting errors. It constitutes a more direct measure of both the adverse consequences faced by restating firms following restatement announcement

(Palmrose et al., 2004; Albring et al., 2013) and the level of opportunistic managerial manipulation (Burns & Kedia, 2006).

Secondly, Salvato & Moores (2010, p. 206) report that “*accounting fails to receive attention as a phenomenon that merits distinct consideration*” so our findings provide answers to scholars’ invitations to further research.

Finally, in the family business literature, agency theory still represents the most widely diffused and supported theoretical framework for accounting research on family firms (Prencipe et al., 2014). Nevertheless, the adoption of different theoretical constructs, such as the socioemotional wealth perspective, which is grounded on the behavioural agency theory (Wiseman & Gomez-Mejia, 1998; Gomez-Mejia et al., 2000), is highly recommended by scholars (Berrone et al., 2012).

We focus our attention on the relationship between restatement severity and family controlled firms in an international context for two primary reasons.

Firstly, the main limitation of prior research in family firms is the adoption of a single national setting. To overcome this drawback, in this study we exploit the mandatory adoption of IFRS to analyse a sample of firms listed in 23 different countries. Secondly, restating firms provides a unique setting for examining the differences in accounting quality between family firms and non-family firms since restatement is a more direct proxy, compared with discretionary accruals and other accruals quality measures, to measure earnings quality (Francis, 2011; Dechow et al., 2010; DeFond & Zhang, 2014) and it can be easily detected without utilizing accounting models.

The rest of the paper follows the outline given below. Section Two both reviews the existing literature dealing with accounting restatement and situates socioemotional wealth theory within the framework of family firms. The third section outlines the development of the hypotheses tested in this research. Section Four describes the research model and the variables adopted. Section Five describes the sample and Section Six reports and discusses results. Lastly, Section Seven briefly concludes the paper.

## ***2. LITERATURE***

### ***a. Accounting Restatements and Family Firms***

An accounting restatement represents an acknowledgement by firms that previously released financial statements have been affected by a material omission or misstatement (Palmrose & Scholz, 2004). Restatements call into question the credibility of a firm’s future financial statements, increasing company risk (Kravet & Shevlin, 2010) since

restatement often reveals that the company is in worse condition than it previously appeared. Companies announcing restatements suffer adverse consequences, including managerial turnover in top management (Desai et al., 2006; Karpoff et al., 2008a), higher audit fees (Feldmann et al., 2009) and stock price declines (Palmrose et al., 2004; Hitz et al., 2012). Besides, researchers have demonstrated that restating firms experience significant rise in the cost of capital after financial restatement. Hribar & Jenkins (2004) document that firms undergo a significant increase in the cost of equity after restatement announcements and Graham et al. (2008) find that loans initiated after restatement have higher loan spreads and more stringent loan contract terms compared with loans initiated before restatement and that firms continue to pay high loan spreads for five years post-restatement. Accounting restatement signals not only low quality financial reporting (Dechow et al., 2010; DeFond & Zhang, 2014) but also poor ethics in accounting (Staubus, 2005). For instance, Ettredge et al. (2010) evidence that managers manipulate earnings in years preceding the misstatement period and Efendi et al. (2007) and Burns & Kedia (2006) find that CEOs with greater equity based incentives have greater propensity to misreport their financial statements. Even though a large volume of previous research has focused on the negative consequences of accounting restatement, low priority in the relevant literature has been attributed to the role of dominant shareholders. Ma et al. (2016) and Tong (2007) find that family firms have lower propensity to commit accounting errors. Moreover, Ma et al. (2016) underline that family controlled firms suffer larger negative market reactions in the post restatement period compared to non-family controlled firms.

Family firms are dominant among both private and public companies worldwide (Shanker & Astrachan, 1996), and the activism of the family in the ownership and management of the firm, well known as family “involvement” (Prencipe et al., 2014), produces a specific agency context in a publicly held firms.

Family involvement in ownership is a unique governance pattern for publicly traded firms. While ownership concentration in the hands of the founding family reduces conflicts between owners and managers, it intensifies the conflicts between one or a group of large family shareholders and a fringe of small minority shareholders, so-called Type II Agency Problem (Jensen & Meckling, 1976). Ownership concentration produces two countervailing effects on the governance of companies: the alignment effect and the entrenchment effect (Wang, 2006). The former theory indicates that family owners have ample incentives to refrain from illegal acts since they are shareholders with long-run

investment horizon. Furthermore, they represent a group of investors that face more adverse consequences when engaging in financial misreporting due to greater reputational concerns and more severe agency problems between controlling and minority shareholders. In contrast, the entrenchment effect suggests that family owners' large equity stakes provide strong incentives to issue misleading corporate reports for gaining private benefits or maximizing their own interests at the expense of other shareholders. Previous studies have investigated extensively the impact of familial ownership concentration on accounting quality. Even though the results are sometimes opposing (Prencipe et al., 2008), previous works document that family firms are associated with higher earnings quality and better corporate disclosure (Wang, 2006; Ali et al., 2007).

***b. Family Involvement: Agency Theory and Socioemotional Wealth Construct.***

Agency theory is the dominant theoretical perspective in studies focusing on family firms (Prencipe et al., 2014). Nevertheless, issues elaborated under an agency framework, when dealing with family firms, often give rise to mixed or unexpected results. Agency theory adopts a parsimonious construct (Cuevas-Rodríguez et al., 2012) based on the simplistic assumptions of individual's opportunistic choices in economic exchanges, without recognizing the relevance of the social context in which the actors behave (Wiseman and Gomez-Mejia, 1998). Family owners often have non-financial objectives in addition to financial goals (Chrisman et al., 2012) and are more responsive to social claims than nonfamily counterparts (Cennamo et al., 2012). Thus, in family business studies, scholars recommend overcoming the limitations of agency theory and extending the boundaries of that framework by incorporating other theoretical perspectives (Cuevas-Rodríguez et al., 2012).

