FINANCIAL REPORTING AND MANAGERIAL DECISIONS

AN INTERNATIONAL ANALYSIS OF CURRENT TOPICS

Dissertation

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by

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Part I: General Introduction

This dissertation studies two overarching topics: international financial reporting practices and firms' top-level strategic decisions. Within the topic of international financial reporting, the first three studies in this dissertation contribute to and are based on the literature on International Financial Reporting Standards (IFRS) and how their adoption and subsequent implementation affect financial reporting outcomes. The next two studies focus on how top-level strategic decisions affect asymmetric cost behavior. Lastly, motivated by the ongoing coronavirus pandemic, the final study in this dissertation addresses a highly current topic by examining how firms' decisions whether and how to report about the ongoing coronavirus (COVID-19) pandemic are reflected in capital market reactions. In particular, this dissertation adds new perspectives to the debate on whether or not IFRS are successful in improving the quality of financial reporting practices on an international level. It does so by addressing three previously unexplored IFRS (adoption) related aspects. First, how does inherent reporting flexibility as a distinctive IFRS characteristic manifest itself in the usefulness of the provided financial information? Second, does the absence of clearly defined required subtotals in IFRS lead to opportunistic reporting practices amongst firms regarding the choice of reported subtotals? Third, are firms' deliberate decisions taken ahead of mandatory IFRS adoption predictive of the quality of the subsequently provided accounting information? Continuing with the topic of firms' strategic decisions, the next two studies deal with their association with firm-level cost behavior. First, do individual CEO's managerial styles determine cost management-related decisions? Second, does a firm's decision to undergo sustainability assurance help improve cost adjustment decisions?

The remainder of this introduction outlines the theoretical underpinnings of the dissertation as well as the general contribution of the studies covered in the dissertation to existing literature. This is followed by a summary of each of the six papers included in this dissertation that points out each paper's contribution and methodological approach. Further, I will illustrate how each paper is related to the overall topic of this dissertation as well as discuss how the individual studies are interrelated from a theoretical and methodological point of view. Last, I will provide a discussion on the regulatory and practical implications of the findings in this dissertation.

The worldwide mandatory adoption of IFRS is one of the most important regulatory changes in accounting in recent times. Not surprisingly, then, a multitude of studies have examined the potential consequences of IFRS adoption (see Ahmed et al., 2013, Brüggemann, 2011, George et al., 2016 for extensive reviews). From a theoretical point of view, the adoption and use of IFRS ought to improve the quality and thus usefulness of accounting information. One of the main arguments in favor of IFRS is that, compared to most domestic Generally Accepted Accounting Principles (GAAP), they are of higher quality as they require more extensive disclosures as well as accounting measurements that more accurately reflect firms' economic position and performance (Ashbaugh & Pincus, 2001; Barth et al., 2008). This is also reflected in the International Accounting Standard Board's (IASB) *Conceptual Framework for Financial Reporting*, which states that the implementation of the new standards ought to help achieve relevance and faithfulness and hence guarantee a high quality of accounting information (IFRS, 2018). According to agency theory (Jensen & Meckling, 1976), increased disclosure should lead to a decrease in managerial discretion and thus lower the chances of opportunistic manager behavior. This ought to mitigate information asymmetry and increase the usefulness of accounting information to outside users such as investors, financial analysts, and other stakeholders. Apart from this, the extensive implementation of IFRS worldwide also ought to lead to an increase in the usefulness of financial information since information provided by firms from different parts of the world will become (more) comparable, making it more accessible to international capital market participants and helping them make better informed decisions (Hail et al., 2010). Both these aspects are expected to lead to higher-quality accounting information and thus decrease information asymmetry between firm insiders and outside users of financial information. However, at least two factors exist that make the achievement of the aforementioned improvements unlikely. First, it is possible that firms do not consider the adoption of IFRS to be beneficial for them and thus decide to implement them only superficially by taking a ticking-a-box approach (Christensen et al., 2015; Daske et al., 2013). This is a widely accepted view in existing literature claiming that if firms are forced to apply the new standards through mandatory adoption and perceive no significant advantages of doing so, they will be reluctant to invest in the proper implementation of IFRS. Instead, they will widely choose to apply the new standards as they did their old domestic GAAP by only undertaking essential minor changes (R. Ball, 2006; Daske et al., 2013). If this is the case, the expected positive developments in terms of accounting quality are unlikely to manifest. Second, IFRS are designed as principles-based standards that embody a comprehensive set of guidelines rather than a set of strict rules, with the aim of giving firms the necessary freedom to tailor the

provided accounting information so that it presents a highly accurate and faithful image of their operating and financial situation. However, this characteristic of IFRS is also likely to enable opportunistic behavior on the part of firms' management (Barth et al., 2008; Langmead & Soroosh, 2009). As long as accounting standards allow some discretion and firms have different reporting incentives, managers may use the provided freedom to their advantage, for example by tailoring their financial information not to make it more relevant and faithful, but to provide a more favorable image of the firm's financial situation and profitability (Christensen et al., 2015; Leuz et al., 2003). These two different scenarios regarding the consequences of IFRS adoption also help explain contradictory findings in literature, the general conclusion of which is that there is no generally valid, unambiguous answer to the question of whether the implementation of the new standards leads to an improvement in the quality of provided accounting information (Capkun et al., 2016). Academic research has come to rather a different conclusion, namely that the positive outcomes of IFRS adoption are highly dependent on a range of additional factors and that in general, accounting standards in themselves do not have the power to improve the quality of provided information (Burgstahler et al., 2006; George et al., 2016; Leuz et al., 2003). Complementary factors such as changes in enforcement and firm-level reporting incentives thus play a central role in determining the success of IFRS implementation measured in terms of improved quality of accounting information. This dissertation contributes to the literature on IFRS by examining three aspects that, to the best of my knowledge, have not been previously analyzed and that help provide further insights into the consequences of the adoption of and reporting under IFRS. First, inherent reporting flexibility, as a distinctive characteristic of IFRS compared to existing domestic GAAP, is shown to be widely used by firms to change the presentation of their income statements. This aids them in providing higher quality and thus more useful information to financial statement users. I argue that inherent reporting flexibility is one of the main factors that enable firms to improve the usefulness of the provided accounting information, as it allows them to tailor the way they present relevant information and to provide a more faithful image of their operating and financial situation. Second, I contribute to the literature on IFRS by showing that due to the lack of any clearly defined required earnings subtotals, firms have widely diverging practices of reporting operating earnings subtotals. Further, their decision on how to define these subtotals is influenced by firm-level factors, such as their reliance on debt financing. Thus, I argue that firms use the discretion they have in deciding how to calculate subtotals to their advantage. Furthermore, these first two findings are also of relevance to standard-setters and regulators as they provide new insights on topics that are currently in the center of attention.

Seeing as the number of individual items that are required in the income statement under IFRS is currently very low, the IASB is considering extending the requirements of IAS1 by including a number of additional subtotals that firms would have to report separately (IFRS, 2020). The argument is that this would allow firms to provide a more accurate picture of the sources of income and expense. Furthermore, the IASB is also considering requiring firms to present clearly defined IFRS subtotals that should follow the same calculation pattern to make them comparable across firms and thus increase their usefulness to financial statement users (IFRS, 2020). Third, I offer new insights into IFRS literature as I take a unique perspective and analyze how firms' choices in the run-up to mandatory IFRS adoption affect subsequent accounting outcomes. I argue that properly preparing for a major accounting change such as the adoption of IFRS is key in ensuring thorough implementation of the new sets of standards, as without the necessary means and knowledge firms would be unable to do so. Furthermore, by taking into account a strategic decision such as investing in top-level accounting expertise, this study also serves as a transition to the second overarching topic of this dissertation.

The second cluster of studies in this dissertation focuses on two additional types of top-level influence through managerial decisions and how this translates into cost management practices. Both studies regard cost management practices by focusing on the concept of asymmetric cost behavior. This concept has emerged in recent research and relies on the fact that although traditional cost models assume that variable costs vary symmetrically with firms' activity levels, this is not observable in practice (Anderson et al., 2003). Rather, costs (such as SG&A) have been found to behave asymmetrically in relation to changes in activity levels. This can lead to cost stickiness if costs increase more rapidly when the activity level increases than they decrease when the activity level decreases to the same degree (Anderson et al., 2003). Alternatively, under an excess capacity assumption, the response of costs to a decrease in activity level exceeds that to an equivalent increase in activity level, in which case they are labelled anti-sticky costs (Banker & Byzalov, 2014). Existing research on cost asymmetry mainly focuses on identifying general firm-specific and macro-economic determinants, such as asset and employee intensity, life cycle of the company, or gross domestic product (Anderson et al., 2003; Banker et al., 2014; Banker & Byzalov, 2014; Dierynck et al., 2012). However, I argue that strategic decisions taken at top management level are just as, if not more, important in explaining observed cost behavior and its consequences on the shareholder side. The first type of strategic decisions are those made by firms' CEOs, the importance of which is validated by implications of extensions of agency theory and neoclassical theory (Bertrand & Schoar, 2003). Thus, I contribute to managerial accounting literature by showing that individual CEOs

significantly contribute to the degree of cost asymmetry within a firm through their individual managerial style and that this is associated with lower shareholder value. I argue that individual CEOs' decisions can be biased by potential personal benefits resulting from empire-building, which would lead to an under-adjustment of costs (i.e., cost stickiness) as well as by managerial myopia due to gains from meeting or beating earnings targets, which would lead to an over-adjustment of costs (i.e., cost anti-stickiness). Both outcomes are assumed to be unfavorable to the firm's shareholders. The second type of strategic decision relates to firms' move to undergo voluntary sustainability assurance of their corporate social responsibility (CSR) reports. With the emerging importance of corporate social and environmental activities in recent years, sustainability assurance of CSR reports has gained increasing popularity (KPMG, 2017). The main objective of sustainability assurance, a review and assurance process of CSR reports by an independent third party, is to improve the credibility and legitimacy of CSR-related disclosures and thus reduce information asymmetry among external users (Cuadrado-Ballesteros et al., 2017; Simnett et al., 2009). However, an additional benefit that is strongly promoted by providers and sought-after by companies is an improvement in the underlying internal information environment of managers that results from advice from providers having reviewed the firm's internal controls, information systems, and processes (A. Ball et al., 2000; O'Dwyer, 2011). This can aid managers in lowering the uncertainty in their decisions on resource adjustments, resulting in more timely cost reductions when activity levels decline (i.e., less cost asymmetry). Thus, I contribute to the emerging literature string on sustainability assurance by showing that sustainability assurance has real economic benefits for a company that go beyond the primary goal of increasing investor confidence in provided CSR disclosures, thus producing internal effects beyond CSR performance. With the aforementioned two studies, I also contribute to the cost asymmetry literature by identifying individual CEOs' decisions and sustainability assurance as additional determinants and most importantly, additionally contribute to the scarce literature on the consequences of cost asymmetry by showing that the sources of cost asymmetry are decisive for how it is perceived by shareholders.

The final section of this dissertation focuses on a very current topic, namely the way corporations choose to address the ongoing coronavirus (COVID-19) pandemic. The pandemic that initially broke out in Wuhan, China in December 2019 has strongly affected societies on both a physical and economic level, with fears of a recession reminiscent of the 2008 financial crisis intensifying (FAZ, 2020). Corporations, key players in today's societies, face the challenge of preparing a strategic response that involves addressing the coronavirus-related risks and drawing up suitable action plans. Thus, I contribute to the literature by showing that

during a pandemic, firms' prompt response in terms of immediate risk assessment and increased transparency in company disclosures is highly valued and rewarded by market participants. I argue that if firms react before a crisis reaches its peak and remain transparent throughout, this allows them to reduce the negative impacts the crisis may have on their business.

The first study *Does Reporting Flexibility under IFRS Impact Analysts' Forecasts?* in **Part II** (co-authored by Joseph Comprix and Kerstin Lopatta) investigates how managers use the inherent reporting flexibility in IFRS in the presentation of firms' income statements following IFRS adoption and whether this has a significant impact on the quality of analysts' forecasts. Inherent reporting flexibility represents one of the distinctive characteristics of IFRS as compared to local GAAP, the direct consequences of which have not been examined by prior research. This flexibility ought to enable firms to tailor their financial statements and thus, in line with IASB's Conceptual Framework for Financial Reporting, provide information that is relevant and faithfully represents a firm's operating and financial situation (IFRS, 2018), thus making it more useful to financial statement users. Existing research on the general effects of IFRS adoption on reporting quality provides inconsistent results, varying from improvements in reporting quality (Daske & Gebhardt, 2006; Lang & Stice-Lawrence, 2014), no significant change (Chalmers et al., 2011; Lin et al., 2012), to even a decline (Capkun et al., 2016; Krishnan & Zhang, 2019). This is most likely due to the adoption of IFRS often being accompanied by regulatory and enforcement changes, which vary amongst jurisdictions thus likely leading to different outcomes (Leuz & Wysocki, 2016). This study identifies changes in income statement presentation in the form of the number of individual line items reported as a direct measure of reporting flexibility-related changes, thus building on the financial statement disaggregation literature under US GAAP (Chen et al., 2015; Hoitash & Hoitash, 2017). Based on theory, under inherent reporting flexibility firms could either choose to increase the amount of information they present (consistent with agency theory – Jensen & Meckling, 1976) or decrease it if they have proprietary information-related concerns (Verrecchia, 1983). According to literature on financial information disaggregation, both these changes should have an impact on the usefulness of the provided information (Blackwell, 1953; Hoitash & Hoitash, 2017). The results show that firms widely use inherent reporting flexibility to both increase and decrease the number of individual items they report in their income statements, these changes being concentrated in IFRS transition years and driven by changes of recurring items individually presented. Further, the results show almost equal numbers of firms using reporting flexibility to increase and decrease the number of reported items, mitigating concerns that the results could capture confounding effects from concurrent but unrelated events, such as regulatory changes,

as these would lead to unidirectional changes in reporting practices of all firms. Furthermore, the results show that, both flexibility-induced increases or decreases in the number of presented items are associated with improvements in analysts' forecast quality following IFRS adoption. Based on disaggregation literature (Bens et al., 2011; Berger & Hann, 2007), the finding that firms decreasing the number of presented items leads to more accurate analysts' forecasts may be counterintuitive, so additional analysis explores the drivers of these changes. Findings show that these decreases are the result of objective decisions, such as the elimination of items inconsistent with IFRS (such as extraordinary items) and the consolidation of individual low dollar value items, and that a decrease in the number of items is often accompanied by an improved structure of the income statement.

This first study makes two main contributions. First, it contributes to the IFRS literature by showing that one of the main sources of improvement in the usefulness of financial information following IFRS adoption is the financial reporting changes attributable to inherent reporting flexibility. Second, it contributes to the literature on financial information disaggregation by providing findings on its effects in an international setting and especially, complementing more recent work in the US GAAP setting showing that higher disaggregation is not always beneficial (Hoitash & Hoitash, 2017). This study contributes to the framework of this dissertation showing that by trying to step away from a holistic view of IFRS as a set of standards and analyzing more precise aspects, such as in this case inherent reporting flexibility of IFRS, helps provide new insights into international financial reporting, specifically the literature on IFRS. Overall, the results show that despite concerns expressed in prior literature about firms opportunistically using the freedom granted by IFRS, in the context of financial statement presentation firms rather use it to provide higher-value information.

The methodology used in this study has two distinctive characteristics. First, it uses a unique hand-collected sample of income statements as reported in firms' consolidated financial statements to construct the main measure of interest, the income statement disaggregation variable measuring changes directly attributable to inherent reporting flexibility. Second, it uses a difference-in-differences research design to mitigate endogeneity concerns. Publicly listed Canadian firms that mandatorily adopted IFRS in 2011 are used as the treatment sample and EU publicly listed firms that mandatorily adopted IFRS in 2005 are the control sample. Canada was chosen because of the absence of IFRS-concurrent significant changes in governance or regulatory institutions (Khan et al., 2017), which allows for a better identification of results. Additional analysis of the type of changes in the presentation of income statements, tests of the

parallel trends assumption for the difference-in-differences regressions, as well as accounting for differences between legal systems help to increase the validity of results.

This project started during a research stay at Syracuse University in September 2017 and the first version of the paper was prepared in September 2018. Since then it has been presented at several international seminars as well as two international conferences (2018 Nordic Accounting Conference in Denmark and 2019 EAA Annual Conference in Cyprus). Based on the received feedback, the paper has been updated twice by improving the theoretical argumentation and extending the methodology through additional tests. The most current version is included in this dissertation. The main motivation for this paper is, first, to examine in more detail the direct consequences of IFRS adoption on firms' reporting practices. Second, the use of unique hand-collected information is an opportunity to accurately capture reporting outcomes, as data standardized in available databases, such as Compustat, does not faithfully depict the true form in which information is presented in financial statements prepared under IFRS.

The second paper *Reporting of Operating Income Subtotals in IFRS and Debt Financing* in **Part III** (co-authored by Joseph Comprix and Kerstin Lopatta) analyzes how firms deal with the lack of exact requirements concerning the reporting of income subtotals in financial statements prepared in accordance with IFRS. Especially operating income metrics play a central role in capital markets as they are used to assess both the profitability and financial stability of firms. However, for firms reporting under IFRS, the IASB does not prescribe any clearly defined accounting terms that could serve as operating income subtotals (OIS) (IASPlus, 2015). Further, practitioners express increasing concerns that this situation could lead to diverging practices and increase the likelihood of firms providing a misleading picture of their financial stability (Powell, 2018; Schelling, 2019). Thus, in a first step this study provides an in-depth analysis of the way firms choose to define their reported operating income subtotals. As operating income metrics (such as EBITDA) are one of the main measures used to evaluate firms' financial stability when accessing debt financing (Debt Explained, 2017), this study further posits that firms' reliance on debt financing acts as an incentive for choosing certain definitions of reported operating income subtotals that could facilitate their access to debt financing. Especially in the EU, this plays a significant role as debt is the most significant source of capital for many firms (Florou & Kosi, 2015), with practitioners highlighting that debt-to-EBITDA ratios have reached unusually high levels (Racanelli, 2018; Schelling, 2019). The results show that 76.7 percent of firms report a tailored version of operating income and that there is a lot of heterogeneity especially over which recurring items are included in their

calculation. In line with expectations, the study shows that firms that rely strongly on debt financing are more likely to tailor their reported operating income metrics by strategically including recurring items that increase their value. Further, the results also show that the announcement of upcoming European Central Bank (ECB) guidance on leveraged lending (capping debt-to-EBITDA ratios to qualify for debt financing) further amplifies firms' strategic inclusion of value-increasing items in their reported operating income subtotals.

This study contributes to the literature in three ways. First, it contributes to literature on IFRS as it is, to the best of my knowledge, the first to provide insights into firms' practices in and incentives for operating income subtotal reporting under IFRS. If strongly incentivized, managers are inclined to opportunistically use the freedom resulting from the absence of requirements concerning income subtotal reporting under IFRS. Second, it provides a rather different approach in that it refrains from discussing IFRS adoption consequences and instead analyzes more current reporting practices of firms reporting under IFRS once they have completed the transition period. Third, it contributes to the non-GAAP reporting literature by showing that the assumptions in non-GAAP studies based on US GAAP reporting cannot be transferred to an international setting. Specifically, it shows that measures reported in the income statement as operating income subtotals by firms using IFRS cannot be used as appropriate proxies for GAAP earnings due to the strong heterogeneity of their composition, which makes them unsuitable as baseline figures. The findings and contributions of this study relate to the framework of this dissertation by addressing reporting practices of operating income subtotals as a distinctive aspect of international financial reporting. It complements the first study by shifting the perspective away from analyzing what happens upon mandatory IFRS adoption towards analyzing reporting practices adopted after the transition period. Further, while the first study focuses on the form in which financial information is presented, this study complements it by concentrating on the content of the presented financial information under IFRS.

Methodologically, this paper uses hand-collected information on reported operating income subtotals in the income statement of publicly traded EU firms and employs a self-developed code, which, based on a list of potential items that are likely included in the calculation of operating income subtotals, is able to identify the individual items that explain at least 99 percent of the value of reported operating income subtotals. A standardized version of operating income by Bloomberg is used in order to identify the diverging items between different definitions of OIS and descriptive analysis is used to provide a comprehensive image of the diverging definition practices. In order to tests the validity of reliance on debt financing

as an incentive for firms' strategic definition of OIS, the paper uses a probability and an OLS regression model. Reliance on debt financing is proxied by using information on bond issues in the SDC Platinum database. The application of additional Heckman correction techniques for non-random selection and a difference-in-differences test for the effect of ECB guidance mitigate endogeneity concerns and increase the quality of the methodology. Further, additional tests using private debt as an alternative measure of reliance on debt financing and using only observations for which 100 percent of the composition of OIS can be identified also increase the robustness of the results.

The outline of the paper was developed in September 2018 and the first draft was completed in May 2019. Since then it has been presented in several interdisciplinary research seminars, the feedback from which led to updates of the paper's storyline and the inclusion of valuable additional tests, all of which are included in the current version presented in this dissertation. The main motivation for the paper came from the current activity of the IASB. One of their major current projects, entitled Primary Financial Statements, focuses on the development of IFRS-defined operating income subtotals. The findings of the study hence provide meaningful insights into which item categories are of interest when defining operating income and draw attention to the fact that certain firm characteristics, such as reliance on debt financing, play a significant role when assessing the usefulness of currently reported subtotals.

The third study *Do You Need Accounting Experts? How Firms Prepare for IFRS Adoption and Its Consequences on Accounting Quality* in **Part IV** (single-authored) looks at how firms' deliberate choice to increase their level of accounting expertise on the board of directors in preparation for mandatory IFRS adoption helps explain the subsequent quality of accounting information. Demand for board directors with accounting and financial expertise has increased in recent years, as regulatory requirements are tightened, accounting standards change, and challenges of accounting rules increase (Ernst & Young, 2013). Existing research on accounting expertise mostly focuses on the US setting (Chychyla et al., 2019; Dhaliwal et al., 2010), international studies only regard it as a part of wider measures of board competence (Nouri & Abaoub, 2016; Verriest et al., 2013). Especially when confronted with complex accounting challenges, such as the mandatory adoption of IFRS, firms should thoroughly prepare for them by ensuring they have the knowledge to successfully overcome them. As accounting experts are a crucial factor that can guarantee a successful execution of complex accounting challenges, this study claims that a firm's deliberate choice to increase its level of accounting expertise in preparation for mandatory IFRS adoption is one of the drivers of subsequent quality of provided accounting information. The results of this study show that

although only a minority of mandatory-adopting firms increase their accounting expertise ahead of IFRS adoption, it has an impact on subsequent accounting quality in the form of increased use of discretionary accruals, increased income smoothing, and less accounting conservatism. The interpretation of these results is, however, not trivial, with two competing views. Internationally focused research (Baik et al., 2019; Pham et al., 2019) and standard-setters' recommendations (IASB 2006) suggest that these results are representative of improved accounting quality, while traditional research argues that they are indicators of lower accounting quality (R. Ball et al., 2000; Leuz et al., 2003). The study is limited in that its current analysis cannot clearly differentiate between these two scenarios.

This study contributes to two strings of literature. First, it contributes to literature on IFRS by considering prior research's recommendations and focusing on a previously unexplored factor that helps explain subsequent outcomes, namely firms' deliberate decision to increase their top-level accounting expertise. Second, it contributes to the literature on accounting expertise by showing that it is important to take into consideration firms' choices in regard to level of accounting expertise, rather than only look at existing accounting expertise levels. Third, it provides additional evidence on the importance of accounting expertise in an international setting. The study complements the framework of this dissertation by analyzing a new perspective on international financial reporting, namely firms' actions in the period immediately preceding mandatory IFRS adoption. It shows that firms' preparations in anticipation of the mandatory adoption of IFRS in the form of deciding on the necessary level of accounting expertise at the top of the firm's hierarchy is an additional, previously unexplored aspect that influences subsequent outcomes.

Methodologically, the paper is similar to the first one. The predictions of the study are tested through a set of simple difference regression analyses, using Canadian firms mandatorily adopting IFRS in 2011 as the treatment sample and a set of difference-in-differences regression analyses, which help mitigate endogeneity concerns and improve identification by additionally using EU firms reporting under IFRS, as the control sample. Additionally, the study also contains a set of difference-in-differences tests for which US firms are used as control sample. As the main concept of the study is accounting expertise, the sample consists of firms for which information on directors' accounting expertise is available in the BoardEx database. The study employs discretionary accruals use, income smoothing, and timeliness of loss recognition as three dimensions of accounting quality proxied by eight different measures to assure a comprehensive depiction of accounting quality, a concept that is difficult to measure (Leuz et al 2003).

The idea for this study was originally developed during an internal doctoral seminar at the University of Hamburg at the end of 2019. The first version was finalized in June 2020, making this one of the two very recent studies in this dissertation. Since then it has benefitted from feedback from colleagues, which helped improve the theoretical underpinnings and led to the version included here. The motivation for the study was the general absence of information on how firms' actions prior to mandatory IFRS adoption may influence how successful they are in implementing the new set of standards. Further, it serves as a transition study to the second major topic of this dissertation: the importance of strategic decisions taken at top management level.

The fourth study in this dissertation, *Managerial Style in Cost Asymmetry and Shareholder Value* in **Part V** (co-authored by Kerstin Lopatta and Thomas Kaspereit), analyzes how individual CEOs' managerial decision-making contributes to cost behavior beyond other firm-specific and macro-economic factors and whether this is associated with shareholder value. Based on extensions of agency theory (Bertrand & Schoar, 2003), the study posits that CEOs contribute to cost management outcomes in the form of SG&A cost asymmetry. This is expected to be negatively associated with shareholder value, as according to agency theory (Jensen & Meckling, 1976) it can either be a result of CEO bias arising from potential benefits from empire-building activities (Cyert & March, 1963; March et al., 1993) or CEO myopia due to potential gains from meeting or beating earnings targets (Cadman & Sunder, 2014; Graham et al., 2005). Indeed, the results show that CEOs contribute significantly to the overall level of cost asymmetry in excess of the firm-specific level and that this is associated with lower shareholder value. Furthermore, the results show that the association with shareholder value is mainly driven by CEOs contributing to excess cost stickiness, especially those with more powerful control rights, and that it is stronger in the case of CEOs whose compensation is less dependent on shareholder value creation.

The study contributes to the literature string on cost asymmetry in two ways. First, it identifies individual CEOs' decisions as an additional important determinant of asymmetric cost behavior and thus extends research on this phenomenon from an agency perspective (Chen et al 2012). Second, it contributes to the scarce literature on the consequences of cost asymmetry by providing the first large-sample empirical evidence of its association with shareholder value. Third, it contributes to literature on the importance of top-level managers by showing that they also have a direct impact on cost adjustment decisions that generally take place at other levels of the firm, highlighting the importance of tone at the top. This study complements the framework of this dissertation by analyzing a specific factor that influences top-level decisions,

namely individual CEOs' managerial style as a significant factor that influences their cost-related decision-making. Thus, it further endorses the idea that CEOs are the most powerful individuals in modern corporations and thus can imprint their style on firm-wide decisions.

The methodology in the paper follows a two-step approach. First, in order to estimate individual CEOs' influence on SG&A cost asymmetry, it uses CEO-fixed effects. For this, the paper uses a self-developed extended version of the cost asymmetry model in Anderson et al. (2003), which includes CEO-fixed effects, and uses the method outlined in Bertrand and Schoar (2003) to estimate them. In a second step, the study uses the estimated CEO-fixed effects on cost asymmetry as the main independent variable of interest in an OLS shareholder value (measured by Tobin's Q) model. Additional tests controlling for CEO overconfidence, newly appointed CEOs as well as other CEO characteristics, such as type of compensation or existing control rights, help improve the robustness of the results and mitigate the possibility of alternative interpretations.

This study was the first to be completed in this dissertation. It commenced in February 2017 during a research stay at the University of Luxembourg and a first version was completed by October 2017. Since then, the paper has been presented at numerous workshops and seminars as well as four international conferences, the feedback from which led to significant improvements in the theoretical part of the paper as well as to the inclusion of important additional tests. The paper was submitted to *Managerial and Decision Economics* in June 2019 and was accepted for publication in January 2020.

The fifth study *Sustainability Assurance and Cost Asymmetry* in **Part VI** (co-authored by Kerstin Lopatta, Anna Rudolf and Sebastian Tideman) examines the internal benefits of sustainability assurance (SA) translated into improved cost-management decisions reflected in the degree of cost asymmetry. SA providers argue that the process contributes to process optimization through a review of internal controls, information systems and processes (KPMG, 2017), thus providing managers with an improved internal information environment and reduced uncertainty (Dorantes et al., 2013; Ittner & Michels, 2017). This ought to aid them in making better resource-allocation decisions, resulting in more timely resource adjustments and better cost management. Further, the paper posits that these improvements are reflected in shareholder value, as prior literature shows that improved information environments lead to more efficient internal capital allocation and overall better performance (Abernathy et al., 2019; Cheng et al., 2018). The results confirm these hypotheses. SA has a significant effect on cost asymmetry, leading to a decrease in asymmetric cost behavior, which is associated with

improved shareholder value. Furthermore, the results show that this is driven by timely cost adjustments in the case of a decrease in activity levels.

The study contributes to three different strings of literature. First, it contributes to the emerging literature on sustainability assurance by providing evidence on the internal effects of SA beyond CSR performance, as it shows that SA affects internal cost adjustment decisions. Second, it contributes to the literature on the link between CSR and shareholder value by identifying SA as a CSR-related factor that is related to shareholder value. Third, it contributes to the literature on asymmetric cost behavior by identifying SA as an additional factor influencing asymmetric cost behavior and providing further evidence on the consequences of cost asymmetry. This study sheds light on the importance of firms' strategic CSR-related decisions by showing that the decision to undergo voluntary sustainability assurance has beneficial effects on firms' wellbeing that go beyond increased legitimacy and credibility of sustainability-related disclosures. Thus, it relates to and complements the findings in the study in Part V of this dissertation.

The research design of this paper is, similar to that used in the fourth paper in Part V, based on a two-step approach. It uses an extended version of the model in Kaspereit and Lopatta (2019) to estimate the effect of SA on cost asymmetry through rolling five-year pooled cross-sectional regressions. In a second step, the identified SA-related part of cost asymmetry is used as independent variable of interest in an OLS shareholder value model using Tobin's Q as measure. The paper employs a Heckman (1979) correction for non-random selection and a two-stage least squares instrumental variable regression analysis to mitigate endogeneity concerns. Further, it uses hand-collected data on the level of assurance on sustainability information in additional tests, which helps explore the findings related to improvements in shareholder value in more detail. Given the complex methodology used in this paper, its development was a lengthy process. The idea was developed in the first half of 2019 and with the first version completed by July 2020, it is the most recent paper to be completed as part of this dissertation. The analysis in the paper has benefitted from improvements through feedback from colleagues and internal team discussions, all of which are included in the version presented in this dissertation.

2020 saw the commencement of one of humanity's biggest crises: the emergence of the coronavirus (COVID-19) pandemic that is threatening populations worldwide. The measures taken to try to contain the spread of the disease and thus minimize loss of life not only affect the wellbeing of individual humans, they are also increasingly threatening to plunge the global economy into one of the most severe financial crises since the Great Depression (FAZ, 2020).

Corporations worldwide are struggling as the pandemic threatens their longevity, and they are faced with significant challenges in preparing a strategic response to this unexpected situation. Thus, motivated by current events, the idea for the final paper in this dissertation was born at the beginning of March 2020 and a first version was drafted in late April 2020. The paper was presented in an internal doctoral seminar, then updated and is now included in its current version in this dissertation. *To Report or Not to Report about Coronavirus? The Role of Periodic Reporting in Explaining Capital Market Reactions during the COVID-19 Pandemic* in **Part VII** (co-authored by Kerstin Lopatta, Thomas Tammen and Kenji Alexander) examines how the prompt incorporation of information on current events in annual reports helps explain short-term capital market developments amidst the ongoing coronavirus pandemic. The study hypothesizes that reporting on the COVID-19 pandemic demonstrates firms' increased early warning and risk-detection ability and a commitment to transparency, both of which ought to be rewarded by the capital market. The results show that firms that choose to report about the COVID-19 pandemic in their 2019 annual reports benefit from improved stock performance and stock risk over those which do not. Firms that released their annual reports before the date on which COVID-19 was declared a pandemic enjoyed the biggest benefits, as they exhibited both an incremental decrease in stock risk and an increase in cumulative abnormal returns following publication.

This paper contributes to the literature on the importance of reporting to capital markets by providing insights into how market reactions to unexpected crises, such as the coronavirus pandemic, are determined by firms' reporting choices. Further, it contributes to the literature on risk management and reporting by showing that it is crucial that firms show a prompt and adequate response to unexpected risks such as a pandemic. The paper enhances the overall framework of this thesis by addressing a current topic of general interest, as the ramifications of the COVID-19 pandemic will likely have a universal impact on participants in societies. Furthermore, it fits into the overarching topic of international financial reporting as it examines the reporting practices of international firms during a global crisis.

The paper uses hand-collected information from 2019 annual reports of firms that are constituents of leading indices in ten countries in order to analyze reporting practices in connection with the coronavirus pandemic. Standard event-study methodology is used to analyze the association between COVID-19 reporting and stock market developments. The constant mean model is used to measure the change in stock performance, while the market model is used to calculate the change in stock risk. Additional analysis includes hand-collected information on state ownership as an additional factor with explanatory power for the

documented effects on stock risk. Further, the study uses a two-stage Heckman (1979) estimation approach to account for non-random selection and takes into account potential effects of changes in earnings guidance, both of which help mitigate endogeneity concerns.

