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Risk Reporting and Earnings Smoothing: Signaling or Managerial Opportunism?

Abstract

Purpose – The purpose of this study is to examine the association between two reporting mechanisms used by managers to communicate risk information to the capital market: risk disclosure and earnings smoothing.

Design/methodology/approach – This study juxtaposes two competing hypotheses, the “opportunistic” and the “signaling” hypotheses, and empirically investigates whether one dominates the other for a sample of large UK firms for the period 2005-2015. This study also uses the global financial crisis as an arguably exogenous shock on overall risk in the economy to investigate its effect on managers' joint use of textual risk disclosures and earnings smoothing.

Findings – This study finds that risk disclosure and earnings smoothing are negatively associated. This finding supports that managers with incentives to mask the firm’s true underlying risk through smoothing earnings provide lower levels of risk-related disclosures. This study documents that the trade-off between risk disclosure and earnings smoothing is more pronounced during the global financial crisis period than before and after the crisis periods. Further, this study demonstrates a more negative association for firms with higher volatility of cash flows. This negative association is robust to various model specifications, additional corporate governance related controls, and an alternative measure of earnings smoothing.

Originality/value – The findings provide new empirical evidence about the association between risk disclosure and earnings smoothing and supports the opportunistic hypothesis, especially when firms are faced with increased risk.

Keywords Agency theory, Signaling theory, Risk disclosure, Earnings smoothing, Textual disclosures, Content analysis

Paper type Research paper

1. Introduction

Prior literature reports several deficiencies in the UK firms' risk narratives by providing empirical evidence on managers' reluctance to highlight firm risk levels through full risk disclosure (Abraham and Cox, 2007; Abraham and Shrivess, 2014; Linsley and Lawrence, 2007; Linsley and Shrivess, 2005, 2006; Marshall and Weetman, 2007). Furthermore, empirical studies provide mixed evidence on the association between risk disclosure and the firm risk profile (Elshandidy *et al.*, 2013; Elzahar and Hussainey, 2012; Linsley and Shrivess, 2005, 2006). Given this, an empirical question still remains as to whether UK managers use their financial reporting discretion to convey (or conceal) private risk information. In the UK, discretion is to some extent inherent in the quantity and quality dimensions of textual risk information as there are no regulatory requirements for a specific level, template or format for risk disclosure. Given this, providing incremental risk disclosures beyond the minimum regulatory requirements is considered a discretionary financial reporting strategy. It follows, therefore, that managers can exercise this discretion to decide on whether to withhold or expand disclosures of private risk information about firm performance and future prospects.

Earnings smoothing is also considered a discretionary reporting strategy used by managers to reduce the variability of a firm's economic earnings (Beidleman, 1973). Prior literature has identified mainly two opposing perspectives of earnings smoothing, namely; the opportunistic behaviour perspective and the information perspective (e.g., Dou *et al.*, 2013; Sankar and Subramanyam, 2001; Tucker and Zarowin, 2006; Yu *et al.*, 2018). The former (opportunistic behaviour) perspective refers to the garbling role of smoothing where private benefits incentivize managers to hide information about firm performance. The latter (information) perspective refers to the informational role of smoothing where managers truthfully signal their private information and expectations about future firm performance.

The findings of the existing literature yield no consensus on whether UK managers are willing to highlight their firms' underlying risks through risk disclosures. Moreover, it is still not known whether managers exercise their financial reporting discretion by reporting smoother earnings together with or in replacement of increased risk disclosure. In efforts to reduce the riskiness of the firm, managers may make accounting choices to reduce the volatility of their firms' earnings (See Yu *et al.*, 2018) as well as reduce or increase the amount of risk information disclosed in the annual report (See Kravet and Muslu, 2013). Prior research has focused on examining the association between non-risk disclosure and earnings management (Francis *et al.*, 2008; Katmon and Al Farooque, 2017; Aerts and Zhang, 2014). Thus, examining managerial reporting strategies in relation to the level of risk disclosure and earnings smoothing is necessary. Both the mixed findings relating to the relevance of risk disclosures and the literature gap on whether earnings smoothing correlates with risk disclosure signal the need to investigate whether opportunistic (signaling) incentives for reporting smoother earnings are associated with less (more) risk disclosures. Studying the relation between risk reporting and earnings smoothing provides a rich understanding on how managers make accounting choices in order to hide (signal) firm performance. Bridging this gap in the literature, thus, we examine the association between two

reporting mechanisms used in communicating firm performance to the capital market: risk disclosure and earnings smoothing. We develop two competing hypotheses: “opportunistic” and “signaling” and investigate whether one hypothesis dominates the other.