A number of theories that have been recently developed offer alternative explanations of phenomena. In this paper, the simplistic principal-agent contract is expanded since we test whether reputational penalties resulting from financial restatements (Karpoff et al., 2008b; Arthaud-Day et al., 2006) and aversion to inflating earnings owing to short-term capital market pressures (Chen et al., 2008) lead family principals to engage in less serious financial misrepresentations relative to non-family firms. This study is thus grounded on behavioural agency theory (Wiseman & Gomez-Mejia, 1998) and specifically on the socioemotional wealth construct, which is likely to become a

preferred theoretical “umbrella” in family business studies under which all distinctive behaviour of family firms can be sensibly explained (Berrone et al., 2012, p. 274).

### **3. HYPOTHESIS DEVELOPMENT**

Accounting restatement represents a source of corporate misconduct. Accounting restatement undermines the reputation of listed companies (Karpoff et al., 2008b) since it implies poor financial quality and a perception that firms have behaved unethically (Arthaud-Day et al., 2006). Accounting errors vary in severity, scholars evidence that the greater the magnitude of restatement, the larger the level of managerial opportunism (Burns & Kedia, 2006). In addition, Palmrose et al. (2004) and Albring et al. (2013) find that when restatement involves more negative adjustment of previously reported income firms suffer more negative returns and lower externally financed growth. Family control is generally valued by investors since it results in better financial reporting quality (Ali et al., 2007; Cascino et al., 2010; Wang, 2006) and lower corporate tax aggressiveness (Chen et al., 2010; Mafrolla & D’Amico, 2016; Steijvers & Niskanen, 2014). Similarly to other managerial opportunistic behaviours and in line with agency theory, we hypothesize that the magnitude of error restatement is less serious in family-controlled firms due to the occurrence of alignment of proprietor and manager interests. Kryzanowski & Zhang (2013) find that larger ownership concentration lowers the probability of accounting restatement. Similarly, in line with socioemotional wealth theory, the importance of non-financial objectives and the importance of socioemotional issues could reduce the extent to which family firms report opportunistically, thus alleviating the seriousness of accounting misstatement. Moreover, family-controlled firms have better corporate reputation (Deephouse & Jaskiewicz, 2013) and face more negative market reactions to an error disclosure than non-family firms (Ma et al., 2016). By comparison, anecdotal evidence suggests that even family firms incurred in high profile accounting scandals worldwide (e.g., Cirio and Parmalat in Italy and Adelphia, WorldCom and Rite Aid Corp. in the U.S.). In addition, Sue et al. (2013) document that family firms, to cover up expropriation wealth at the expense of minority shareholders, commit more severe accounting restatements. As a first step in this study, we test whether family firms are associated with less severe accounting restatement. Therefore, we propose the following hypothesis:

*H<sub>1</sub>: Family firms commit less severe financial restatement compared to nonfamily firms.*

Higher concentration of ownership in the hands of the family and the presence of family on board results in greater influence over the firm's strategic dimensions, so reinforcing the control dimension of socioemotional wealth. Berrone et al. (2010) find that family ownership has a positive effect on environmental performance within firms operating in polluting industries and argue that family owners with a controlling interest could exercise their influence on a firm's decisions more effectively if the family CEO is also the board chair. Deephouse & Jaskiewicz (2013) highlight that family involvement in firm ownership and boards is related to higher corporate reputations. In addition, it is crucial to underline that family firms suffer more negative market reactions than non-family firms when accounting errors are announced owing to higher reputation and long-term orientation that characterize them (Ma et al., 2016).

However, the dominance of the Type II Agency Problem is likely to produce an entrenchment effect because the high concentration of ownership and the active involvement of the family in the management of the firm impel the family to divert resources from the firm, addressing to their own purposes at the expense of minority shareholders. Fan and Wong (2002) document that in East Asian countries family ownership is associated with lower earnings quality and Yeh & Woidtke (2005) find that the prospect of rent extractions for personal (or familial) purposes at the expense of small shareholders is more likely to arise when the board is closely linked to familial large shareholders. Previous works with regard to accounting restatement typically support the argument for the entrenchment hypothesis. Indeed, Agrawal & Chadha (2005) and Leone & Liu (2010) find that firms in which the CEO belongs to the founding family have higher probability to restate their financial statements and are less likely to fire the CEO after the revelation of accounting irregularities.

In sum, family owners and family managers are in a unique position to influence financial reporting quality. Given the larger seriousness of negative consequences for family businesses in cases of revelation of accounting restatement we hypothesize that family controlled firms with larger involvement of family members in ownership and management will commit less severe financial restatement. Thus, in line with socioemotional wealth theory, the following hypotheses are formulated and tested:

*H<sub>2</sub>: Larger family influence in ownership and management results in lower error severity.*

## **4. RESEARCH DESIGN**

### ***a. Empirical Model***



We examine whether family firms commit less severe accounting restatement using the following equation:

$$SEVERITY = \alpha_0 + \beta_1 F\_FAM + \gamma_1 ASSETS + \gamma_2 NEG\_EPS + \gamma_3 LEV + \gamma_4 ROA + \gamma_5 CFO + \gamma_6 BIG4 + \gamma_n \text{Country dummies} + \gamma_k \text{Industry dummies} + \varepsilon \quad (1)$$

To test our second hypotheses, we restrict the sample to family-controlled firms and run the following regression:

$$SEVERITY = \alpha_0 + \beta_2 FAM\_OWN + \beta_3 CEO\_DUA + \beta_4 FAM\_OWN*CEO\_DUA + \gamma_1 ASSETS + \gamma_2 NEG\_EPS + \gamma_3 LEV + \gamma_4 ROA + \gamma_5 CFO + \gamma_6 BIG4 + \gamma_k \text{Industry dummies} + \varepsilon \quad (2)$$

All of the independent variables in Models (1) and (2) are measured in the year when the misstatement occurs. For restating firms that correct more than one year, we measure the independent variables in the last year in which the misstatement occurs. For regressions (1) and (2), we utilized robust standard errors to correct for heteroscedasticity (White, 1980). We adopt ordinary least squares procedure to estimate both Equations (1) and (2). We drop country dummies in Equation (2) to reduce multicollinearity concerns.