Overall, the findings of the six studies in this dissertation contribute to the literature on international financial reporting by highlighting the importance of analyzing specific factors in order to provide more accurate insights into its usefulness. Particularly, it shows that firms' use of specific characteristics such as inherent reporting flexibility and lack of clear requirements concerning the reporting of subtotals play a significant role in explaining reporting outcomes. Further, it shows that firms' strategic decisions, such as boosting their accounting expertise, also contribute to IFRS implementation outcomes. Finally, the results highlight the importance of reporting in times of crisis. The important role of strategic decisions at top management level is further accentuated by the findings on CEOs' managerial styles and firms' decisions to undergo voluntary sustainability assurance, which influences cost management and thus shareholder value. These findings contribute to the literature on cost asymmetry as well as to sustainability literature. Besides the contributions to literature, the dissertation also provides valuable insights for standard setters and regulators. First, the results of the studies in Part II and Part III in this dissertation contribute to the ongoing debate on potential changes in requirements of international reporting standards. Specifically, they provide valuable information that can help advance standard-setters' efforts to improve IFRS and relate directly to one of the current major projects of the IASB, Primary Financial Statements, on developing IFRS-defined operating subtotals (IFRS, 2020). Second, the results of the accounting expertise related study provides valuable insights to standard setters and regulators that can contribute to the further development of requirements on accounting and financial knowledge of board members. Third, the study analyzing SA-related cost management consequences provides additional arguments that legitimize the necessity of sustainability assurance as a potential future regulated and required process to review reported information, similar to external audits for financial information.

Finally, the results of this dissertation also have implications for practitioners. First, they can aid practitioners in deciding how they present their financial information or whether and how they choose to present operating activity results based on peer practice. Second, the findings of the accounting expertise-related paper in Part IV show that the decision to invest in accounting expertise can be profitable as it can aid practitioners in significantly changing the quality of accounting information. Third, the study focusing on CEO managerial style in Part V of the dissertation highlights the importance of the right choice of CEO as managerial style

has implications for company-wide outcomes. Fourth, practitioners can use the findings of the sustainability assurance-related study in Part VI to make a more informed decision on the usefulness of voluntary sustainability assurance for their business. Last, the study on the COVID-19 pandemic provides practitioners with valuable new information on the importance of covering coronavirus-related information in their periodic reports. This information should thus be especially valuable to practitioners whose next reporting cycle will be the first one to be affected by the COVID-19 pandemic, such as those with fiscal year end date at 30th of June.

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Part II: Does Reporting Flexibility under IFRS Impact Analysts' Forecasts?

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Abstract

We examine the impact of reporting flexibility under IFRS on the presentation of income statements following IFRS adoption and whether this affects analysts' forecasts. We use mandatory IFRS adoption in Canada as an exogenous shock to financial reporting flexibility and EU firms using IFRS as a control group. We capture the consequences of reporting flexibility under IFRS by analyzing the changes in the number of unique line items reported based on 'as reported' income statements. We find that 45.3 percent (44.3 percent) of first-time IFRS adopters exhibit an average marginal increase (decrease) of 2.762 (-1.369) items in the number of unique items reported. These changes lead to a decrease in analysts' absolute forecast errors, both for firms with increases and decreases. Additional analysis reveals that our main findings are driven by changes in the number of unique recurring (and not transitory) items presented due to reporting flexibility under IFRS.

Keywords: Reporting flexibility; IFRS; Disaggregation; Analyst forecasts;

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1 Introduction

The primary purpose of this paper is to examine how managers use the financial reporting flexibility inherent in International Financial Reporting Standards (IFRS). Specifically, we analyze whether reporting flexibility impacts the presentation of income statements following IFRS adoption and whether this has a significant impact on the quality of analysts' forecasts. In our study, European Union (EU) firms using IFRS are our control group and we use mandatory IFRS adoption in Canada as an exogenous shock to financial reporting flexibility.

Despite extensive research on the consequences of IFRS adoption (see K. Ahmed et al., 2013; Brüggemann et al., 2013 and DeGeorge et al., 2016 for comprehensive reviews), the findings are often inconsistent, some studies documenting a positive effect on financial reporting quality (Barth et al., 2012; Daske & Gebhardt, 2006; Landsman et al., 2012), others failing to document any significant effect (Atwood et al., 2011; Doukakis, 2014) or even finding a negative association (A.S. Ahmed et al., 2013; Capkun et al., 2016; Liao et al., 2012).

One characteristic of IFRS that has not been heavily explored in prior research, is the inherent reporting flexibility allowed by principles-based standards. As opposed to (mostly) rules-based prior local Generally Accepted Accounting Principles (GAAP), IFRS allows firms to 'tailor' their financial statements to provide relevant information that faithfully represents their financial situation. Consequently, firms reporting under IFRS have flexibility in deciding how they present the income statement so we analyze the corresponding changes using the number of unique line items reported subsequent to IFRS adoption. We focus on income statements because IAS 1 only requires the separate presentation of a very limited number of items (as compared to previous local GAAPs) and the only required earnings item is net profit or loss, so we would expect to see the maximum amount of flexibility there. Additionally, comparison studies of prior local GAAP and IFRS highlight the fact that income statements are the area where there is a significant relaxation of disclosure requirements associated with the switch to IFRS (CPA Canada, 2017; KPMG Canada, 2010). Thus, we expect IFRS adoption to lead to a significant change in the number of unique items reported in the income statement.

Because of the reporting flexibility inherent in IFRS, firms can either increase the amount of information they present in their income statements in an attempt to reduce information asymmetry and achieve capital market benefits such as a lower cost of capital (consistent with agency theory – Jensen and Meckling (1976)) or alternatively, they can limit the amount of information they disclose if they are concerned that proprietary information could be used by

competitors or others to the detriment of the company (consistent with proprietary costs theory – Verrechia (1983)). Furthermore, prior research claims that regulation regarding increased disclosure does not always lead to optimal levels of disclosure (Farvaque et al., 2011; Hermalin & Weisbach, 2012; Leuz & Wysocki, 2016), thus some firms might choose to decrease their disclosure to a level they consider beneficial when given reporting flexibility under IFRS. Therefore, theory suggests that IFRS adoption can lead to either an increase or a decrease in the number of unique items reported in the income statement.

Further, we expect reporting flexibility-related changes in the number of unique items reported to significantly impact the quality of analysts' forecasts. This is important because analysts have a significant influence on investors' judgements and beliefs (Bercel, 1994; Walther, 1997) and they are among the most important users of financial reports (Schipper, 1991). Due to competing views in prior literature on the interpretation of disaggregated financial information and its costs and benefits (either improved disclosure quality – S. Chen et al., 2015, or increased accounting reporting complexity – Hoitash & Hoitash, 2017), we do not make a directional assumption on the effect of reporting flexibility following IFRS adoption on the quality of analysts' forecasts.

Our research design has two distinctive characteristics. First, we use a unique hand-collected sample of income statements as reported within the *'Consolidated Financial Statement'* section of individual annual reports to construct our income statement disaggregation variable by counting the unique items individually reported in the income statement. Second, we employ a difference-in-differences research design to mitigate endogeneity concerns. We use EU publicly traded firms that mandatorily adopted IFRS in 2005 (i.e., firms traded on EU-regulated stock exchanges) as a control sample and employ publicly traded Canadian firms as a treatment sample, as these firms mandatorily adopted IFRS for fiscal years beginning on or after January 1, 2011. We choose Canada because of its similarities to the EU in terms of development, the legal and regulatory environment, strong corporate governance, and the absence of any other significant concurrent changes in governance and regulatory institutions around mandatory IFRS adoption (S. Khan et al., 2017). We do not look into changes in EU countries around IFRS adoption due to significant differences in national GAAP across them pre-IFRS and to the high possibility of numerous unrelated, but concurrent, shocks (Leuz & Wysocki, 2016).

In line with our expectation that IFRS adopters use reporting flexibility to both increase and decrease the number of reported items in their income statements, our main findings show that, out of the 307 firms in our treatment sample, 45.3 percent exhibit an average marginal

increase of 2.762 items in the number of unique reported items, while 44.3 percent exhibit an average marginal decrease of 1.369 items. Approximately 10.4 percent of the treatment firms do not change the number of items presented in the income statement. Additional tests increase the reliability of our results, showing that reporting flexibility-related changes in the income statement are concentrated in the IFRS transition years and that, on average, the pattern in the number of items is steady in preceding and subsequent years. Further, since there are nearly equal numbers of firms increasing and firms decreasing the number of reported items in the year of IFRS adoption mitigates concerns that our analysis may capture confounding effects from concurrent but unrelated events (such as other regulation changes), since those would lead to the reporting practices of all treatment firms concurrently changing in one direction.

Regarding the impact of reporting flexibility-related changes in income statement presentation on analysts' forecasts following IFRS adoption, our main results show a significant improvement in analysts' forecast quality due to them. Specifically, we document a 2.50 percent decrease in analysts' earnings forecast errors following IFRS adoption. Additional tests show that both increases and decreases in the number of items reported are associated with positive changes in analysts' forecast quality.

To better understand the improvement in the quality of analysts' forecasts post-IFRS for firms reporting fewer income statement items, we take a closer look at that sample. First, firms that reduce the number of reported items improve the structure of their financial statements after IFRS adoption. Specifically, they start to separate (core) operating items from non-operating items. Second, we find that firms tend to stop separately reporting low dollar value items (instead choosing to combine them). Third, some pre-IFRS line items that are not consistent with IFRS are eliminated. Thus, it appears that in many cases firms improve the usefulness of their income statements (and make them consistent with IFRS) even while eliminating items, which may explain the increase in analysts' forecast quality that we find for this group. Finally, we address the concern that observed changes in the number of items reported may be mostly due to transitory items. For this, we split our measure into recurring and transitory items and control for the latter in the main analysis. Our results confirm that changes in the number of reported recurring items (and not reported transitory items) drive reporting flexibility-related changes in income statement presentation.

We contribute to the IFRS adoption literature by identifying inherent reporting flexibility, which is a distinctive characteristic of IFRS, as a factor that significantly impacts analysts' forecast quality. Despite concerns expressed in prior literature about firms opportunistically using the freedom granted when reporting under IFRS, in this setting, the evidence suggests

that firms use this freedom to provide higher-value information to financial statement users. Furthermore, we contribute to the literature on financial information disaggregation by investigating its impact in an IFRS setting. Our evidence that, in some cases, reducing the number of reported items may improve analysts' forecast quality complements more recent work in the US GAAP setting showing that higher degrees of disaggregation are not always beneficial (Hoitash & Hoitash, 2017).

The rest of this paper is structured as follows. Section 2 discusses the prior literature and section 3 presents the hypotheses. Section 4 discusses the research design. Section 5 reports the main results and additional analyses. Section 6 concludes.

2 Literature review

Our research question addresses a gap between the literature on the consequences of IFRS adoption and on financial statement disaggregation under US GAAP. Although extant evidence on the effects of IFRS adoption on disclosure quality exists, there is no consensus on whether these effects are positive or negative (see K. Ahmed et al., 2013; Brüggemann et al., 2013; DeGeorge et al., 2016 for extensive reviews). Some studies document general improvements in disclosure quality (Daske & Gebhardt, 2006; Lang & Stice-Lawrence, 2015), the information content of earnings (Denis Cormier & Magnan, 2016; Landsman et al., 2012; S.W.J. Lin et al., 2019), the value relevance of net income and the book value of equity (Barth et al., 2012, Barth et al., 2014, Horton & Serafeim, 2010), and decreases in discretionary accruals (H. Chen et al., 2010) following IFRS adoption. However, other studies fail to document a significant impact of IFRS on the relevance of financial reporting or earnings (K. Chalmers et al., 2008; Goodwin et al., 2008; S. Lin et al., 2012), the usefulness of financial reporting in the short term (Callao et al., 2007), information content of tax expense (Jin, 2018) and earnings management (Doukakis, 2014; Houqe et al., 2012; Said, 2019).

Conversely, some studies report negative financial reporting consequences following IFRS adoption, such as decreased timeliness of loss recognition (A.S. Ahmed et al., 2013) and increased earnings management (Capkun et al., 2016; S. Lin et al., 2012). Moreover, studies investigating IFRS adoption in Canada find conflicting results, Jermakowicz et al. (2018) document higher value relevance of earnings, D. Cormier (2013) shows that this effect is restricted to firms with good governance, Liu and Sun (2015) fail to find any significant change in earnings quality and Krishnan and Zhang (2019) find that IFRS earnings have lower quality. Cross-country studies also provide mixed evidence, documenting IFRS-related improvements

in value relevance and earnings management in France and Germany (Devalle et al., 2010; Zéghal et al., 2011), decreases in Italy and Spain (Devalle et al., 2010; Paglietti, 2009), and no effect in the United Kingdom and Greece (Agostino et al., 2011; Iatridis & Rouvolis, 2010).

Furthermore, a set of studies examines the effects of changes in reporting quality following IFRS adoption. These find positive effects on the cost of equity capital (S. Li, 2010), public bond issues and bond yield spreads (Florou & Kosi, 2015), information asymmetry (Muller et al., 2011) or claim that the market's positive reaction to IFRS adoption is due to investors' expectations of net information quality benefits (Armstrong et al., 2010). Regarding the impact of IFRS on financial analysts, Bae et al. (2008), and Hodgdon et al. (2008) report an improvement in analysts' forecast accuracy following IFRS adoption. By contrast, Cuijpers and Buijink (2005) document larger forecast errors for firms using IFRS relative to local GAAP users, while Jönsson et al. (2012) fail to document any significant effect. Studies focusing on individual countries or regions also show generally positive effects, reporting lower forecast errors for firms in the Asia-pacific region (Cheong & Al Masum, 2010), or improved quality of analysts' forecasts in Australia (K. G. Chalmers et al., 2011; Cotter et al., 2012). However, Byard et al. (2011) find that analysts' earnings forecast errors and dispersion decrease only for mandatory IFRS adopters domiciled in countries with strong enforcement regimes and domestic accounting standards that differ significantly from IFRS (Jiao et al., 2011 report similar findings). Further, Lang et al. (2010) find IFRS related improvements in comparability are positively associated with analyst coverage and forecast accuracy, and negatively associated with forecast dispersion and bid-ask spreads. Neel (2017) also identifies comparability as the main driver of forecast accuracy (consistent with Glaum et al., 2013). However, Horton et al. (2012) find both improvements in reporting quality and in comparability are drivers of forecast accuracy.

We complement and extend the literature on the reporting quality consequences of IFRS adoption by focusing on the inherent reporting flexibility these standards offer by being principles-based. IFRS, as opposed to (most of) the preceding local GAAPs, are designed as a comprehensive set of guidelines accompanying the reporting process and allow reporting flexibility intended to enable firms to 'tailor' their financial statements to provide relevant information that faithfully represents their financial situation (IFRS 2010). We analyze how reporting flexibility under IFRS affects financial statement presentation and further, whether the direct consequences of reporting flexibility under IFRS are associated with changes in analysts' forecast quality following IFRS adoption. We contribute to the existing literature on

IFRS adoption by testing one of the distinctive characteristics of IFRS and extend the findings on the impact of IFRS adoption on analysts' forecast quality.

To better discuss the consequences of reporting flexibility under IFRS on financial statement presentation, we address the literature on reporting quality in the form of financial statement disaggregation under US GAAP. Two main disaggregation measures dominate this body of literature. The first measure assumes that finer information is of higher quality (Blackwell, 1953) and thus, disaggregation of financial information should represent higher quality disclosure (Bens et al., 2011; Berger & Hann, 2007). The second measure is based on the argument that higher disaggregation represents higher accounting reporting complexity, which is likely to have negative consequences such as increases in the likelihood of misstatements and the incorrect application of GAAP (Hoitash & Hoitash, 2017).

S. Chen et al. (2015) measure financial information disaggregation based on the number of non-missing COMPUSTAT line items and their measure (DQ) is positively associated with the quality of firms' information environments, thus capturing disclosure quality. Subsequent studies provide evidence that DQ is associated with higher dividends (Koo et al., 2017), moderates the association between the information environment and cost of capital (Shroff et al., 2017), is positively associated with abnormal returns around the issuance of accounting standards (U. Khan et al., 2017), is associated with lower information asymmetry and higher trading activity (Chung et al., 2019), is negatively associated with proprietary costs of firms (Aobdia, 2018; Novak & Tang, 2018), and is negatively associated with the cost of borrowing (C.Y. Lin et al., 2018). Conversely, other studies document that increased DQ is associated with higher audit risk assessments and audit fees (Beck et al., 2016; Koh et al., 2016). Additionally, Song (2017) shows that financial information is only more informative when disaggregated using a standardized criterion and Fang et al. (2017), using a quarter based version of DQ, show that the variance of accounting errors stemming from transaction complexity is related to a firm's accounting bias.

However, various studies criticize the accuracy of COMPUSTAT data showing that it significantly differs from data in 10-K filings in both amount and magnitude (Chychyla & Kogan, 2015; Tallapally et al., 2011). Following this argument, recent studies switch to measuring financial information disaggregation based on eXtensible Business Reporting Language (XBRL) tags of accounting items disclosed in 10-K filings. Hoitash & Hoitash (2017) build an accounting reporting complexity (ARC) measure based on the number of disaggregated items having individual XBRL tags and show that it is associated with a greater likelihood of misstatements and material weakness disclosures, longer audit delays, and higher

audit fees. Hoitash et al. (2018) find that ARC is associated with poor analyst performance, suggesting that it diminishes the usability of financial reports. Huang et al. (2019) find that managers use elements strategically to increase XBRL complexity, which is associated with less (more) persistent positive (negative) earnings. Conversely, Felo et al. (2018) find that detailed XBRL tagging of footnote information improves analysts' information environments, reducing information processing costs, but only for firms using standardized footnote tags.

We build on this string of literature and investigate income statement disaggregation in terms of the number of unique items disclosed as a measure of reporting flexibility. Specifically, to examine the direct consequences of reporting flexibility under IFRS, we are interested in whether the number of unique items reported changes following mandatory IFRS adoption. In addition, we investigate whether changes in the number of unique items reported significantly impacts the quality of financial analysts' forecasts.

3 Hypothesis development

3.1 Inherent reporting flexibility in IFRS

A unique characteristic of IFRS that has not been given much attention by prior research is the inherent reporting flexibility afforded by being principles-based. As opposed to prior local GAAP, IFRS embody a comprehensive set of guidelines that enables firms to 'tailor' their financial statements and thus provide information that faithfully represents their operating and financial situation. Consistent with this, Schipper (2003) suggests that IFRS encourages the preparation of financial statements based on the essence of economic transactions rather than on a set of relatively inflexible rules. Given that IFRS allows more discretion than previously followed local GAAP, it is reasonable to expect changes in the presentation of financial statements post-IFRS. One way to directly investigate the consequences of inherent reporting flexibility in IFRS is to analyze the changes in the number of unique items reported in the income statement following IFRS adoption. We focus on income statements because IAS 1 only requires the separate presentation of a very limited number of items and the only required earnings item is net profit or loss , so we would expect to see the maximum amount of flexibility there. The differences in requirements for income statement presentation are also obvious when comparing the corresponding standard sections under CA GAAP (CICA Handbook, Part V, Section 1520) versus IFRS (IAS 1.82-82A). Additionally, comparison studies of prior local GAAP and IFRS highlight the fact that income statements are the ones where there is a

significant relaxation of disclosure requirements associated with the switch to IFRS (CPA Canada, 2017; KPMG Canada, 2010).

Given the discretion (managers of) firms have under IFRS, they can either increase or decrease the number of items disclosed in the income statement. On the one hand, agency theory (Jensen & Meckling, 1976) suggests that disclosure mitigates agency costs between firm insiders and outsider stakeholders so we could expect firms to increase the information they present in income statements in an attempt to reduce information asymmetry and achieve capital market benefits such as a lower cost of capital. Similarly, signaling theory (Spence, 1973, 2002) considers high levels of disclosure a direct signal of the company's quality, which can produce capital market benefits for the firm, such as decreased risk of adverse selection. Thus, we could expect firms adopting IFRS to increase the amount of disclosed information. On the other hand, it is also possible that firms use their inherent reporting flexibility to limit the information presented in financial statements if they have proprietary information. Proprietary costs theory (Dye, 1986; Verrechia, 1983) asserts that companies have an incentive to limit information disclosure when that information could be used by competitors and others to the company's detriment. These firms have an incentive to decrease the amount of information presented in their financial statements if they have reporting flexibility under IFRS. Furthermore, prior research claims that regulation regarding increased disclosure does not always lead to optimal levels of disclosure (Farvaque et al., 2011; Hermalin & Weisbach, 2012; Leuz & Wysocki, 2016), thus some firms might choose to decrease their disclosure to a level they consider beneficial when given reporting flexibility under IFRS. Following these arguments, we formulate our first (non-directional) hypothesis:

Hypothesis 1: *Inherent reporting flexibility under IFRS leads to a significant change (both increases and decreases) in the number of unique line items reported in the income statement following mandatory IFRS adoption.*

3.2 Reporting flexibility in IFRS and quality of analysts' forecasts

Prior research identifies professional financial analysts as among the most important users of financial reports (Schipper, 1991) and highlights the importance of financial disclosures in aiding them when issuing earnings forecasts (Lang & Lundholm, 1996). Understanding how financial analysts react to changes in disclosure is important because they significantly influence investors' judgement and beliefs (Bercel, 1994; Walther, 1997). As the adoption of IFRS represents a major change in financial reporting, its association with the information environment of financial analysts has been extensively examined by prior research. The

majority of studies finds that IFRS adoption has a positive effect on the information environment of financial analysts (Byard et al., 2011; Hodgdon et al., 2008; Lang et al., 2010), some attributing it to an increase in financial reporting comparability (Bae et al., 2008; Lang et al., 2010; Neel, 2017) and others to improvements in reporting quality (Horton et al., 2012) or to increased earnings guidance provided by managers (X. Li & Yang, 2015).

Assuming that inherent reporting flexibility under IFRS leads to significant changes in financial statement presentation following IFRS adoption, we expect these changes to significantly impact analysts' forecast quality. However, it is not clear whether the impact is a positive one. A popular view in the literature is that finer (i.e., more disaggregated) information is of higher quality (Blackwell, 1953) and is associated with an improvement in analysts' forecast quality (S. Chen et al., 2015; Dhaliwal et al., 2012). However, some studies argue that finer information is not always beneficial (Huang et al., 2019; Song, 2017) and that it represents higher accounting and reporting complexity (Hoitash & Hoitash, 2017). Based on this, disaggregation can increase the risk of accounting errors (Fang et al., 2017), diminish analysts' forecasts mitigating effect on information asymmetry (Diaz et al., 2019), diminish the usability of financial reports and is negatively associated with analysts' forecast quality (Hoitash et al., 2018). Thus, prior research shows that higher financial statement disaggregation either improves or harms the quality of analysts' information environment. Furthermore, prior research also claims that regulation regarding increased disclosure does not always lead to optimal levels of disclosure (Farvaque et al., 2011; Hermalin & Weisbach, 2012; Leuz & Wysocki, 2016). Thus, firms choice to decrease their level of disclosure once they have reporting flexibility under IFRS might aid them in providing a beneficial level of disclosure, which can positively affect forecast quality. Last, even if firms disclose less due to proprietary costs concerns, this does not necessarily lead to a decreased quality of the information environment (Heinle et al., 2018). Thus, our second hypothesis is as follows:

Hypothesis 2: *The change in the number of unique items reported in the income statement following mandatory IFRS adoption significantly impacts the quality of analysts' forecasts.*

4 Methodology

We employ a difference-in-differences research design in order to mitigate endogeneity concerns. We use publicly traded EU firms that mandatorily adopted IFRS in 2005 as our control sample. The main advantage is that all of these firms operate in similar regulatory and legal environments (and use the same set of standards for financial reporting), thus assuring the

homogeneity of the control group. Further, because the control firms use IFRS both before and after mandatory adoption in Canada, any changes likely reflect the impact of concurrent economic and possible regulatory changes, but not of mandatory IFRS adoption (Byard et al., 2011) and thus increase the validity of using the EU sample as an unaffected control group.

For our treatment sample, we choose publicly traded Canadian firms. IFRS became mandatory in Canada for fiscal years beginning on or after January 1, 2011, forcing Canadian firms to switch from reporting under Canadian GAAP (CA GAAP) to reporting under IFRS. We choose Canada as our treatment sample as it is similar to the EU in terms of both development and the legal and regulatory environment. Canada has a strong enforcement regime due to its legal and governance institutions and does not present issues involving concurrent changes in governance and regulation in the period around mandatory IFRS adoption (S. Khan et al., 2017), which mitigates concerns about unrelated but concurrent confounding regulatory, technological, and market shocks (Leuz & Wysocki, 2016). We focus on mandatory IFRS adopters in Canada to avoid selection problems arising from the incentives of voluntary IFRS adopters (Leuz & Wysocki, 2016).

4.1 Sample selection

We construct our sample by hand collecting 'as reported' income statements from the *'Consolidated Financial Statement'* sections of firms' annual reports, which we use to compute the variable *ITEMS*. We retrieve additional accounting data from Thomson Reuters Datastream and analysts' forecasts from I/B/E/S. We include all firms that are constituents of All-Share indexes from all EU member states as of January 1, 2005 and thus mandatorily adopted IFRS in 2005 to ensure we capture all relevant firms on the market and have no sample selection bias. For Canada, we additionally include any firms with I/B/E/S coverage that are not included in the S&P TSX Composite Index to ensure extant coverage. We follow prior research and exclude financial and insurance companies, as the structure of their financial statements is not comparable to that of other companies and because provincial securities regulators initially allowed investments companies, insurance companies, and rate-regulated entities in Canada to delay IFRS adoption until fiscal years beginning on or after January 1, 2013 (Burnett et al., 2015). This results in an initial sample of 26,064 unique firm-year observations for non-financial EU and Canadian firms covering the period 2005-2016. As we focus on Canadian firms that mandatorily adopted IFRS in 2011 as our treatment sample, we exclude any Canadian firms that never adopted IFRS or that adopted IFRS after 2011, resulting in a loss of 391 observations. We further exclude 56 observations for pre-2011 Canadian voluntary IFRS

adopters to ensure an exogenous shock from IFRS adoption and thus mitigate concerns of endogeneity. We lose another 2,506 observations due to missing data in Thomson Reuters Datastream.

To ensure the validity of the difference-in-difference research design, we require the composition of our sample to be consistent over time to avoid the possibility that our results are driven by changes in the sample. For this, we exclude another 246 observations corresponding to firms that do not have one or more observations both before and after IFRS adoption in Canada. Thus, our sample for testing the first hypothesis consists of 22,275 firm-year observations for 307 Canadian firms and 1,704 EU firms, with an average of 10.9 observations per firm for our 12-year sample. To test our second hypothesis, we further exclude 6,880 observations missing I/B/E/S data and another 465 observations lacking data for the control variables in Thomson Reuters Datastream. Lastly, we exclude another 774 observations for firms that do not have one or more observations both before and after IFRS adoption in Canada. Our final sample for our second hypothesis tests consists of 14,156 observations for 214 Canadian and 1,187 EU firms, with an average of 10.1 observations per firm for our 12-year period. Table 1 provides an overview of the sample selection procedure.

>> Insert Table 1 about here <<

4.2 Construction of the income statement disaggregation measure 'ITEMS'

We construct the variable *ITEMS* as a proxy for the direct consequences of inherent reporting flexibility under IFRS by counting the number of unique items individually reported in the income statement within the *'Consolidated Financial Statement'* section of individual annual reports. Hoitash and Hoitash (2017) use a similar approach in computing an items measure based on financial reports under US GAAP. However, there are a few differences between our approach and theirs. First, our focus is on the number of items reported in the income statement and how this changes as a direct consequence of reporting flexibility under IFRS. In contrast, Hoitash and Hoitash (2017) try to validate their variable as a measure of reporting complexity. Second, we do not include any items related to comprehensive income in our sample as firms reporting under IFRS can choose to either report them in a separate comprehensive income statement or combined with the income statement, while under CA GAAP firms can also report comprehensive income within their statement of changes in equity, both of which would make a comparison difficult. Third, we exclude earnings-per-share items and dividend items in the earnings section, as we are only interested in the items that are included in the calculation of

the 'net profit or loss' value. This yields an initial set of 252 (139) unique individually reported items for EU (Canadian) firms.

4.3 Reporting flexibility impact on income statement presentation

The first difference-in-differences model we use analyzes the direct effect of inherent reporting flexibility on income statement presentation following IFRS adoption:

$$\begin{aligned}\text{ITEMS}_{it} = {} & \beta_0 + \beta_1 \text{POST}_{it} \times \text{TREAT}_{it} + \beta_2 \text{POST}_{it} \times \text{TREAT}_{it} \times \text{D\_increase}_{it} \\ & + \beta_3 \text{POST}_{it} \times \text{TREAT}_{it} \times \text{D\_decrease}_{it} + \beta_4 \text{Restructure}_{it} + \beta_5 \text{M\&A}_{it} \\ & + \beta_6 \text{Asset\_writedown}_{it} + \beta_7 \text{Asset\_sale}_{it} + \beta_8 \text{Goodwill\_impairment}_{it} + \beta_9 \text{Litigation}_{it} \\ & + \beta_{10} \text{Other\_one\_time}_{it} + \beta_{11} \log(\text{Size})_{it} + \beta_{12} \text{Return\_volatility}_{it} \\ & + \beta_{13} \log(\text{Product\_segments})_{it} + \text{yearFE} + \text{firmFE} + \varepsilon_{it}, \end{aligned} \quad (1)$$

where *ITEMS* is the dependent variable and we identify the effect of reporting flexibility following IFRS adoption based on the coefficients of our three variables of interest, the interaction terms *POST×TREAT*, *POST×TREAT×D_increase*, and *POST×TREAT×D_decrease*. *POST* is a dummy variable taking the value of one for all years following mandatory IFRS adoption in Canada, and zero otherwise. *TREAT* is a dummy variable taking the value of one for all firms in our treatment sample (Canada), and zero otherwise. *D_increase* (*D_decrease*) is a dummy variable taking the value of one for all Canadian firms exhibiting an increase (decrease) in the number of items they report in the income statement in the year of IFRS adoption, and zero otherwise. As we expect the effect of reporting flexibility on income statement presentation to lead to changes in two different directions (both increases and decreases in the number of reported items), we differentiate between the three different groups of IFRS adopters (positive/negative/no change) in order to avoid increases and decreases cancelling each other out when included in the same group.

We also control for firm-specific factors associated with financial statement disaggregation. We include firm size (*log(Size)*) and the number of product segments (*log(Product_segments)*) to control for larger firms with more complex operations, which require more diverse disclosures and have a greater demand for information (Atiase, 1985; Lang & Lundholm, 1993), so we expect a positive association with *ITEMS*. We control for stock return volatility (*Return_volatility*) as firms with greater growth options and uncertainty about future prospects are expected to disclose less (Dye, 1985; Jung & Kwon, 1988). In addition, we control for seven groups of economic activity outside of normal operations by including separate binary variables (*Restructuring, M&A, Asset_sale, Asset_writedown, Goodwill_impairment, Litigation*, and *Other_one_time*) because firms engaging in these activities are more likely to report additional items in their financial statements (Liang & Riedl,

2014). As an alternative, we use a summary count variable *Transitory_activity* to capture all items related to activities outside of normal operations. We include year- and firm-fixed effects to control for firm-specific, macroeconomic and temporal effects. In line with our first hypothesis, we expect the coefficient β_2 to be positive statistically significant, β_3 to be negative statistically significant, and β_1 to not be statistically significant. We cluster standard errors two-way at firm and year level to mitigate serial correlation concerns.

4.4 Reporting flexibility impact on analysts' forecast quality

We also test our second hypothesis using a difference-in-differences model:

$$\begin{aligned}|\mathrm{FE}|_{it} = {} & \beta_0 + \beta_1 \mathrm{ITEMS}_{it} + \beta_2 \mathrm{POST}_{it} \times \mathrm{ITEMS}_{it} + \beta_3 \mathrm{TREAT}_{it} \times \mathrm{ITEMS}_{it} \\ & + \beta_4 \mathrm{POST}_{it} \times \mathrm{TREAT}_{it} \times \mathrm{ITEMS}_{it} + \beta_5 \mathrm{EPS\_volatility}_{it} + \beta_6 \mathrm{Growth}_{it} + \beta_7 \mathrm{ROA}_{it} \\ & + \beta_8 \log(\mathrm{Analysts\_following})_{it} + \beta_9 \log(\mathrm{Size})_{it} + \beta_{10} \mathrm{Restructure}_{it} + \beta_{11} \mathrm{M\&A}_{it} \\ & + \beta_{12} \mathrm{Asset\_writedown}_{it} + \beta_{13} \mathrm{Asset\_sale}_{it} + \beta_{14} \mathrm{Goodwill\_impairment}_{it} + \beta_{15} \mathrm{Litigation}_{it} \\ & + \beta_{16} \mathrm{Other\_one\_time}_{it} + \beta_{17} \mathit{Return\_volatility}_{it} + \beta_{18} \log(\mathrm{Product\_segments})_{it} + \mathrm{firmFE} \\ & + \mathrm{yearFE} + \varepsilon_{it}, \end{aligned} \quad (2)$$

where the dependent variable (proxy for analysts' forecast quality) is analysts' absolute forecast error *(|FE|*), defined as absolute forecast errors scaled by absolute actual earnings per share. We scale forecast errors by absolute actual EPS to control for cross-sectional scale differences. Our independent variable of interest is *POST×TREAT×ITEMS* and we expect the coefficient, β_4, to be statistically significant in line with Hypothesis 2.