Under the managerial opportunistic view, managers obfuscate or hide risk information when faced with higher agency costs (e.g., Abraham and Cox, 2007; Elshandidy and Neri, 2015). At the same time, they hide information about firm economic performance and future prospects (e.g., Yu *et al.*, 2018). Therefore, the association between risk reporting and earnings smoothing would be negative. Under the signaling view, managers disclose more risk information to convey informative signals about firm risk (e.g., Elshandidy *et al.*, 2013). At the same time, they truthfully signal their private information and expectations about future firm performance through earnings smoothing (e.g., Dou *et al.*, 2013; Shuto and Iwasaki, 2014). Therefore, the association between both risk reporting and earnings smoothing would be positive. If the prevailing motive is opportunistic (signaling), we expect the association between firm risk reporting and earnings smoothing to be negative (positive). We find a negative association between risk disclosure and earnings smoothing, consistent with the prediction of the opportunistic behavior of managers in financial reporting. That is, managers that smooth earnings also disclose less risk information.

We use the global financial crisis as an arguably exogenous shock on overall risk in the economy to investigate its effect on managers' joint use of textual risk disclosures and earnings smoothing. We find that the trade-off between risk disclosure and earnings smoothing is more pronounced during the global financial crisis, supporting our opportunistic hypothesis that managers faced with higher risk report smoother earnings and less risk information. We also find a more pronounced negative association between risk disclosure and earnings smoothing for firms with higher volatility of cash flows.

We contribute to several strands of the literature. First, we extend the literature on reporting choices. Prior studies focus on risk disclosure alone (e.g., Elshandidy *et al.*, 2013; Elzahar and Hussainey, 2012; Linsley and Shrivess, 2005, 2006) or earnings smoothing alone (e.g., Graham *et al.*, 2005; Shuto and Iwasaki, 2014). Prior research that combines earnings management and other financial reporting choices focus on non-risk reporting (e.g., voluntary disclosures in Sahyoun and Magnan, 2020; disclosure quality in Katmon and Al Farooque, 2017; environmental disclosures in Gerged *et al.*, 2020). Second, we extend studies on managerial behavior by presenting another mechanism that can explain management opportunistic and/or signaling behavior. Prior literature focuses on mechanisms such as open market repurchases (Fried, 2001), the use of discretionary accruals in financial reporting (Guan *et al.*, 2005), and the use of special items in financial statements (Riedl and Srinivasan, 2010). Our finding of a negative association between the level of risk disclosure and the extent of earnings smoothing extends our understanding of managerial motives for not providing a comprehensive picture of the firm’s risk profile, as criticized by Linsley and Shrivess (2005, 2006). The findings contribute to a better understanding on how managers use their accounting discretion to hide the firm’s underlying risk by reporting smoother earnings and less risk information. Specifically, the findings add to the existing literature by revealing how managers use earnings smoothing as a device to obscure firm performance e.g. Chen *et al.* (2017). We also extend the literature investigating the informativeness of voluntary disclosures e.g. Fernando *et al.* (2018).

Practically, this contribution is useful as the findings of this research inform stakeholders, regulators and policy makers on the alternative managerial strategies that could be employed to hide a firm's risk profile. The results help, particularly, regulators obtain greater insights into the drivers of reporting smoother earnings as opposed to incremental risk disclosures which call for placing financial reporting choices under greater scrutiny in times of financial market turmoil and for firms with more volatile cash flows. The results also caution investors from being misled about the risk profile of a firm when smoothing takes place and about the managerial incentives behind earnings smoothing. The overall results bring to the attention of accountants and board of directors how such managerial practices could mislead investors about the true image of the firm's economic performance and future prospects. Revealing and highlighting such managerial techniques may reduce managers' tendency to distort earnings information through smoothing while encouraging managers to be transparent about the firm's true risk profile by reporting expanded useful risk disclosures.

The paper proceeds as follows. Section 2 presents the literature review and discusses our main hypotheses. Section 3 outlines the research design and data. Section 4 reports the empirical results. Section 5 presents further analyses and various robustness tests, and Section 6 concludes.

2. Literature Review and Hypotheses Development

2.1 Opportunistic hypothesis

As firms' economic earnings volatility and exposure to risk cannot be directly observed by outsiders, opportunistic managers may use their discretion in both reporting risk information, which can be seen as a discretionary choice (Jorgensen and Kirschenheiter, 2003), and distorting earnings numbers through smoothing earnings.

Under the opportunistic view, managers are more likely to withhold risk information about past and future events that affect firm performance. This is because risk can be viewed as divergence between actual and expected earnings (ICAEW, 2011). In line with this, prior studies show that managers with incentives to maintain their private control and protect their jobs are more likely to conceal the firm's underlying risk by smoothing earnings through the use of accruals (Burgstahler *et al.*, 2006; Leuz *et al.*, 2003) or withholding unfavorable risk information (Campbell *et al.*, 2014; Dobler, 2008; Kothari *et al.*, 2009). Furthermore, by making the reported income stream appear more smooth, managers can mask the variability of a firm's underlying performance to enjoy greater private control benefits (Leuz *et al.*, 2003), larger private gains (Barton, 2001; Eckles *et al.*, 2011), lower cost of capital (Kanagaretnam *et al.*, 2004), and greater job security (Fudenberg and Tirole, 1995). This opportunistic view of earnings smoothing proposes that managers tend to smooth out earnings fluctuations within their accounting discretion either to conceal the firm's current or future poor performance.