### ***b. Description of the Variables***

The research model adopted in this work is based on three different sets of variables. Firstly, the dependent variable is a proxy for restatement severity. Secondly, the explanatory variables capture the level of involvement of the family in the ownership and management of the firms, measured as the level of socioemotional endowment of the family. Thirdly, we add several financial controls to the models that are typically adopted in the accounting restatement literature.

In Equations (1) and (2), the dependent variable *SEVERITY* equals error amount divided by total assets at the first fiscal year-end before the announcement of the restatement and multiplied by 100. Higher values of *SEVERITY* represent more serious restatements. Prior research suggests that restatements with more negative income effects are of greater concern to market participants (Palmrose et al., 2004) and leads to higher

turnover rate of audit committee members (Srinivasan, 2005). The first explanatory variable used in Equation (1) designates the firm as family or nonfamily based on the measurement of family proprietorship in the equity and family activity in the management of the firm. The first variable is a general indicator of family status and is measured as a dichotomous variable. In order to test whether family firms commit less severe accounting errors in our sample we adopt the independent variable  $F\_FAM$  equals 1 if: (1) one or more family members are officers or directors of the firm; and (2) family members own 20% or more of the firm's equity, either individually or as a group. Similarly to Cruz et al. (2010), we decided to adopt the threshold of 20 percent family stock ownership suggested by La Porta et al. (1999). In line with Hypothesis 1, we expect a negative relationship between  $F\_FAM$  and  $SEVERITY$  in Equation (1). The "family involvement approach" is widely used in empirical research (Prencipe et al., 2014) to define at which level the family is engaged in the firm's activities. It offers an opportunity to switch from a dichotomous approach to a multifaceted approach, showing that the involvement of the family in the firm is a heterogeneous phenomenon. Following a socioemotional wealth perspective, family involvement signals to external stakeholders the family's priority of preserving the various dimensions of socioemotional wealth (Berrone et al., 2012). It is measured as a family's implication in ownership and management, and it can show the salience of the socioemotional wealth. The socioemotional wealth construct is composed of five major dimensions. In this paper, we focus on family control and influence, which is the socioemotional dimension most widely adopted by empirical literature (Berrone et al., 2012). We use the continuous value of the sum of percentages of ownership held by different individuals of the same family group ( $FAM\_OWN$ ) to measure family involvement in ownership. Moreover, we add the indicator variable  $CEO\_DUA$  to distinguish a situation in which the CEO and chairperson are the same individual and belongs to family to measure family involvement in management. In this situation, the power of control is exerted directly by a family member. In addition, to test  $H_2$  we include the interaction term  $FAM\_OWN$  and  $CEO\_DUA$ . Braun and Sharma (2007) hypothesize that both a family member as CEO-chair and high family ownership can lead to higher business performance. Following prior literature on accounting restatement (Kinney & McDaniel, 1989; Ma et al., 2016; Agrawal & Chadha, 2005), we include the following control variables in our model:  $ASSETS$ ,  $NEG\_EPS$ ,  $LEV$ ,  $ROA$ ,  $CFO$ ,  $BIG4$ , and country and industry dummies.  $ASSETS$  controls for firm size, it is the natural logarithm of total assets. Kinney &

McDaniel (1989) find that smaller firms have higher probabilities to correct their financial statements. *NEG\_EPS* is a dummy variable equals one if a firm has a negative earnings per share, and 0 otherwise. Ma et al. (2016) document that firms with net loss are more likely to misstate their financial reports. Consequently, we expect *SEVERITY* to be negatively related to *ASSETS*, but positively related to *NEG\_EPS*. We also include firm leverage (*LEV*), measured as total debt divided by total assets to control for debt-dependence, and *ROA*, which is earnings before interest and taxes scaled by total assets to account for firm profitability, since Kinney & McDaniel (1989) report that restating firms are less profitable and have higher debt compared to non-restating firms. Accordingly, we predict a negative association between *SEVERITY* and *ROA*, but a positive association between *SEVERITY* and *LEV*. We included *CFO*, which is cash flow from operations scaled by total assets, to control for firm liquidity. We predict *CFO* to be negatively related to *SEVERITY*. We proxy the quality of external auditing by adopting the binary variable *BIG4*, which equals 1 if the auditor is a Big 4 auditing company, and 0 otherwise (Agrawal & Chadha, 2005). Since Carcello & Nagy (2004) find that accounting fraud is less likely to occur for firms audited by Big audit companies, we expect a negative relationship between *BIG4* and *SEVERITY*. Lastly, we included country indicators to control for country effects and control for industry effects by utilizing binary variables based on the one-digit SIC code (Graham et al., 2008), since previous studies have shown that restatements are more likely in some industries (Beneish, 1999; Burns and Kedia, 2006).

## **5. SAMPLE SELECTION AND DESCRIPTIVE STATISTICS**

We examined a sample of listed companies that restated their financial statements over the period between 2006 and 2014. We begin the sample collection procedure by including all listed firms from countries mandatorily adopting IFRS since at least 31/12/2005, excluding banks (Standard Industrial Classification codes 6000-6199), in line with previous works (Stanley & Sharma, 2011; Perols & Lougee, 2011). Similarly to Daske et al. (2008), the countries involved in our study are Australia, Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hong Kong, Hungary, Ireland, Italy, Luxemburg, the Netherlands, Norway, Philippines, Poland, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, the United Kingdom and Venezuela. Our data are provided by Datastream. We used Datastream database by Thompson Reuters to identify firms that restated the annual financial statements prepared in accordance with the IFRSs.