We include four additional control variables. *EPS_volatility* and *Growth* control for the difficulty in predicting volatile earnings, and thus the risk of inaccurate forecasts (Brown & Hillegeist, 2007; Dichev & Tang, 2009; S. Li, 2010). We include *ROA* to control for performance, which may be negatively (firms with extreme performance are more difficult to forecast) or positively (more profitable firms have incentives to provide high-quality information (Byard et al., 2011)) associated with the quality of analysts' forecasts. We also include analysts following (*log(Analysts_following)*) to capture shareholders' demands for disclosure (Ajinkya et al., 2005), which is expected to improve analysts' forecast accuracy. All other variables are as defined before. We include firm- and year-fixed effects to control for persistent firm, macroeconomic and temporal effects. Finally, we cluster standard errors two-way at the firm and year level to mitigate serial correlation concerns within a firm or among firms within a year. The Appendix provides detailed definitions of all variables.

5 Results

5.1 Tests of Hypothesis 1

5.1.1 Reporting flexibility-related increases vs. decreases in ITEMS

As discussed in section II, reporting flexibility-related changes in the presentation of income statements of first-time IFRS adopters can result in more or fewer items being reported so we analyze these two scenarios in more detail. For this, we create three subsamples of treatment firms (Canadian first-time mandatory IFRS adopters) based on the direction of the change in the number of items reported in the income statement in the year of IFRS adoption: positive-change firms (negative-change firms/ no-change firms), which use reporting flexibility to increase (decrease/not change) the number of items. The control sample remains unchanged, comprising all EU firms in our initial sample. Figure 1 presents an overview of the changes in *ITEMS* for all three subgroups of first-time IFRS adopters.

>> Insert Figure 1 about here <<

First, out of the 307 treatment firms, the number of those exhibiting reporting flexibility-related increases in the number of items reported in the income statement in the year of IFRS adoption (139 or 45.3 percent of firms) is almost equal to the number of those exhibiting a decrease (136 or 44.3 percent of firms), while only a very small number of firms do not exhibit any change (32 or 10.4 percent of firms). This is consistent with our not making a directional assumption about whether IFRS adoption will increase or decrease the number of line items reported. Second, the change in the number of items reported is concentrated in the years of transition to IFRS. Finally, the fact that we identify a nearly equal number of firms with a positive or negative change in the number of reported items mitigates concerns that our analysis may pick up confounding effects arising from concurrent but unrelated events (e.g. other regulation changes). Such events would lead to the reporting practices of all firms in our treatment sample concurrently moving in one direction (i.e., all firms increasing or all firms decreasing the number of reported items).

Next, we run a range of two-sample t-tests to analyze differences in the means of ITEMS between our subsamples. We split our treatment sample into increase, decrease, or no change subsamples and separately run t-tests for each of these groups against EU firms based on firms' country of origin (EU (0) or Canada (1)) and the two periods, pre-mandatory IFRS adoption (0) and post-mandatory IFRS adoption (1) in Canada. Table 2 presents the results. As before, the EU sample consists of all 1,704 EU firms in all three panels. Pre-IFRS adoption in Canada, EU

firms have a mean of 16.316 unique reported items in the income statement, while post-IFRS adoption in Canada, the mean slightly increases to 16.626 items (0.310 item increase; t-value 6.58). In panel A (panel B), Canadian firms have a mean increase (decrease) of 3.140 items, t-value 15.88, (0.739 items, t-value 4.20) from an average of 13.134 (15.026) items pre-IFRS to 16.274 (14.287) items post-IFRS adoption. Conversely, Canadian firms in panel C exhibit an average increase of 0.762 items, t-value 1.86, which is only significant at the 10 percent level. These results offer preliminary evidence for Hypothesis 1 showing statistically significant average increases and decreases in income statement disaggregation following mandatory IFRS adoption in Canada, which are ten and 2.4 times, respectively, higher than the overall change in *ITEMS* for EU firms reporting under IFRS.

>> Insert Table 2 about here <<

5.1.2 Descriptive statistics

Table 3, panel A, reports descriptive statistics for variables used in the main test of Hypothesis 1. The mean (median) firm-year observation in our sample has 16.217 (16) unique line items in the income statement. The most common activities outside of normal operations are those related to asset sales (42.4 percent of observations) and write-downs (28.6 percent). The most infrequent transitory activity is *Litigation* (6.2 percent). The mean of *Transitory_activity* indicates that, on average, firms have 1.33 categories of activities outside of normal operations. The mean (median) size of firms in our sample is consistent with values reported by Lang et al. (2010). The mean and median values for *Return_volatility* are slightly higher than those reported in related studies (Hoitash & Hoitash, 2017), however this is most likely due to the financial crisis years in our sample. The average number of firms' product segments is approximately 2.8. Panel B of Table 3 presents pairwise correlations. All correlations between *ITEMS* and the control variables have the expected signs and none of the magnitudes presents any concern regarding multicollinearity.

>> Insert Table 3 about here <<

5.1.3 Regression results

Table 4, column (1), presents the results from estimating the model in equation (1) and column (3) reports the results if we replace the individual variables for activities outside of normal operations with *Transitory_activity*. Columns (2) and (4) present average marginal effects corresponding to the estimated coefficients in columns (1) and (3), respectively. As our dependent variable *ITEMS* is a count variable, we use a Poisson regression. Using either model

specification, the coefficients on our main variables of interest are consistent with Hypothesis 1. The coefficient on *POST×TREAT×D_increase* is positive statistically significant and the values are similar (0.170, p-val<0.01 in the main specification, 0.174, p-val<0.01 in the alternative specification). The coefficient on *POST×TREAT×D_decrease* is negative and statistically significant and the values are similar (-0.084, p-val<0.01 in the main specification, -0.085, p-val<0.01 in the alternative specification). As expected, the coefficient on *POST×TREAT* is not statistically significant in any of the model specifications. In column (2) the average reporting flexibility-related increase in reported items (2.762 items) is 2 times higher than the average decrease (-1.369 items), while the no-change firms do not exhibit any significant change. The results are consistent with our prediction that there is a significant change in the number of items reported in the income statement post-IFRS, and confirms our first hypothesis.

>> Insert Table 4 about here <<

Regarding the control variables, all coefficients on variables controlling for activities outside normal operations are, as expected, positively associated with the dependent variable and statistically significant, while the statistically significant positive coefficients on *log(Size)* (0.0236; p-val <0.01) and on *log(Product_segments)* (0.0093; p-val<0.01) are also in line with our predictions.

5.2 Tests of Hypothesis 2

5.2.1 Descriptive statistics

Table 5, panel A, presents descriptive statistics of the variables used in Eq. (2). The statistics for the control variables also used in equation (1) are very similar to the ones presented in Table 3, panel A, so we do not discuss them in detail. Analysts' absolute forecast error has a mean value of 0.311 and a median value of 0.077, consistent with values reported in studies using similar definitions or samples (Horton et al., 2012). (Sales) *Growth* has a mean (median) of 17.9 (7.6) percent and the average (median) *ROA* is 3.9 (4.4) percent, both in line with prior research (Armstrong et al., 2010; X. Li & Yang, 2015). Because of the skewness in the standard deviation of EPS (mean is 2.146, median is 0.389, untabulated) we use decile ranks in our regressions and have a mean (median) value of *EPS_volatility* of 5.373 (5.00). The correlations presented in panel B of Table 5 are consistent with the expected associations. Their magnitudes do not raise any concerns of multicollinearity.

>> Insert Table 5 about here <<

5.2.2 Regression results

Table 6 presents the results of the model in equation (2). Using OLS regressions, we regress analysts' absolute earnings forecast errors on the difference-in-differences estimator *POST×TREAT×ITEMS* and other determinants. Column (1) reports the results of the model in equation (2), while column (2) reports results of the alternative model specification using *Transitory_activity*. If the consequences of reporting flexibility under IFRS on the presentation of income statements significantly impact the quality of analysts' forecasts, we expect the coefficient on *POST×TREAT×ITEMS* to be statistically significant.

Table 6, column (1), shows that the coefficient on *POST×TREAT×ITEMS* is negative and statistically significant (-0.0108, p-val<0.05), while column (2) also reports a negative and statistically significant coefficient when we use the alternative model specification (-0.0103, p-val<0.05). These results show that the reporting flexibility-related changes in income statement presentation of first-time IFRS adopters lead to higher forecast accuracy, relative to the control sample, consistent with our second hypothesis. In terms of economic significance, our estimates show an additional -2.50 percent decrease in analysts' absolute forecasts errors post-IFRS adoption.

Most of the coefficients on the control variables are statistically significant and have the expected signs. Higher *EPS_volatility* (0.0353, p-val<0.01) and higher *log(Size)* (0.0852, p-val<0.05) are associated with lower analysts' forecast quality, consistent with firms having higher growth opportunities and more complex operations being harder to forecast. Better firm performance is associated with reduced |*FE*| (*ROA* coefficient is -1.050, p-val<0.01). The number of analysts is also positively associated with the accuracy of forecasts (-0.0994, p-val<0.01). The reporting of transitory items does not exhibit any consistent pattern of association with analysts' forecast quality, although we observe a positive association for *Goodwill_impairment* with |*FE*|, consistent with lower quality analysts' forecasts.

>> Insert Table 6 about here <<

5.3 Increases vs. decreases in ITEMS and analysts' forecast quality

As documented in earlier tests, the number of firms increasing the number of items reported is nearly equal to those decreasing them. Thus, we are interested in examining which of the two groups of firms is responsible for the improvement in analysts' forecast quality. To this end, we compute two variables Δ*ITEMS_POSITIVE* and Δ*ITEMS_NEGATIVE* that equal the percentage increase and decrease, respectively, in the number of items reported in the income

statement in the year of IFRS adoption relative to the year preceding it (the last year of CA GAAP reporting), and zero if there is no increase or decrease. To isolate the effect of mandatory IFRS adoption in Canada, for this part of the analysis, we only consider the year of the transition to IFRS in Canada in estimating a modified version of the model in equation (2):

$$\begin{aligned}|\mathrm{FE}|_{it} = {} & \beta_0 + \beta_1 \Delta\mathrm{ITEMS\_POSITIVE}_{it} + \beta_2 \Delta\mathrm{ITEMS\_POSITIVE}_{it} \times \mathrm{TREAT}_{it} \\ & + \beta_3 \Delta\mathrm{ITEMS\_NEGATIVE}_{it} + \beta_4 \Delta\mathrm{ITEMS\_NEGATIVE}_{it} \times \mathrm{TREAT}_{it} + \sum \mathrm{Controls}_{it} \\ & + \mathrm{industryFE} + \mathrm{yearFE} + \varepsilon_{it}, \end{aligned} \quad (3)$$

The controls are the same as in equation (2). Table 7, panel A, presents summary statistics comparing the four groups of firms in our sample – first-time IFRS adopters exhibiting increases (decreases) in the number of reported items in the year of IFRS adoption, Δ*ITEMS_POSITIVE Canada* (Δ*ITEMS_NEGATIVE Canada*), versus Δ*ITEMS_POSITIVE EU* (Δ*ITEMS_NEGATIVE EU*). Both the magnitude and frequency of changes for first-time IFRS adopters in Canada are considerably higher than those for control group firms. Thus, 48.1 (44.9) percent of the Canadian firms use reporting flexibility to increase (decrease) the number of items they report upon IFRS adoption, with an average increase (decrease) of 10.24 (-7.57) percent (as compared to only 23.3 (17.8) percent of EU firms with an average increase (decrease) of 1.93 (-1.30) percent in the same year).

Panel B of Table 7 presents the results of the OLS regression of Eq. (3). The negative statistically significant coefficient on Δ*ITEMS_POSITIVE*×*TREAT* (-0.0098, p-val<0.05) and positive statistically significant coefficient on Δ*ITEMS_NEGATIVE*×*TREAT* (0.0132, p-val<0.01) indicate that the improvement in analysts' forecast quality is driven by both firms that increase and firms that decrease the number of items they report. In contrast, changes in the control group have no consistent impact on analysts' forecast quality. The negative and statistically significant coefficients on Δ*ITEMS_POSITIVE*×*TREAT* are in line with findings of prior research that more disaggregated information is of higher quality and thus more useful to users of financial statements (Blackwell, 1953; S. Chen et al., 2015). We further investigate the positive impact on analysts' forecast quality of first-time adopters decreasing the number of items they report in the additional analysis section to shed light on why we find this result.

>> Insert Table 7 about here <<

5.4 Additional analysis

5.4.1 Recurring vs. transitory items

One concern related to the results in our main analysis is that they may be driven by the reporting of transitory items, rather than by structural changes in how firms present the results

of their ordinary activities. Although we control for the presence of transitory items in our main analysis, in order to verify the robustness of our results we build an additional measure (*ITEMS_Recurring*) based only on recurring activities. Table 8, panel A, presents summary statistics for *ITEMS_Recurring* and two-sample t-tests similar to those reported in Table 2. Most of the changes in the number of income statement items reported by Canadian firms upon IFRS adoption can be attributed to changes in the number of recurring items reported. For positive (negative) change firms, we document an average increase (decrease) of 2.785 (-1.012) recurring items (t-value 15.66 (-6.21)) and for no-change firms an average increase of 0.823 recurring items (t-value 2.29). Next, we rerun the model in equation (1) with *ITEMS_Recurring* as the dependent variable (as opposed to all items). Table 8, panel B, presents the results, which are consistent with those in Table 4. The coefficient on *POST×TREAT×D_increase* is positive and statistically significant (0.155 and 0.154 in columns (1) and (3), respectively; p-val<0.01), on *POST×TREAT×D_decrease* is negative and statistically significant (-0.127 and -0.129 in columns (1) and (3), respectively; p-val<0.01) and on *POST×TREAT* is not statistically significant. Thus, reporting flexibility under IFRS leads to a significant change in the number of recurring items presented by first-time IFRS adopters in their income statements relative to the control group, the positive-change (negative-change) firms exhibiting on average a marginal increase (decrease) of 2.438 (-2.003) recurring items.

>> Insert Table 8 about here <<

In Table 9, columns (1) and (2) presents the results of the estimation of equation (2) with *ITEMS_Recurring*. The coefficient on *POST×TREAT×ITEMS_Recurring* is negative and statistically significant (-0.0111 and -0.0106 in columns (1) and (2), respectively; p-val<0.05). Column (3) of Table 9 reports the results of an alternative specification of equation (2) in which we include a second difference-in-differences estimator using *ITEMS_Transitory*. The coefficient on *POST×TREAT×ITEMS_Recurring* remains negative and statistically significant (-0.0115, p-val <0.05), while the coefficient on *POST×TREAT×ITEMS_Transitory* is not statistically significant. The results confirm that the source of improvement in analysts' forecasts in our main analysis is changes in the presentation of recurring items in the income statement by first-time IFRS adopters, while changes in the number of reported transitory items following IFRS adoption have no impact on the quality of analysts' forecasts in our study.

>> Insert Table 9 about here <<

5.4.2 Sources of decreases in the number of reported items

To shed more light on the documented positive impact of firms decreasing the number of reported items post-IFRS adoption on the quality of analysts' forecasts, we manually inspect the financial statements of fifty of the first-time IFRS adopters in the negative change group and identify three main reasons for this decrease. First, a focus on only reporting material items is the most common reason (identified for 36 out of 50 firms) for the decrease in the number of items reported. Second, IFRS explicitly requires firms to analyze their expenses in the income statement either by nature or by function (IASPlus, 2015), which is not required by CA GAAP (CPA Canada, 2015), this being the reason for a decrease in the number of items reported for a small number of firms (nine out of the 50 firms). Third, some of the documented decreases in the number of items reported (for 32 out of the 50 firms) are due to firms having fewer transitory items to report. Finally, despite a decrease in the number of items they report, the presentation of the income statement of 11 of the analyzed firms is better structured after IFRS adoption by separating operating income and expenses from items relating to financing activities (which was not done previously). Clearly classifying items as either (core) operating or non-operating activities may firms increase the quality of information provided to financial analysts. In summary, it seems that many of these changes would improve the quality of financial reporting while still managing to provide a faithful representation of their financial situation, which may explain the improvement in forecast quality.

5.4.3 Further robustness tests

To ensure the robustness of our main results, we perform a series of additional tests. First, we test the validity of the parallel trends assumption by performing a test in which we define 'false shock' variables for each of the years in our sample (dummy variables that take the value of one if the observation belongs to that specific year, and zero otherwise) both before and after IFRS adoption in Canada. The insignificant coefficients on the difference-in-differences (i.e., the three-way interaction terms) confirm that there is no statistically significant difference in analysts' forecast quality due to differences in the number of line items in the income statement between the treatment and control groups prior to IFRS adoption in Canada, thus validating the parallel trends assumption. In the post-IFRS adoption period, the positive reporting flexibility effect on $|FE|$ is not persistent across all years (it is consistent for the years immediately after adoption). This makes sense as unexpected firm events causing unexpected earnings and losses might still affect analysts' forecast accuracy.

Second, as Canada is a common law country, we run our main test for Hypothesis 2 by only using firms in common law EU countries (UK, Ireland and Cyprus) as a control group, in order to further eliminate the possibility of our results being driven by differences in legal systems (although we already control for this in our main regressions by using firm-fixed effects). Third, we use two alternative definitions of the *POST* variable for the control (EU) firms (one version defines *POST* as one starting with 2010 if the firm has a fiscal year-end at calendar year-end and starting with 2011, otherwise, the second version defines *POST* as one for all fiscal years starting with 2010). Fourth, we re-run our regressions after excluding 2010 from our sample. Fifth, we also split the EU sample based on the direction of change in the number of reported items in the year of mandatory IFRS adoption in Canada and run the model above by comparing positive- (negative-/no-) change Canadian firms to positive- (negative-/no-) change EU firms. Sixth, we run the tests for Hypothesis 1 using the sample for Hypothesis 2 (14,156 firm-year observations) to ensure that the results remain consistent. Untabulated results for all of these tests are consistent with and qualitatively similar to our main results. Seventh, by running out main analysis only with *ITEMS_Recurring*, we also account for the fact that these might better represent the impact on analysts' forecast quality since it is possible that part of the analysts' forecasts represent street earnings forecasts (which are based on firms' recurring activities).

Lastly, we also run our main tests separately for subsamples of Canadian firms that (1) are non-persistent changers, meaning they either revert their income statement disaggregation to pre-IFRS adoption levels or reverse (i.e., although they have an increase (decrease) in the IFRS adoption year they present on average fewer (more) items for the whole post-IFRS adoption period as compared to pre-IFRS adoption) and (2) are persistent changers, meaning that the observed direction of change in disaggregation levels (increase or decrease) in the year of IFRS adoption persists, on average, throughout the whole post-IFRS adoption period. We expect our results to (not) hold for the subsample of firms with a persistent (non-persistent) change. Our results confirm the expectations. Both hypotheses are confirmed when using the subsample of firms with persistent changes in their disaggregation levels, while we do not document any statistically significant results for the firms with non-persistent changes in their disaggregation levels.

6 Conclusion

We examine the consequences of reporting flexibility in income statement presentation following mandatory IFRS adoption and how this impacts analysts' earnings forecast errors. To control for endogeneity and the effect of confounding concurrent events, we use a control sample of EU firms that already adopted IFRS in 2005 and a sample of Canadian firms that mandatorily adopted IFRS for fiscal years starting on or after January 1, 2011. First, we find that reporting flexibility under IFRS leads to significant changes in income statements, with both increases and decreases in the number of unique items reported. Further, the number of firms increasing the number of items reported in the income statement is nearly equal to those decreasing them. Second, we find that the consequences of reporting flexibility on income statement presentation of first-time IFRS adopters positively impact analysts' forecast quality by decreasing absolute earnings forecast errors. In addition, both firms using reporting flexibility to increase and those using it to decrease the number of reported items contribute to this effect.

In further analysis, we find that changes in income statement presentation following IFRS adoption in Canada are driven by firms changing the number of reported recurring items, not by changes in reported transitory items. In addition, changes in recurring items drive the improvements in analysts' forecast quality that we document. Further, we find that decreases in the number of reported items are largely motivated by objective factors, such as IFRS only requiring firms to report material items. Overall, these results suggest that income statement flexibility has significant consequences for IFRS adopters and that firms appear not to opportunistically report, but rather to provide a faithful representation of their financial situation, increasing the quality of the information provided to financial analysts.

We acknowledge that our study has some possible limitations, arising from the fact that we are not able to provide information on other financial statements (e.g. balance sheets or cash flow statements). However, since it is based on a hand-collected sample and accounting professionals argue that the highest differences are expected to exist in the income statement presentation, as well as the fact that income statements represent the primary information source for earnings forecasts, we are confident that our results provide a valid picture of the reporting flexibility effects on the quality of analysts' forecasts.

We consider the results of our study to be of use to standard setting bodies (such as the IASB or FASB), financial statement users, such as investors, in deciding on the reliability of

provided accounting information as well as regulatory bodies thinking about requiring the future adoption of IFRS in other countries.

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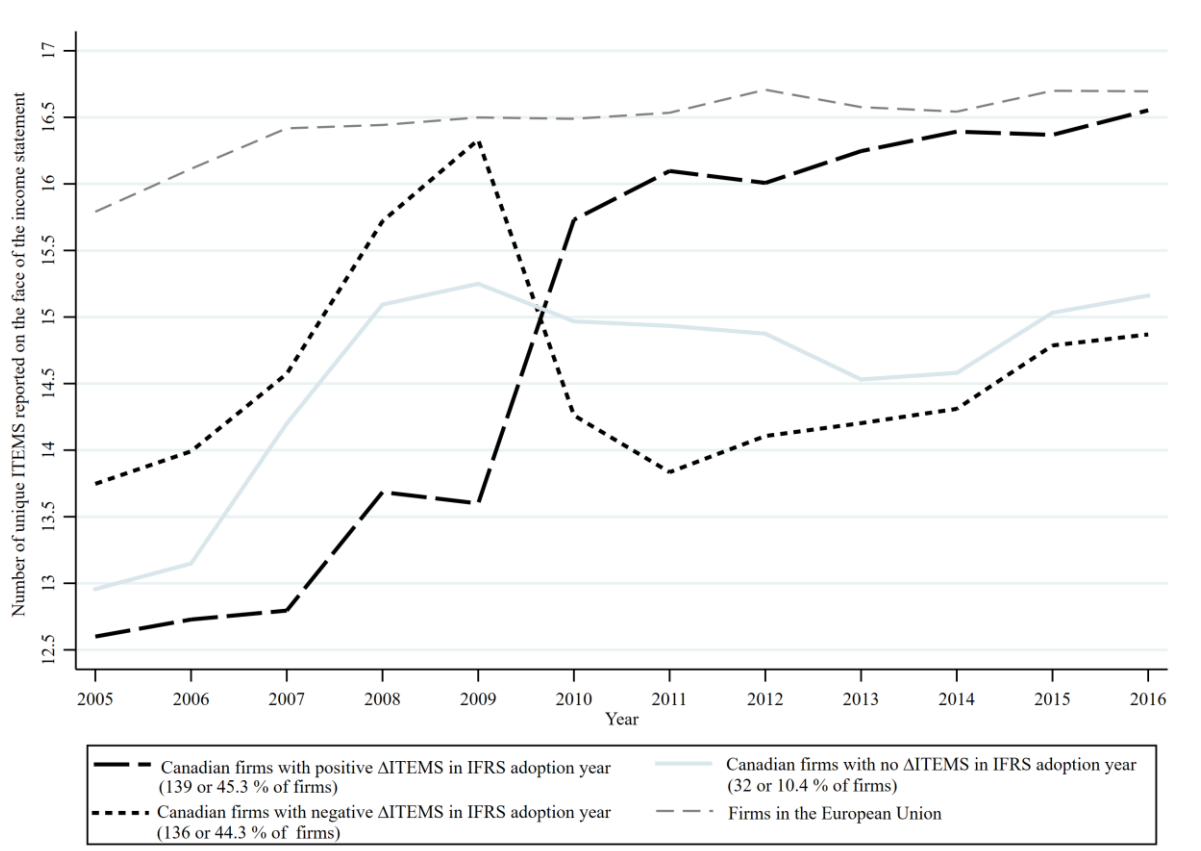
Figure 1: Changes in the number of items reported on the face of the income statement due to reporting flexibility following IFRS adoption



Appendix: Variable definitions

Variable	Definition
ITEMS	Total number of unique items reported in the income statement as reported in the 'Consolidated Financial Statement' section of individual annual reports.
ITEMS_Recurring	Total number of unique recurring items reported on the face of the income statement as reported in the 'Consolidated Financial Statement' section of individual annual reports.
ITEMS_Transitory	Total number of unique non-recurring (transitory) items reported in the income statement as reported in the 'Consolidated Financial Statement' section of individual annual reports.
POST	Dummy variable taking the value of one for all firm-year observations after mandatory IFRS adoption year in Canada, zero otherwise.
TREAT	Dummy variable taking the value of one for all firm-year observations corresponding to Canadian firms, zero otherwise.
D_increase	Dummy variable taking the value of one for all Canadian firms that increase the number of reported items in the income statement in the year of IFRS adoption, zero otherwise.
D_decrease	Dummy variable taking the value of one for all Canadian firms that decrease the number of reported items in the income statement in the year of IFRS adoption, zero otherwise.
log(Size)	Firm size, measured as the logarithm of a firm's total assets.
Restructure	Dummy variable taking the value of one if the firm has restructuring activities in the corresponding firm-year observation, zero otherwise.
M&A	Dummy variable taking the value of one if the firm has M&A activities in the corresponding firm-year observation, zero otherwise.
Asset_writedown	Dummy variable taking the value of one if the firm has asset write-downs in the corresponding firm-year observation, zero otherwise.
Asset_sale	Dummy variable taking the value of one if the firm has asset selling activities in the corresponding firm-year observation, zero otherwise.
Goodwill_impairment	Dummy variable taking the value of one if the firm has goodwill impairment in the corresponding firm-year observation, zero otherwise.
Litigation	Dummy variable taking the value of one if the firm has litigation activities in the corresponding firm-year observation, zero otherwise.
Other_one_time	Dummy variable taking the value of one if the firm has other one-time occurrences in the corresponding firm-year observation, zero otherwise.
Transitory_activities	Count variable equal to the number of total transitory activity categories that a firm has in the corresponding firm-year observation, based on the above 7 transitory activities categories.
Return_volatility	Standard deviation of monthly returns over the current year.
log(Product_segments)	Operating complexity, measured as the logarithm of the total number of product segments of a firm.
$\|FE\|$	Absolute forecast error, measured as the average of the absolute difference between actual EPS and analyst earnings forecasts, deflated by absolute actual earnings per share of earnings samples at each month between the fiscal year end of year t and the earnings announcement of year t, scaled by absolute actual earnings per share of year t.
EPS_volatility	Decile ranks of earnings volatility, measured as the standard deviation of EPS over the previous five years (year t − 4 to t), deflated by share price at the end of year t.
Growth	Average percentage growth in sales over the previous five years (year t−4 to year t).
ROA	Income before extraordinary items divided by total assets.
log(Analyst_following)	Logarithm of the number of analysts issuing EPS forecasts for the current year.
Δ*ITEMS_POSITIVE*	Percentage increase in the number of unique items reported on the face of the income statement as reported in the 'Consolidated Financial Statements' section, in the year of mandatory IFRS adoption in Canada.
Δ*ITEMS_NEGATIVE*	Percentage decrease in the number of unique items reported on the face of the income statement as reported in the 'Consolidated Financial Statements' section, in the year of mandatory IFRS adoption in Canada.

Table 1: Sample selection

Criteria	Observations
Unique firm-year observations for EU and Canadian non-financial firms 2005 – 2016	26,064
1) – less firm-year observations for Canadian firms never adopting IFRS or adopting IFRS after 2011	391
2) – less firm-years for Canadian firms with no observations prior to IFRS adoption	561
3) – less firm-years for Canadian voluntary IFRS adopters	85
= firm-years for EU and mandatory IFRS adopters in Canada 2005 - 2016	25,027
4) – less firm-years with unavailable data for firm fundamentals	2,506
5) - less firm-years of firms without at least one observation in the PRE and one observation in the POST IFRS adoption period	246
= sample for testing Hypothesis 1	**22,275**
6) – less firm-years with unavailable I/B/E/S data	6,880
7) – less firm-years with unavailable data for analyst forecasts control variables	465
8) – less firm-years of firms without at least one observation in the PRE and one observation in the POST IFRS adoption period	774
= sample for testing Hypothesis 2	**14,156**

This table presents the sample selection criteria. The complete sample for the test of the first hypothesis covers the years 2005-2016 and is composed of 307 Canadian firms that are first-time IFRS adopters for fiscal years starting on January 1, 2011 (start of transition period January 1, 2010) and 1,704 firms in the EU that report according to IFRS during the whole sample period. The complete sample for the test of the second hypothesis covers the years 2005-2016 and is composed of 214 Canadian firms and 1,187 EU firms.

Table 2: Two-sample t-tests

Panel A: EU vs. Canadian firms increasing ITEMS in the year of IFRS adoption			
ITEMS	PRE-IFRS ADOPTION CANADA(0)	POST-IFRS ADOPTION CANADA(1)	DIFFERENCE
EUROPEAN UNION (0)	16.316	16.626	-0.310*** (-6.58)
CANADA_POS (1)	13.134	16.274	-3.140***(-15.88)
Panel B: EU vs. Canadian firms decreasing ITEMS in the year of IFRS adoption			
ITEMS	PRE-IFRS ADOPTION CANADA(0)	POST-IFRS ADOPTION CANADA(1)	DIFFERENCE
EUROPEAN UNION (0)	16.316	16.626	-0.310*** (-6.58)
CANADA_NEG(1)	15.026	14.287	0.739*** (4.20)
Panel C: EU vs. Canadian firms not changing ITEMS in the year of IFRS adoption			
ITEMS	PRE-IFRS ADOPTION CANADA(0)	POST-IFRS ADOPTION CANADA(1)	DIFFERENCE
EUROPEAN UNION (0)	16.316	16.626	-0.310*** (-6.58)
CANADA _ZERO(1)	14.168	14.930	-0.762* (-1.86)

This table presents two-sample t-tests for difference in means of *ITEMS* based on different subsamples of the sample covering the years 2005-2016 and consisting of 307 Canadian firms and 1,704 EU firms. Panel A (B,C) compares the means of ITEMS pre- and post-IFRS adoption of Canadian firms increasing (decreasing, not changing) *ITEMS* in the year of IFRS adoption to changes in *ITEMS* for firms in the EU before and after IFRS adoption in Canada. *ITEMS* is defined as the total number of unique items reported on the face of the income statement as reported in the 'Consolidated Financial Statement' section of individual annual reports. T-statistics are presented in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3: Descriptive statistics - Test of Hypothesis 1

Panel A: Summary statistics

Variables	N	Mean	S.D.	P25	Median	P75
ITEMS	22,275	16.217	3.378	14.000	16.000	18.000
Restructure	22,275	0.204	0.403	0.000	0.000	0.000
M&A	22,275	0.076	0.266	0.000	0.000	0.000
Asset_writedown	22,275	0.286	0.452	0.000	0.000	1.000
Asset_sale	22,275	0.424	0.494	0.000	0.000	1.000
Goodwill_impairment	22,275	0.106	0.307	0.000	0.000	0.000
Litigation	22,275	0.062	0.240	0.000	0.000	0.000
Other_one_time	22,275	0.175	0.380	0.000	0.000	0.000
Transitory_activities	22,275	1.332	1.394	0.000	1.000	2.000
log(Size)	22,275	13.385	2.081	11.922	13.222	14.712
Return_volatility	22,275	0.788	3.253	0.000	0.000	0.000
log(Product_segments)	22,275	1.064	0.663	0.693	1.099	1.609

Panel B: Pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) ITEMS		0.138*	0.019*	0.197*	0.196*	0.127*	0.111*	0.097*	0.178*	-0.131*	0.241*
(2) Restructure	0.132*		0.244*	0.217*	0.251*	0.178*	0.219*	0.258*	0.292*	-0.001	0.149*
(3) M&A	0.019*	0.244*		0.076*	0.172*	0.084*	0.140*	0.157*	0.167*	0.009	0.107*
(4) Asset_writedown	0.194*	0.217*	0.076*		0.268*	0.122*	0.136*	0.132*	0.215*	-0.073*	0.148*
(5) Asset_sale	0.194*	0.251*	0.172*	0.268*		0.112*	0.194*	0.188*	0.233*	0.006	0.180*
(6) Goodwill_impairment	0.130*	0.178*	0.084*	0.122*	0.112*		0.091*	0.102*	0.149*	-0.021*	0.126*
(7) Litigation	0.105*	0.219*	0.140*	0.136*	0.194*	0.091*		0.143*	0.126*	-0.023*	0.126*
(8) Other_one_time	0.090*	0.258*	0.157*	0.132*	0.188*	0.102*	0.143*		0.211*	0.048*	0.124*
(9) Log(Size)	0.185*	0.297*	0.163*	0.226*	0.238*	0.159*	0.132*	0.212*		-0.037*	0.333*
(10) Return_volatility	-0.086*	0.031*	-0.004	-0.018*	0.004	0.007	-0.009	0.058*	-0.055*		-0.094*
(11) Log(Product_segments)	0.243*	0.150*	0.150*	0.134*	0.178*	0.121*	0.103*	0.120*	0.329*	-0.043*	

Panel A presents descriptive statistics and Panel B reports a correlation matrix for the dependent and control variables used for the model in equation (1). The sample covers the years 2005-2016 and consists of 307 Canadian firms and 1,704 EU firms. Pearson (Spearman) correlations are reported below (above) the diagonal in Panel B. Detailed definitions of all variables are provided in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. In Panel B, * indicates significance at the 5% level or lower.