Thus, under the "opportunistic" view, we expect that managers exercise discretion by reporting smoother earnings and less risk information. Stated differently, we posit that managers with incentives to smooth earnings disclose less risk information, in order to mask the firm's underlying risk of earnings variability. Therefore, we expect the following:

Hypothesis 1a: There is a negative association between the level of risk disclosure and earnings smoothing.

2.2 Signaling hypothesis

Arguments based on signaling theory suggest that managers disclose risk information to outsiders in order to reduce information asymmetry with regards to the uncertainties about firms' future prospects and thus improve the predictability of future earnings (Campbell *et al.*, 2019). That is, managers report risk disclosures in order to signal their abilities in responding to potential risk or underlying risk that affects profitability (Elshandidy *et al.*, 2013; Elzahar and Hussainey, 2012; Marshall and Weetman, 2007). Similarly, signaling theory suggests that managers have incentives to smooth earnings using accruals in order to improve the informativeness of reported earnings about future outcomes (Sankar and Subramanyam, 2001; Tucker and Zarowin, 2006; Di and Marciukaiyte, 2015). Managers have incentives to engage in beneficial signaling through smoothing earnings in order to lower the risk perception of various stakeholders (Amiram and Owens, 2018; Dou *et al.*, 2013; Shuto and Iwasaki, 2014; Chang *et al.*, 2021), and thereby favorably affect firm valuation (Bao and Bao, 2004).

Drawing upon the common signaling role of earnings smoothing and risk disclosure, we expect that managers with incentives to smooth earnings, in order to enhance the predictability of the firm's future profitability, convey more risk information. Thus, under the signaling incentive, we posit that managers will report smoother earnings and expanded risk information. We state our expectation as follows:

Hypothesis 1b: There is a positive association between the level of risk disclosure and earnings smoothing.

3. Research Methodology

3.1 Sample selection

Our sample includes non-financial firms listed on the FTSE 100 index for at least three consecutive years between 2005 and 2015. This is consistent with prior UK-based risk disclosure studies (e.g., Abraham and Cox, 2007; Elzahar and Hussainey, 2012; Linsley and Shrives, 2005, 2006). We exclude financial firms that are subject to different risk regulations for disclosure. The initial sample is 96 non-financial firms. Following prior literature, we require that our firms have a complete time-series of financial data (annual reports) and market data necessary to calculate the variables, particularly, earnings smoothing (Elshandidy and Shrives, 2016). Hence, we remove 22 firms with incomplete data. Our final sample contains 74 firms with 814 firm-year observations representing 9 industries: industrials, oil and gas, basic materials, technology, consumer goods, health care, telecommunications, consumer services and utilities, categorised in accordance with Industry Classification Benchmark (ICB) [1]. To reduce the impact of outliers, we winsorize continuous variables at the top and bottom one percent of the distribution.

3.2 Empirical model

Based on our above discussion, the decision to report a specific level of risk disclosure is clearly endogenous, thus we need to recognize that this outcome is a function of managerial decisions to

smooth earnings. This is consistent with the view of prior research that reporting risk information is endogenous and influenced by managerial motives (Dobler, 2008). The act of smoothing earnings precedes firm risk reporting as a manager observes volatility in the firm's unmanaged economic earnings and decides whether to smooth long before providing risk disclosures. That is, smoothing takes place over several years before reporting risk information at fiscal year-end. Hence, managers' underlying incentives to smooth earnings are likely to determine the level of risk disclosure. If a manager decides to reduce fluctuations in economic earnings over time, to hide a firm's underlying risk for private gain, then this decision likely results in less risk disclosures at year end. Alternatively, if a manager decides to minimize volatility in earnings realizations over time, to convey private information about future prospects, then that decision likely results in more risk disclosures. Prior studies analyze earnings management as a determinant of corporate disclosure (e.g., Aerts and Zhang, 2014; Francis *et al.*, 2008). Thus, to test whether the level of risk disclosure is decreasing or increasing in a firm's extent of earnings smoothing, we estimate the following ordinary least squares (OLS) regression model on a pooled time-series, cross-sectional basis:

$$Risk_Disclosure_{it} = \beta_0 + \beta_1 Smoothing_{it} + \beta_2 Total_Risk_{it} + \beta_3 Beta_{it} + \beta_4 RAR_{it} + \beta_5 Leverage_{it} + \beta_6 Liquidity_{it} + \beta_7 Size_{it} + \beta_8 Profitability_{it} + \beta_9 Growth_{it} + \beta_{10} Readability_{it} + \text{Year effects} + \text{Industry effects} + \varepsilon_{it} \quad (1)$$

where i refers to the firm and t to the year. β_0 is the intercept and β_{1-10} are the slope coefficients of *Smoothing* and of the control variables. *Risk_Disclosure_{it}* represents the natural logarithm of the total number of sentences containing at least one risk-related word. *Smoothing* is earnings smoothing which represents the ratio of a firm's standard deviation of operating income (deflated by total assets) divided by the standard deviation of its cash flow from operations (deflated by total assets), multiplied by -1. We explain these variables further in section 3.3 below.