We collect data about audit firms on Thomson Reuters Eikon. We manually collected information about the amount of error corrections using the annual reports available both on corporate websites and in Osiris database provided by Bureau van Dijk. We found 362 restating firms. After dropping observations with missing values on Datastream, missing governance data or family firm data, our final sample contains 201 restating firms. The mean, median, and quartile amount for the variables are displayed in Table 1.

-----  
Insert Table 1 about here  
-----

The amount of accounting error represents about 3.03% of total assets. This value is much similar to the work carried out by Kryzanowski & Zhang (2013), i.e. 2.7%. The mean value of *F\_FAM* reports that the majority of restating firms are non-family controlled ( $mean(F\_FAM)=0.3831$ ). There is a considerable variation in firm size, as average total assets is 7.928 € billion, whereas median total assets is slightly more than 0.266 € billion. Restating firms that reported a negative earnings per share constitute nearly 40% of our observations ( $mean(NEG\_EPS)=0.393$ ). Sample firms are highly indebted ( $mean(LEV)=0.23779$ ) and, generally, not highly profitable, considering that they have an *ROA* that on average equals -0.01055. On average, firms in our sample have a scarce liquidity ( $mean(CFO)=0.029721$ ). In the end, the majority of restating firms are audited by a Big 4 auditing company ( $mean(BIG4)=0.602$ ).

Table 2 presents a breakdown of our sample firms based on countries and industries.

-----  
Insert Table 2 about here  
-----

Table 2 shows the national distribution of restating firms. For example, during 2006-2014, 10 firms listed in Italy restated their financial statements. It indicates that firms are listed in 23 different countries, and that the majority of them are listed in Australia, Germany and in the United Kingdom. Firms listed in France, Germany and Italy account for nearly a third of our sample firms. Besides, Table 2 shows the industry distribution of restating firms by one-digit SIC group. Quite clearly, manufacturing industry has the highest proportion of

accounting restatements, which is similar to other studies carried out in prior fraud (Beneish, 1997; Perols & Lougee, 2011) and restatement research (Kryzanowski & Zhang, 2013).

Table 3 provides the Pearson correlations of variables used in the models.

-----  
Insert Table 3 about here  
-----

*FAM\_OWN* is positively related to *CEO\_DUA*, showing that the higher the firm ownership held by family members, the higher the probability of appointing a familial CEO as chairman of the board ( $\rho=0.30$ ). *ASSETS* is negatively correlated with *F\_FAM* ( $\rho=-0.21$ ) and *NEG\_EPS* ( $\rho=-0.32$ ), but positively related to *LEV* ( $\rho=0.31$ ), *ROA* ( $\rho=0.30$ ), *CFO* ( $\rho=0.29$ ) and *BIG4* ( $\rho=0.42$ ). *LEV* is positively related to *CFO* ( $\rho=0.16$ ), indicating that highly leveraged firms have larger liquidity. Lastly, as expected, *ROA* is highly correlated with *CFO* ( $\rho=0.58$ ).

## 6. RESULTS

Table 4 reports the results of the regression analysis.

-----  
Insert Table 4 about here  
-----

We estimate two different specifications of our multivariate regression models, one including the full sample of restating firms (Model 1), and one restricting to family controlled firms (Model 2). We contend that family controlled firms should place a relatively greater value on avoiding reputational problems associated with more severe accounting restatement compared to non-family controlled firms. Moreover, we hypothesize that larger involvement in ownership and management of family members should refrain family firms from committing more severe accounting errors. *In primis*, consistent with H<sub>1</sub>, we find that *F\_FAM* is significantly and negatively related with *SEVERITY* ( $\beta_1 < 0$ ,  $p\text{-value} < 0.05$ ). Particularly, we document that for family controlled firms, compared to non-family controlled firms, *SEVERITY* decreases by 2.28. This result reveals a tendency of family firms analysed to incur in less severe accounting restatement than non-family controlled firms. We

also find a negative significant impact of  $FAM\_OWN*CEO\_DUA$  ( $\beta_4 < 0$ ,  $p\text{-value} < 0.10$ ) on *SEVERITY*. Consequently, in our analyses we document a negative effect on restatement severity for family controlled firms with high levels of familial ownership and a family CEO also serving as board chair ( $H_2$ ). As a robustness test in Models (1) and (2) we measure the independent variables in the first year in which the misstatement occurs for firms that restated more than one years. The results are displayed in Table 5.

-----  
Insert Table 5 about here  
-----

Results shown in Table 5 validates our hypotheses since  $F\_FAM$  ( $\beta_1 < 0$ ;  $p\text{-value} < 0.05$ ) and  $FAM\_OWN*CEO\_DUA$  ( $\beta_4 < 0$ ;  $p\text{-value} < 0.05$ ) retain their signs and statistical significance. We also find significant impacts of some control variables on *SEVERITY*. *ASSETS* is significantly and negatively related to *SEVERITY* ( $\gamma_1 < 0$ ,  $p\text{-value} < 0.05$ ) in Models (1) and (2). Also, we document a significant and positive impact of *NEG\_EPS* on *SEVERITY* ( $\gamma_2 > 0$ ,  $p\text{-value} < 0.05$ ) in Table 5, Column (1), in line with our expectations. In the end, we report that the quality of external auditor plays a crucial role in detecting and minimizing the misstatement occurrence ( $\gamma_6 < 0$ ,  $p\text{-value} < 0.05$ ) in the subsample of family firms.

## 7. CONCLUSION

Earnings management and accounting restatement have been extensively studied by academics.

While earnings management represents within generally accepted accounting practices manipulation, a financial restatement highlights that firms have engaged in illegal practices, intentionally or unintentionally (Ettredge et al., 2010). Considering the unique characteristics of family firms, such as their ownership structure and their concerns about family reputation, it is fundamental to study whether family firms exhibit greater or lower seriousness in accounting failures compared to their non-family counterparts. Furthermore, we examine whether family socioemotional wealth, measured as family involvement in the ownership and management of a firm, affects the severity of accounting misstatements. Our results show that family firms are less apt to commit more serious accounting restatement than non-family firms. This means that family owners are more concerned about the reputational consequences of their actions than non-family owners. In addition, recognizing

heterogeneity across family firms, our study suggests that having large family ownership and a family CEO as board chair significantly improve the preservation of socioemotional wealth. Our robustness tests confirm our findings.