Table 4: Direct consequences of reporting flexibility on I/S presentation

Variables	(1) ITEMS	(2) Average Marginal Effect	(3) ITEMS	(4) Average Marginal Effect
POST×TREAT	0.0162	0.263	0.0156	0.252
	(0.586)	(0.586)	(0.603)	(0.603)
POST×TREAT×D_increase	0.170***	2.762***	0.174***	2.820***
	(0.000)	(0.000)	(0.000)	(0.000)
POST×TREAT×D_decrease	-0.0844***	-1.369***	-0.0849***	-1.376***
	(0.00432)	(0.00432)	(0.004)	(0.004)
Transitory_activities			0.0176***	0.286***
			(0.000)	(0.000)
Restructure	0.000850	0.0138		
	(0.887)	(0.887)		
M&A	-0.00346	-0.0561		
	(0.691)	(0.691)		
Asset_writedown	0.0253***	0.410***		
	(0.000)	(0.000)		
Asset_sale	0.0346***	0.561***		
	(0.000)	(0.000)		
Goodwill_impairment	0.0206***	0.333***		
	(0.000)	(0.000)		
Litigation	0.000366	0.00593		
	(0.947)	(0.947)		
Other_one_time	0.0218***	0.353***		
	(0.006)	(0.006)		
log(Size)	0.0236***	0.383***	0.0229***	0.372***
	(0.000)	(0.000)	(0.000)	(0.000)
Return_volatility	0.000850	0.0138	0.000866	0.0140
	(0.213)	(0.213)	(0.209)	(0.209)
log(Product_segments)	0.00933**	0.151**	0.00974**	0.158**
	(0.013)	(0.013)	(0.010)	(0.010)
Constant	2.404***		2.433***	
	(0.000)		(0.000)	
Observations	22,275	22,275	22,275	22,275
Pseudo R-squared	10.4 %		10.4 %	
Firm FE	YES		YES	
Year FE	YES		YES	

This table reports the results of testing the direct consequences of reporting flexibility in income statement presentation following IFRS adoption by running a Poisson regression of the model in equation (1). The sample consists of 307 Canadian firms that switched from domestic accounting standards (CA GAAP) to IFRS and 1,704 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2005–2016. Detailed definitions of all variables are provided in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm fixed effects and year fixed effects. Standard errors are clustered two-way by firm and year to account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Summary statistics

	N	Mean	S.D.	P25	Median
	14,156	0.311	0.821	0.028	0.077
	14,156	16.282	3.367	14.000	16.000
ransitory	14,156	0.399	0.695	0.000	0.000
e	14,156	0.273	0.446	0.000	0.000
	14,156	0.107	0.309	0.000	0.000
edown	14,156	0.303	0.460	0.000	0.000
	14,156	0.483	0.500	0.000	0.000
_impairment	14,156	0.125	0.331	0.000	0.000
	14,156	0.077	0.266	0.000	0.000
e_time	14,156	0.218	0.413	0.000	0.000
_activities	14,156	1.586	1.503	0.000	1.000
tility	14,156	5.373	2.857	3.000	5.000
	14,156	0.179	0.567	0.022	0.076
	14,156	0.039	0.097	0.015	0.044
sts_following)	14,156	1.922	0.896	1.099	1.946
	14,156	14.152	1.927	12.795	14.008
latility	14,156	0.734	2.640	0.000	0.000
uct_segments)	14,156	1.128	0.648	0.693	1.386

Pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
		0.187*	-0.023*	-0.126*	0.086*	-0.019*	0.044*	0.017*	-0.049*	0.449*	-0.031*	-0.442*	-0.284*	-0.133*
	0.093*		0.128*	0.009	0.214*	0.167*	0.131*	0.109*	0.084*	0.277*	-0.078*	-0.189*	0.074*	0.209*
cture	-0.003	0.122*		0.243*	0.263*	0.246*	0.174*	0.221*	0.243*	0.014	-0.229*	-0.118*	0.236*	0.243*
	-0.064*	0.010	0.243*		0.084*	0.174*	0.070*	0.143*	0.150*	-0.168*	-0.020*	0.031*	0.163*	0.111*
writedown	0.053*	0.208*	0.263*	0.084*		0.292*	0.157*	0.153*	0.151*	0.144*	-0.153*	-0.184*	0.182*	0.278*
ale	-0.001	0.164*	0.246*	0.174*	0.292*		0.127*	0.191*	0.186*	-0.085*	-0.110*	-0.049*	0.190*	0.176*
ill_impairment	0.027*	0.135*	0.174*	0.070*	0.157*	0.127*		0.102*	0.099*	0.075*	0.086*	-0.137*	0.104*	0.148*
on	0.002	0.104*	0.221*	0.143*	0.153*	0.191*	0.102*		0.134*	0.028*	-0.083*	-0.054*	0.127*	0.120*
one_time	-0.026*	0.076*	0.243*	0.150*	0.151*	0.186*	0.099*	0.134*		-0.099*	-0.117*	-0.060*	0.187*	0.186*
volatility	0.249*	0.276*	0.015	-0.167*	0.145*	-0.083*	0.076*	0.029*	-0.098*		-0.129*	-0.407*	-0.267*	-0.032*
h	0.066*	-0.039*	-0.123*	-0.045*	-0.058*	-0.099*	-0.039*	-0.052*	-0.062*	0.049*		0.138*	-0.064*	-0.137*
	-0.196*	-0.095*	-0.065*	0.029*	-0.123*	-0.003	-0.111*	-0.028*	-0.021*	-0.347*	-0.115*		0.137*	-0.044*
nalysts_following)	-0.160*	0.061*	0.231*	0.161*	-0.178*	0.187*	0.099*	0.122*	0.182*	-0.266*	-0.091*	0.166*		0.639*
ize)	-0.081*	0.209*	0.245*	0.106*	0.282*	0.182*	0.157*	0.121*	0.183*	-0.033*	-0.110*	0.101*	0.623*	
n_volatility	-0.001	-0.106*	0.038*	-0.003	-0.029*	0.021*	-0.013	-0.012	0.075*	-0.110*	-0.030*	-0.024*	0.008	-0.050*
Product_segments)	-0.014	0.216*	0.156*	0.103*	0.160*	0.171*	0.132*	0.101*	0.117*	0.055*	-0.138*	0.031*	0.186*	0.343*

resents descriptive statistics and Panel B reports correlations for the variables used for the model in equation (2). Pearson (Spearman) correlations are reported b
n Panel B. The sample consists of 214 Canadian firms that switched from domestic accounting standards (CA GAAP) to IFRS and 1,187 EU firms that report under IF
riod 2005–2016. Detailed definitions of all variables are provided in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigat
n Panel B, * indicates significance at the 5% level.

Descriptive statistics

Table 6: Reporting flexibility-related changes on I/S presentation & quality of analysts' forecasts

Variables	(1) |FE|	(2) |FE|
ITEMS	0.000734	0.000678
	(0.889)	(0.899)
POST×ITEMS	-0.00265	-0.00299
	(0.482)	(0.419)
TREAT×ITEMS	0.0339***	0.0340***
	(0.005)	(0.003)
POST×TREAT×ITEMS	-0.0108**	-0.0103**
	(0.022)	(0.032)
Transitory_activities		0.00628
		(0.574)
Restructure	0.0231	
	(0.415)	
M&A	-0.0647**	
	(0.011)	
Asset_writedown	0.0270	
	(0.325)	
Asset_sale	-0.0135	
	(0.308)	
Goodwill_impairment	0.0543**	
	(0.037)	
Litigation	0.0216	
	(0.469)	
Other_one_time	-0.0117	
	(0.693)	
EPS_volatility	0.0353***	0.0365***
	(0.000)	(0.000)
Growth	0.0422	0.0427
	(0.304)	(0.297)
ROA	-1.050***	-1.096***
	(0.000)	(0.000)
Log(Analysts_following)	-0.0994***	-0.102***
	(0.000)	(0.000)
log(Size)	0.0852**	0.0790**
	(0.017)	(0.024)
Return_volatility	0.00431	0.00436
	(0.336)	(0.331)
log(Product_segments)	-0.00278	-0.00295
	(0.909)	(0.903)
Constant	-0.973**	-0.884*
	(0.046)	(0.066)
Observations	14,156	14,156
Adjusted R-squared	19.8 %	19.7 %
Firm FE	YES	YES
Year FE	YES	YES

This table reports the results of tests of the impact of reporting flexibility related changes in income statement presentation following IFRS adoption on the quality of analysts' forecasts by running an OLS regression of the model in equation (2). The sample consists of 214 Canadian firms that switched from domestic accounting standards (CA GAAP) to IFRS and 1,187 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2005–2016. Detailed definitions of all variables are provided in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm fixed effects and year fixed effects. Standard errors are clustered two-way by firm and year to account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 7: Reporting flexibility-related increases vs. decreases in the number of reported items & quality of analysts' forecasts

Panel A: Summary statistics

Variables	N	# (%) different from zero	Mean	SD	Min	Median	Max
Δ*ITEMS_POSITIVE EU*	1,187	277 (23.3%)	1.93 %	4.32	0	0	54.55 %
Δ*ITEMS_POSITIVE Canada*	214	103 (48.1%)	10.24 %	19.07	0	0	200 %
Δ*ITEMS_NEGATIVE EU*	1,187	211 (17.8%)	-1.30 %	3.33	-41.67%	0	0
Δ*ITEMS_NEGATIVE Canada*	214	96 (44.9%)	-7.57 %	10.85	-55 %	0	0

Panel B: Regression results

Variables	(1) |FE|	(2) |FE|
Δ*ITEMS_POSITIVE*	0.00769*	0.00776*
	(0.054)	(0.054)
Δ*ITEMS_POSITIVE×TREAT*	-0.00987**	-0.0100**
	(0.040)	(0.035)
Δ*ITEMS_NEGATIVE*	-0.00447**	-0.00436**
	(0.033)	(0.039)
Δ*ITEMS_NEGATIVE×TREAT*	0.0132***	0.0132***
	(0.000)	(0.000)
Transitory_activities		0.000203
		(0.972)
Restructure	0.0320	
	(0.241)	
M&A	-0.0570***	
	(0.007)	
Asset_writedown	-0.0816	
	(0.213)	
Asset_sale	0.00497	
	(0.791)	
Goodwill_impairment	0.0892***	
	(0.005)	
Litigation	0.0356***	
	(0.006)	
Other_one_time	0.00725	
	(0.838)	
Controls	YES	YES
Constant	-0.239***	-0.243***
	(0.002)	(0.002)
Observations	1,401	1,401
Adjusted R-squared	9.6 %	8.6 %
Industry FE	YES	YES
Year FE	YES	YES

This table reports the results of testing the impact of reporting flexibility-related increases and decreases in the number of items reported in the income statement in the year of IFRS adoption on the quality of analysts' forecasts. Panel A presents descriptive statistics for the changes in income statement presentation. Δ*ITEMS_POSITIVE EU* (Δ*ITEMS_NEGATIVE EU*) captures EU firms exhibiting increases (decreases) in the number of items reported in the year of mandatory IFRS adoption in Canada as compared to the last year before mandatory adoption in Canada. Δ*ITEMS_POSITIVE Canada* (Δ*ITEMS_NEGATIVE Canada*) captures Canadian firms exhibiting increases (decreases) in the number of items reported in the year of mandatory IFRS adoption as compared to the last year of reporting according to CA GAAP. Panel B presents OLS regression results of the model in equation (3). The sample consists of 214 observations corresponding to Canadian firms that switched from CA GAAP to IFRS and 1,187 observations corresponding to EU firms that report under IFRS. Detailed definitions of all variables are provided in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include industry fixed effects and year fixed effects. Standard errors are clustered two-way by firm and year to account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 8: Direct consequences of reporting flexibility on presentation of recurring items

Panel A: Summary statistics and two-sample t-tests

Variables	N	# firms	Mean	Difference
# Recurring ITEMS CA PRE IFRS Δ>0	591	133	12.320	2.785***(15.66)
# Recurring ITEMS CA POST IFRS Δ>0	867	133	15.105	
# Recurring ITEMS CA PRE IFRS Δ<0	585	131	14.179	-1.012***(-6.21)
# Recurring ITEMS CAPOST IFRS Δ<0	861	131	13.167	
# Recurring ITEMS CA PRE IFRS Δ=0	204	43	14.074	0.823**(2.29)
# Recurring ITEMS CA POST IFRS Δ=0	281	43	14.897	
# Recurring ITEMS European Union	18,886	1,704	16.107	

Panel B: Regression results

Variables	(1) ITEMS_Recurring	(2) Average Marginal Effect	(3) ITEMS_Recurring	(4) Average Marginal Effect
POST×TREAT	0.0238	0.375	0.0244	0.385
	(0.302)	(0.302)	(0.289)	(0.289)
POST×TREAT×D_increase	0.155***	2.438***	0.154***	2.435***
	(0.000)	(0.000)	(0.000)	(0.000)
POST×TREAT×D_decrease	-0.127***	-2.003***	-0.129***	-2.040***
	(0.000)	(0.000)	(0.000)	(0.000)
Transitory_activities			0.00422**	0.0665**
			(0.010)	(0.010)
Restructure	-0.00962*	-0.152*		
	(0.099)	(0.099)		
M&A	-0.0118	-0.186		
	(0.146)	(0.146)		
Asset_writedown	0.00529	0.0835		
	(0.271)	(0.271)		
Asset_sale	0.0242***	0.381***		
	(0.000)	(0.000)		
Goodwill_impairment	0.00141	0.0223		
	(0.760)	(0.760)		
Litigation	0.000357	0.00562		
	(0.942)	(0.942)		
Other_one_time	0.00401	0.0632		
	(0.598)	(0.598)		
Controls	YES	YES	YES	YES
Constant	2.414***		2.426***	
	(0.000)		(0.000)	
Observations	22,275	22,275	22,275	22,275
Pseudo R-squared	10.0 %		9.9 %	
Firm FE	YES		YES	
Year FE	YES		YES	

This table reports the results of testing the direct consequences of reporting flexibility on income statement presentation in terms of the number of recurring items following IFRS adoption. Panel A presents summary statistics and results of two-sample t-tests. Panel B presents the results of a Poisson regression of the model in equation (1) with *ITEMS_Recurring* as the dependent variable. The sample consists of 307 Canadian firms that switched from domestic accounting standards (CA GAAP) to IFRS and 1,704 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2005–2016. Detailed definitions of all variables are provided in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm fixed effects and year fixed effects. Standard errors are clustered two-way by firm and year to account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1%, are indicated by *, **, and ***, respectively.

Table 9: Reporting flexibility-related changes in presentation of recurring items & quality of analysts' forecasts

Variables	(1) |FE|	(2) |FE|	(3) |FE|
ITEMS_Recurring	-0.00176	-0.00203	-0.00236
	(0.732)	(0.698)	(0.650)
POST×ITEMS_Recurring	-0.00327	-0.00354	-0.00315
	(0.337)	(0.294)	(0.339)
TREAT×ITEMS_Recurring	0.0399***	0.0403***	0.0381***
	(0.000)	(0.000)	(0.000)
POST×TREAT×ITEMS_Recurring	-0.0111**	-0.0106**	-0.0115**
	(0.028)	(0.040)	(0.018)
ITEMS_Transitory			0.0140
			(0.644)
POST×ITEMS_Transitory			0.00489
			(0.868)
TREAT×ITEMS_Transitory			0.0499
			(0.406)
POST×TREAT×ITEMS_Transitory			-0.0167
			(0.828)
Transitory_activities		0.00860	
		(0.447)	
Restructure	0.0237		
	(0.403)		
M&A	-0.0634**		
	(0.013)		
Asset_writedown	0.0303		
	(0.276)		
Asset_sale	-0.00881		
	(0.520)		
Goodwill_impairment	0.0564**		
	(0.027)		
Litigation	0.0218		
	(0.461)		
Other_one_time	-0.00969		
	(0.743)		
Controls	YES	YES	YES
Constant	-0.960**	-0.869*	-0.859*
	(0.045)	(0.065)	(0.067)
Observations	14,156	14,156	14,156
Adjusted R-squared	19.8 %	19.7 %	19.7 %
Firm FE	YES	YES	YES
Year FE	YES	YES	YES

This table reports the results of testing the impact of reporting flexibility related changes in income statement presentation of recurring items following IFRS adoption on the quality of analysts' forecasts by running an OLS regression of two alternative specifications of the model in equation (2) with *ITEMS_Recurring*. The sample consists of 214 Canadian firms that switched from domestic accounting standards (CA GAAP) to IFRS and 1,187 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2005–2016. Detailed definitions of all variables are provided in the Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm fixed effects and year fixed effects. Standard errors are clustered two-way by firm and year to account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Part III: Reporting of Operating Income Subtotals in IFRS and Debt Financing

Joseph Comprix, Kerstin Lopatta & Laura-Maria Gastone

Abstract

This study investigates how EU firms reporting under IFRS define the operating income subtotals (OIS) they disclose in their income statements and how a high reliance on debt financing acts as an incentive for the strategic choice of a tailored definition of OIS. We find that 76.7 percent of the firms in our sample use a tailored definition for their reported OIS. We find firms with high reliance on debt financing are 7.9 percent more likely to report a tailored version of OIS in terms of items included and strategically include recurring items, which on average increase the values of reported OIS. Included uncommon recurring items are on average 4.7 percentage points more income increasing for firms with high reliance on debt financing as compared to those without. Furthermore, we document that the announcement of upcoming ECB guidance on leveraged lending based on assessments of total debt-to-EBITDA ratios further amplifies the incentives of firms highly relying on debt financing and having abnormally high levels of leverage to strategically include higher recurring gains in their reported OIS.

Keywords: IFRS; income subtotals; operating income; debt financing;

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1 Introduction

This study analyzes how firms reporting under International Financial Reporting Standards (IFRS) use the freedom given by the lack of any exact requirements regarding the reporting of income subtotals in financial statements. More exactly, we analyze how differently firms define the operating income metrics disclosed in their income statements and how higher reliance on debt financing acts as an incentive for the choice of a tailored definition for the reported OIS.

Operating income metrics play a central role in capital markets as they are used to assess both the profitability of firms' main business operations and firms' financial stability. Especially in the context of debt financing, operating income figures play a critical role as they are commonly used as the basis for EBITDA (Earnings before interest, tax, depreciation and amortization) calculation, which is hereby commonly calculated by adding back (mostly) depreciation and amortization expenses to reported operating income metrics. The EBITDA metric represents an essential component of the most widely used ratio (debt-to-EBITDA ratio) for the assessment of firms' financial stability by various (potential) debt providers, as it is claimed to have the ability to gauge the financial health and thus debt capacity of a firm (Debt Explained, 2017). However, while public firms reporting under US GAAP are required to disclose prescribed income subtotals in the income statement according to Regulation S-X (17 C.F.R. §210) (US Federal Government, 2019), under IFRS neither EBITDA nor operating income are recognized or required accounting terms. Recently, attention is being drawn to the fact that, although these metrics represent widely accepted benchmarks for firm valuation (also regarding their financial stability), the diverging practices used for calculating these figures, by both US and international firms, make them prone to providing a misleading picture of firms' actual leverage and thus financial stability (Debt Explained, 2017; Powell, 2018; Schelling, 2019). Furthermore, practitioners currently draw attention to the fact that debt-to-EBITDA ratios exhibit unusually high levels, even for investment grade firms (Racanelli, 2018; Schelling, 2019). Especially in the European setting, this plays a significant role as debt is the most significant source of capital for many firms (Florou & Kosi, 2015) and public lenders rely heavily on available public information. Thus, firms' reported operating income figures are expected to play a central role in satisfying the informational needs of public lenders (in our case, bondholders).

Furthermore, operating income metrics are also of importance to other capital market participants, such as the European Central Bank (ECB). In 2017, the ECB released new

guidance on leveraged lending, which explicitly focuses on the total debt-to-EBITDA ratio as the main determinant of acceptable leverage levels (European Central Bank, 2017), claiming that loan offerings to firms with total debt exceeding six times EBITDA should remain purely exceptional. Thus, it is critical to understand what the reported operating income, and thus EBITDA figures represent, for the ECB guidance to achieve its intended purpose.

The issue of diversity in practice regarding which items get included in the calculation of operating income is also acknowledged by the IASB (ifrs.org, 2018), as one of their current major projects, entitled *Primary Financial Statements*, focuses on the development of IFRS-defined operating income subtotals. Currently there is no IFRS-defined term for the results of operating activities. This is especially important, as (1) the IASB explicitly mentions financial reporting comparability (i.e. between different firms' reported figures or across time) as one of the four main enhancing qualitative characteristics in their *Conceptual Framework* (IFRS, 2018), which in the absence of any required IFRS-defined operating income metrics is likely to not be achieved, (2) even in the absence of an exact definition, firms widely choose to provide an operating profit subtotal, which they label either *Operating profit*, declinations hereof (such as operating income, profit from operating activities etc.) or *EBIT*, and (3) many stakeholders see the definition of an operating income subtotal by IFRS as necessary in order to assure the comparability and thus usefulness of financial statements.

Last, although extensive research exists on non-GAAP disclosures under US GAAP (see Black et al. (2018) for a comprehensive review), we consider that the findings from this string of literature are not transferable to the IFRS setting and that it is even more crucial to get a better understanding of the practices related to the reporting of operating income subtotals in an IFRS setting. This is mainly due to the fact that (as opposed to US GAAP) IFRS does not prescribe any rules regarding definitions of disclosed income subtotals in the income statement or regarding the disclosure of alternative performance measures, thus leaving firms with considerable flexibility in choosing the metrics they disclose. IAS 1 only requires the presentation of totals for profit or loss, total other comprehensive income and comprehensive income for the period, thus leaving it up to the reporting companies to decide which additional income subtotals they disclose (Iasplus.com, 2015). Regarding supplemental income subtotals, IAS 1.85A-85B only states that: "When an entity presents subtotals, those subtotals shall be comprised of line items made up of amounts recognized and measured in accordance with IFRS; be presented and labelled in a clear and understandable manner; be consistent from period to period; not be displayed with more prominence than the required subtotals and totals; and reconciled with the subtotals or totals required in IFRS" (Iasplus.com, 2015). This freedom is

further amplified by the fact that, as opposed to US GAAP, where the format of the income statement is relatively inflexible, firms reporting under IFRS have a higher freedom in deciding how to structure their income statement, as IAS 1 only requires a low number of items to be separately disclosed. Although existing so-called non-IFRS studies often use income statement subtotals as baseline comparable measures in their analysis of the usefulness of non-GAAP measures under IFRS (Clinch et al., 2018; Isidro & Marques, 2015; Malone et al., 2016), to the best of our knowledge, none of them addresses the possibility of decreased comparability between income statement subtotals of different firms arising from them choosing different definitions for their calculation.

Based on the above-mentioned arguments, we expect that firms reporting under IFRS exhibit differences in terms of the definition chosen for the income subtotals they report in their financial statements. We hereby focus on reported operating income metrics due to the central role they play in firms' evaluations by capital market participants. Thus, we expect firms reporting under IFRS to exhibit differences in their reported operating income figures in terms of items included. Due to the central role these metrics play in evaluating firms' financial stability, we further expect that firms' higher reliance on debt financing (proxied by bond issues) acts as an incentive for them to strategically choose which items they include in reported operating income metrics. In order to better identify which the main items of interest that get strategically included in reported operating income might be, we draw an analogy to findings of non-GAAP literature in US GAAP (Black et al., 2018). This string of literature finds that managers mostly tend to make recurring item adjustments in order to provide a better picture of their firms' performance. Second, taking into consideration that transitory items are by nature unpredictable and not persistent over time, including such items in reported operating income metrics is unlikely to enable firms to provide a consistently improved image of their financial stability over time. Conversely, strategically including certain recurring items in reported operating income metrics has the potential of helping achieving this goal. Thus, we expect firms with high reliance on debt financing to strategically choose which recurring items they include in their reported operating income figures, thus increasing their value.

We use a sample comprising all industrial firms included in EU countries' All-Share Indexes between 2009-2016 for which we retrieve reported operating income subtotals (*OIS* hereafter) from their publicly disclosed income statements. In order to identify the exact composition of the reported OIS, we compute, based on definitions provided by commercial services providers such as Bloomberg or Thomson Reuters, as well as by taking into account item categories that are often mentioned in existing non-GAAP studies (Black et al., 2018), a

list of 23 items that are most likely to vary between different *OIS* definitions. As an aid in our item identification methodology, we use Bloomberg's *Adjusted Operating Income* (as it is calculated identically for all firms, which makes it comparable across firms and over time), which helps us identify the items corresponding to one of the above-mentioned categories that vary between reported OIS definitions of different firms. We use a self-developed code, which tests all possible combinations between a firm's reported items corresponding to one of the categories until it finds the combination of items, which accurately explains the value of the difference between the reported *OIS* and Bloomberg's *ADJ_OIS*. Through this procedure, we manage to explain at least 99 percent of the difference value for 96.8 percent of the firm-year observations in our sample based on 17 different transitory item and 6 recurring item categories. We find that 76.7 percent of our sample reports an operating income metric based on a tailored definition (i.e. includes at least one of the items in our 23 identified varying categories) and that, on average, there is a lot of heterogeneity in terms of which items are included in reported OIS, especially regarding recurring items. First, recurring item categories have lower frequencies of inclusion in reported OIS (varying between 17.03-0.31 percent of all observations in our sample; between 46.18-1.15 percent of observations where they are reported) compared to their transitory counterparts (varying between 46.18-0.09 percent of all observations in our sample; between 100-9.64 percent of observations where they are reported). However, this only makes the question regarding why the firms that choose to include them do so even more interesting. Second, we find that most of the items in transitory categories usually get included in reported *OIS*, this pointing towards firms generally following IASB's recommendation regarding the inclusion of items clearly related to operating activities even if they occur irregularly or are unusual in amount (IASB, 2007).

In line with our expectations, we find that firms highly relying on debt financing (i.e. having bonds issued) have incentives to strategically choose which items they include in the definitions of their reported *OIS* under IFRS, especially recurring items. These firms are 7.9 percentage points more likely to report a tailored version of OIS in terms of items included and strategically include recurring items, which on average represent net recurring gains thus increasing the values of reported operating income subtotals. Included uncommon recurring items are on average 4.7 percentage points more income increasing for firms with high reliance on debt financing as compared to those without. This might aid firms in meeting certain thresholds used by debt providers in assessing firms' financial stability, as reported operating income figures play a significant role herein. Additionally, we document that the announcement of upcoming ECB guidance on leveraged lending based on assessments of total debt-to-

EBITDA ratios further amplifies the incentives of firms with high reliance on debt financing and abnormally high levels of leverage (bond issues and a total debt-to-EBITDA ratio over 6) in strategically choosing to include higher recurring gains in their reported *OIS*. We also find these results to hold when we proxy for debt financing by using private debt (i.e. loans). We perform a series of additional analyses to confirm the robustness of our results. We correct for non-random selection of firms issuing bonds by using a two-stage estimation approach following Heckman (1979), use alternative measures for the value of identified varying items in the composition of reported *OIS* and also use alternative sample specifications by imposing additional restrictions. All of these additional tests produce results that are qualitatively similar to our main results.

We contribute to the literature on IFRS by providing findings on European firms' practices and their incentives in the reporting of operating income metrics. We show that firms reporting under IFRS make use of the flexibility resulting from the lack of exact definitions, when reporting operating income subtotals and that this plays a significant role within capital markets, as firms' reliance on debt financing acts as a clear incentive in choosing a certain definition for these metrics. We also contribute to the literature on non-GAAP reporting by showing that the assumptions in US GAAP non-GAAP studies (i.e. that measures reported in financial statements represent GAAP defined, comparable measures) cannot be transferred on an international setting. Measures reported in the income statement as operating income subtotals by firms using IFRS are not appropriate proxies for GAAP earnings, as their composition differs between firms and thus should not be used as comparison baseline figures in non-GAAP studies within the IFRS setting.

The remainder of this paper is structured as follows. Section 2 discusses prior literature and hypothesis development. Section 4 presents the sample selection procedure and discusses our methodology. Sections 5 and 6 present the main results and the additional analysis. Section 7 concludes.

2 Literature review and hypothesis development

The relatively new string of literature on earnings measures under IFRS (commonly labelled as non-GAAP reporting in the IFRS setting) mainly focuses on analyzing differences between alternative earnings figures reported in earnings announcement press releases and reported income (sub-)totals in firms' financial statements. The results of these studies are however inconsistent. Generally, the studies find that managers' likelihood to use so-called non-GAAP

measures to meet or beat earnings benchmarks depends on law and enforcement, investor protection, and development of financial markets (Isidro & Marques, 2015), that firms make extensive use of so-called "earnings before" metrics and, more importantly, of pure alternative performance measures, both in terms of frequency and reporting emphasis (Hitz, 2010). Some studies find that alternative metrics have the potential to misinform investors as they reflect figures that are opportunistically composed (Aubert, 2009), that UK firms are more likely to report alternative earnings under IFRS if they are better governed or have a weaker financial performance (Charitou et al., 2018) and that auditors of UK firms are more likely to rely on so-called non-GAAP profit before tax as materiality benchmark if firms report this item, which reduces audit strictness (Hallman et al., 2018). Other studies find that alternative earnings measures lead to higher quality of analysts' forecasts, thus suggesting usefulness rather than opportunism in the adjustments (Malone et al., 2016), that they are useful to predict future cash flows only for firms providing disaggregated income statements (i.e. having at least one income subtotal) (Jeanjean et al., 2018) and that the disclosure of alternative versions of operating earnings in earnings announcements provide value relevant information in terms of price prediction (Clinch et al., 2018). Additionally, Yang and Abeysekera (2018) find that Australian Securities Exchange guidelines for non-GAAP earnings for Australian firms reporting under IFRS are associated with higher earnings quality. Furthermore, Venter et al. (2014) focus on South Africa as a setting where reporting of non-GAAP earnings is mandatory and find that non-GAAP earnings have higher value relevance than GAAP earnings. However, as in Venter et al. (2014), most of the mentioned studies only focus on one single country such as France (Aubert, 2009; Jeanjean et al., 2018), Germany (Hitz, 2010), Australia (Malone et al., 2016) or New Zealand (Rainsbury et al., 2013) and some studies analyze sample periods both before and after IFRS adoption and do not differentiate between the use of two different sets of standards (Aubert, 2009; Rainsbury et al., 2013).The one study that directly analyzes the relevance of income subtotals reported in the income statement is the one by Cormier et al. (2017), who show that EBITDA reporting (based on the use of a dummy variable documenting whether it is reported or not) is associated with greater analyst following and with less information asymmetry. They do not however analyze the composition of EBITDA.

The one prevalent issue in the aforementioned studies is the fact that most of them regard earnings subtotals presented in IFRS income statements as representing GAAP measures that are comparable between firms. However, IAS 1 only defines and requires the presentation of totals for profit or loss, total other comprehensive income and comprehensive income for the period (Iasplus.com, 2015). To the best of our knowledge, there is no study analyzing how

operating income subtotals reported in income statements are calculated by different firms and what the incentives for choosing a certain model for the calculation of these subtotals might be. Thus, we aim at complementing this field of research by investigating how firms reporting under IFRS define their reported operating income subtotals in terms of items they include in their calculation and by analyzing whether the choice of a certain model for OIS calculation is driven by any specific incentives.

As compared to other subtotals (such as profit before tax), we consider OIS to be of higher relevance as it is commonly used in assessing a firm's financial stability in debt financing. One of the most commonly used measures to assess firms' financial stability is the debt-to-EBITDA ratio (Petitt, 2019; Rozenbaum, 2019; Schmidlin, 2014), which also commonly plays a central role in determining firms' investment grade ratings by rating agencies such as Standard & Poor's and Moody's (Asanuma & Manabe, 2019; Galvin, 2019). EBITDA is hereby commonly calculated by (mostly) adding back depreciation and amortization expenses to reported operating income subtotals. Practitioners currently draw attention to the fact that debt-to-EBITDA levels exhibit unusually high levels, even for investment grade firms, with an average of 3.2, as compared to 2.1 in 2007 (Racanelli, 2018). Furthermore, the average debt-to-EBITDA ratios for leveraged loans also exhibit a concerningly increasing trend within the EU, reaching record high levels of 5.4 in 2018 since 2007 before the financial crisis, where the average level was six (Deslandes et al., 2019). Especially in the European setting, this plays a significant role, as debt is the most significant source of capital for many firms (Florou & Kosi, 2015) with the total amount of debt (private debt and corporate bonds) being 3.3 times higher than the amount of total shares outstanding for firms in the EU area. Similarly, Schildbach (2013) documents a 63 percent increase in bond issuance following the financial crisis in the EU. Public lenders (i.e. corporate bondholders) rely more heavily on available public information, as they are more dispersed and thus have less incentives to engage in costly monitoring (Financial Intermediation, 2003) while firms are also less likely to provide private information to dispersed bondholders (Bhattacharya & Chiesa, 1995). Thus, firms' reported subtotals are expected to play a central role in satisfying the informational needs of public lenders, represented in our case by bondholders.