We include several control variables identified by prior studies as related to risk disclosure. The first set of control variables includes risk proxies. The literature provides somewhat mixed evidence regarding the association between firm risk profile and level of risk disclosure (e.g., Elshandidy *et al.*, 2013; Elzahar and Hussainey, 2012; Linsley and Shrivs, 2005; Marshall and Weetman, 2007). Overall, riskier firms appear to highlight risk through additional risk disclosures, conceal their higher risk through less risk disclosures, or refrain from signaling through risk disclosure. We include controls for firm risk levels using market-risk measures including total risk (*Total_Risk_{it}*), measured as the variance of firms' monthly stock returns, over a five-year period. We also include systematic risk (*Beta_{it}*), derived from the market model using firms' monthly stock returns on the value weighted market index, over a five-year period; as well as risk-adjusted returns (*RAR_{it}*), reflecting the Sharpe ratio, calculated as excess monthly stock returns divided by the standard deviation of monthly stock returns, over a five-year period. We control for accounting-based risk measures of financial risk (*Leverage_{it}*) defined as the ratio of total debt to total equity, and liquidity risk (*Liquidity_{it}*) defined as total current assets divided by total current liabilities.

Further, we include control variables to capture other firm-year attributes, such as firm size (*Size_{it}*), the natural logarithm of total assets; profitability (*Profitability_{it}*), the ratio of earnings before interest, taxes, depreciation and amortization to total assets; growth (*Growth_{it}*), the ratio of market

value to book value of equity; and the level of annual report readability ($Readability_{it}$) using the natural logarithm of the fog index of firms' annual reports. Finally, we include industry- and year-fixed effects to control for changing microeconomic factors across time and industries.

Consistent with prior research, we estimate robust standard errors clustered at the firm level to control for heteroscedasticity and serial correlation (Campbell *et al.*, 2014).

3.3 Variable measurement

3.3.1 Risk disclosure

We measure the level of textual risk disclosure ($Risk_Disclosure_{it}$) in firms' annual reports through the natural logarithm of the total number of sentences containing at least one risk-related keyword. We adopt the sentence unit-of-analysis approach to identify risk disclosures in order to avoid multiple counting of the same risk-related information (e.g., Elshandidy *et al.*, 2015; Elshandidy and Shrivs, 2016; Kravet and Muslu, 2013).

We first identify a number of potential risk-related words based on reading 30 randomly selected annual reports. Some of the keywords are already used in prior risk reporting research (Elshandidy *et al.*, 2013; Kravet and Muslu, 2013; Li, 2006). We then re-examine the shortlisted words and drop words that may introduce noise – words referring to information describing operations management and historical financial results that do not necessarily imply risk. Our final word list contains most keywords found in prior studies (e.g., Elshandidy *et al.*, 2013; Kravet and Muslu, 2013). Specifically, we use the 27 risk-related word roots presented in Appendix I. Appendix II provides examples of risk disclosure statements.

To ensure that our instrument is reliable, we adopt Kravet and Muslu's (2013) procedure in testing the degree of consistency among the two methods of reflecting the same concept (risk disclosure). Hence, using Kravet and Muslu's (2013) list of risk-related keywords, we validate our keyword list by calculating the correlation between both risk disclosure measures based on a sample of 20 randomly selected annual reports. We find our risk disclosure measure to be highly correlated with the measure in Kravet and Muslu (2013) with a correlation coefficient of 0.73, significant at the 1% level.

3.3.2 Earnings smoothing

We measure earnings smoothing ($Smoothing_{it}$) by calculating the ratio of standard deviation of operating income divided by the standard deviation of cash flow from operations, both scaled by the beginning-of-year total assets. We use five annual data to calculate the standard deviation by using the current and past four years' observations. We multiply the measure by minus one so that higher values indicate that managers exercise more discretion in altering the level of accruals to reduce the variability of reported earnings.