The contributions to the literature offered in this paper are manifold.

*In primis*, as opposed to the binary approach of using financial restatements adopted by Ma et al. (2016) and Tong (2007), we utilized error severity that provides us a more refined measure of the degree of accounting misconduct.

Second, as a main contribution to the literature, we evidence that family-based firms adopt higher quality financial reporting practices compared with nonfamily-based firms, confirming the results of previous research drawn upon socioemotional wealth theory (Martin et al., 2016; Achleitner et al., 2014), notwithstanding the different institutional setting of this research carried out by utilizing a cross-national sample. In the end, this work provides initial evidence with regard to the study of accounting fails in family firms which have been largely neglected in prior literature (Salvato & Moores, 2010).

## **REFERENCES**

- Achleitner, A. K., Günther, N., Kaserer, C., & Siciliano, G. (2014). Real earnings management and accrual-based earnings management in family firms. *European Accounting Review*, 23(3), 431-461.
- Agrawal, A., & Chadha, S. (2005). Corporate governance and accounting scandals. *Journal of Law and Economics*, 48(2), 371-406.
- Albring, S. M., Huang, S. X., Pereira, R., & Xu, X. (2013). The effects of accounting restatements on firm growth. *Journal of Accounting and Public Policy*, 32(5), 357-376.
- Ali, A., Chen, T. Y., & Radhakrishnan, S. (2007). Corporate disclosures by family firms. *Journal of Accounting and Economics*, 44(1-2), 238-286.
- Arthaud-Day, M. L., Certo, S. T., Dalton, C. M., & Dalton, D. R. (2006). A changing of the guard: Executive and director turnover following corporate financial restatements. *Academy of Management Journal*, 49(6), 1119-1136.
- Beneish, M. D. (1997). Detecting GAAP violation: Implications for assessing earnings management among firms with extreme financial performance. *Journal of Accounting and Public Policy*, 16(3), 271-309.
- Beneish, M. D. (1999). Incentives and penalties related to earnings overstatements that violate GAAP. *The Accounting Review*, 74(4), 425-457.
- Berrone, P., Cruz, C., & Gomez-Mejia, L. R. (2012). Socioemotional wealth in family firms theoretical dimensions, assessment approaches, and agenda for future research. *Family Business Review*, 25(3), 258-279.
- Berrone, P., Cruz, C., Gomez-Mejia, L. R., & Larraza-Kintana, M. (2010). Socioemotional wealth and corporate responses to institutional pressures: Do family-controlled firms pollute less?. *Administrative Science Quarterly*, 55(1), 82-113.
- Braun, M., & Sharma, A. (2007). Should the CEO also be chair of the board? An empirical examination of family-controlled public firms. *Family Business Review*, 20(2), 111-126.
- Burns, N., & Kedia, S. (2006). The impact of performance-based compensation on misreporting. *Journal of Financial Economics*, 79(1), 35-67.
- Burns, N., & Kedia, S. (2008). Executive option exercises and financial misreporting. *Journal of Banking & Finance*, 32(5), 845-857.
- Burns, N., Kedia, S., & Lipson, M. (2010). Institutional ownership and monitoring: Evidence from financial misreporting. *Journal of Corporate Finance*, 16(4), 443-455.



- Carcello, J. V., & Nagy, A. L. (2004). Audit firm tenure and fraudulent financial reporting. *Auditing: A Journal of Practice & Theory*, 23(2), 55-69.
- Cascino, S., Pugliese, A., Mussolino, D., & Sansone, C. (2010). The influence of family ownership on the quality of accounting information. *Family Business Review*, 23(3), 246-265.
- Cennamo, C., Berrone, P., Cruz, C., Gomez-Mejia, L. (2012) Socioemotional wealth and proactive stakeholder engagement: Why family-controlled firms care more about their stakeholders, *Entrepreneurship: Theory and Practice*, 36, 1153-1173.
- Chen, S., Chen, X. I. A., & Cheng, Q. (2008). Do family firms provide more or less voluntary disclosure?. *Journal of Accounting Research*, 46(3), 499-536.
- Chen, S., Chen, X., Cheng, Q., & Shevlin, T. (2010). Are family firms more tax aggressive than non-family firms?. *Journal of Financial Economics*, 95(1), 41-61.
- Chrisman, J. J., Chua, J., Pearson, A., & Barnett, T. (2012). Family involvement, family influence, and family centered non-economic goals in small firms. *Entrepreneurship Theory and Practice*, 36, 267–293.
- Cruz, C. C., Gómez-Mejia, L. R., & Becerra, M. (2010). Perceptions of benevolence and the design of agency contracts: CEO-TMT relationships in family firms. *Academy of Management Journal*, 53(1), 69-89.
- Cuevas-Rodriguez, G., Gomez-Mejia, L. R., & Wiseman, R. M., (2012). Has agency theory run its course? Making the theory more flexible to inform the management of reward systems. *Corporate Governance: An International Review*, 20(6), 526-546.
- Daske, H., Hail, L., Leuz, C., & Verdi, R. (2008). Mandatory IFRS reporting around the world: Early evidence on the economic consequences. *Journal of Accounting Research*, 46(5), 1085-1142.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1996). Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research*, 13(1), 1-36.
- Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, 50(2), 344-401.
- Deephouse, D. L., & Jaskiewicz, P. (2013). Do family firms have better reputations than non-family firms? An integration of socioemotional wealth and social identity theories. *Journal of Management Studies*, 50(3), 337-360.