Furthermore, the introduction of guidance on leveraged lending by the European Central Bank (ECB) in 2017 further highlights the importance of firms' reported *OIS*. Following a survey of credit institutions conducted in 2015, the ECB defines acceptable leverage levels at deal inception as those that do not exceed existing total debt being 6 times of EBITDA, whereby transactions with firms exceeding this limit should remain exceptional (European Central Bank,

2017). For this purpose, the ECB does not prohibit adjustments to EBITDA, they do however mention that these should be duly justified. Furthermore, the ECB along with expert practitioners encourage the use of this guidance for other types of transactions and highlight the fact that lenders have been using many of the key facts of the lending guidance before its introduction (Avery et al., 2016; European Central Bank, 2017). Additionally, some national supervisory authorities, such as the Federal Financial Supervisory Authority in Germany (BaFin) issued guidelines, which provide similar requirements.

Under IFRS, the decision of firms to report operating income subtotals is voluntary. If firms choose to report additional subtotals, then IAS1.85A-85B states that these "shall be comprised of line items made up of amounts recognized and measured in accordance with IFRS; be presented and labeled in clear and understandable manner; be consistent from period to period, […]" (Iasplus.com, 2015). Additionally, in its *Basis for Conclusion on IAS 1* the IASB notes that entities should ensure that the amount disclosed is representative of activities that would normally be regarded as operating. Interestingly enough, the IASB states that all items resulting from operating activities, even those that occur irregularly or infrequently or are unusual in amount, should be included in the result of operating activities, as not doing so would be misleading to users of financial statements (IASB, 2007). Overall, no exact guidance or rules are provided regarding the composition of reported subtotals, which can potentially lead to comparability issues or firms opportunistically computing their subtotals in order to provide a better image of their performance. Recently, the IASB has acknowledged the issue of missing rules/definitions for additional subtotals that might be reported, and focuses in one of its current major projects entitled *Primary Financial Statements* on developing IFRS-defined operating subtotals. Tentative Board decisions presented in the 2018 IFRS Staff Paper mention the requirement of three new IFRS-defined subtotals: Operating profit, Operating profit and share of profit or loss of integral associates and JVs, and Profit before financing and income tax.

Based on the above-mentioned arguments, we focus on operating income subtotals as they generally play a central role for capital market participants, and are crucial metrics in the setting of debt financing. Thus, we posit that EU firms using IFRS and highly relying on debt financing (proxied in our analysis by bond issues) are expected to have higher incentives to provide OIS subtotals that could aid them in receiving a positive financial stability evaluation. We formulate our first hypothesis as follows:

Hypothesis 1: *Firms, which rely more on debt financing and report under IFRS, are more likely to use different (tailored) definitions for reported operating income subtotals in terms of included items.*

In order to get more insight into which specific items might purposefully be chosen by firms with high debt reliance for inclusion in their reported *OIS* we first resort to the extensive literature on non-GAAP reporting under US GAAP (see Black et al. (2018) for a comprehensive review). The focus of these studies has been on investigating what the nature of the adjustments to the reported non-GGAP income measures is in order to find out whether managers opportunistically choose which items to exclude. Overall, they find that managers opportunistically exclude recurring items from their non-GAAP metrics. Barth et al. (2012), Bowen et al. (2005) and Doyle et al. (2003) find that some managers opportunistically exclude recurring earnings from non-GAAP metrics and even reclassify recurring expenses as non-recurring exclusions in order to provide a better image of the firm's performance. Likewise, Kolev et al. (2008) find that, following intervention by the SEC, managers more often shift recurring expenses into transitory items. Black and Christensen (2009) and Doyle et al. (2013) find that managers strategically exclude items from non-GAAP earnings in order to meet earnings benchmarks, excluded recurring items being the main drivers of this finding. Mehring et al. (2019) also find that the exclusion of recurring expenses from non-GAAP metrics are misleading to investors. Second, it is unlikely that firms will strategically choose to include transitory items in their reported operating income figures, seeing as the occurrence of this type of items is unpredictable by nature and thus likely not persistent over time. Including such items in reported operating income metrics is not likely to enable firms to provide a consistently improved image of their financial stability over time. However, strategically including certain recurring items in reported operating income metrics has the potential of helping achieving this goal. Thus, we expect firms highly relying on debt financing and reporting under IFRS to strategically choose which recurring items (especially gains) they include in reported operating income subtotals and formulate our second hypothesis as follows:

Hypothesis 2: *Higher reliance on debt financing acts as an incentive for firms to include higher recurring gains in their reported operating income subtotals under IFRS.*

3 Methodology

3.1 Data and sample selection

We construct our sample by selecting all firms that use IFRS and are constituents of All-Share indexes from each EU member state to capture all relevant firms on the market and have no sample selection bias. We follow prior research and exclude financial and insurance companies, as their operating activities are not comparable to those of industrial companies. This results in

an initial sample of 15,696 unique firm-year observations for 2,127 EU firms covering the period 2009-2016. The lower bound of our sample period is restricted due to Bloomberg data (necessary for our methodology) only being available starting in 2009. Next, we hand collect income statement data from the *Consolidated Financial Statement* sections of firms' annual reports, which we use to retrieve the reported operating income subtotals. For this we identify items reported in the income statement that are labeled as operating profit, declinations hereof (such as operating income, profit from operating activities etc.) or earnings before interest or taxes (EBIT). We observe that, although operating profit and EBIT are theoretically (and especially in the view of the IASB) not equivalent, a few firms use them interchangeably meaning that each firm-year observation in our sample has either operating profit (or a declination hereof) or EBIT reported, but not the two at the same time. We exclude 1,148 firm-year observations for which no OIS is reported. This represents 3.1% of the firms in our sample confirming that the reporting of OIS is a widespread practice under IFRS, even if these measures are not defined nor required by IFRS. Next, we identify items that are most likely to vary in terms of being included in OIS definitions. For this, we use Bloomberg's *Adjusted Operating Income* measure as an aid in our analysis in order to identify the individual items that vary between definitions of reported OIS by different firms. We exclude 1,917 firm-year observations for which we are not able to accurately identify these items (see section 3.2 for a detailed description of the identification methodology), which decreases our sample to 12,631 firm-year observations corresponding to 2,061 EU firms. Further, we retrieve additional accounting data from Thomson Reuters Datastream and data on debt financing in the form of bonds issues from SDC Platinum. This leads to the exclusion of an additional 2,414 firm-year observations for which data is not available. Last, we exclude 16 firm-year observations with no data on revenues, as this is necessary to calculate our main variables. Thus, the final sample consists of 10,132 firm-year observations for 1,851 unique EU firms reporting under IFRS for the years 2009-2016. Table 1 Panel A provides an overview of the sample selection procedure. Panel B of Table 1 presents the distribution of our sample by country.

>> Insert Table 1 about here <<

3.2 Identification of operating income subtotals definitions

We identify reported operating income subtotals as items reported in the income statement that are labeled either Operating Income (or declinations hereof such as operating profit, profit from operating activities etc.) or EBIT. Throughout our analysis, we are going to refer to this measure as *OIS*. In order to identify the items that vary between the definitions of *OIS* of different firms,

we use Bloomberg's *Adjusted Operating Income* as an aid in our methodology, which serves as a proxy for commercial service providers' and analysts' recommendations regarding the calculation of operating income subtotals. We use this measure as it is calculated identically (in terms of included items) for all firms, which makes it comparable across firms and over time. We are going to refer to this measure as *ADJ_OIS*. According to Bloomberg's official definition, this figure represents reported operating income adjusted to correct for any non-operating gains and expenses that are included (such as foreign currency gains or losses or share of associates' net profit etc.) as well as for any abnormal items (such as restructuring charges, merger and acquisition expenses, impairment of goodwill etc.). Although Bloomberg does not provide an exhaustive list of all the items they exclude in calculating *ADJ_OIS*, we compute a list of 23 possible item categories based on their definition of *ADJ_OIS* as well as by taking into account item categories that are often mentioned in existing non-GAAP studies (see Black et al. (2018)). Table 2 provides an overview of the item categories. Based on this list, we then identify all reported items in our sample corresponding to one of the categories. Due to the fact that different firms use (slightly) different labels for items they report, this leads to the identification of 81 different reported items (either in the income statements or the notes to the financial statements) corresponding to one of the 23 item categories. We use these items in a self-developed code, which tests all possible combinations between a firm's reported items corresponding to one of the categories until it finds the combination of items, which accurately explains the value of the difference between the reported *OIS* and Bloomberg's *ADJ_OIS*. To exemplify we use AUDI AG's 2015 reported financial information. The reported operating profit has a value of 4,836 EUR million, while Bloomberg's adjusted operating income measure has a value of 4,754 EUR million. Thus, we have a difference of 82 EUR million that corresponds to the varying items in the firm's definition of OIS compared to other firms. Through our analysis, we identify two item categories explaining the full amount of the difference. First, AUDI AG includes foreign exchange gains of 79 EUR million in the calculation of its reported OIS. Second, we have a 3 EUR million gain on the sale of assets which is also included. The information on these amounts comes from the notes to the financial statements in AUDI AG's 2015 annual report (AUDI AG, 2015). Similarly, we identify for each firm-year observation in our sample the exact reported items making up the difference between reported *OIS* and *ADJ_OIS*. Last, we check for any cases where two or more of the items corresponding to one of the 23 categories have identical values in the same firm-year observation (e.g. it might be possible that a firm has in the same year M&A expense of 5 EUR and foreign exchange loss of 5 EUR). In this case, it might be possible that we identify the

wrong combination of items that are included in *OIS* based on our methodology. We identify 311 firm-year observations where we have at least two (maximum four) items with equal values. We check in all of these cases which of them are included in reported *OIS* and find that either all of them are included or none of them are identified as being part of reported *OIS*, which eliminates the possibility of wrongly identifying the composition of *OIS*. Through our methodology, we manage to explain at least 99 percent (90 percent) of the difference value for 96.8 percent (98.77 percent) of the firm-year observations in our sample. This ensures that the data we use is complete and accurately represents firms' reporting practices. As some of the items represent either gains or losses, we use the following convention: positive values represent expenses while negative values represent gains. One important remark hereby is that each firm that (at some point in time over our sample period) chooses to use an alternative definition for the calculation of its reported *OIS* keeps the respective definition throughout the sample period (i.e. we do not have firms in our sample that e.g. include a certain item category in reported *OIS* in one year but exclude it in the next one). This shows that firms do respect the accounting consistency requirement by regulators and financial statement users.

Panel A of Table 2 provides descriptive statistics regarding the EUR values of the items included in reported *OIS*. The first 17 categories of items represent those corresponding to transitory activities, i.e. items that arise from activities outside of normal operations or transactions that arise from unexpected events, which are both seen as being of a non-recurring nature (e.g. a machine breaking down, restructuring of operations). The last six categories represent items corresponding to recurring but mostly regarded as non-operating activities or transactions (e.g. losses or gains from foreign exchange transactions, shares in profits of associates, dividend income). Throughout the paper, we will refer to the first 17 categories as transitory items and to the latter 6 categories as recurring items. We observe that almost half (11 out of 23) of the item categories included in reported OIS represent on average included gains, and especially when focusing on the subgroup of recurring items, we observe that the average included gains significantly outrun included losses in terms of value. To get a better idea of the relative importance of these items compared to firms' overall results, Panel B of Table 2 presents summary statistics for the monetary amounts of included transitory and recurring items, as well as of all included items as percentage of firms' revenue. Included recurring (transitory) items represent on average 0.61 percent (2.63 percent) of total revenues, the sum of all included varying items representing, on average, 2.89 percent of total revenues.

>> Insert Table 2 about here <<

Figure 1 presents frequencies of reporting and inclusion in reported *OIS* for the 23 identified item categories. First, we identify the percentage of firm-year observations in which each item category is reported (either in the income statement or in the notes to the financial statements) out of all the observations in our sample. This is depicted through the grey bars. Next, for each item we calculate the percentage of firm-year observations in which it is reported and included in the calculation of reported *OIS*. The red bars in Figure 1 depict this percentage. For example, for the item M&A-related Expense we identify 1,292 firm-year observations in which it is reported (12.75 percent of all observations in the sample). Out of these, it is included in the calculation of OIS in 1,264 firm-year observations (12.47 percent of all observations in the sample), meaning we only have 28 firm-year observations in our sample for which it is excluded from the reported *OIS* (0.28 percent of all observations in the sample). If we have more than one reported item per category, we identify the number of unique observations for which at least one of the items is reported (in order to avoid double counting). We can observe that there is a lot of heterogeneity in how often the single item categories are reported by firms as well as regarding how often they are included in reported *OIS*. The categories labeled as recurring are reported significantly more often than the ones labeled as transitory. Additionally, we can see that the recurring categories also have lower frequencies of inclusion in reported *OIS* than their transitory counterparts. First, *Other Financial G/L* is the category with the highest frequency of reporting (73.44 percent) but gets included in reported *OIS* in only 0.85 percent of the observations in our sample. On first sight, it might seem obvious that these items should not be part of OIS. However, there are more factors to be taken into account. It might be possible that, for example, they arise from customer credits, which are part of a firm's operations. The problem hereby is that firms do not offer sufficiently detailed information to users of financial statements needed to disentangle the operating from the pure financing part of these items. Second, we can observe that *Foreign Exchange G/L* and *Equity in Earnings of Associates/JVs* have the highest frequency of inclusion in OIS calculation out of all recurring items (17.03 percent and 11.51 percent respectively; this corresponds to a 23.87 percent and 24.20 percent, respectively, inclusion rate out of all the times they are reported). Generally, we find that items in the recurring group usually do not get included in reported *OIS*. However, the question remains why the firms that choose to include them do so. A first thought might be that firms might be cherry-picking what they include in their calculation of *OIS* (e.g. a firm that usually has gains from shares in the profit of associates might include the item in reported *OIS*, while a firm that usually has losses from shares in the profit of associates would not include it). Third, we find that 11 out of the 17 transitory item categories get included in reported *OIS* in

85 pecent or more of the times when they are reported. The interesting thing about this is that seven out of the 11 previously mentioned categories usually represent expenses that firms incur, and thus decrease the value of reported *OIS* upon inclusion. Although it might appear counterintuitive for firms to do this, this shows firms generally follow IASB's recommendation regarding the inclusion of items clearly related to operating activities even if they occur irregularly or are unusual in amount.

>> Insert Figure 1 about here <<

Figure 2 provides additional information regarding the within-firm pattern of inclusion of each item category. The X-axis provides the average within-firm mean frequency of inclusion and the Y-axis depicts the average within-firm variation of item values included in reported *OIS*. We observe that recurring items tend to have relatively more stable values over time than transitory items, the latter ones usually exhibiting higher variation in their values. Last, we also observe that recurring items' average firm-specific frequency of inclusion is relatively low compared to that of most of the transitory items. Given the observed patterns in Figures 1 and 2, especially regarding recurring items, it is clear that a more detailed analysis of the data on the 23 item categories is needed in order to understand why firms choose to include certain items in reported OIS.

>> Insert Figure 2 about here <<

3.3 Reporting a tailored OIS & reliance on debt financing

For the test of our first hypothesis, we use the following model:

$$\begin{aligned}\text{Prob(OIS\_diff)}_{it} = {} & \beta_0 + \beta_1 \text{Bonds\_issued}_{it} + \beta_2 \text{ROA}_{it} + \beta_3 \text{Leverage}_{it} + \beta_4 \text{BTM}_{it} + \beta_5 \text{Z\_Score}_{it} \\ & + \beta_6 \text{Loss}_{it} + \beta_7 \text{Size}_{it} + \beta_8 \text{Complexity}_{it} + \beta_9 \text{Firm\_Age}_{it} + \text{IndustryFE} \\ & + \text{YearFE} + \text{CountryFE} + \varepsilon_{it}, \end{aligned} \quad (1)$$

where our dependent variable, *Prob(OIS_diff)*, is an indicator variable taking the value of one if the reported *OIS* includes any of the items in the previously identified 23 item categories, zero otherwise. Alternatively, we also differentiate between firms reported *OIS* being income increasing or decreasing and define *Prob(OIS_high)* and *Prob(OIS_low)*, which take a value of one if the items corresponding to the previously identified 23 categories included in reported *OIS* represent overall net gains and overall net losses, respectively. The two variables take a value of zero if the reported OIS does not include any of the items in the 23 categories. We choose firms' bonds issues in order to proxy for firms' higher reliance on debt financing. Thus, our main independent variable of interest, *Bonds_Issued*, is an indicator variable taking the value of one for all firm-years in our sample in which the corresponding firm has bonds issued,

zero otherwise. Alternatively, we also use *Initial_Offering* as main independent variable of interest, which we define as the log of the value of initial offering at bond issuance date. If a firm has multiple bond issuances, it equals the sum of initial offering values of all active bond offerings in the respective firm-year. For firm-years with no bonds issued, *Initial_Offering* has a value of zero. In order to confirm our first hypothesis we expect β_1 to be positive and statistically significant for all used model specifications.

We control for factors identified by prior literature as being associated with financial reporting and debt financing in order to mitigate possible omitted variable bias. We include firm size (*Size*), the number of product segments (*Complexity*) and *Firm_Age* to control for larger firms with more complex operations, which require more diverse disclosures and have a greater demand for information (Atiase, 1985; M. Lang & Lundholm, 1993). We also control for a set of firm characteristics such as *ROA*, *BTM* and *Loss* in order to account for differences arising from firm profitability (Curtis et al., 2013; Huang & Skantz, 2016; Isidro & Marques, 2015) and *Leverage* and Altman's Z-score (*Z_Score*) to control for firms' financing characteristics (Bradley et al., 2016; Byun et al., 2013; Franco et al., 2015). We include country, industry and year fixed effects in order to control for country level regulatory differences, industry specific differences, and macroeconomic/temporal events, respectively. We use robust standard errors to account for heteroscedasticity. Detailed definitions of all variables are provided in Appendix.

3.4 Debt financing as incentive for strategic recurring item inclusion in OIS

We test our second hypothesis by using the following model:

$$\begin{aligned}\mathrm{REC_{it}} = {} & \beta_0 + \beta_1 \mathrm{Bonds\_Issued_{it}} + \beta_2 \mathrm{ROA_{it}} + \beta_3 \mathrm{Leverage_{it}} + \beta_4 \mathrm{BTM_{it}} + \beta_5 \mathrm{Z\_Score_{it}} + \beta_6 \mathrm{Loss_{it}} \\ & + \beta_7 \mathrm{Size_{it}} + \beta_8 \mathrm{Complexity_{it}} + \beta_9 \mathrm{Firm\_Age_{it}} + \mathrm{IndustryFE} + \mathrm{YearFE} + \mathrm{CountryFE} + \varepsilon_{i,t}, \quad (2)\end{aligned}$$

where our dependent variable, *REC*, represents the sum of all included varying recurring items (out of the 6 identified item categories) in the corresponding firm-year observation's definition of reported *OIS*, scaled by the corresponding total revenues. A positive value of *REC* represents overall included net recurring expenses; a negative value represents overall included net recurring gains. If a firm does not include any of the varying recurring items in its reported *OIS*, *REC* will have a value of zero. Our main independent variable of interest is again *Bonds_Issued* (alternatively *Initial_Offering*). As negative values of *REC* represent net included recurring gains and lower positive values represent lower included net losses, we expect β_1 to be negative and statistically significant in order to confirm our second hypothesis. All control variables are as previously defined. We include country, industry and year fixed effects in order to control

for country level regulatory differences, industry specific differences, and macroeconomic/ temporal events, respectively. We use two-way clustered standard errors by industry and year to mitigate serial correlations concerns. Alternatively, we use *TRANS* as dependent variable in order to confirm that firms with debt financing strategically decide on which recurring items they include in their reported *OIS* and that debt financing does not act as an incentive in choosing which transitory items are included in reported *OIS*. By analogy, *TRANS* equals the sum of all included transitory items (out of the identified 17 item categories) in the corresponding firm-year observation's reported *OIS*, scaled by corresponding total revenues. *TRANS* takes a value of zero if no transitory items are included in reported *OIS*.

4 Results

4.1 Summary statistics and univariate analysis

Table 3 Panel A provides summary statistics for variables used in the main test of Hypothesis 1. Approximately 76.7 percent of the firm-year observations in our sample report a differently defined *OIS* (i.e. include at least one item belonging to the identified 23 categories of varying items between reported *OIS* definitions of different firms). This indicates that firms do indeed use the lack of exact (regulated) definitions for subtotals under IFRS and develop tailored *OIS* definitions. The mean value for *REC* (*TRANS*) is -0.029 (1.244) indicating that if firms choose to tailor the definition of their reported *OIS*, they include, on average, net recurring gains and net transitory losses in their reported *OIS*. We also observe that 28.56 percent (71.61 percent) of the firm-year observations in our sample have at least one recurring (transitory) item corresponding to one of the identified item categories included in their reported *OIS*. Regarding the prevalence of debt financing in our sample, we observe that 11 percent of our sample has bonds issued, with an average initial offering amount of 43 percent of total assets value at the time of initial offering. Panel B of Table 3 presents pairwise correlations for the variables used in our model. All correlations have the expected signs and none of the magnitudes presents any concern regarding multicollinearity. Both *Bonds_Issued* and *Initial_Offering* are negatively and statistically significantly correlated with *REC*, which offers preliminary evidence for our second hypothesis. The mean (median) size of firms in our sample is consistent with the one reported in prior studies using EU firms samples (M. H. Lang et al., 2010). The average number of firms' product segments is 3.4 and the average firm age is approximately 14.6 years indicating that our sample mostly consists of relatively large, more complex and older firms. Mean (median) *ROA* is 0.030 (0.040) and in line with prior research (Armstrong et al., 2010;

Li & Yang, 2015). Mean *Leverage* has a slightly higher value as compared to prior research (Isidro & Marques, 2015), which is mostly due to the inclusion of the years around the financial crisis in our sample.

Table 3 Panel C presents the results of the univariate tests of differences in means between the group of firms that do not have bonds issued and the group of those who do. Firms with bonds issued are more likely to report a tailored version of *OIS*, the difference of 0.2232 (t-statistic 16.87) being statistically significant. This offers preliminary evidence for our first hypothesis. When analyzing the type of items included, we observe that firms with bonds issued are more likely to include higher recurring gains in their reported *OIS* as compared to firms with no bonds issued (difference in means of 0.1579, t-statistic 3.52), the average value of included recurring items for firms with bonds issued being almost three times as high as the one for firms without. However, we do not find any statistically significant difference in the means of the two groups of firms for the overall sum of included items or the value of included transitory items. This offers preliminary evidence for our second hypothesis claiming that firms' higher reliance on debt financing acts as an incentive only for the strategical choice of recurring items they choose to include in their reported *OIS*, and not for the transitory items.

>> Insert Table 3 about here <<

4.2 Regression results

Table 4 presents the results of the model in Eq. (1). Using a Probit regression, we regress the likelihood of firms reporting a tailored version of *OIS* on the existence of issued bonds and other firm-specific factors. Columns 1 to 3 (4 to 6) present the results of the model specification with *Bonds_Issued* (*Initial_Offering*) as main independent variable of interest. Overall, the positive and statistically significant coefficient of 0.689 (p-value<0.01) (0.0966 (p-value<0.01)) on *Bonds_Issued* (*Initial_Offering*) in column 1 (4) provides evidence that firms which have bonds issued are more likely to report a tailored version of OIS in their income statement. The estimated marginal effect presented in Panel B, column 1 indicates that, overall, firms with bonds issued are 7.9 percent more likely to choose a tailored definition of their reported OIS. This confirms our first hypothesis by showing that firms' higher reliance on debt financing acts as an incentive in choosing to report an individually tailored version of *OIS*. We further differentiate between whether the reported *OIS* includes net income increasing varying items or net income decreasing varying items. For the models presented in columns 3 and 5 (2 and 4) we only keep the observations that have an income increasing (decreasing) reported *OIS*

value and those that do not have any of the varying items included in reported *OIS*. The results in columns 2 and 3 show that firms with bonds issued, as compared to firms that do not have any bonds issued, are more likely to report a tailored *OIS* version including both net varying losses and net varying gains, respectively. The results of the alternative model specification in columns 5 and 6 confirm this finding. Thus, overall, we do not identify a specific pattern that firms highly relying on debt financing follow in terms of the total value of all varying items (transitory and recurring) they include in their reported OIS, inclusion of income increasing and income decreasing items to the reported OIS being both more likely. The coefficients on the control variables indicate that larger (coefficient of *Size* in column 1 equals 0.561; p-val<0.01), more complex (coefficient on *Complexity* in column 1 equals 0.274; p-val<0.01) firms with lower profitability (coefficient of *ROA* in column 1 equals -0.682; p-val<0.05) and in higher financial distress (coefficient on *Z_Score* in column 1 equals -0.029; p-val<0.05) are more likely to report a tailored version of *OIS*.

>> Insert Table 4 about here <<

Table 5 presents the results of the model in Eq. (2), representing our main test of Hypothesis 2. Panel A presents mean values for included recurring items in reported *OIS* based on whether firms have bonds issued or not. We observe that the mean values in EUR million for included recurring items are consistently higher when firms have a higher reliance on debt. Overall, firms having bonds issued include recurring items that are 34 times higher in value than those included by firms without bonds issued (mean value of -40.73 EUR million versus -1.17 EUR million), both groups including overall mean recurring gains in their reported OIS. When differentiating between firms including net recurring gains and those including net recurring losses in their reported *OIS*, the same pattern is observed. Mean net recurring gains (losses) included in reported *OIS* for firms with bonds issued have a mean value of -214.16 EUR (65.44) million, while firms without bonds issued only include net recurring gains with an average value of -15.33 (-9.31) EUR million. Using a fixed effects regression, we regress *REC* (equals the value of included recurring items identified as belonging to one of the 6 varying recurring item categories, scaled by total revenues) on the existence of issued bonds and other firm-specific factors. Columns 1 and 2 in Panel B present the results of the model based on the whole sample. The negative and statistically significant coefficient on *Bonds_Issued* (coefficient = -0.047, p-val<0.05) in column 1 indicates that firms with issued bonds include recurring items in their reported OIS that are on average 4.7 percentage points more income increasing (as negative values of *REC* represent net included recurring gains and positive values

net included recurring losses) as compared to firms with no bonds issued. The negative and statistically significant coefficient (-0.009; p-val<0.05) on *Initial_Offering* in column 2 confirms this finding. Thus, we confirm our second hypothesis that firms' higher reliance on debt financing acts as an incentive in strategically choosing the recurring items they include in reported *OIS*, leading to the inclusion of more income increasing recurring items. This incentive may arise from the fact that a more favorable value of operating income helps firms to get a better evaluation of their financial stability and thus can aid them in receiving better terms for or higher amounts of debt financing.

In columns 3 and 4 (5 and 6) of Panel B we perform additional subsample analysis for which we only keep observations of firms reporting *OIS* that overall include net recurring gains (net recurring losses). The negative and statistically significant coefficient (-0.253; p-val<0.05) on *Bonds_Issued* in column 3 shows that firms having bonds issued include on average net recurring gains that are 25.3 percentage points higher as compared to firms including net recurring gains that do not have bonds issued. Regarding the firms that include overall net recurring losses in their reported *OIS*, the results in column 5 show that firms with bonds issued include, on average, net recurring losses that are 12.4 percentage points higher, as compared to firms including overall net recurring losses that do not have any bonds issued (coefficient on *Bonds_Issued* is 0.124; p-val<0.01). These results also hold when we use *Initial_Offering* in columns 4 and 6 as an alternative to *Bonds_Issued*. Although at first it might appear counterintuitive that firms relying more on debt financing also exhibit higher levels of net included recurring losses, this finding is in line with the accounting consistency assumption. We know from our *OIS* definition identification section that if a firm chooses a certain tailored calculation model for reported *OIS* it keeps it throughout the sample period as not doing so would also strongly contradict with the accounting consistency expectation and requirement by standard setters and users of financial statements. If a firm decides to include certain recurring items in their reported *OIS* it cannot exclude them in the years where these represent possible losses as this would lead to inconsistencies in their accounting methods (e.g. including shares in the profits of associates can lead to additional gains from associates being included in reported *OIS* calculation in certain years, but can also lead to inclusion of additional losses in other years, if the associate reports overall net losses). Thus, this explains why we also find firms with bonds issued to have significantly higher net recurring losses included in *OIS*, as compared to firms without bonds issued. However, we observe that the magnitude of the coefficient on *Bonds_Issued* is almost twice as high for observations of firms having overall net recurring gains included in *OIS* (-0.253 in column 3) as compared to those having overall

net recurring losses included (0.124 in column 5). Panel C of Table 5 presents the results of a Wald test of equality of coefficients on *Bonds_Issued* from the two regressions presented in columns 3 and 5 of Panel B. We find that the difference between them is statistically significant with a chi2-statistic of 30.07 (p-val<0.01). We thus conclude that the main driver of our results is higher reliance on debt financing acting as an incentive for firms to provide a more favorable reported *OIS* by including income increasing recurring items in order to uphold critic thresholds and thus receive a better evaluation of their financial stability, necessary for obtaining (better) external financing.

>> Insert Table 5 about here <<

To further confirm our expectation that firms reliance on debt financing only acts as an incentive regarding the strategical choice of included recurring items in the reported OIS definition, we estimate the model in Eq. (2) with *TRANS* as dependent variable. We expect all of the estimated coefficients on both *Bonds_Issued* and *Initial_Offering* to not be statistically significant, which would provide further proof for the validity of our second hypothesis. Table 6 presents the results and shows that, as expected, firms' reliance on debt financing does not act as an incentive to strategically choose the transitory items that get included in reported *OIS*, as none of the reported coefficients on the main variables of interest are statistically significant.

>> Insert Table 6 about here <<

5 Additional analysis

5.1 Heckman correction for non-random selection

We acknowledge the fact that firms might self-select to issue bonds and that the ones that do so are systematically different from those who do not. Table 7 Panel A provides results for a test of difference in means between firm characteristics of firms with bonds issued and those without. We can observe that firms issuing bonds are systematically different from firms without bonds, by being more profitable (higher *ROA*, less losses, lower *BTM*), larger, more complex and in higher financial distress (lower *Z_score*). In order to correct for firms issuing bonds being a non-random process, we use the approach in Heckman (1979). The Heckman correction technique consists of a two-step analysis. In the first stage, we estimate a bond issuance choice model based on which we calculate the inverse of Mills ratio (Heckman's lambda) and then include it as an additional variable in the second-stage regression. We use the

following model for our first-stage regression of the probability of a firm issuing bonds using factors identified by prior literature as playing a role in this decision:

$$\begin{aligned}\text{Prob(Bonds\_Issued)}_{it} = {} & \beta_0 + \beta_1 \text{Leverage}_{it} + \beta_2 \text{MTB}_{it} + \beta_3 \text{Z\_Score}_{it} + \beta_4 \text{Loss}_{it} + \beta_5 \text{Size}_{it} \\ & + \beta_6 \text{Firm\_Age}_{it} + \beta_7 \text{Interest\_Coverage}_{it} + \beta_8 \text{Tangibility}_{it} \\ & + \beta_9 \text{Operating\_CF}_{it} + \text{IndustryFE} + \text{YearFE} + \text{CountryFE} + \varepsilon_{it}, \end{aligned} \quad (3)$$

where *Prob(Bonds_Issued)* is an indicator variable taking the value of one if a firm has bonds issued in the corresponding firm-year observation, zero otherwise. As determinants, we include *Leverage, Z_score, Loss, Size*, and *Firm_Age*, which are all as previously defined in the models in Eq. (1) and (2). Additionally, we include factors that are not part of our second stage model (models in Eq. (1) and (2)) in order to guarantee the validity of the Heckman correction approach. These include *Interest_Coverage, Tangibility, MTB* and *Operating_CF*, and have all been identified by prior literature to be associated with bond issuance (Bradley et al., 2016; Byun et al., 2013; Franco et al., 2015). We include country, industry and year fixed effects in order to control for country level regulatory differences, industry specific differences, and macroeconomic/temporal events, respectively. We use robust standard errors to account for heteroscedasticity. We compute the inverse of the Mills ratio (*Inverse_Mills*) based on the Probit estimation of the model in Eq. (3) and include it in our second stage regression (based on models in Eq. (1) and (2)) as an additional control variable.

Table 7, Panel B presents summary statistics for the variables used in this part of the analysis. We lose 663 firm-year observations, due to unavailable data on the additional variables used in the first-stage selection model. However, the mean (median) values of the variables are highly comparable to the ones reported in Table 2 Panel A for our whole sample. The pairwise correlations presented in Panel C of Table 7 for the variables used in the first-stage regression are consistent with the expected associations and their magnitude does not raise any concerns of multicollinearity.