4. Empirical Results

4.1 Descriptive statistics

Panel A of Table 1 reports descriptive statistics. This shows that the mean of the risk disclosure measure, $Risk_Disclosure_{it}$, is 5.5, implying, on average, 282 sentences with risk information. This is comparable to the average risk disclosure score of 3.8, reported by Elshandidy and Neri (2015)

for UK firms during 2005-2009. Our higher risk disclosure score suggests that increases in textual risk information over the last few years coincide with the incremental regulations on firm risk reporting in the UK, particularly, those relating to disclosures on principal business risks (See FRC, 2014) and financial risks arising from the use of financial instruments (See IASB, 2014). With respect to $Smoothing_{it}$, the mean value is -1.26 suggesting that firms on average exhibit higher volatility in operating income relative to operating cash flows. Our sample of UK firms with average size of 9.06 is comparable to average size of 9.81 reported in Elzahar and Hussainey (2009).

Panel B of Table 1 presents pairwise Pearson and Spearman correlations for our regression variables. We see no evidence suggesting concerns over multicollinearity since correlations among explanatory variables are below 0.8 and Variance Inflation Factors (untabulated) are below 10 for all our explanatory variables.

Both parametric (Pearson) and non-parametric (Spearman) coefficients show a significant negative correlation between risk disclosure and earnings smoothing, suggesting that reporting smoother earnings is associated with lower levels of risk disclosures.

[Table 1 here]

4.2 Multivariate regression analysis

We examine the association between risk disclosure and earnings smoothing using the full sample of firms. Table 2 presents the results of pooled OLS regression of risk disclosure on the level of earnings smoothing and control variables – Equation (1). The table reveals that earnings smoothing ($Smoothing_{it}$) is negatively related to risk disclosure ($\beta_1 = -0.045$) at the 5% significance level. This provides support for our first hypothesis ($H1a$). Thus, the significant negative association between risk disclosure and earnings smoothing is consistent with the prediction of the opportunistic view of earnings smoothing. Specifically, this finding suggests that managers with opportunistic incentives exercise discretion by reporting smoother earnings and less risk information. This finding is in line with the arguments of prior studies indicating that when managerial disclosure preferences are not aligned with those of shareholders, for reasons of self-interest, managers have a greater tendency to hide the firm's underlying risk by smoothing earnings (Burgstahler *et al.*, 2006; Leuz *et al.*, 2003) or withholding risk disclosures (Campbell *et al.*, 2014; Linsley and Shrivess, 2006). This finding also lends support to the empirical evidence of prior literature that opportunistic incentives underlying earnings smoothing dominate signaling incentives for earnings smoothing (e.g., Amiram and Owens, 2018; Chen *et al.*, 2017; Yu *et al.*, 2018). In sum, the result supports that earnings smoothing by UK firms is detrimental to investors, rather than beneficial, as this practice results in obfuscating the firm's true underlying risk.

As for the control variables, we find a negative association between total risk ($Total_Risk_{it}$) and risk disclosure ($\beta_2 = -1.802$) statistically significant at the 10% level. While the coefficient on $Beta_{it}$ is insignificant at conventional significance levels, the level of risk-adjusted returns (RAR_{it}) is significantly and negatively related to risk disclosure ($\beta_4 = -0.055$), at the 10% level. This result indicates that firms with higher risk-adjusted returns are less likely to disclose risk information. Consistent with prior research, our regression results reveal a positive association between financial risk ($Leverage_{it}$) and risk disclosure ($\beta_5 = 0.055$, significant at the 1% level) (e.g.,

Elshandidy *et al.*, 2013; Marshall and Weetman, 2007; Monjed and Ibrahim, 2020). Liquidity risk (*Liquidity_{it}*) is negatively associated with risk disclosure ($\beta_6 = -0.135$, significant at the 5% level). We also find that larger firms report more textual risk information ($\beta_7 = 0.094$, significant at the 1% level), consistent with larger firms more likely exposed to greater scrutiny and facing greater risk of litigation and political costs (Watts and Zimmerman, 1986). The positive coefficient on firm profitability (*Profitability_{it}*) ($\beta_8 = 0.470$, at the 10% level), indicating that high-profitability firms are more likely to report risk information. As for annual report readability (*Readability_{it}*), the positive association ($\beta_{10} = 0.518$, significant at the 1% level) is consistent with higher level of annual report reading difficulty associated with more risk disclosures.

In sum, the main result on the association between risk disclosure and earnings smoothing supports our hypothesis *H1a*. This finding is consistent with the opportunistic view of earnings smoothing, suggesting that managers exercise discretion opportunistically to conceal firm underlying risk through reporting a smoother pattern of earnings while withholding risk information.