- DeFond, M. L., & Jiambalvo, J. (1991). Incidence and circumstances of accounting errors. *The Accounting Review*, 66(3), 643-655.
- DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics*, 58(2), 275-326.
- Desai, H., Hogan, C. E., & Wilkins, M. S. (2006). The reputational penalty for aggressive accounting: Earnings restatements and management turnover. *The Accounting Review*, 81(1), 83-112.
- Donoher, W. J., Reed, R., & Storrud-Barnes, S. F. (2007). Incentive alignment, control, and the issue of misleading financial disclosures. *Journal of Management*, 33(4), 547-569.
- Efendi, J., Srivastava, A., & Swanson, E. P. (2007). Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics*, 85(3), 667-708.
- Ettredge, M., Scholz, S., Smith, K. R., & Sun, L. (2010). How do restatements begin? Evidence of earnings management preceding restated financial reports. *Journal of Business Finance & Accounting*, 37(3-4), 332-355.
- Fan, J. P., & Wong, T. J. (2002). Corporate ownership structure and the informativeness of accounting earnings in East Asia. *Journal of Accounting and Economics*, 33(3), 401-425.
- Feldmann, D. A., Read, W. J., & Abdolmohammadi, M. J. (2009). Financial restatements, audit fees, and the moderating effect of CFO turnover. *Auditing: A Journal of Practice & Theory*, 28(1), 205-223.
- Francis, J. R. (2011). A framework for understanding and researching audit quality. *Auditing: A Journal of Practice & Theory*, 30(2), 125-152.
- Gomez-Mejia, L. R., Cruz, C., & Imperatore C. (2014) Financial reporting and the protection of socioemotional wealth in family-controlled firms, *European Accounting Review*, 23 (3): 387-402.
- Gomez-Mejia, L. R., Cruz, C., Berrone, P., & De Castro, J. (2011). The bind that ties: Socioemotional wealth preservation in family firms. *The Academy of Management Annals*, 5(1), 653-707.
- Gomez-Mejia, L. R., Welbourne, T. M. & Wiseman, R. M. (2000). The role of risk sharing and risk taking under gain-sharing. *Academy of Management Review*, 25, 492-507.
- Graham, J. R., Li, S., & Qiu, J. (2008). Corporate misreporting and bank loan contracting. *Journal of Financial Economics*, 89(1), 44-61.

- Hennes, K. M., Leone, A. J., & Miller, B. P. (2014). Determinants and market consequences of auditor dismissals after accounting restatements. *The Accounting Review*, 89(3), 1051-1082.
- Hitz, J.-M., Ernstberger, J., & Stich, M. (2012). Enforcement of Accounting Standards in Europe: Capital- Market-Based Evidence for the Two-Tier Mechanism in Germany. *European Accounting Review*, 21(2), 253-281.
- Hribar, P., & Jenkins, N. T. (2004). The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review of Accounting Studies*, 9(2-3), 337-356.
- Huang, Y., & Scholz, S. (2012). Evidence on the association between financial restatements and auditor resignations. *Accounting Horizons*, 26(3), 439-464.
- IASB – International Accounting Standards Board (2005). *International Accounting Standard (IAS) no. 8 – Accounting Policies, Changes in Accounting Estimates and Errors*, December 2005: London.
- Jensen, M., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3, 303-360.
- Karpoff, J. M., Lee, D. S., & Martin, G. S. (2008a). The consequences to managers for financial misrepresentation. *Journal of Financial Economics*, 88(2), 193-215.
- Karpoff, J. M., Lee, D. S., & Martin, G. S. (2008b). The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis*, 43(3), 581-611.
- Kinney, W. R., & McDaniel, L. S. (1989). Characteristics of firms correcting previously reported quarterly earnings. *Journal of Accounting and Economics*, 11(1), 71-93.
- Kravet, T., & Shevlin, T. (2010). Accounting restatements and information risk. *Review of Accounting Studies*, 15(2), 264-294.
- Kryzanowski, L., & Zhang, Y. (2013). Financial restatements and Sarbanes–Oxley: Impact on Canadian firm governance and management turnover. *Journal of Corporate Finance*, 21, 87-105.
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. *Journal of Finance*, 54(2), 471–517.
- Leone, A. J., & Liu, M. (2010). Accounting irregularities and executive turnover in founder-managed firms. *The Accounting Review*, 85(1), 287-314.
- Ma, L., Ma, S., & Tian, G. G. (2016). Family control, accounting misstatements, and market reactions to restatements: Evidence from China. *Emerging Markets Review*, 28, 1-27.
- Mafrolla, E., & D’Amico, E. (2016). Tax aggressiveness in family firms and the non-linear entrenchment effect. *Journal of Family Business Strategy*, 7(3), 178-184.

Martin, G., Campbell, J. T., & Gomez-Mejia, L. (2016). Family control, socioemotional wealth and earnings management in publicly traded firms. *Journal of Business Ethics*, 133(3), 453-469.

Palmrose, Z. V., & Scholz, S. (2004). The accounting causes and legal consequences of non-GAAP reporting: evidence from restatements. *Contemporary Accounting Research*, 21(1), 139-180.

Palmrose, Z. V., Richardson, V. J., & Scholz, S. (2004). Determinants of market reactions to restatement announcements. *Journal of Accounting and Economics*, 37(1), 59-89.

Perols, J. L., & Lougee, B. A. (2011). The relation between earnings management and financial statement fraud. *Advances in Accounting*, 27(1), 39-53.

Prencipe, A., Bar-Yosef, S., Dekker, H. C. (2014). Accounting research in family firms: Theoretical and empirical challenges, *European Accounting Review*, 23: 361-385.

Prencipe, A., Bar-Yosef, S., Mazzola, P., & Pozza, L. (2011). Income Smoothing in Family-Controlled Companies: Evidence from Italy. *Corporate Governance: An International Review*, 19(6), 529-546.

Prencipe, A., Markarian, G., and Pozza, L. (2008) Earnings management in family firms: Evidence from R&D cost capitalization in Italy. *Family Business Review*, 21: 71-88.

Salvato, C., & Moores, K. (2010). Research on accounting in family firms: Past accomplishments and future challenges. *Family Business Review*, 23(3), 193-215.