>> Insert Table 7 about here <<

The results of the first-stage model estimation are presented in Table 8, Panel A. The model exhibits a good fitting for the data used, with an adjusted R-squared on 0.52 and the statistically significant coefficients on the explanatory variables show that firms with better performance (positive coefficients on *MTB* and *Loss*), larger in size (positive coefficient on *Size*) and in higher financial distress (negative coefficient on *Z_score*) are more likely to issue bonds. Panel B of Table 8 presents the results of the second-stage regression based on the model in Eq. (2) which is extended by including the *Inverse_Mills* ratio. The coefficients of our main

variables of interest *Bonds_Issued* and *Initial_Offering* are statistically significant in all our model specifications and have the same signs as in our main models. Overall, after controlling for self-selection, we document firms with bonds issued include recurring items in their reported *OIS* that are on average 4.5 percentage points more income increasing as compared to firms with no issued bonds (coefficient on *Bonds_Issued* in column 1 is -0.045, p-val<0.05). Results of the subsample analysis also remain qualitatively unchanged. The negative (positive) and statistically significant coefficient (-0.243; p-val<0.01 (0.138; p-val<0.01)) on *Bonds_Issued* in column 3 (5) shows that firms with bonds issued include on average net recurring gains (losses) that are 24.3 percentage (13.8 percentage) points higher as compared to firms including net recurring gains (losses) that do not have bonds issued. These results help us confirm the validity of our main results and thus of our second hypothesis that firms' higher reliance on debt financing acts as an incentive in strategically choosing the recurring items they include in reported *OIS*, leading to the inclusion of more income increasing recurring items. Untabulated results of the second-stage model using the model in Eq. (1) are also qualitatively similar to the results in our main analysis, confirming that firms with higher reliance on debt financing are more likely to report a tailored version of *OIS*.

>> Insert Table 8 about here <<

5.2 Effect of ECB guidance for leveraged lending

In our next set of additional analysis we are investigating in more detail, whether and how the guidance on leveraged lending by the ECB affects firms' practices in defining their reported *OIS*. In 2017, the ECB officially released its guidance on leveraged transactions, following the model of the previously released 2013 Interagency Guidance on Leveraged Financing by the Federal Reserve (FED) (SR 13-3, 2013). The starting point of this process was a survey issued by the ECB in May 2015. With this survey, the ECB targeted European banks by asking them to provide detailed information on their leveraged lending activities. This process was perceived by the participants, claiming that "obviously the ECB is thinking about leveraged finance and the way they regulate it", as a clear indication of upcoming guidance of the ECB regarding the issue of leveraged loans (Ruckin, 2015).

The main purpose of the ECB's guidance is to offer financial institutions guidelines regarding the appropriateness of risk levels when issuing new debt to highly leveraged entities. The guidance explicitly states that issuing further debt to entities presenting abnormally high leverage levels (i.e. a ratio of total debt-to-EBITDA exceeding 6 times) at deal inception should remain exceptional and that such cases should be duly justified if they take place. The reasoning

behind this recommendation is that leverage levels higher than 6 times total debt-to-EBITDA raise concerns of the repayment ability of firms in most of the industries. Additionally, the ECB states in its released guidance that although leveraged transactions are the primary focus hereof, institutions should also apply similar criteria to other types of transactions. Seeing as the starting point for calculating EBITDA is usually operating profit, the measures defined by firms as representing operating profit (*OIS*) are expected to play a central role in this examination. We expect the incentives of EU firms highly relying on debt financing, that exhibit abnormally high levels of leverage (i.e. total debt-to-EBITDA over 6 times), for choosing how they define their reported *OIS* in terms of strategically included recurring items, to be amplified by the increased scrutiny resulting from the release of the ECB's guidance on leveraged lending. Specifically, following ECB's guidance release, we expect firms with bonds issued to include even higher value recurring gains in their reported *OIS* if they exhibit high leverage levels.

In order to empirically test our predictions, we use a difference-in-differences research design based on two criteria: firms' level of leverage and the date when the process for upcoming ECB regulation on leveraged lending was first started. We define treatment firms as those with exceptionally high levels of leverage by following the definition provided by the ECB, i.e. firms with leverage levels over 6 times of total debt-to-EBITDA. As control firms, we use those that have leverage levels under 4 times of total debt-to-EBITDA. Our post-treatment period starts with the year 2015, as that was the year when the ECB released they survey on lending guidance practices, thus providing clear indication of the upcoming guidance. We exclude firms that do not have at least one observation before and one observation after the treatment date in order to assure the validity of the difference-in-differences research design. We use the following modified version of our model in Eq. (2) to empirically test our predictions:

$$\begin{aligned}\mathrm{REC}_{i,t} = {} & \beta_0 + \beta_1 \mathrm{Bonds\_Issued}_{it} + \beta_2 \mathrm{D\_high}_{it} + \beta_3 \mathrm{D\_high}_{it} * \mathrm{Bonds\_Issued}_{it} \\ & + \beta_4 \mathrm{POST}_{it} * \mathrm{Bonds\_Issued}_{it} + \beta_5 \mathrm{POST}_{it} * \mathrm{D\_high}_{it} \\ & + \beta_6 \mathrm{POST}_{it} * \mathrm{D\_high}_{it} * \mathrm{Bonds\_Issued}_{it} + \beta_7 \mathrm{ROA}_{it} + \beta_8 \mathrm{Leverage}_{it} + \beta_9 \mathrm{BTM}_{it} \\ & + \beta_{10} \mathrm{Z\_Score}_{it} + \beta_{11} \mathrm{Loss}_{it} + \beta_{12} \mathrm{Size}_{it} + \beta_{13} \mathrm{Complexity}_{it} + \beta_{14} \mathrm{Firm\_Age}_{it} \\ & + \mathrm{IndustryFE} + \mathrm{YearFE} + \mathrm{CountryFE} + \varepsilon_{it}, \end{aligned} \quad (4)$$

where our dependent variable *REC*, *Bonds_Issued* and the control variables are as previously defined in the model in Eq. (2). Our corresponding treatment variable is *D_high*, which takes the value of one if a firm has a ratio of total debt-to-EBITDA higher than 6, zero if the total debt-to-EBITDA ratio is lower than 4. Our *POST* variable has a value of one for all years starting with 2015, zero otherwise. Our main independent variable of interest is the difference-

in-difference estimator *POST*D_high*Bonds_Issued* and in order to confirm our expectations, we expect the coefficient β_6 to be negative and statistically significant. We include country, industry and year fixed effects in order to control for country level regulatory differences, industry specific differences, and macroeconomic/temporal events, respectively. We use two-way clustered standard errors by industry and year to mitigate serial correlations concerns. Alternatively, we also use *Initial_Offering* instead of *Bonds_Issued* to confirm the robustness of our results.

Table 9 presents the results. The coefficient on the difference-in-difference estimator in column 1 is negative and statistically significant (-0.443, p-val<0.01) for the overall sample, indicating that firms having bonds issued and abnormally high leverage levels include recurring items in their reported *OIS* that are on average 44.3 percentage points more income increasing (as negative values of *REC* represent net included recurring gains and positive values net included recurring losses) following the announcement of the upcoming ECB guidance on leveraged lending. The negative and statistically significant coefficient on *POST*D_high*Bonds_Issued* in column 3 (-0.429, p-val<0.01) shows that this result is driven by firms with net recurring gains included in their reported *OIS*, these being, on average, 42.9 percentage points higher following the announcement of ECB guidance. The results also hold when using *Initial_Offering* as an alternative to *Bonds_Issued* (see Table 9, columns 4-6). These results confirm our expectation that the incentives of firms with high reliance on debt financing and abnormally high leverage levels in strategically including higher recurring gains in their reported *OIS* are amplified by the announcement of upcoming ECB guidance on leveraged lending.

>> Insert Table 9 about here <<

5.3 Private debt

As an alternative to using issued bonds as a proxy for firms' high reliance on debt financing, we next retrieve data on firms receiving debt financing in the form of private debt (i.e. loans). We consider this to also be worthy of testing, since there are certain differences between informational needs of private versus public debt providers. We thus want to ensure (as much as our access to data allows it), that our results are not only valid for firms relying on debt in the form of bond issues, but that our findings can also be applied to firms getting debt financing in the form of loans. For this, we once again use SDC Platinum as a data source to retrieve the necessary information. The main limitation for this part of the analysis is that SDC Platinum only provides information of private debt provided over the US market for EU firms. Thus, in

order to avoid a sample selection bias we perform this part of the analysis only based on the observations for which information on private debt procurement in the form of loans is available. This helps us avoid instances where we would categorize a firm as not having any private debt although it, for instance, receives a loan on the EU market, which would not be covered by SDC Platinum. As for this part of the analysis we only have firms with private debt in our sample we are not able to perform the analysis that would be equivalent to our main tests in the models from Eq. (1) and (2). However, we are able to perform the analysis on the effect of ECB's guidance on leveraged transactions. By analogy to firms with issued bonds, we expect incentives of firms with high levels of private debt to strategically include recurring gains in their reported *OIS* to be further amplified once they have clear indication of upcoming ECB guidance on leveraged lending. For this, we use the following difference-in-differences model:

$$\begin{aligned} \mathrm{REC}_{it} = {} & \beta_0 + \beta_1 \mathrm{D\_high}_{it} + \beta_2 \mathrm{POST}_{it} * \mathrm{D\_high}_{it} + \beta_4 \mathrm{ROA}_{it} + \beta_5 \mathrm{Leverage}_{it} + \beta_6 \mathrm{BTM}_{it} \\ & + \beta_7 \mathrm{Z\_Score}_{it} + \beta_8 \mathrm{Loss}_{it} + \beta_9 \mathrm{Size}_{it} + \beta_{10} \mathrm{Complexity}_{it} + \beta_{11} \mathrm{Firm\_Age}_{it} \\ & + \mathrm{IndustryFE} + \mathrm{YearFE} + \mathrm{CountryFE} + \varepsilon_{it}, \end{aligned} \quad (5)$$

where all the variables are as previously defined in section 5.2. In order to confirm our prediction, we expect the coefficient on the difference-in-differences estimator (*POST*D_high*), β_2, to be negative and statistically significant. Table 10 presents the results. The negative and statistically significant coefficient on *POST*D_high* in column 1 (-0.416, p-val<0.01) confirms our prediction. Firms with abnormally high leverage levels receiving private debt financing include recurring items in their reported *OIS* that are, on average, 41.6 percentage points more income increasing following the announcement of upcoming ECB guidance on leveraged lending. The statistically insignificant coefficient on *POST*D_high* in column 2 and the negative and statistically significant coefficient in column 3 (-0.259, p-val<0.05) show that this effect is driven by firms with overall net recurring gains included in their reported *OIS* including even higher net recurring gains following the announcement of upcoming ECB guidance on leveraged lending. These results provide assurance that our previously reported results are not dependent on the chosen proxy for high reliance on debt financing, thus increasing the robustness of our main results.

>> Insert Table 10 about here <<

5.4 Further robustness tests

We perform a series of additional tests to ensure the robustness of our main results. First, we run our analysis based on the subsample of firms that never include *Equity in Earnings of Associates/JVs* in their reported *OIS* (even if they have it reported). We do so to eliminate any

concerns regarding our results (especially for the tests of our second hypothesis) being driven by this particular item category as (1) based on the descriptive statistics in Table 2 the values of included *Equity in Earnings of Associates/JVs* in the reported *OIS* are by far the highest among the recurring item categories, and (2) the IASB proposes a clear separation of operating income and *Equity in Earnings of Associates/JVs* in their tentative decision regarding future IFRS-defined and required operating income subtotals within the *Primary Financial Statements* project. Second, we use an alternative definition for our *REC* and *TRANS* variables, where we scale them by lagged total assets instead of total revenues. Third, we exclude firms that never report any of the items in our 23 identified categories and thus would have no choice on whether to include them or not in the definition of their reported *OIS*. Fourth, we exclude firms for which we only have one observation in our sample. Fifth, we only keep firm-year observations for which we can accurately identify all the varying items (i.e. firm-year observations for which we can explain 100 percent of the difference between reported *OIS* and *ADJ_OIS*). Untabulated results for all these alternative specifications are consistent with and qualitatively similar to our main results.

6 Conclusion

This study is motivated by the importance of operating income subtotals to capital market participants in aiding them to assess companies' performance and financial stability as well as the increased attention by standard setters regarding the regulation of reported operating income subtotals under IFRS. The clear definition of operating income subtotals reported by firms using IFRS is essential for (1) allowing capital market participants to perform an accurate assessment of firms' financial stability and thus debt servicing capacity and (2) guaranteeing the comparability of provided information amongst firms. First, our results show that firms using IFRS use the flexibility they have in defining reported operating income subtotals, mainly regarding specific recurring items they choose to include. Thus, measures reported on the income statement as operating income subtotals are not appropriate proxies for GAAP earnings under IFRS, as their composition differs between firms and thus makes them unsuitable to use as comparison baseline figures in non-GAAP studies within the IFRS setting. Second, we find that firms using IFRS overall respect IASB's recommendations regarding the inclusion of transitory items in operating income subtotals if these relate to activities of an operating nature. Third, we find that firms highly relying on debt financing (both in terms of bond issues as well as private loans) have incentives to strategically choose which items they include in the

definitions of their reported operating income subtotals under IFRS, especially regarding recurring items included. These firms are more likely to report tailored versions of *OIS* in terms of items included and strategically choose which recurring items to include, which on average represent net recurring gains and thus increase the values of reported operating income metrics. This might aid firms in meeting certain thresholds used by debt providers in assessing firms' financial stability, as reported operating income figures are important parts hereof.

We contribute to the literature on IFRS by showing firms' practices and their incentives (hereby high reliance on debt financing) for reporting income subtotals as well as to the literature on international non-GAAP reporting by showing that the assumptions in US GAAP non-GAAP studies (i.e. using financial statement figures as comparable GAAP measures) cannot be transferred on an international setting. Overall, our results are of importance to participants to the capital markets such as debt providers and for standard setters, especially regarding the debate on the necessity of the implementation required, clearly defined operating income subtotals under IFRS.

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Table 1: Sample selection

Panel A: Sample selection procedure	
	Firm-year observations (unique firms)
Non-financial firms in All-Share Indexes of EU countries between 2009-2016	15,696 (2,127)
- Firm-years not reporting an operating income subtotal (OIS)	1,148 (66)
- Firm-years for which accurate identification of items included in operating income subtotal not possible	1,917 (0)
= Sample with identified components of operating income subtotals	12,631 (2,061)
- Missing data on debt financing and control variables	2,414 (208)
- Revenues = 0 so no scaling possible	16 (2)
= Final sample for analysis	10,132 (1,851)

Panel B: Sample distribution by country	
Country	Total firm-year obs (# firms)
Austria	175 (27)
Belgium	323 (59)
Bulgaria	15 (5)
Croatia	16 (3)
Cyprus	3 (1)
Czech Republic	27 (9)
Denmark	424 (73)
Estonia	6 (1)
Finland	504 (93)
France	1,451 (294)
Greece	217 (39)
Germany	1,504 (254)
Hungary	25 (5)
Ireland	52 (9)
Italy	876 (149)
Lithuania	41 (8)
UK	1,663 (269)
Latvia	9 (4)
Malta	11 (3)
Netherlands	358 (64)
Portugal	175 (31)
Poland	719 (179)
Romania	22 (7)
Spain	427 (79)
Sweden	1,063 (181)
Slovenia	26 (5)

Panel A of this table presents the sample selection criteria. The complete sample for the test of the hypotheses covers the years 2009-2016 and is composed of 1,851 EU firms reporting operating income subtotals under IFRS. Panel B presents the distribution of these firms and the corresponding firm-year observations by country.

Table 2: Descriptive statistics for varying item categories between OIS definitions

Panel A: Average values of included item categories

#	Item Group	N	Mean value	% losses	Mean losses	% gains	Mean gains
1	M&A-related Expense	1,264	18.46	88.84%	25.87	11.16%	-40.55
2	G/L on Disposal of Assets	4,973	-10.08	39.67%	3.44	60.33%	-18.99
3	Restructuring Expense	2,805	49.24	95.40%	52.48	4.60%	-17.98
4	Impairment of Goodwill	1,055	131.72	99.53%	132.35	0.47%	-0.62
5	Other One-Time Items	2,265	12.86	70.86%	47.92	29.14%	-72.27
6	G/L on Early Extinguishment of Debt	71	-1.75	40.85%	6.19	59.15%	-7.23
7	G/L on Sale of Business	1,013	-49.13	28.83%	19.25	71.17%	-76.82
8	G/L on Sale of Investments	287	-74.10	24.74%	8.26	75.26%	-101.17
9	Asset Write-down	2,923	75.07	88.18%	87.06	11.82%	-13.89
10	Impairment of Intangibles	1,373	34.65	93.37%	37.89	6.63%	-10.93
11	Unrealized G/L on Investments	293	1.07	61.43%	13.17	38.57%	-18.22
12	Acquired In-Process R&D	24	1.50	62.50%	2.54	37.50%	-0.22
13	Legal Settlement Expense	938	91.99	71.64%	137.37	28.36%	-22.64
14	G/L on Derivatives	190	-16.53	50.53%	84.79	49.47%	-120.00
15	Insurance Settlement Charges	514	-7.59	2.33%	1.70	97.67%	-7.81
16	Write-Back of Depreciation & Provisions	9	-0.15	33.33%	0.53	66.67%	-0.49
17	Exceptional Operating Charges	107	-0.64	15.89%	1.32	84.11%	-1.01
18	Equity in Earnings of Associates/JVs	1,166	-53.59	26.39%	25.43	73.61%	-81.93
19	Foreign Exchange G/L	1,725	3.22	51.84%	29.43	48.16%	-26.15
20	Other Miscellaneous Operating Inc/Exp	57	4.04	50.00%	11.71	50.00%	-2.91
21	Other Non-Operating Inc/Exp	248	-9.55	56.98%	8.22	43.02%	-32.87
22	Dividend Income	31	-3.20	35.48%	0.45	64.52%	-5.20
23	Other Financial G/L	86	14.91	55.68%	28.69	44.32%	-2.64

Panel B: Included varying items by type as percentage of firms' total revenue

Variable	Obs	Mean	SD	Median	P1	P25	P75	P99
REC as % of revenue	2,894	0.617	1.021	0.205	0.002	0.057	0.649	4.52
TRANS as % of revenue	7,256	2.634	8.481	0.569	0.002	0.131	1.964	41.83
DIFF as % of revenue	7,767	2.894	7.455	0.627	0.003	0.159	2.087	50.407

Panel A presents mean values in EUR million for each identified varying item category between reported operating income subtotal definitions of the different EU firms reporting under IFRS in our sample. The first 17 categories represent transitory items, the last 6 categories represent recurring items. N represents the number of observations in which the corresponding item category is included in reported *OIS*. The last four columns present the percentage (mean values) of identified items representing losses and gains, respectively. We use the following convention: positive values represent expenses/losses, negative values represent income/gains. Panel B presents the value of included varying items by type (all items, transitory and recurring items) as percentage of the corresponding firms' total revenue. The calculated values rely only on the observations for which the corresponding item type is included in the reported *OIS*. Thus, we have 2,894 (7,256) firm-year observations in our sample in which firms include at least one item corresponding to one of the 6 (17) identified recurring (transitory) item categories and 7,767 firm-year observations overall that report an *OIS* that includes at least 1 item corresponding to one of the 23 identified item categories.

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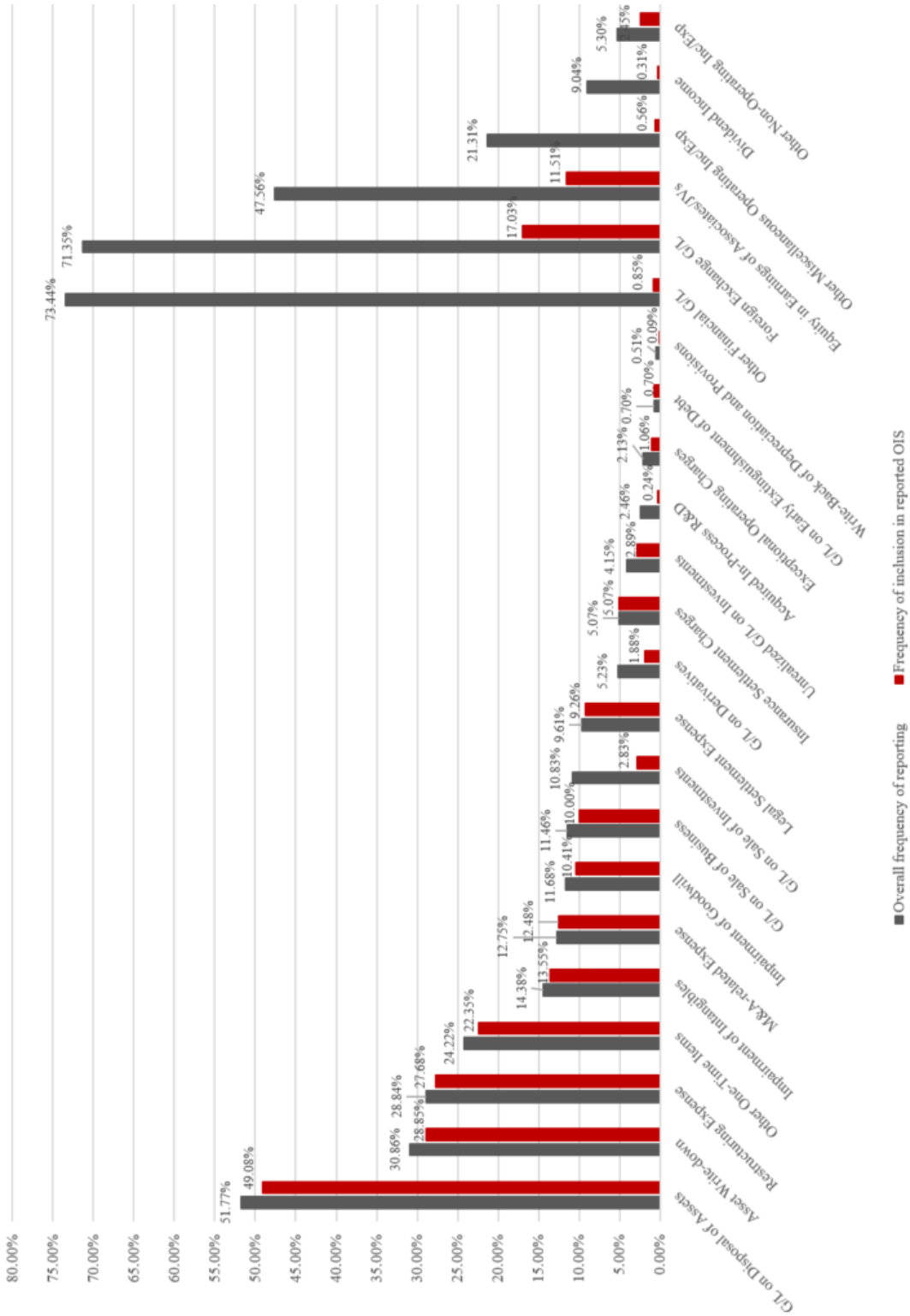

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Table 3: Descriptive statistics for sample used in main tests

Panel A: Summary statistics

Variable	Obs	Mean	SD	Median	P1	P25	P75	P99
REC	10,132	-0.029	0.455	0.000	-2.640	0.000	0.000	2.025
TRANS	10,132	1.244	4.634	0.007	-7.365	0.000	0.799	32.089
DIFF	10,132	1.260	5.291	0.017	-11.419	0.000	0.877	37.078
Prob(OIS_diff)	10,132	0.767	0.423	1.000	0.000	1.000	1.000	1.000
Prob(OIS_high)	4,842	0.512	0.500	1.000	0.000	0.000	1.000	1.000
Prob(OIS_low)	7,655	0.691	0.462	1.000	0.000	0.000	1.000	1.000
ROA	10,132	0.030	0.122	0.040	-0.548	0.006	0.078	0.327
Leverage	10,132	0.549	0.214	0.553	0.090	0.411	0.680	1.273
BTM	10,132	0.767	0.703	0.594	-0.585	0.331	0.986	3.811
Z_Score	10,132	3.319	3.632	2.554	-3.626	1.574	3.899	22.083
Complexity	10,132	1.214	0.616	1.386	0.000	1.099	1.609	2.303
Size	10,132	13.540	2.071	13.398	9.365	12.068	14.869	18.706
Loss	10,132	0.212	0.408	0.000	0.000	0.000	0.000	1.000
Firm_Age	10,132	2.679	0.774	2.773	0.000	2.303	3.178	3.912
Initial_Offering	10,132	0.777	2.251	0.000	0.000	0.000	0.000	8.895
Bonds_Issued	10,132	0.110	0.313	0.000	0.000	0.000	0.000	1.000
REC!=0	2,894	-0.100	0.847	-0.024	-2.640	-0.299	0.125	2.025
TRANS!=0	7,256	1.736	5.398	0.283	-7.494	-0.021	1.497	32.264
DIFF!=0	7,767	1.643	5.990	0.255	-11.419	-0.068	1.449	37.078

Panel B: Pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)REC	1										
(2)Bonds_Issued	-0.05*	1									
(3)Initial_Offering	-0.05*	0.98*	1								
(4)ROA	-0.01	0.03*	0.03*	1							
(5)Leverage	0.00	0.14*	0.14*	-0.19*	1						
(6)BTM	-0.00	-0.07*	-0.07*	-0.12*	-0.16*	1					
(7)Z_Score	-0.00	-0.09*	-0.10*	0.35*	-0.53*	-0.27*	1				
(8)Complexity	-0.04*	0.15*	0.15*	0.07*	0.16*	0.05*	-0.17*	1			
(9) Size	-0.07*	0.45*	0.47*	0.17*	0.17*	0.00	-0.11*	0.31*	1		
(10)Loss	0.01	-0.08*	-0.08*	-0.45*	0.30*	0.14*	-0.17*	-0.07*	-0.20*	1	
(11)Firm_Age	-0.04*	0.18*	0.19*	0.10*	0.09*	0.02*	-0.07*	0.15*	0.23*	-0.09*	1

Panel C: Tests of differences in means

	Bonds_Issued=0 (9,014)	Bonds_Issued=1 (1,118)	Difference in Means (t-value)		
Prob(OIS_diff)	0.7420	0.9651	-0.2232	***	(-16.87)
Prob(OIS_high)	0.4868	0.8738	-0.3869	***	(-13.40)
Prob(OIS_low)	0.6583	0.9540	-0.2957	***	(-17.94)
DIFF!=0	1.6495	1.6059	0.0437		(0.22)
REC!=0	-0.0778	-0.2356	0.1579	***	(3.52)
TRANS!=0	1.7288	1.7805	-0.0517		(-0.28)

Panel A presents descriptive statistics for the variables used in the models in Eq. (1) and (2). The last 3 rows of Panel A present descriptive statistics based only on the observations for which the corresponding item type (recurring, transitory or all) is included in reported OIS. Panel B reports pairwise correlations for the dependent and control variables used for the model in Eq. (2). Panel C reports the results of univariate tests of differences in means between our dependent variables in models in Eq. (1) and (2). The sample covers the years 2009-2016 and consists of 1,851 EU firms. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. In Panel B, * indicates significance at the 5% level or lower.

Table 4: Debt financing as incentive for reporting a tailored version of OIS

Panel A: Results for the main test of hypothesis 1						
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	*Prob (OIS_diff)*	*Prob (OIS_low)*	*Prob (OIS_high)*	*Prob (OIS_diff)*	*Prob (OIS_low)*	*Prob (OIS_high)*
Bonds_Issued	0.689***	0.657***	0.579***			
	(0.000)	(0.001)	(0.009)			
Initial_Offering				0.097***	0.090***	0.083**
				(0.001)	(0.002)	(0.011)
ROA	-0.682**	-1.340***	1.311***	-0.684**	-1.344***	1.312***
	(0.019)	(0.000)	(0.007)	(0.019)	(0.000)	(0.007)
Leverage	0.166	0.176	-0.018	0.169	0.179	-0.016
	(0.386)	(0.391)	(0.947)	(0.377)	(0.384)	(0.953)
BTM	-0.079	-0.094*	-0.109	-0.079	-0.094*	-0.108
	(0.132)	(0.095)	(0.158)	(0.132)	(0.095)	(0.162)
Z_Score	-0.029**	-0.027**	-0.061***	-0.029**	-0.027**	-0.061***
	(0.013)	(0.032)	(0.003)	(0.013)	(0.032)	(0.002)
Loss	-0.047	-0.097	0.016	-0.048	-0.097	0.014
	(0.570)	(0.278)	(0.892)	(0.562)	(0.274)	(0.904)
Size	0.561***	0.622***	0.472***	0.562***	0.624***	0.472***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Complexity	0.274***	0.283***	0.359***	0.274***	0.284***	0.359***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm_Age	-0.048	-0.110**	0.073	-0.048	-0.111**	0.072
	(0.296)	(0.025)	(0.262)	(0.290)	(0.024)	(0.263)
Constant	-2.000**	-3.046***	-2.274**	-1.996**	-3.048***	-2.247**
	(0.036)	(0.002)	(0.031)	(0.035)	(0.001)	(0.032)
Observations	10,132	7,651	4,834	10,132	7,651	4,834
Pseudo R-squared	0.338	0.353	0.387	0.338	0.353	0.386
Industry, Year & Country FE	YES	YES	YES	YES	YES	YES
Panel B: Marginal effects						
Bonds_Issued	0.079***	0.084***	0.079***			
	(0.000)	(0.001)	(0.009)			
Initial_Offering				0.011***	0.012***	0.011**
				(0.001)	(0.003)	(0.011)

This table reports the results of the model in Eq. (1) by running a Probit regression. The sample consists of 1,851 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2009–2016. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include country, industry and year fixed effects. Presented p-values are based on robust standard errors, which account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 5: Debt financing as incentive for strategic recurring item inclusion in OIS

Panel A: Mean value in EUR million of included recurring items based on firms reliance on debt						
			Bonds_Issued=0		Bonds_Issued=1	
All recurring items			-1.17		-40.73	
REC>0 (net recurring losses included in OIS)			9.31		65.44	
REC<0 (net recurring gains included in OIS)			-15.33		-214.16	
Panel B: Results for the main test of hypothesis 2						
Variables	(1)	(2)	(3)	(4)	(5)	(6)
	REC	REC	REC<0	REC<0	REC>0	REC>0
Bonds_Issued	-0.047**		-0.253**		0.124***	
	(0.036)		(0.014)		(0.000)	
Initial_Offering		-0.008**		-0.041**		0.019***
		(0.030)		(0.011)		(0.000)
ROA	-0.002	-0.005	1.068***	1.051***	-1.354***	-1.357***
	(0.977)	(0.950)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.055*	0.054*	0.501***	0.496***	-0.267***	-0.266***
	(0.088)	(0.090)	(0.008)	(0.008)	(0.007)	(0.008)
BTM	-0.004	-0.005	0.007	0.005	-0.024	-0.023
	(0.681)	(0.643)	(0.885)	(0.921)	(0.581)	(0.592)
Z_Score	-0.001	-0.001	-0.013	-0.013	0.007***	0.007***
	(0.729)	(0.721)	(0.261)	(0.254)	(0.001)	(0.000)
Loss	0.00280	0.003	-0.118**	-0.119**	0.061	0.061
	(0.884)	(0.870)	(0.017)	(0.016)	(0.382)	(0.379)
Size	-0.001	0.001	0.060***	0.067***	-0.038**	-0.039**
	(0.832)	(0.901)	(0.005)	(0.001)	(0.022)	(0.012)
Complexity	-0.017	-0.018	0.027	0.024	-0.032	-0.031
	(0.189)	(0.181)	(0.479)	(0.506)	(0.473)	(0.487)
Firm_Age	-0.010	-0.010	0.057*	0.057*	-0.060	-0.060
	(0.215)	(0.226)	(0.089)	(0.085)	(0.119)	(0.123)
Constant	0.011	-0.006	-1.395***	-1.479***	0.911***	0.929***
	(0.876)	(0.934)	(0.001)	(0.000)	(0.000)	(0.000)
Observations	10,132	10,132	1,623	1,623	1,271	1,271
Adj. R-squared	0.021	0.021	0.186	0.189	0.217	0.217
Industry, Year and Country FE	YES	YES	YES	YES	YES	YES
Panel C: Wald-test for equivalence of Bonds_Issued coefficients						
chi2-statistic				30.07		
Prob>chi2				0.000		

Panel A presents means for included recurring items in reported OIS for the groups of firms with and without bonds issued. Panel B reports the results of the model in Eq. (2) by running a fixed effects regression. Results in columns 1 and 2 are based on the whole sample. Results in columns 3 and 4 (5 and 6) are based on the subsample of observations that have overall net recurring gains (net recurring losses) included in their reported OIS. Panel C presents the results of the Wald-test of equality in coefficients on *Bonds_Issued* between the models presented in columns (3) and (5) of Panel B. The full sample consists of 1,851 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2009–2016. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include country, industry and year fixed effects. Presented p-values are based on two-way clustered standard errors by industry and year, which account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 6: Debt financing and transitory item inclusion in reported OIS