[Table 2 here]

4.3 Global financial crisis effect

We use the global financial crisis as an arguably exogenous shock to overall risk in the economy to investigate its effect on managers' joint use of earnings smoothing and textual risk disclosures. Prior research finds mixed results regarding corporate risk disclosure practices during and after the global financial crisis (e.g., Beatty *et al.*, 2018). Examining whether the relation between earnings smoothing and risk disclosure is more pervasive during the global financial crisis provides evidence concerning whether managers use their discretion to tradeoff between both reporting choices in order to opportunistically obfuscate a firm's performance during the financial market turmoil. Thus, we re-estimate Equation (1) including an interaction term (*Smoothing_{it}*Crisis_{it}*). *Crisis_{it}* is a dummy variable that takes on the value of one for the financial crisis period 2008-2009, and zero for the pre-crisis period 2005-2007 and post-crisis period 2010-2015. Table 3 reveals that the coefficient on *Smoothing_{it}* remains negative ($\beta_1 = -0.040$, significant at the 5% level). More importantly, the coefficient on *Smoothing_{it}*Crisis_{it}* is also negative ($\beta_2 = -0.053$, significant at the 10% level) indicating that the trade-off between earnings smoothing and risk disclosure is more pronounced during the crisis relative to the non-crisis period. This is consistent with stronger incentives for managers during the crisis to opportunistically hide unfavorable news and make their firm appear more stable compared to other firms facing greater earnings volatility and risk exposures due to the economic turmoil.

[Table 3 here]

4.4 Cash flow volatility effect

We perform additional analyses to examine the association between risk disclosure and earnings smoothing based on the level of operating cash flow volatility. Prior research argues that firms with higher underlying operating cash flow volatilities are more likely to smooth earnings. For example, Das *et al.* (2013) find that managers with financial-based incentives are more inclined to smooth earnings for firms with higher cash flow volatility. We expect that managers in firms with higher cash flow volatility have stronger opportunistic incentives to conceal firms' underlying performance. We therefore conjecture that the negative association between risk disclosure and

earnings smoothing is more pronounced for firms with higher underlying cash flow volatility than for firms with lower volatility. Consistent with Das *et al.* (2013), we re-estimate Equation (1) after adding the interaction term $Smoothing_{it} * HighVolatility_{it}$ and the main effect $HighVolatility_{it}$. The variable $HighVolatility_{it}$ is measured using a dummy variable which takes on the value of one for firms with high (above-median) cash flow volatility, and otherwise zero. Table 4 shows that $Smoothing_{it}$ continues to be negatively associated with risk disclosure ($\beta_1 = -0.031$, significant at the 5% level). The coefficient on interaction term is also negative and significant ($\beta_2 = -0.073$, significant at the 1% level). Thus, this result is consistent with managers trading off risk disclosure and earnings smoothing to a larger extent when cash flow volatility is higher, possibly to obscure higher underlying risk.

[Table 4 here]

5. Additional Analyses and Robustness Checks

5.1 Alternative regression specifications

We perform further analyses to check whether our primary findings are robust to endogeneity testing. To account for potential endogeneity problem, we estimate both a two-stage least squares (2SLS) model and a fixed-effects regression model as both methods are widely used for detecting and mitigating endogeneity (e.g., Elshandidy and Neri, 2015; Katmon and Al Farooque, 2017).

We estimate a 2SLS model using instrumental variables which could affect the practice of earnings smoothing such as the proportion of independent directors relative to the board size ($Ind_Directors_{it}$) and the number of analyst following ($Analyst_{it}$). We select these particular instruments for two main reasons. First, prior research finds that internal monitoring and external monitoring exercised by independent directors and equity analysts, respectively, are likely to influence smoothing practices (e.g., Barton, 2001; Huang *et al.*, 2009). Second, both instrumental variables are not highly correlated with risk disclosure.

To examine whether these two variables are valid instruments, we perform a statistical analysis using tests of over-identifying restrictions (Sargan and Basmann statistics). Panel A of Table 5 reports Sargan and Basmann statistics supporting that $Ind_Directors_{it}$ and $Analyst_{it}$ are valid instruments to use in our first stage of the 2SLS regression. In the first stage, earnings smoothing is treated as an endogenous variable and thus $Smoothing_{it}$ is regressed on the two instruments and all other control variables of Equation (1) by estimating a pooled OLS model. In the second stage, $Risk_Disclosure_{it}$ is regressed on the control variables of Equation (1) and on a variable representing the fitted values of $Smoothing_{it}$, estimated from the first-stage regression, which are purged of correlation with omitted variables. Panel B of Table 5 reports the results of the Durbin and Wu-Hausman statistics which both indicate rejecting the null hypothesis at the 10% significance level, thus, suggesting that $Smoothing_{it}$ is endogenous.

Panel C of Table 5 reports the results of the second-stage regression demonstrating that $Risk_Disclosure_{it}$ is still significantly and negatively related to $Smoothing_{it}$ at the 5% level ($\beta_1 = -0.236$), thereby corroborating the primary findings. We also re-estimate Equation (1) using fixed-effects regression. The untabulated results indicate that the negative association between risk

disclosure and earnings smoothing is not attributed to any endogeneity problem associated with the current study dataset ($\beta_1 = -0.027$, significant at the 5% level).