Shanker, M. C., & Astrachan, J. H. (1996). Myths and realities: Family businesses' contribution to the US economy- A framework for assessing family business statistics. *Family Business Review*, 9(2), 107-123.

Srinivasan, S. (2005). Consequences of financial reporting failure for outside directors: Evidence from accounting restatements and audit committee members. *Journal of Accounting Research*, 43(2), 291-334.

Stanley, B. W., & Sharma, V. I. (2011). To cheat or not to cheat: How bank debt influences the decision to misreport. *Journal of Accounting, Auditing & Finance*, 26(2), 383-414.

Staubus, G. J. (2005). Ethics failures in corporate financial reporting. *Journal of Business Ethics*, 57(1), 5-15.

Steijvers, T. & Niskanen, M. (2014). Tax aggressiveness in private family firms: An agency perspective. *Journal of Family Business Strategy*, 5, 347–357 .

Sue, S. H., Chin, C. L., & Chan, A. L. C. (2013). Exploring the causes of accounting restatements by family firms. *Journal of Business Finance & Accounting*, 40(9-10), 1068-1094.

- Tong, Y. H. (2007). Financial reporting practices of family firms. *Advances in Accounting*, 23, 231-261.
- Wang, D. (2006). Founding family ownership and earnings quality. *Journal of Accounting Research*, 44(3), 619-656.
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica*, 48(4), 817-838.
- Wiseman, R. M., & Gomez-Mejia, L. R. (1998). A behavioral agency model of managerial risk taking. *Academy of Management Review*, 23: 133–153.
- Yeh, Y. H., & Woidtke, T. (2005). Commitment or entrenchment?: Controlling shareholders and board composition. *Journal of Banking & Finance*, 29(7), 1857-1885.

**Table1**  
**Descriptive Statistics**

<i>Variables</i>	<i>Min</i>	<i>1<sup>st</sup> Quar.</i>	<i>Median</i>	<i>Mean</i>	<i>3<sup>rd</sup> Quar.</i>	<i>Max</i>	<i>N</i>
<i>SEVERITY</i>	0.00032	0.22930	0.72480	3.03400	2.41300	82.75000	201
<i>F_FAM</i>	0	0	0	0.3831	1	1	201
<i>FAM_OWN</i>	0.2018	0.3005	0.4390	0.4583	0.5810	0.96	77
<i>CEO_DUA</i>	0	0	0	0.2468	0	1	77
<i>ASSETS</i>	1.052	66.400	266.300	7,928	997.300	708,300	201
<i>NEG_EPS</i>	0	0	0	0.393	1	1	201
<i>LEV</i>	0	0.05778	0.20588	0.23779	0.35583	1.0956	201
<i>ROA</i>	-1.44526	-0.03860	0.04474	-0.01055	0.08700	0.78949	201
<i>CFO</i>	-1.746395	-0.002211	0.050698	0.029721	0.087718	0.981382	201
<i>BIG4</i>	0	0	1	0.602	1	1	201

*Note: ASSETS is not log-transformed and reported in millions €.*

**Table 2**  
**Descriptive Statistics**

<i>Countries</i>	<i># of firms</i>	<i>Industries</i>	<i>2-digit SIC code</i>	<i># of firms</i>
<i>AUSTRALIA</i>	41	<i>AGRICOLTURE</i>	[01-09]	4
<i>AUSTRIA</i>	2	<i>MINING</i>	[10-19]	40
<i>BELGIUM</i>	1	<i>COMMODITY</i>	[20-29]	18
<i>DENMARK</i>	3	<i>MANUFACTURING</i>	[30-39]	43
<i>FINLAND</i>	6	<i>TRANSPORTATION AND UTILITIES</i>	[40-49]	21
<i>FRANCE</i>	16	<i>WHOLESALE AND RETAIL</i>	[50-59]	18
<i>GERMANY</i>	38	<i>FINANCIAL</i>	[62-69]	19
<i>GREECE</i>	3	<i>PERSONAL</i>	[70-79]	31
<i>HONG KONG</i>	2	<i>HEALTH AND OTHER SERVICES</i>	[80-89]	7
<i>HUNGARY</i>	1	<i>TOTAL</i>		201
<i>IRELAND</i>	2			
<i>ITALY</i>	10			
<i>NORWAY</i>	5			
<i>PHILIPPINES</i>	1			
<i>POLAND</i>	15			
<i>THE CZECH REPUBLIC</i>	1			
<i>THE NETHERLANDS</i>	1			
<i>THE UK</i>	34			
<i>SINGAPORE</i>	3			
<i>SOUTH AFRICA</i>	8			
<i>SPAIN</i>	1			
<i>SWEDEN</i>	4			
<i>SWITZERLAND</i>	3			
<i>TOTAL</i>	201			

*Note: We exclude depository institutions (2-digit SIC code 60) and non-depository credit institutions (2-digit SIC code 61).*