Variables	(1) TRANS	(2) TRANS	(3) TRANS<0	(4) TRANS<0	(5) TRANS>0	(6) TRANS>0
Bonds_Issued	-0.020		-0.169		0.043	
	(0.859)		(0.232)		(0.845)	
Initial_Offering		-0.003		-0.029		0.021
		(0.845)		(0.117)		(0.541)
ROA	-12.28***	-12.28***	-1.885*	-1.889*	-26.65***	-26.63***
	(0.000)	(0.000)	(0.082)	(0.082)	(0.000)	(0.000)
Leverage	-0.240	-0.240	0.082	0.083	-0.801	-0.800
	(0.727)	(0.727)	(0.862)	(0.861)	(0.468)	(0.467)
BTM	0.335**	0.335**	-0.057	-0.058	0.334**	0.337**
	(0.014)	(0.014)	(0.617)	(0.607)	(0.027)	(0.025)
Z_Score	0.009	0.009	0.083**	0.083**	0.058	0.058
	(0.878)	(0.879)	(0.013)	(0.013)	(0.384)	(0.382)
Loss	0.195	0.196	-0.788***	-0.787***	0.630**	0.628**
	(0.231)	(0.231)	(0.000)	(0.000)	(0.047)	(0.048)
Size	0.283***	0.284***	0.048*	0.052*	0.127	0.115
	(0.000)	(0.000)	(0.068)	(0.056)	(0.145)	(0.188)
Complexity	-0.010	-0.010	0.160*	0.159*	-0.291	-0.289
	(0.946)	(0.945)	(0.075)	(0.074)	(0.298)	(0.304)
Firm_Age	-0.176	-0.175	0.096	0.096	-0.170	-0.172
	(0.115)	(0.117)	(0.239)	(0.238)	(0.264)	(0.261)
Constant	-2.312	-2.318	-2.270***	-2.327***	1.385	1.550
	(0.105)	(0.104)	(0.000)	(0.000)	(0.505)	(0.451)
Observations	10,132	10,132	2,082	2,082	5,174	5,174
Adj. R-squared	0.152	0.152	0.171	0.172	0.320	0.320
Industry, Year & Country FE	YES	YES	YES	YES	YES	YES

This table reports the results of the model in Eq. (2) by running a fixed effects regression in which the dependent variable is *TRANS*. Results in columns 1 and 2 are based on the whole sample. Results in columns 3 and 4 (5 and 6) are based on the subsample of observations that have overall net transitory gains (net transitory losses) included in their reported OIS. The sample consists of 1,851 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2009–2016. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include country, industry and year fixed effects. Presented p-values are based on two-way clustered standard errors by industry and year, which account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 7: Descriptive statistics – two-stage Heckman approach

Panel A: Test of differences in means

Variable	No bonds issued (9,014 firm-year observations)	Bonds issued (1,118 firm-year observations)	Difference in means (t-statistic)
ROA	0.029	0.042	-0.013*** (-2.62)
Firm_Age	2.630	3.081	-0.451*** (-18.71)
Loss	0.223	0.117	0.106*** (8.22)
Leverage	0.547	0.637	-0.089*** (-8.95)
BTM	0.792	0.635	0.156*** (4.35)
Size	13.211	16.195	-2.984*** (-50.93)
Complexity	1.182	1.474	-0.292*** (-15.12)
Z_Score	3.439	2.347	1.093*** (9.53)

Panel B: Summary statistics

Variable	Obs	Mean	SD	Median	P1	P25	P75	P99
Bonds_Issued	9,469	0.118	0.323	0.000	0.000	0.000	0.000	1.000
Initial_Offering	9,469	0.831	2.318	0.000	0.000	0.000	0.000	8.910
Leverage	9,469	0.555	0.214	0.559	0.092	0.418	0.684	1.282
MTB	9,469	2.366	2.671	1.611	-3.256	0.962	2.872	16.425
Z_Score	9,469	3.281	3.652	2.528	-3.823	1.540	3.864	23.012
Loss	9,469	0.215	0.411	0.000	0.000	0.000	0.000	1.000
Size	9,469	13.588	2.089	13.449	9.370	12.099	14.949	18.740
Firm_Age	9,469	2.688	0.766	2.773	0.000	2.303	3.178	3.912
Interest_Coverage	9,469	3.263	9.791	0.907	0.000	0.470	1.888	53.348
Tangibility	9,469	0.208	0.214	0.128	0.001	0.036	0.319	0.901
Operating_CF	9,469	0.065	0.105	0.058	-0.347	0.013	0.113	0.378
REC	9,469	-0.030	0.456	0.000	-2.629	0.000	0.000	2.008
TRANS	9,469	1.273	4.652	0.009	-7.208	0.000	0.832	32.089
DIFF	9,469	1.290	5.311	0.021	-11.226	0.000	0.908	37.078
ROA	9,469	0.028	0.123	0.039	-0.555	0.005	0.076	0.325
BTM	9,469	0.765	0.707	0.591	-0.660	0.328	0.986	3.820
Z_Score	9,469	3.281	3.652	2.528	-3.823	1.540	3.864	23.012
Complexity	9,469	1.218	0.615	1.386	0.000	1.099	1.609	2.303

Panel C: Pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)Bonds_Issued	1									
(2) Leverage	0.14*	1								
(3)MTB	0.03*	-0.04*	1							
(4)Z_Score	-0.10*	-0.53*	0.44*	1						
(5)Loss	-0.09*	0.12*	-0.07*	-0.16*	1					
(6)Size	0.46*	0.17*	-0.02*	-0.12*	-0.20*	1				
(7)Firm_Age	0.19*	0.09*	-0.05*	-0.07*	-0.10*	0.25*	1			
(8) Interest_Coverage	-0.05*	-0.03*	0.01	0.04*	0.03*	0.09*	-0.04*	1		
(9)Tangibility	0.05*	0.13*	-0.10*	-0.17*	-0.04*	0.12*	0.12*	-0.18*	1	
(10)Operating_CF	0.06*	-0.05*	0.16*	0.18*	-0.34*	0.09*	0.14*	-0.15*	0.25*	1

Panel A reports the results of univariate tests of differences in means for the firms characteristics of the sample used in the models in Eq. (1) and (2) based on whether the firm has bonds issued or not. Panel B presents descriptive statistics for the variables used in the two-stage estimation following Heckman (1979). Panel C reports pairwise correlations for the dependent and control variables used for the model in Eq. (3). The sample covers the years 2009-2016 and consists of 1,711 EU firms. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. In Panel C, * indicates significance at the 5% level or lower.

Table 8: Results of the two-stage Heckman approach analysis

Panel A: Results of the first-stage estimation

Variables	(1) Bonds_Issued
Leverage	0.535***
	(0.006)
MTB	0.051***
	(0.000)
Z_Score	-0.060**
	(0.024)
Loss	-0.207***
	(0.008)
Size	0.704***
	(0.000)
Firm_Age	0.043
	(0.229)
Interest_Coverage	-0.001
	(0.917)
Tangibility	-0.825***
	(0.000)
Operating_CF	0.077
	(0.898)
Constant	-12.68***
	(0.000)
Observations	9,469
Pseudo R-squared	0.521
Industry, Year and Country_FE	YES

Panel B: Results of the second-stage estimation

Variables	(1) REC	(2) REC	(3) REC<0	(4) REC<0	(5) REC>0	(6) REC>0
Bonds_Issued	-0.045**		-0.243***		0.138***	
	(0.037)		(0.000)		(0.001)	
Initial_Offering		-0.009**		-0.047***		0.023***
		(0.023)		(0.008)		(0.000)
ROA	0.001	-0.001	1.062***	1.047***	-1.397***	-1.401***
	(0.986)	(0.990)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.077**	0.076**	0.529***	0.528***	-0.268**	-0.268**
	(0.043)	(0.044)	(0.001)	(0.006)	(0.012)	(0.012)
BTM	-0.002	-0.003	0.004	0.001	-0.019	-0.019
	(0.793)	(0.742)	(0.925)	(0.983)	(0.683)	(0.695)
Z_Score	-0.000	-0.000	-0.009	-0.008	0.007***	0.007***
	(0.983)	(0.973)	(0.361)	(0.461)	(0.001)	(0.000)
Loss	0.002	0.002	-0.116*	-0.117**	0.032	0.032
	(0.916)	(0.903)	(0.056)	(0.034)	(0.628)	(0.628)
Size	-0.001	0.000	0.061***	0.068***	-0.037**	-0.036**
	(0.820)	(0.927)	(0.000)	(0.001)	(0.040)	(0.021)
Complexity	-0.020	-0.020	0.022	0.020	-0.028	-0.028
	(0.150)	(0.145)	(0.575)	(0.587)	(0.561)	(0.569)
Firm_Age	-0.009	0.001	0.000	0.010*	-0.007***	-0.010***
	(0.273)	(0.355)	(0.995)	(0.095)	(0.000)	(0.001)
Inverse_Mills	0.000	-0.009	0.057**	0.057*	-0.061	-0.061
	(0.812)	(0.285)	(0.035)	(0.084)	(0.161)	(0.165)
Constant	-0.005	-0.022	-2.012***	-1.515***	0.826***	0.856***
	(0.943)	(0.753)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	9,469	9,469	1,517	1,517	1,194	1,194
Adj. R-squared	0.021	0.021	0.188	0.192	0.205	0.206
Industry, Year & Country FE	YES	YES	YES	YES	YES	YES

Panel A presents the results of the first-stage Probit estimation for the Heckman (1979) approach. Presented p-values are based on robust standard errors, which account for heteroscedasticity. Panel B presents the results for the corresponding second-stage estimation based on the model in Eq. (2). Results in columns 1 and 2 are based on the whole sample. Results in columns 3 and 4 (5 and 6) are based on the subsample of observations that have overall net recurring gains (net recurring losses) included in their reported OIS. Presented p-values are based on two-way clustered standard errors by industry and year, which account for heteroscedasticity. The sample consists of 1,711 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2009–2016. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include country, industry and year fixed effects. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 9: Effect of ECB guidance on leveraged lending on reported OIS

Variables	(1) REC	(2) REC>0	(3) REC<0	(4) REC	(5) REC>0	(6) REC<0
Bonds_Issued	0.0188	0.0635	0.0371			
	(0.508)	(0.433)	(0.604)			
*D_high*Bonds_Issued*	0.172**	0.119	0.0273			
	(0.011)	(0.603)	(0.894)			
*POST*Bonds_Issued*	0.092***	0.0337	0.152**			
	(0.002)	(0.688)	(0.022)			
*POST*D_high*Bonds_Issued*	-0.443***	0.294	-0.429***			
	(0.000)	(0.523)	(0.001)			
Initial_Offering				0.00127	0.00819	0.00454
				(0.760)	(0.537)	(0.675)
*D_high*Initial_Offering*				0.034***	0.0191	0.00790
				(0.005)	(0.597)	(0.818)
*POST*Initial_Offering*				0.017***	0.0063	0.0224*
				(0.000)	(0.659)	(0.082)
*POST*D_high*Initial_Offering*				-0.077***	0.0699	-0.062***
				(0.000)	(0.382)	(0.005)
*POST*D_high*	0.0195	-0.119	0.0279	0.0186	-0.123	0.0171
	(0.365)	(0.496)	(0.699)	(0.406)	(0.481)	(0.811)
D_high	0.00653	0.193*	-0.0666	0.00572	0.192*	-0.0688
	(0.724)	(0.099)	(0.276)	(0.754)	(0.099)	(0.266)
ROA	0.0341	-1.020***	1.063***	0.0333	-1.025***	1.058***
	(0.606)	(0.000)	(0.000)	(0.614)	(0.000)	(0.000)
Leverage	0.0379	-0.374***	0.464**	0.0382	-0.374***	0.462**
	(0.349)	(0.000)	(0.0246)	(0.350)	(0.000)	(0.026)
BTM	-0.00553	-0.0567	0.0228	-0.00567	-0.0566	0.0217
	(0.642)	(0.146)	(0.655)	(0.637)	(0.147)	(0.672)
Z_Score	-0.00187	0.00172	-0.0162	-0.00190	0.00161	-0.0166
	(0.542)	(0.688)	(0.158)	(0.536)	(0.706)	(0.151)
Loss	0.00154	0.0632	-0.125*	0.00159	0.0619	-0.125*
	(0.939)	(0.303)	(0.050)	(0.937)	(0.317)	(0.0536)
Size	-0.00661	-0.0234	0.0233	-0.00640	-0.0229	0.0232
	(0.192)	(0.138)	(0.413)	(0.210)	(0.144)	(0.415)
Complexity	-0.0166	-0.0232	0.0225	-0.0165	-0.0222	0.0229
	(0.217)	(0.638)	(0.591)	(0.219)	(0.652)	(0.586)
Firm_Age	-0.0136	-0.0726	0.0610*	-0.0134	-0.0727	0.0610*
	(0.106)	(0.107)	(0.089)	(0.113)	(0.106)	(0.089)
Constant	0.130	0.646***	-1.319***	0.127	0.638***	-1.312***
	(0.133)	(0.002)	(0.001)	(0.145)	(0.003)	(0.001)
Observations	9,195	1,182	1,473	9,195	1,182	1,473
R-squared	0.034	0.282	0.222	0.034	0.281	0.221
Industry, Year & Country FE	YES	YES	YES	YES	YES	YES

This table reports the results of the model in Eq. (4) by running a fixed effects regression. Results in columns 1 and 4 are based on the whole sample. Results in columns 2 and 5 (3 and 6) are based on the subsample of observations that have overall net recurring losses (net recurring gains) included in their reported OIS. The sample consists of 1,824 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2009–2016. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include country, industry and year fixed effects. Presented p-values are based on two-way clustered standard errors by industry and year, which account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 10: Private debt as proxy for external debt financing

Variables	(1) ALL REC	(2) REC>0	(3) REC<0
D_high	0.219	0.148	-0.0830
	(0.150)	(0.760)	(0.445)
POST D_high*	-0.416***	-0.447	-0.259**
	(0.000)	(0.301)	(0.029)
ROA	-0.215	-1.190	-0.964
	(0.759)	(0.799)	(0.470)
Leverage	-0.242	-0.166	0.235
	(0.344)	(0.800)	(0.348)
BTM	-0.0891	-0.413	0.210***
	(0.200)	(0.293)	(0.000)
Z_Score	-0.0509	-0.00495	-0.0532***
	(0.232)	(0.957)	(0.008)
Loss	-0.0768*	0.249	-0.130**
	(0.098)	(0.200)	(0.0387)
Size	-0.0192	-0.0783	-0.196***
	(0.570)	(0.358)	(0.003)
Complexity	0.0233	-0.00652	0.00493
	(0.637)	(0.974)	(0.951)
Firm_Age	-0.00411	-0.209	0.0640
	(0.918)	(0.302)	(0.548)
Constant	0.795	2.757	3.083**
	(0.289)	(0.130)	(0.017)
Observations	593	104	147
R-squared	0.185	0.643	0.800
Industry, Year & Country FE	YES	YES	YES

This table reports the results of the model in Eq. (5) by running a fixed effects regression. Results in column 1 are based on the whole sample. Results in column 2 (3) are based on the subsample of observations that have overall net recurring losses (net recurring gains) included in their reported OIS. The sample consists of 127 EU firms that report under IFRS for the whole sample period. The sample period includes fiscal years 2009–2016. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include country, industry and year fixed effects. Presented p-values are based on two-way clustered standard errors by industry and year, which account for heteroscedasticity. Estimated coefficients are followed by p-values in parentheses. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Appendix: Variable definitions

Variable	Definition
REC	Sum of all included recurring items (out of the 6 identified categories) in a firm's reported OIS as percentage of corresponding total revenues.
TRANS	Sum of all included transitory items (out of the 17 identified categories) in a firm's reported OIS as percentage of corresponding total revenues.
DIFF	Sum of all included items (out of the 23 identified categories) in a firm's reported OIS as percentage of corresponding total revenues.
Prob(OIS_diff)	Indicator variable equaling 1 if reported OIS includes any of the items in the 23 identified categories, 0 otherwise.
Prob(OIS_high)	Indicator variable equaling 1 if reported OIS includes overall income increasing items corresponding to the 23 identified categories, 0 otherwise.
Prob(OIS_low)	Indicator variable equaling 1 if reported OIS includes overall income decreasing items corresponding to the 23 identified categories, 0 otherwise.
ROA	Ratio of net income to total assets at beginning of fiscal year.
Leverage	Total liabilities scaled by total assets.
BTM	Book value of equity scaled by market value of equity.
Z_Score	Altman's Z-score defined as 1.2*(working capital scaled by total assets) plus 1.4*(retained earnings scaled by total assets) plus 3.3*(earnings before interest and taxes scaled by total assets) plus 0.6*(firm's market capitalization scaled by total liabilities) plus net revenues scaled by total assets.
Complexity	Logarithm of a firm's total number of different product segments.
Size	Logarithm of a firm's total assets at beginning of fiscal year.
Loss	Indicator variable equaling 1 if a firm reported a loss in the previous year, 0 otherwise.
Firm_Age	Logarithm of firm age in years.
Initial_Offering	Logarithm of amount of initial offering upon bond issuance, 0 if a firm has no bonds issued. If a firm has multiple bond offerings, then it represents the sum of initial offerings of all existing bonds.
Bonds_Issued	Indicator variable equaling 1 if a firm has bonds issued in the corresponding firm-year observation, 0 otherwise.
Prob(Bonds_Issued)	Indicator variable equaling 1 if a firm has bonds issued in the corresponding firm-year observation, 0 otherwise.
Operating_CF	Operating cash flow scaled by total assets at beginning of fiscal year.
MTB	Market value of equity scaled by book value of equity.
Interest_Coverage	Ratio of earnings before interest and taxes scaled by interest expense.
Tangibility	Ratio of net property, plant and equipment to total assets.
Inverse_Mills	Inverse Mills Ratio calculated based on the first-stage Probit estimation of the Heckman selection model.
D_high	Indicator variable equaling 1 if total debt-to-EBITDA ratio is over 6. Equaling 0 if total debt-to-EBITDA ratio is under 4. Total debt-to-EBITDA ratio is defined as total debt scaled by earnings before interest, taxes, depreciation and amortization.
POST	Indicator variable equaling 1 starting with 2015, 0 otherwise.

Part IV: Do You Need Accounting Experts? How Firms Prepare for IFRS Adoption and its Consequences on Accounting Quality

Laura-Maria Gastone

Abstract

This paper takes a distinctive approach by examining how firms' decisions to change individual-level characteristics of board members, such as their level of accounting expertise, play a significant role in explaining accounting quality outcomes following IFRS adoption. I claim and find evidence that the quality of provided accounting information following IFRS adoption is influenced by firms' decisions to increase their level of accounting expertise on the board of directors in preparation for the switch to IFRS. I use mandatory IFRS adoption in Canada as an exogenous shock to financial reporting practices and, as control groups, EU firms using IFRS as well as US firms following US GAAP in a difference-in-differences analysis. I capture the impact on accounting quality by analyzing discretionary accruals use, income smoothing, and accounting conservatism in the form of timelines of loss recognition. I find that firms that increase accounting expertise on the board of directors one year prior to mandatory IFRS adoption are more likely to report income-increasing discretionary accruals, have higher income smoothing, and exhibit less accounting conservatism. Considering recent findings, this could be the result of firms doing a better job on accurately implementing the new standards, thus including more accurate forward-looking information in presented accounting figures and following standard-setters' recommendations to reduce accounting conservatism. Conversely, considering the traditional view, this could represent firms being better able to use the flexibility inherent in IFRS to provide a more favorable picture of their financial situation through earnings management.

Keywords: accounting expertise; IFRS; accounting quality;

1 Introduction

This study analyzes how firms' deliberate choice to increase their level of accounting expertise on the board of directors ahead of the mandatory adoption of International Financial Reporting Standards (IFRS) helps explain the post-IFRS adoption quality of accounting information. More specifically, I examine whether firms choose to increase the number of directors with accounting expertise one year prior to mandatory IFRS adoption and if this has a significant impact on the quality of provided accounting information following IFRS adoption, measured by discretionary accruals use, income smoothing, and timeliness of loss recognition.

One firm-level factor that has not been analyzed by prior research yet may play a significant role in explaining accounting quality consequences of IFRS adoption is firms' choice of level of accounting expertise in preparation for the mandatory adoption of IFRS. Over the past few years, demand has been rising for board directors who are financial experts as regulatory requirements are tightened up, accounting standards change, and investor activism rises (Ernst & Young, 2012). Practitioners claim that board directors with accounting and financial expertise have the means to navigate complex economic issues, offer a strategic perspective to finance, and provide insights into key accounting judgements (Ernst & Young, 2012). Furthermore, challenges of accounting rules and auditing standards make accounting expertise ever more valuable (Ernst & Young, 2013). Although a considerable number of studies examine accounting expertise as an indicator of board quality in an US setting (Chychyla et al., 2019, D. A.N. Dhaliwal et al., 2010, Krishnan & Visvanathan, 2008, amongst others), the evidence on accounting expertise on an international level is scarce. This is important, as research on firm-level accounting expertise in an international setting is likely different from research on US firms due to differences in regulatory requirements. For example, in the EU there are still some regimes that allow listed firms to not have an audit committee (KPMG, 2016), the existence of which has been mandatory in the US since the Sarbanes-Oxley Act was adopted in 2002. Most international studies only regard accounting expertise as a part of an aggregate measure of board competence and find results ranging from this improving compliance with IFRS (Bepari & Mollik, 2015; Verriest et al., 2013) to board competence not always playing a role in determining accounting quality (Bonetti et al., 2016; Nouri & Abaoub, 2016). Furthermore, all existing studies focus on existing accounting expertise levels but do not take into account the impact that firms' deliberate choice to improve their accounting expertise may have on accounting outcomes. As accounting experts within a firm are the main actors

responsible for and involved in implementing the new set of standards (i.e., IFRS), I expect this to influence the quality of accounting information provided. When firms are faced with the challenge of successfully implementing a completely new set of standards, the expertise and knowledge of top-level firm members plays a crucial role. Thus, I claim that analyzing firms' choice to change their level of accounting expertise in preparation for mandatory IFRS adoption will provide additional insights that can better explain the subsequent impact on accounting quality. More recent studies claim that the reason for the documented contradictory results regarding accounting quality following IFRS adoption is in differences in complementary factors such as enforcement or firm-level reporting incentives (Ahmed et al., 2013; Doukakis, 2014), emphasizing the fact that accounting standards alone are not capable of improving financial reporting quality. This reinforces the relevance of analyzing firms' choice regarding accounting expertise in preparation for mandatory IFRS adoption as a significant factor affecting accounting quality.

Mandatory IFRS adoption represents a comprehensive change in accounting rules, likely representing the biggest challenge that firms' accounting experts have had to deal with in recent years. The IASB's new set of standards stipulates relevance and faithfulness as main criteria of high-quality accounting information. Thus, it is only logical that firms should prepare for this thoroughly, especially by ensuring they possess the accounting expertise to successfully manage the implementation of necessary accounting changes that will allow them to meet the criteria. Practitioners' studies do not find evidence of a systematic increase in the number of directors with accounting expertise close to mandatory IFRS adoption in Canada; rather, a peak in the number of CEOs with financial and accounting expertise was observed in 2008, coinciding with the financial crisis (Ernst & Young, 2012). One of the main arguments for the necessity of IFRS is that they are of higher quality than domestic Generally Accepted Accounting Principles (GAAP) in that they stipulate more stringent disclosure requirements and thus have the potential to improve the quality of provided accounting information (Barth et al., 2008). If this were the case, capital market participants should be better able to monitor and evaluate the quality of firms' financial disclosures, which in turn should be a disincentive for managers to engage in earnings management practices. In this scenario, firms boosting their accounting expertise ahead of mandatory IFRS adoption should be a sign of their commitment to the full implementation of the new accounting standards and thus the provision of higher-quality accounting information. An increase in accounting expertise at the board level is also associated with additional costs, which are only justifiable if firms strive to benefit from providing better-quality information that is valued and rewarded by capital market participants.

However, numerous obstacles may stand in the way of IFRS improving accounting quality. First, high-quality accounting standards alone cannot guarantee higher-quality accounting information. Especially for mandatory adopters, the implementation of the new standards could be regarded as suboptimal, as they do not consider the switch to IFRS to be beneficial for them and thus are not willing to dedicate generous resources to the transition. This could lead to superficial implementation by taking a ticking-a-box approach (Christensen et al., 2015; Daske et al., 2013). As an increase in accounting expertise at the board level is associated with additional costs, which would not be justified in the case of firms that do not see the benefits of properly implementing IFRS, I would not expect to observe an increase in accounting expertise at the firm level. Second, IFRS are principles-based standards, which means they are designed more as a set of guidelines than a strict set of rules. This implicitly offers management more discretion and provides flexibility due to the absence of proper guidance for their implementation. This offers reporting firms more freedom to tailor their reporting outcomes (Barth et al., 2008). Third, IFRS, unlike domestic GAAP, makes extensive use of fair-value accounting, which also provides management with more discretion over the valuation of their accounting items. Given these scenarios, I claim that firms that choose to improve their accounting expertise ahead of mandatory IFRS adoption are better able to use the loopholes and discretion provided by IFRS to their advantage, which gives them the opportunity to tailor their financial information to provide a more favorable firm image. I would hence expect to observe lower accounting quality. Due to these competing views, I make no directional assumption on the effect of firms' choice to boost their accounting expertise ahead of mandatory IFRS adoption on subsequent accounting quality.

In order to analyze the impact on accounting quality of firms' choice to improve their accounting expertise ahead of mandatory IFRS adoption, I focus on three aspects: use of discretionary accruals, income smoothing practices, and timeliness of loss recognition. Interpreting changes in the metrics associated with firms' choice regarding accounting expertise in preparation for mandatory IFRS adoption is not trivial. Although the traditional view in research is that higher discretionary accruals and higher income smoothing represent higher earnings management and, together with lower accounting conservatism, represent lower accounting quality (Barth et al., 2008), more recent international accounting-focused literature claims the opposite, namely that firms' use of income-increasing accruals and income smoothing does not necessarily imply higher earnings management. This could be due rather to management's ability to properly incorporate positive forward-looking information in their current accounting figures and thus provide users of financial information with more relevant

information that better reflects future developments (Baik et al., 2019; Pham et al., 2019). This would be in line with the IASB's requirements for high-quality accounting information being relevant and faithful. Further, international standard-setters claim that accounting conservatism is not necessarily a desirable quality of accounting information (IASB, 2006), so a decrease in timeliness of loss recognition could simply represent firms better following standard-setters recommendations. Last, firms with greater accounting expertise are likely to focus on appropriately implementing IFRS by following the requirements of the new standards rather than on trying to minimize earnings management indicators such as discretionary accruals. It is possible that, due to changed valuation requirements for various items (such as current assets, liabilities, or short term debt) used in earnings management metrics, their values change following IFRS adoption, leading to higher estimated values without this being due to earnings management practices.

I proxy for changes in the firm-level of accounting expertise by computing the change in number of directors with accounting expertise (defined following Chychyla et al., 2019) on the board in the year prior to mandatory IFRS adoption in Canada. Thus, the main sample consists of mandatory IFRS-adopting Canadian firms with available data on directors' accounting expertise (i.e., BoardEx coverage). I choose to focus on Canada as it represents a highly stable environment around mandatory IFRS adoption with no significant concurrent regulatory changes (Khan et al., 2017). In order to mitigate endogeneity concerns in the tests of my predictions, I also use a difference-in-differences research design for which I employ EU firms reporting under IFRS with available data on directors' accounting expertise in BoardEx as the control sample. I choose not to use mandatory IFRS adoption by EU firms as my main sample, as prior research has shown that significant differences in previously applicable domestic GAAP as well as the strong possibility of numerous unrelated but concurrent shocks (Leuz & Wysocki, 2016) likely lead to biased results. I also run a set of separate difference-in-differences tests for which I use US firms reporting under US GAAP as the control sample. US firms may be a more appropriate control sample due to their similarity to Canadian firms. Supporters of this alternative also claim that US firms represent a more stable control sample, as US GAAP underwent less major developments. The sample for the main difference-in-differences tests of discretionary accruals use (income smoothing) consists of 139 (207) Canadian firms and 742 (775) EU firms over the period 2005 to 2017. The sample for the timeliness of loss recognition tests consists of 215 Canadian firms. Additional firm-level financial information is retrieved from Thomson Reuters Datastream.

First, I find that the majority of mandatory IFRS adopting firms do not exhibit any change in their level of accounting expertise upon IFRS adoption, which confirms prior literature's assumptions that most of them take a ticking-a-box approach. Second, in line with my assumptions, I find that if firms choose to increase their accounting expertise in preparation for mandatory IFRS adoption, this significantly contributes to the quality of accounting information following IFRS adoption. Specifically, I find that firms with an increase in accounting expertise exhibit incrementally higher income-increasing discretionary accruals, more income smoothing, and less accounting conservatism (i.e., less timely loss recognition) following mandatory IFRS adoption. These firms are 28.2 percent more likely to report income-increasing discretionary accruals than firms with no change in their level of accounting expertise. They also exhibit an increase in income smoothing that is 2.2 times higher than that documented for control EU firms. The results also hold using the sample of US firms with BoardEx coverage as a control sample. Altogether, the results confirm my prediction that firms' deliberate choice regarding accounting expertise represent an important factor that helps explain documented accounting quality outcomes following mandatory IFRS adoption.

This study contributes to two strings of literature. First, it contributes to literature on IFRS adoption by shedding more light on the contradictory results regarding accounting quality consequences of IFRS adoption. I consider prior research recommendations and focus on firms' deliberate choice to improve their accounting expertise on the board of directors as a firm-level factor that significantly affects how IFRS are implemented. Thus, this study further highlights the fact that introducing new accounting standards in itself has only a limited role in influencing the quality of provided accounting information. Ultimately, other forces, such as – in this case – firms' deliberate choice regarding accounting expertise, have more influence on the quality of accounting outcomes. Second, it contributes to the literature on accounting expertise as an important firm-level factor by providing evidence on the importance of accounting expertise in an international setting and most importantly, by showing that it is important not only to analyze existing levels of accounting expertise but also to consider firms' choices regarding accounting expertise. Furthermore, this study is also of relevance to practitioners, showing that investing in accounting expertise by increasing the number of directors with accounting expertise, can help them achieve significant changes in the quality of their accounting information following IFRS adoption. This is in line with the widely observed trend towards appointing board directors with accounting and financial expertise as essential and valuable assets for the firm. Finally, the results are also of significance to standard-setters, as they can regard increases in

accounting expertise as an indicator of firms' commitment to more thoroughly implementing IFRS and thus following their requirements and recommendations.

The remainder of this paper is structured as follows. Section 2 discusses prior literature and hypothesis development. Section 3 presents the sample selection procedure and discusses the methodology. Sections 4 presents the main results and section 5 contains additional analysis. Section 6 concludes.

2 Literature review and hypothesis development

Although the extensive mandatory adoption of IFRS was one of the most important regulatory changes in accounting in recent times and there is much research regarding its consequences, literature has not reached a consensus on whether it has led to improvements in accounting practices or not. Some studies on accounting quality find that mandatory IFRS adoption had no significant impact on earnings management practices (Christensen et al., 2015; Doukakis, 2014; Jeanjean & Stolowy, 2008), while others document an increase in earnings management following mandatory IFRS (Ahmed et al., 2013; Capkun et al., 2012; Paananen, 2008). Conversely, Chen et al. (2010) find evidence of decreases in accrual-based earnings management but an increase in income smoothing and a decrease in the likelihood of large loss recognition. Similarly, Aussenegg et al. (2008) find that Central European firms exhibit a decrease in earnings management following IFRS adoption. The results concerning voluntary IFRS adopters are slightly different. Christensen et al. (2015) document a decrease in earnings management for voluntary IFRS adopters, as do Barth et al. (2008). However, Capkun et al. (2012) report an increase in earnings management even for voluntary adopters. The main explanation of these differences between voluntary and mandatory IFRS adopters is that mandatory adopters may perceive fewer benefits from a shareholder-oriented set of accounting standards (i.e., IFRS) and thus avoid the cost of transferring to IFRS by taking a ticking-a-box approach (Christensen et al., 2015), applying IFRS as they did their old national GAAPs with no substantial change in accounting practices. It is also argued that IFRS changed significantly between 2003 and 2005, thus at the point of mandatory adoption allowing managers greater flexibility and discretion (Capkun et al., 2012). The consensus seems to be that sharing accounting rules is not a sufficient condition to create positive change, and that management incentives and other firm-level factors play an important role in framing financial reporting characteristics. Doukakis (2014) finds that strong earnings management incentives play a dominant role in shaping earnings management following IFRS adoption. Marra et al. (2011)

find that board independence and audit committees play an important and effective role in reducing earnings management after the introduction of IFRS, and that the accounting regulatory framework significantly contributes to the effectiveness of the two corporate governance mechanisms.