[Table 5 here]

To further investigate the sensitivity of the main results to the use of alternative specifications, we follow Fama and MacBeth (1973) and re-estimate Equation (1) to control for possible cross-sectional correlation in the error terms and unspecified heteroscedasticity using the Newey-West corrected standard errors. Table 6 show similar inferences as the pooled OLS regression results; specifically, $Smoothing_{it}$ remains negatively related to $Risk_Disclosure_{it}$ ($\beta_1 = -0.048$, significant at the 1% level).

[Table 6 here]

We further test the robustness of our primary results by using a changes model, which mitigates concerns related to endogeneity and reverse causality. This requires calculating and substituting the change in variables for the level of the variables in Equation (1). The untabulated results indicate that changes in earnings smoothing are negatively related to changes in risk disclosure ($\beta_1 = -0.03$, significant at the 5% level).

5.2 Alternative measure of earnings smoothing

To substantiate our findings that earnings smoothing reflects managerial reporting opportunism, we employ an alternative measure of earnings smoothing which captures managers' use of their discretion in adjusting accruals to smooth income and the underlying pre-managed income series. Thus, the alternative proxy for earnings smoothing ($Smoothing_Corr_{it}$) is measured as the correlation between changes in pre-discretionary earnings (ΔPDE) and changes in discretionary accruals (ΔDA), over a rolling window of four years. This includes the current and past three years' observations. Pre-discretionary earnings (PDE) are calculated as the difference between net income and discretionary accruals (DA). Consistent with prior studies (e.g., Tucker and Zrowin, 2006; Chen *et al.*, 2017; Yu *et al.*, 2018), we estimate discretionary accruals (DA) using the modified Jones model, adjusted for performance (Dechow *et al.*, 1995; Kothari *et al.*, 2005):

$$\frac{ACCR_{i,t}}{assets_{i,t-1}} = a_1 \left(\frac{1}{Assets_{i,t-1}} \right) + a_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + a_3 \frac{PPE_{i,t}}{Assets_{i,t-1}} + a_4 ROA_{i,t} + \varepsilon_{i,t}, \quad (2)$$

Where $ACCR$ is total accruals (net income minus cash flow from operations), PPE is property, plant, and equipment, $\Delta Sales$ is the change in sales relative to the previous year, ROA is return on assets, and $Assets$ is total assets. We estimate Equation (2) for all firms in the same industry (four-digit ICB) each year. We use the estimated residual as a proxy for discretionary accruals (DA). A more negative correlation, between ΔPDE and ΔDA , indicates a greater extent of earnings smoothing. Hence, a positive β_1 in Equation(1) suggests a negative association between earnings smoothing and risk disclosure, consistent with our prediction under the opportunistic view (*H1a*). In contrast, a negative β_1 in Equation(1) suggests a positive association between earnings smoothing and risk disclosure, consistent with our prediction under the signaling view (*H1b*). We, therefore, re-estimate Equation (1) with the replacement of $Smoothing_{it}$ by $Smoothing_Corr_{it}$. Results in Table 7 show similar results to our primary findings that risk disclosure and earnings

smoothing are negatively associated ($\beta_1 = 0.11$, at the 1% significance level)[2]. The results provide further support for our *H1a* that managers, with incentives to hide bad news, report smoother earnings and less risk information opportunistically.

[Table 7 here]

5.3 Controlling for corporate governance

In this section, we examine the relationship between firm governance structure and risk disclosure levels. It could be that firm governance structures simultaneously determine financial reporting decisions and corporate risk disclosure. Because both of these relationships are well documented (see Xie *et al.*, 2003 for a discussion about governance and financial reporting and Abraham and Cox, 2007 for research on governance and disclosure), not controlling for governance structures could create a correlated omitted variable problem. We therefore re-estimate Equation (1) with additional controls for CEO power, board size, and board independence[3]. In untabulated results, we find that the coefficient on earnings smoothing ($Smoothing_{it}$) remains negative ($\beta_1 = -0.05$, significant at the 1% level) after controlling for corporate governance factors.

5.4 Additional controls

We re-estimate Equation (1) controlling for the length of the annual report, which can mitigate the omitted-correlated-variable problem - relating to the characteristics of the annual report - on the association between risk disclosure and earnings smoothing. We further control for litigation risk as firms subject to greater litigation risk tend to disclose more risk information (Nelson and Prtichard, 2016). We use a dummy variable for litigation risk which is equal to 1 for sample firms operating in a risky industry, namely, oil and gas as well as technology, and 0 otherwise. The results (untabulated) are in line with the main results.