**Table 3**  
**Pearson's Correlation Matrix**

<i>Variables</i>	<i>F_FAM</i> <i>[1]</i>	<i>[2]</i>	<i>[3]</i>	<i>[4]</i>	<i>[5]</i>	<i>[6]</i>	<i>[7]</i>	<i>[8]</i>
<i>FAM_OWN [2]</i>	-							
<i>CEO_DUA [3]</i>	-	<b>0.30</b> <b>(0.01)</b>						
<i>ASSETS [4]</i>	<b>-0.21</b> <b>(0.00)</b>	0.05 <i>(0.67)</i>	0.08 <i>(0.48)</i>					
<i>NEG_EPS [5]</i>	0.02 <i>(0.83)</i>	-0.03 <i>(0.80)</i>	0.02 <i>(0.85)</i>	<b>-0.32</b> <b>(0.00)</b>				
<i>LEV [6]</i>	-0.02 <i>(0.78)</i>	-0.06 <i>(0.61)</i>	0.15 <i>(0.20)</i>	<b>0.31</b> <b>(0.00)</b>	0.10 <i>(0.14)</i>			
<i>ROA [7]</i>	0.05 <i>(0.49)</i>	-0.02 <i>(0.85)</i>	0.08 <i>(0.47)</i>	<b>0.30</b> <b>(0.00)</b>	<b>-0.59</b> <b>(0.00)</b>	0.11 <i>(0.11)</i>		
<i>CFO [8]</i>	0.02 <i>(0.74)</i>	0.10 <i>(0.40)</i>	0.00 <i>(0.99)</i>	<b>0.29</b> <b>(0.00)</b>	<b>-0.36</b> <b>(0.00)</b>	<b>0.16</b> <b>(0.03)</b>	<b>0.58</b> <b>(0.00)</b>	
<i>BIG4 [9]</i>	<b>-0.24</b> <b>(0.00)</b>	-0.06 <i>(0.58)</i>	<b>-0.22</b> <b>(0.05)</b>	<b>0.42</b> <b>(0.00)</b>	<b>-0.16</b> <b>(0.03)</b>	0.03 <i>(0.71)</i>	0.08 <i>(0.28)</i>	<b>0.17</b> <b>(0.02)</b>

*Note:* Significant correlations ( $p < 0.10$ ) are bolded,  $p$ -values in brackets. The number of observations utilized to compute correlations in Columns [2] and [3] is 77. The number of observations utilized to compute correlations in Columns [1], [4], [5], [6], [7] and [8] is 201.



**Table 4**  
**Multivariate Statistics**

<i>Variables</i>	<i>Coef.</i>	<i>(1)</i> <b>SEVERITY</b>	<i>(2)</i> <b>SEVERITY</b>
<i>F_FAM</i>	$\beta_1$	-2.28** (-2.51)	-
<i>FAM_OWN</i>	$\beta_2$	-	7.05 (1.38)
<i>CEO_DUA</i>	$\beta_3$	-	8.34* (1.87)
<i>FAM_OWN*CEO_DUA</i>	$\beta_4$	-	-15.57* (-1.96)
<i>ASSETS</i>	$\gamma_1$	-0.70** (-2.15)	-1.10** (-2.07)
<i>NEG_EPS</i>	$\gamma_2$	3.39 (1.64)	1.27 (1.22)
<i>LEV</i>	$\gamma_3$	-2.97 (-0.91)	-4.65 (1.67)
<i>ROA</i>	$\gamma_4$	0.01 (0.00)	4.44* (1.70)
<i>CFO</i>	$\gamma_5$	2.84 (1.14)	4.86 (0.82)
<i>BIG4</i>	$\gamma_6$	0.65 (0.47)	-2.30** (-2.20)
<i>Country dummies</i>		Included	No
<i>Industry dummies</i>		Included	Included
<i>Adj-R<sup>2</sup></i>		0.02195	0.2429
<i>Observations</i>		201	77

*Note:* This table presents respectively the estimates of Equation (1) in Column (1) and Equation (2) in Column (2). T-Statistics are reported in parenthesis and are calculated using Huber/White correction. Coefficients for intercept, country and industry dummies omitted to conserve space.

\*, \*\*, and \*\*\* denote statistical significance at the 0.10, 0.05 and 0.01 levels (two-sided, respectively).

**Table 5**  
**Robustness Tests**

<i>Variables</i>	<i>Coef.</i>	<i>(1)</i> <b>SEVERITY</b>	<i>(2)</i> <b>SEVERITY</b>
<i>F_FAM</i>	$\beta_1$	-2.11** (-2.25)	-
<i>FAM_OWN</i>	$\beta_2$	-	6.08 (1.27)
<i>CEO_DUA</i>	$\beta_3$	-	9.65* (1.90)
<i>FAM_OWN*CEO_DUA</i>	$\beta_4$		-18.44** (-2.05)
<i>ASSETS</i>	$\gamma_1$	-0.66** (-2.18)	-1.05** (-2.56)
<i>NEG_EPS</i>	$\gamma_2$	4.51** (1.99)	0.40 (0.36)
<i>LEV</i>	$\gamma_3$	-4.52 (-1.61)	-3.54 (-1.35)
<i>ROA</i>	$\gamma_4$	7.09 (1.43)	2.74 (1.32)
<i>CFO</i>	$\gamma_5$	1.32 (0.52)	6.58 (1.16)
<i>BIG4</i>	$\gamma_6$	0.64 (0.41)	-2.22* (-1.94)
<i>Country dummies</i>		Included	No
<i>Industry dummies</i>		Included	Included
<i>Adj-R<sup>2</sup></i>		0.0328	0.2382
<i>Observations</i>		197	75

*Note:* This table presents respectively the estimates of Equation (1) in Column (1) and Equation (2) in Column (2). T-Statistics are reported in parenthesis and are calculated using Huber/White correction. Coefficients for intercept, country and industry dummies omitted to conserve space.

\*, \*\*, and \*\*\* denote statistical significance at the 0.10, 0.05 and 0.01 levels (two-sided, respectively).

## Appendix A. Variable Definitions

<i>Variable names</i>	<i>Variable definitions</i>
<i>SEVERITY</i>	(Error <sub>t</sub> / total assets <sub>t-1</sub> ) * 100
<i>F_FAM</i>	1 for family firms; 0 otherwise
<i>FAM_OWN</i>	The percentage of family ownership
<i>CEO_DUA</i>	1 if CEO and chairperson are the same individual and belongs to family
<i>ASSETS</i>	The natural logarithm of total assets
<i>NEG_EPS</i>	1 if a firm has a negative EPS; 0 otherwise
<i>LEV</i>	total debt / total assets
<i>ROA</i>	Earnings before interest and taxes / total assets
<i>CFO</i>	Cash flow from operations / total assets
<i>BIG4</i>	1 if the auditor is a Big 4 audit firm; 0 otherwise
<i>Industry dummies</i>	Industry dummies based on the one-digit SIC code
<i>Country dummies</i>	Country dummies