6. Conclusion

This paper examines the association between risk disclosure and earnings smoothing in light of opportunistic and signaling explanations. We find a negative association between risk disclosure and earnings smoothing, consistent with the prediction under the opportunistic view of earnings smoothing, indicating that managers with incentives to smooth earnings disclose less risk information in order to mask the firm's underlying risk of earnings variability. We document a more pronounced negative association between risk disclosure and earnings smoothing for firms with higher volatility of cash flows. We use the global financial crisis as an arguably exogenous shock on overall risk in the economy to investigate its effect on managers' joint use of earnings smoothing and textual risk disclosures. Consistent with the opportunistic view, we also document that a more pronounced trade-off between risk disclosure and earnings smoothing during the global financial crisis. Our results are robust to using alternative specifications and measures of earnings smoothing.

These findings contribute to the literature on how firms' risk disclosures can be endogenous to managerial incentives underlying earnings smoothing. These empirical results provide a rationale for the empirical evidence and criticism of prior literature concerning UK firms' risk reporting deficiencies and managers' reluctance to provide full disclosure on risk, as discussed earlier. To

the extent that a primary motivation for managers to engage in earnings smoothing is to hide firm risk, our study complements and extends prior studies where they document that managers with concerns relating to private benefits and job security appear more likely to conceal their firms' underlying risk by smoothing earnings (Burgstahler *et al.*, 2006; Leuz *et al.*, 2003) or withholding unfavorable risk information (Campbell *et al.*, 2014; Kothari *et al.*, 2009). Our findings inform stakeholders, regulators and policymakers on the managerial strategies underlying earnings smoothing employed to conceal the firm's risk information. Since UK has high disclosure requirements, the empirical results call for closer regulatory scrutiny over the pattern of risk disclosures and reported earnings, particularly during the financial market turmoil and for firms with high volatility of underlying cash flows.

The current study is subject to limitations that could provide opportunities for future studies. First, the current study does not employ measures which proxy for managers' opportunistic and signaling incentives given that managerial motives cannot be *ex ante* observed (Chen *et al.*, 2017). Second, the sentence-based method employed in the current study to measure the level of risk disclosures does not consider the quality of risk reporting. Future studies can extend this by examining the association between the quality of risk disclosures and earnings management (smoothing).

Notes.

1. ICB refers to the Industry Classification Benchmark which is a system for assigning public firms to appropriate industries developed by Dow Jones and the Financial Times Stock Exchange (FTSE).
2. The sample reduces from 814 to 713 firm-year observations, as we require changes in pre-discretionary earnings and changes in discretionary accruals to have non-missing values. The collection of raw data to estimate *DA* and therefore *Corr_Smoothing_{it}* (over a rolling window of 4 years) starts from 2001.
3. Consistent with prior studies on managerial power, we use an index proxy for CEO power combining multiple governance variables (e.g., Cho *et al.*, 2019, Muttakin *et al.*, 2018). Therefore, CEO power index is measured as the sum of CEO duality, tenure, and non-cash/non-bonus compensation, taking on values ranging from 0 to 3. We use dummy variables for tenure and compensation that are coded as 1 if the value is greater than the median of our sample distribution, and 0 otherwise.

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Appendix I: List of risk-related keywords in current study compared to prior studies

Keywords marked with a * also include derivatives of the original.

Keywords in bold in other studies' list are also included in current study.

Current study list of risk-related keywords	Kravet and Muslu's (2013) list of risk-related keywords	Elshandidy <i>et al.</i> 's (2013) list of risk-related keywords
adverse*	affect	against
affect*	can	catastrophe (catastrophic)
challeng*	cannot	challenge (challenges)
could	could	chance (chances)
detrimental	depend*	decline (declined)
expect	expos*	decrease (decreased)
expects	fluctuat*	differ*
expos*	hedg*	diversify*
fail*	influent*	fail (failure)
fluctuat*	likely to	fluctuate*
impact*	may	gain (gains)
influent*	might	increase (increased)
likely	possibl*	less
may	potential*	loss*
might	risk*	low*
possibl*	subject to	peak (peaked)
potential*	susceptible	probable*
risk*	uncertain*	reverse (reversed)
susceptible	vary* / varies	risk*
threat*		shortage
uncertain*		significant*
unexpected*		threat
unhedge*		unable
unlikely		uncertain (uncertainty; uncertainties)
unpredictable		viable
variability		
volatil*		

Appendix II: Examples of risk disclosure statements in annual reports

Risk Statement	Firm & Annual Report Year
<p>“Exchange rate fluctuations can have a material impact on our performance reflected in Sterling: the Group’s asset values, earnings and cash flows are influenced by a wide variety of currencies owing to the geographic diversity of the Group’s customers and areas of operation.”</p>	<p>Aggreko PLC (2011)</p>
<p>“A major safety incident (such as a hull loss) could adversely affect easyJet's reputation and its operational and financial performance. The impact of such an incident would be heightened if EasyJet failed to react promptly and deal with it effectively.”</p>	<p>EasyJet PLC (2015)</p>
<p>"The economic uncertainty within the eurozone has led to volatility in financial markets during the year, however, we have not experienced any adverse effects."</p>	<p>National Grid PLC (2012)</p>