To shed more light on why prior literature has found such contradicting results on the accounting quality consequences of IFRS adoption, it is necessary to look at additional firm-level factors that likely play a significant role. As mandatory IFRS adoption implies a comprehensive switch in accounting rules, I posit that one important firm-level factor that has not yet been examined in prior literature yet plays a crucial role for successful IFRS adoption is firms' choice to change their level of accounting expertise in preparation for the mandatory IFRS adoption. The concept of accounting expertise is commonly found in studies on the effectiveness of audit committee expertise in the US following the Sarbanes-Oxley Act of 2002, the majority of which agree that effectiveness only increases when audit committees appoint financial accounting experts. Such studies find that accounting expertise on the audit committee leads to a decline in and higher-quality non-GAAP earnings exclusions (Seetharaman et al., 2014), increased accrual quality (D. S. Dhaliwal et al., 2006; D. A.N. Dhaliwal et al., 2010), curtailed expectations management (Liu et al., 2014), more conservative accounting (Krishnan & Visvanathan, 2008), increased financial reporting timeliness (Abernathy et al., 2015), and positive market reactions (DeFond et al., 2005). Chychyla et al. (2019) find that accounting expertise is associated with increased financial reporting complexity, but that it also helps mitigate the negative outcomes of financial reporting complexity. Bryan et al. (2013) document that only firms with an optimal choice of the appointed accounting expert benefit from better earnings quality, while firms with suboptimal choices exhibit no improvement and even lower their earnings quality. However, on an international level, especially in relation to IFRS, evidence on accounting expertise is rather scarce. The majority of existing studies marginally address financial accounting expertise of audit committee members as part of their measure of audit committee competence, which is usually regarded as a part of a wider measure of board effectiveness. Nouri and Abaoub (2016) find that the independence and competence of an audit committee as part of board effectiveness is associated with decreased earnings management following mandatory IFRS adoption in France, but not in the UK. Bonetti et al. (2016) find that firms in strong-enforcement countries experience improvements in financial reporting quality following IFRS adoption independently of board effectiveness (measured using six aggregate factors including audit committee competence), which only helps improve financial reporting quality in low-enforcement countries. Bepari and Mollik (2015) find that firms reporting under

IFRS exhibit more compliance with IFRS if they have audit committee members with an accounting and finance background. Additionally, Wang et al. (2019) find that audit committee quality (one of the determinants of which is members' accounting expertise) is positively related to the quality of integrated reports for a sample of South African firms. Similarly, Verriest et al. (2013) also show that stronger-governance firms (one of the factors being audit committee effectiveness) comply more with and use IAS less opportunistically. Interestingly, they use a sample of EU firms from the MSCI Pan Euro Index and find that some do not even have a separate audit committee. This is because, although generally required, under certain circumstances EU firms are exempt from having an audit committee (KPMG, 2016). This likely makes research on firm-level accounting expertise in an international setting significantly different from research on US firms. Furthermore, none of the studies in an IFRS setting addresses the possibility of firms deliberately appointing members with accounting expertise to the board ahead of the mandatory adoption of IFRS. I claim this aspect is important to analyze given that, when confronted with the challenge of implementing a completely new set of standards, having more top-level firm members with the necessary accounting knowledge is likely to make the process easier and more successful. Trends in practice also confirm the importance of board members with accounting expertise. Recent studies have found that the demand for board members with accounting expertise has been steadily increasing, as their role becomes more important given tighter regulatory requirements, changing accounting standards, and increasing investor scrutiny (Ernst & Young, 2012). Here, the emphasis is especially on members with accounting and financial expertise as they are most able to deal appropriately with the challenges of accounting rules (Ernst & Young, 2013). Recent literature underlines the role of institutional features and concludes that accounting standards alone do not determine financial reporting quality (Ball et al., 2000; Burgstahler et al., 2006; Leuz et al., 2003). On the contrary, more recent studies claim that the reason for documented contradictory results regarding accounting quality following IFRS adoption lies in differences in complementary factors such as enforcement or firm-level reporting incentives (Ahmed et al., 2013; Doukakis, 2014). Overall, the role of accounting standards in influencing earnings management practices may be limited relative to the effects of other forces and may not be sufficient to ensure an improvement in financial reporting behavior unless underlying institutional and firm-level factors evolve as well (Holthausen, 2009; Samarasekera et al., 2012). Beside these factors, I claim that the way firms choose to compose their teams in terms of member profiles is also of crucial importance in determining the outcomes of IFRS adoption. I focus on an individual-level characteristic that is directly linked to the quality of accounting outcomes, namely the

accounting expertise of individual board members. Thus, I aim to further disentangle the mechanism behind the documented contradictory accounting quality consequences of IFRS adoption by analyzing whether a firm's choice to increase its accounting expertise at the board level in preparation for the switch to IFRS significantly impacts accounting quality after the fact. As prior literature claims that accounting quality is a broad concept, I use different measures to capture different aspects of it: use of discretionary accruals, income smoothing practices, and accounting conservatism. However, it is not possible to make a directional assumption regarding the expected impact of firms' changes in accounting expertise on these measures of accounting quality.

A common accepted view is that IFRS are of higher quality than GAAP because they impose higher disclosure requirements and require accounting measurements that more accurately reflect a firm's economic position and performance. Thus, this should lead to an increase in accounting quality (Barth et al., 2008). Following the mandatory adoption of IFRS, capital market participants should be better able to monitor and evaluate accounting quality and to compare different accounting choices and assumptions among firms and across countries, which may ultimately act as a disincentive for managers to engage in accrual earnings management practices (Barth et al., 2008). In this case, stronger accounting expertise within the firm will allow firms to better implement the new standards and thus provide higher-quality information. This can be seen as a sign of a firm's commitment to thoroughly implement the new standards rather than just tick the boxes. In this case, I would expect to observe an increase in accounting quality following mandatory IFRS adoption for firms that increase their level of accounting expertise.

However, there are various obstacles that could prevent this outcome. First, IFRS may not be optimal for mandatory adopters and thus they may not be incentivized to properly apply IFRS. They may apply IFRS as they did their old national GAAP with no substantial change in accounting practices, merely responding to mandatory compliance by ticking the boxes rather than engage in a sincere effort to adopt the new standards and improve reporting quality (Christensen et al., 2015; Daske et al., 2013). Second, as long as accounting standards provide some discretion and firms have different reporting incentives, it is likely that financial reporting behavior will differ across firms (Leuz et al., 2003). IFRS are principles-based standards, meaning they offer more managerial discretion that could render it ineffective in restricting earnings management of firms with low incentives to comply. This could lead to an increase in earnings management practices, as the inherent flexibility due to the lack of implementation guidance under principles-based standards has the potential to provide greater opportunity for

firms to tailor their financial information in order to provide a more favorable image relative to rules-based domestic standards. Both these explanations are consistent with IFRS not necessarily improving accounting quality (Ball & Shivakumar, 2006; Barth et al., 2008; Christensen et al., 2015; Jeanjean & Stolowy, 2008). Firms with stronger accounting expertise can be seen as having the means to better use the discretion provided by the principles-based IFRS to their advantage. Thus, in this case it is reasonable to assume that firms that increase their level of accounting expertise upon mandatory IFRS adoption will have the means to better tailor the provided accounting information to provide a more favorable image of their financial situation. In this case, I would expect to observe a decrease in the quality of accounting information following IFRS adoption for firms that increase their accounting expertise.

Lastly, it is important to highlight that although the traditional view states that an increase in the use of discretionary accruals and income smoothing or a decrease in accounting conservatism are signs of low quality accounting information, more recent findings contradict this. Thus, it is not necessarily an indicator of opportunistic behavior by management. According to signaling theory, managers may exercise discretion to communicate inside information about a firm's prospects to outside stakeholders to help them predict and form expectations pertaining to the firm's future prospects (see Fields et al. (2001), Healy and Palepu (1993), Watts and Zimmerman (1986), among others). Furthermore, recent research has found that income-increasing discretionary accruals of firms with an effective board and audit committee as well as income smoothing by high-performing managers are used to communicate private favorable information related to firms' future performance (Baik et al., 2019; Pham et al., 2019). As a higher level of accounting expertise is representative of a greater ability and knowledge of board members to deal with accounting challenges, this is likely valid for firms that choose to increase their level of accounting expertise in preparation for mandatory IFRS adoption. Further, changes in accounting quality measures may only reflect the appropriate implementation of new valuation rules for the different items used. In this case, the observed changes could be due to firms with an increase in accounting expertise making a thorough change to the way they value items according to the new standards and thus may not necessarily represent a decrease in accounting quality. Thus, I formulate the first two two-tailed hypotheses as follows:

Hypothesis 1: *Firms' decision to increase their accounting expertise upon mandatory IFRS adoption significantly affects the use of discretionary accruals.*

Hypothesis 2: *Firms' decision to increase their accounting expertise upon mandatory IFRS adoption significantly affects income smoothing practices.*

Although accounting conservatism is often seen as a desirable characteristic signaling less earnings management in traditional research, the IASB argues that conservatism is not necessarily a desirable quality of financial reporting information (IASB, 2006, BC2.22), as it is not considered an adequate way of dealing with uncertainty (Hellman, 2008). Thus, a decrease in accounting conservatism may also indicate higher compliance with IFRS and standard-setters' recommendations. Given the competing possible scenarios, I formulate the third two-tailed hypothesis as follows:

Hypothesis 3: *Firms' decision to increase their accounting expertise upon mandatory IFRS adoption significantly affects accounting conservatism.*

3 Methodology

I use publicly traded Canadian firms that mandatorily adopt IFRS as the main sample in my analysis. IFRS became mandatory in Canada for fiscal years beginning on or after January 1, 2011, forcing Canadian firms to switch from reporting under Canadian GAAP (CA GAAP) to IFRS. I choose Canada as it has a strong enforcement regime due to its legal and governance institutions and there are no issues involving concurrent changes in governance and regulation in the period around mandatory IFRS adoption (Khan et al., 2017), mitigating concerns about unrelated yet concurrent confounding regulatory, technological, and market shocks (Leuz & Wysocki, 2016). Further, I focus on mandatory IFRS adopters in Canada to avoid selection problems arising from the incentives of voluntary IFRS adopters (Leuz & Wysocki, 2016).

To mitigate endogeneity concerns, I employ a difference-in-differences research design to test the first and second hypotheses. For this, I use publicly traded EU firms, for which director information is available in BoardEx and mandatorily adopted IFRS in 2005 as my control sample. The main advantage of using EU firms as a control sample for the Canadian treatment sample is that all of these firms operate in similar regulatory and legal environments (and use the same set of standards for financial reporting), thus assuring the homogeneity of the control group. Further, because the control firms used IFRS both before and after mandatory adoption in Canada, any changes likely reflect the impact of concurrent economic and possible regulatory changes but not that of mandatory IFRS adoption (Byard et al., 2011), increasing the validity of using the EU sample as an unaffected control group. To test hypothesis three I employ a simple difference analysis based on the sample of Canadian firms, as the used

accounting conservatism model (following Basu, 1997) cannot be meaningfully used with a difference-in-differences research design due to econometric restrictions.

3.1 Sample selection

As the analysis centers on accounting expertise, the starting point for my sample selection procedure is the availability of information on directors in BoardEx. I start with 15,354 firm-year observations corresponding to EU firms reporting under IFRS and Canadian mandatory-IFRS-adopting firms for which director information is available for the period 2005-2017. I follow prior research and exclude financial companies, as their activities and thus accounting outcomes are not comparable to those of industrial companies. This results in a loss of 2,763 observations. For all other variables, I retrieve additional data from Thomson Reuters Datastream. For the discretionary accruals (income smoothing) analysis I exclude another 1,384 observations for which I cannot calculate discretionary accruals (the income smoothing measure) and 434 (699) observations with missing data for control variables. To ensure the validity of the difference-in-differences research design, I require the composition of the sample to be consistent over time to avoid the possibility that the results are driven by changes in the sample. For this, I exclude another 739 (391) observations corresponding to firms that do not have one or more observations both before and after IFRS adoption in Canada from the discretionary accruals (income smoothing) analysis sample. Thus, the sample for testing the first hypothesis consists of 10,034 firm-year observations for 139 Canadian firms and 742 EU firms, with an average of 11.4 observations per firm for the 13-year sample. The sample for testing the second hypothesis consists of 11,343 firm-year observations for 207 Canadian firms and 775 EU firms, with an average of 11.6 observations per firm for the 13-year sample. Table 1, Panels A and B provide an overview of the sample selection procedure for the tests of hypothesis one and two, respectively.

To test the third hypothesis (accounting conservatism), I start with 3,570 observations for Canadian mandatory-IFRS-adopting firms with available director data in BoardEx. I exclude 491 observations corresponding to financial firms, as well as 290 observations with no information on earnings per share and returns. I exclude another 52 observations with missing data for control variables and 473 observations corresponding to firms that that do not have one or more observations both before and after IFRS adoption in Canada. The final sample for testing the third hypothesis consists of 2,264 firm-year observations for 215 Canadian firms, with an average of 10.5 observations per firm for the 13-year sample. Table 1, Panel C provides an overview of the sample selection procedure.

>> Insert Table 1 about here<<

3.2 Accounting expertise measure

I measure a firm's accounting expertise using the number of directors with accounting expertise on the board of directors. I use the accounting expertise definition in Chychyla et al. (2019) and consider an individual to have accounting expertise if they are a certified public accountant (CPA or similar) or have experience as a controller, treasurer, chief financial officer, auditor, or tax professional. I use data from BoardEx Europe and North America to collect the qualifications of board members and then identify those who are accounting experts based on the above-mentioned criteria. I then create a measure of increase in accounting expertise, *IncrAcct*, defined as an indicator variable that takes the value of one if the number of directors on board with accounting expertise increases in the year prior to mandatory IFRS adoption in Canada (i.e., in 2010 as compared to 2009), zero otherwise. As the mandatory adoption of IFRS in Canada took place in 2011, I posit that if firms decide to acquire more accounting expertise they will do so one year prior in order to be able to better prepare for the change in accounting standards. Furthermore, Canadian IFRS adopters were also required to prepare comparative statements in accordance with IFRS starting with the actual transition date, which was January 1, 2010 (CSA, 2002; Doucet et al., 2011; IASPlus, 2015). To properly do so they would have had to increase their accounting expertise by the end of 2010.

3.3 Accounting expertise and discretionary accruals

Accounting quality is a concept that is difficult to measure, especially as it manifests in different forms (Leuz et al., 2003). I address this issue by examining three dimensions of accounting quality, namely discretionary accruals use, income smoothing, and timeliness of loss recognition. Below I discuss the methodology for testing the three hypotheses related to these three factors.

I use discretionary accruals to capture the extent to which insiders use the discretion offered by accounting standards when reporting earnings. Generally, a higher (i.e., more positive) value of discretionary accruals suggests more income-increasing earnings management, which is seen as indicating lower accounting quality (Chen et al., 2010). However, prior studies show that managers may use discretionary accruals to increase the informativeness of their financial reports (Leuz et al., 2003; Watts & Zimmerman, 1986). The most frequently used models for estimating discretionary accruals are the Jones (1991) model and the Modified Jones model (Dechow et al., 1995). Thus, I use four measures of discretionary

accruals: (a) signed discretionary accruals estimated using the cross-sectional Jones model, (b) an indicator variable taking the value of one if signed discretionary accruals estimated using the cross-sectional Jones model are income-increasing (i.e., positive), zero otherwise, (c) signed discretionary accruals estimated using the cross-sectional Modified Jones model, and (d) an indicator variable taking the value of one if signed discretionary accruals estimated using the cross-sectional Modified Jones model are income-increasing (i.e., positive), zero otherwise. I choose the cross-sectional models to estimate discretionary accruals as prior research has shown that they are better able to identify earnings management than time-series models (Bartov et al., 2000; Chen et al., 2010). I compute total accruals in line with the approach in Dechow et al. (1995) as follows:

$$\mathrm{ACC_{it}} = \Delta\mathrm{CA_{it}} - \Delta\mathrm{Cash_{it}} - (\Delta\mathrm{CL_{it}} - \Delta\mathrm{StDebt_{it}} - \Delta\mathrm{TaxPayable_{it}}) - \mathrm{Depreciation_{it}}, \quad (1)$$

where *ΔCA* equals change in current assets, *ΔCash* represents change in cash and cash equivalents, *ΔCL* equals change in current liabilities, *ΔStDebt* equals change in short term debt, *ΔTaxPayable* equals change in income taxes payable and *Depreciation* represents depreciation and amortization expense for the year. Detailed definitions of all variables are provided in Appendix. I follow Ahmed et al. (2013) and assume the change in taxes payable and short-term debt to be equal to zero if a firm does not provide information on this.

First, I use the cross-sectional Jones Model to calculate the first two measures for discretionary accruals. Non-discretionary accruals are defined as:

$$\mathrm{NDA_{it}} = \alpha_1 1/\mathrm{TA_{it-1}} + \alpha_2 \Delta\mathrm{Sales_{it}} + \alpha_3 \mathrm{PPE_{it}}, \quad (2)$$

where *NDA* is non-discretionary accruals, *TA* is total assets, *ΔSales* represents change in total revenue, *PPE* depicts property, plant and equipment, and α_1, $\alpha_2$and $\alpha_3$are industry-year specific parameters. Detailed definitions of all variables are provided in Appendix. I estimate the industry-year specific parameters based on regressions for each one-digit SIC-year group based on the following model:

$$\mathrm{ACC_{it}} = \beta_1 1/\mathrm{TA_{it-1}} + \beta_2 \Delta\mathrm{Sales_{it}} + \beta_3 \mathrm{PPE_{it}} + \varepsilon_{it}, \quad (3)$$

where β_1, β_2 and β_3 are the OLS estimates of α_1, $\alpha_2$and α_3 and *ACC* equals total accruals calculated as in Eq. (1). ε_{it} is the residual, which represents the firm-specific discretionary portion of total accruals. Thus, the first measure *DACC-J* equals estimated ε_{it} from cross-sectional regressions of the model in Eq. (3). The second measure, *POS_DACC-J*, is an indicator variable taking the value of one if *DACC-J* is higher than zero, zero otherwise. All other variables are as defined in Eq. (2).

Second, I use the cross-sectional Modified Jones Model to calculate the next two measures of discretionary accruals. Dechow et al. (1995) present evidence indicating that the modified Jones model is more powerful at detecting earnings management than the original. To control for the possibility that revenue recognition is subject to manipulation by management, Dechow et al. (1995) add the change in accounts receivable. For this model, non-discretionary accruals are defined as:

$$\mathrm{NDA_{it}} = \alpha_1 1/\mathrm{TA_{it-1}} + \alpha_2(\Delta\mathrm{Sales} - \Delta\mathrm{AR})_{\mathrm{it}} + \alpha_3\mathrm{PPE_{it}}, \quad (4)$$

where *NDA* is non-discretionary accruals, *TA* is total assets, *ΔSales* equals change in total revenues, *ΔAR* equals change accounts receivables, *PPE* is property, plant and equipment, and α_1, $\alpha_2$and α_3 are industry-year specific parameters. Detailed definitions of all variables are provided in Appendix. I estimate the industry-year specific parameters based on regressions for each one-digit SIC-year group based on the following model:

$$\mathrm{ACC_{it}} = \beta_1 1/\mathrm{TA_{it-1}} + \beta_2(\Delta\mathrm{Sales} - \Delta\mathrm{AR})_{\mathrm{it}} + \beta_3\mathrm{PPE_{it}} + \varepsilon_{\mathrm{it}}, \quad (5)$$

where β_1, β_2 and β_3 are the OLS estimates of α_1, $\alpha_2$and α_3 and *ACC* is total accruals calculated as in Eq. (1). $\varepsilon_{\mathrm{it}}$ is the residual, which represents the firm-specific discretionary portion of total accruals. Thus, the third measure *DACC-JM* equals estimated $\varepsilon_{\mathrm{it}}$ from cross-sectional regressions of the model in Eq. (5). The fourth measure, *POS_DACC-JM*, is an indicator variable taking the value of one if *DACC-JM* is positive, zero otherwise. All other variables are as defined in Eq. (4).

To test my first hypothesis I use two different regression models. First, I perform a difference analysis based only on the sample of mandatory IFRS adopting firms (i.e., Canadian firms) using the following model:

$$\begin{aligned}\mathrm{DACC_{it}} = {} & \beta_0 + \beta_1\mathrm{POST_{it}} * \mathrm{IncrAcct_{it}} + \beta_2\mathrm{BoardSize_{it}} + \beta_3\mathrm{IndepDir_{it}} + \beta_4\mathrm{Size_{it}} + \beta_5\mathrm{Leverage_{it}} \\ & + \beta_6\mathrm{Growth_{it}} + \beta_7\Delta\mathrm{Liabilities_{it}} + \beta_8\mathrm{Turn_{it}} + \beta_9\mathrm{CFO_{it}} + \mathrm{firmFE} + \mathrm{yearFE} + \varepsilon_{\mathrm{it}}, \quad (6)\end{aligned}$$

where *DACC* represents one of the four discretionary accruals measures (*DACC-J, POS_DACC-J, DACC-JM, POS_DACC-JM*), *POST* is an indicator variable taking the value of one after mandatory IFRS adoption in Canada, zero otherwise. *IncrAcct* is my main variable of interest representing an increase in accounting expertise in the year prior to mandatory IFRS adoption in Canada. I include two control variables to account for board effectiveness: size of the board of directors (*BoardSize*) and number of independent directors on board (*IndepDir*). Following prior research (Ahmed et al., 2013; Barth et al., 2008; Chen et al., 2010), the model also includes the following control variables: *Growth* defined as percentage change in sales,

Leverage defined as end of year total liabilities divided by end of year total assets, *ΔLiabilities* defined as the percentage change in total liabilities, *Turn* defined as sales divided by total assets, *Size* defined as the natural logarithm of beginning of year total assets and *CFO* defined as operating cash flow divided by average total assets. Detailed definitions of all control variables are provided in Appendix. I include firm- and year-fixed effects to control for firm-specific, macroeconomic and temporal effects. In order to confirm the first hypothesis, I expect β_1 to be statistically significant.

Second, in order to mitigate endogeneity concerns, I use the following difference-in-differences model, which uses EU firms reporting under IFRS over the whole sample period as control sample:

$$\begin{aligned}\mathrm{DACC_{it}} = {} & \beta_0 + \beta_1 \mathrm{POST_{it}} * \mathrm{TREAT_{it}} + \beta_2 \mathrm{POST_{it}} * \mathrm{TREAT_{it}} * \mathrm{IncrAcct_{it}} + \beta_3 \mathrm{BoardSize_{it}} \\ & + \beta_4 \mathrm{IndepDir_{it}} + \beta_5 \mathrm{Size_{it}} + \beta_6 \mathrm{Leverage_{it}} + \beta_7 \mathrm{Growth_{it}} + \beta_8 \Delta\mathrm{Liabilities_{it}} \\ & + \beta_9 \mathrm{Turn_{it}} + \beta_{10} \mathrm{CFO_{it}} + \mathrm{firmFE} + \mathrm{yearFE} + \varepsilon_{it}, \end{aligned} \quad (7)$$

where *TREAT* is an indicator variable taking the value of one for Canadian mandatory IFRS adopters, zero otherwise. All other variables are as previously defined. In order to confirm the first hypothesis, I expect the coefficient on the difference-in-differences estimator β_2 to be statistically significant.

3.4 Accounting expertise and income smoothing

The used measure of income smoothing captures the degree to which insiders smooth earnings, i.e. reduce the variability of reported earnings by altering their accrual component. I follow Leuz et al. (2003) and define the measure for income smoothing, *SMTH*, as the ratio of standard deviation in operating earnings to the standard deviation of cash flow from operations. Scaling by the cash flow from operations controls for differences in the variability of economic performance across firms. Lower values of this measure indicate that management exercises accounting discretion to smooth reported earnings. In order to test the second hypothesis, I use, as I did for the tests of the first hypothesis, two different regression models. First, I run a simple difference analysis based on a sample composed only of Canadian firms:

$$\begin{aligned}\mathrm{SMTH_{it}} = {} & \beta_0 + \beta_1 \mathrm{POST_{it}} * \mathrm{IncrAcct_{it}} + \beta_2 \mathrm{BoardSize_{it}} + \beta_3 \mathrm{IndepDir_{it}} + \beta_4 \mathrm{Size_{it}} + \beta_5 \mathrm{Leverage_{it}} \\ & + \beta_6 \mathrm{Growth_{it}} + \beta_7 \Delta\mathrm{Stock_{it}} + \beta_8 \Delta\mathrm{Liabilities_{it}} + \beta_9 \mathrm{Turn_{it}} + \beta_{10} \mathrm{CFO_{it}} + \mathrm{firmFE} + \mathrm{yearFE} \\ & + \varepsilon_{it}, \end{aligned} \quad (8)$$

where *SMTH* is the income smoothing measure. *POST* is an indicator variable taking the value of one after mandatory IFRS adoption in Canada, zero otherwise. *IncrAcct* is the main variable of interest representing an increase in accounting expertise one year prior to mandatory IFRS

adoption in Canada. As before, I include two control variables in order to account for board effectiveness: size of the board of directors (*BoardSize*) and number of independent directors on board (*IndepDir*). Additionally, following prior research (Ahmed et al., 2013; Barth et al., 2008; Chen et al., 2010), I include the following control variables: *Growth, ΔStock* defined as change in common stock, *Leverage, ΔLiabilities, Turn, Size* and *CFO*. Detailed definitions of all variables are provided in Appendix. I include firm- and year-fixed effects to control for firm-specific, macroeconomic and temporal effects. To confirm the second hypothesis, I expect β_1 to be statistically significant.

Second, I run a difference-in-differences model to mitigate endogeneity concerns, for which EU firms reporting under IFRS over the whole sample period are used as control sample:

$$\begin{aligned}\mathrm{SMTH_{it}} = {} & \beta_0 + \beta_1 \mathrm{POST_{it}} * \mathrm{TREAT_{it}} + \beta_2 \mathrm{POST_{it}} * \mathrm{TREAT_{it}} * \mathrm{IncrAcct_{it}} + \beta_3 \mathrm{BoardSize_{it}} \\ & + \beta_4 \mathrm{IndepDir_{it}} + \beta_5 \mathrm{Size_{it}} + \beta_6 \mathrm{Leverage_{it}} + \beta_7 \mathrm{Growth_{it}} + \beta_8 \Delta\mathrm{Stock_{it}} + \beta_9 \Delta\mathrm{Liabilities_{it}} \\ & + \beta_{10} \mathrm{Turn_{it}} + \beta_{11} \mathrm{CFO_{it}} + \mathrm{firmFE} + \mathrm{yearFE} + \varepsilon_{it}, \end{aligned} \quad (9)$$

where all variables are as previously defined. To confirm the second hypothesis, I expect the coefficient on the difference-in-difference estimator β_2 to be statistically significant.

To maintain comparability with prior research, I employ a two-stage design to control for factors that may affect managers' accounting decisions or reflect the economic environment but are not related to specific accounting standards. For this, I follow Barth et al. (2008) and first estimate the following regression for each of the variables included in the income smoothing measure, *SMTH*, namely operating income and operating cash flow. I then retain the residuals (denoted by *) from each regression and use these instead of the raw variables when computing the income smoothing measure:

$$\begin{aligned}\mathrm{Variable_{it}} = {} & \beta_0 + \beta_1 \mathrm{Size_{it}} + \beta_2 \mathrm{Leverage_{it}} + \beta_3 \mathrm{Growth_{it}} + \beta_4 \Delta\mathrm{Stock_{it}} + \beta_5 \Delta\mathrm{Liabilities_{it}} \\ & + \beta_6 \mathrm{Turn_{it}} + \beta_7 \mathrm{CFO_{it}} + \mathrm{industryFE} + \mathrm{yearFE} + \varepsilon_{it}, \end{aligned} \quad (10)$$

where *Variable* represents either operating income (*OPINC*) or operating cash flow (*OCF*). I follow prior research (Ahmed et al., 2013; Barth et al., 2008) and include the following determinants: *Growth, ΔStock, Leverage, ΔLiabilities, Turn, Size* and *CFO*. I also include industry- and year-fixed effects. When estimating the model in Eq. (10) for operating cash flow, I exclude *CFO* as control variable. Consistent with Barth et al. (2008) I estimate the model in Eq. (6) jointly for treatment (Canadian) and benchmark (EU) firms because I want to test for difference-in-differences between treatment and benchmark firms. I then construct the income smoothing measure by computing the ratio of the volatility in *OPINC** to the volatility in *OCF**. Lower values represent less volatile earnings and thus higher income smoothing. Following

Barth et al. (2008) and Christensen et al. (2015), I separately pool treatment and benchmark sample observations that occur either pre- or post-IFRS adoption (i.e., mandatory IFRS adoption in Canada). This produces four different subsamples, which I use to test for differences in means of the income smoothing measure between the pre- and post-IFRS adoption periods for both treatment and benchmark firms. To confirm the second hypothesis I expect the difference in means for Canadian firms to be statistically significant.

3.5 Accounting expertise and timely loss recognition

As a timely loss recognition measure I choose the Basu (1997) asymmetric timeliness measure which indicates whether "bad news" are recognized in earnings in a more timely manner than "good news" and is estimated using the following model:

$$\mathrm{EPS}_{it} = \beta_0 + \beta_1 \mathrm{Ret}_{it} + \beta_2 \mathrm{DR}_{it} + \beta_3 \mathrm{DR}_{it} * \mathrm{Ret}_{it} + \varepsilon_{it}, \quad (11)$$

where the dependent variable *EPS* is earnings per share scaled by beginning of the year stock price and *Ret* is the 12-month cumulative return for year t. *DR* is an indicator variable taking the value of one if *Ret* is negative, zero otherwise. β_3 thus captures the incremental sensitivity of earnings to bad news versus good news. To test the third hypothesis I am interested in analyzing whether firms' choice to increase their accounting expertise upon mandatory IFRS adoption leads to changes in the incremental timeliness of incorporating bad news relative to good news. To test this, I follow Ahmed et al. (2013) and expand the model in Eq. (11) to allow slope coefficients to vary over periods and based on whether firms have an increase in accounting expertise or not. Note that for this part of the analysis I only use the Canadian sample, as including a benchmark sample would lead to a very high number of complex interaction terms, the interpretation of which would not be reasonable from an econometric point of view. Thus, I use the following model:

$$\begin{aligned}\mathrm{EPS}_{it} = {} & \beta_0 + \beta_1 \mathrm{DR}_{it} + \beta_2 \mathrm{Ret}_{it} + \beta_3 \mathrm{POST}_{it} * \mathrm{DR}_{it} + \beta_4 \mathrm{POST}_{it} * \mathrm{Ret}_{it} + \beta_5 \mathrm{POST}_{it} * \mathrm{DR}_{it} * \mathrm{Ret}_{it} \\ & + \beta_6 \mathrm{DR}_{it} * \mathrm{IncrAcct}_{it} + \beta_7 \mathrm{Ret}_{it} * \mathrm{IncrAcct}_{it} + \beta_8 \mathrm{DR}_{it} * \mathrm{Ret}_{it} * \mathrm{IncrAcct}_{it} \\ & + \beta_9 \mathrm{POST}_{it} * \mathrm{DR}_{it} * \mathrm{IncrAcct}_{it} + \beta_{10} \mathrm{POST}_{it} * \mathrm{Ret}_{it} * \mathrm{IncrAcct}_{it} \\ & + \beta_{11} \mathrm{POST}_{it} * \mathrm{DR}_{it} * \mathrm{Ret}_{it} * \mathrm{IncrAcct}_{it} + \beta_{12} \mathrm{BoardSize}_{it} + \beta_{13} \mathrm{IndepDir}_{it} + \beta_{14} \mathrm{Size}_{it} \\ & + \beta_{15} \mathrm{Leverage}_{it} + \beta_{16} \mathrm{ROA}_{it} + \beta_{17} \mathrm{MTB}_{it} + \mathrm{firmFE} + \mathrm{yearFE} + \varepsilon_{it}, \end{aligned} \quad (12)$$

where *EPS, Ret* and *DR* are as defined in Eq. (11). *IncrAcct* is the measure of accounting expertise increase and *POST* is an indicator variable taking the value of one following mandatory IFRS adoption in Canada, zero otherwise. I once again include *BoardSize* and *IndepDir* to control for board effectiveness. Further, I include *Size, Leverage, ROA* and *MTB* as control variables. Detailed definitions of all variables are provided in Appendix. I also

include firm- and year-fixed effects in order to control for firm-specific, macroeconomic and temporal effects. The main coefficients of interest are β_{11} and β_5. β_{11} measures the incremental change in the asymmetric timeliness of news recognition of firms choosing to increase their accounting expertise upon IFRS adoption relative to firms that do not change or decrease their accounting expertise upon IFRS adoption. β_5 measures the change in the asymmetric timeliness of news recognition for firms that do not change or decrease their accounting expertise upon IFRS adoption. To confirm the third hypothesis, I expect β_{11} to be statistically significant. I interpret a positive (negative) β_{11} as indicating an increase (decrease) in the timeliness of loss recognition, and thus accounting conservatism, for firms that increase their accounting expertise upon IFRS adoption.

4 Results

4.1 Accounting expertise and discretionary accruals

Table 2 presents summary statistics for the variables used in the tests for the first hypothesis. Panel A provides more insight into accounting expertise at firm level. On average, firms in my sample have 1.9 directors with accounting expertise on the board. As average board size in the sample is 10.7 directors, on average 17.8 percent of board members have accounting expertise. The average change in accounting expertise upon IFRS adoption for Canadian firms is 7.2 percent, while benchmark firms (EU firms reporting under IFRS over the whole sample period) have an average change in accounting expertise in the year prior to mandatory IFRS adoption in Canada of only 2.0 percent. Furthermore, the magnitude of the increase in accounting expertise for Canadian firms (on average 1.3 directors) is higher than that of EU firms (on average 1.1 directors). Conversely, the magnitude of decreases in accounting expertise for Canadian firms (on average -1.1 directors) is lower than that of EU firms (on average -1.3 directors). Panel B provides information on the variables used in the model in Eq. (7). *IncrAcct* has a mean value of 0.133, meaning that 13.3 percent of (both Canadian and EU) firms in the sample show an increase in accounting expertise in the year prior to mandatory IFRS adoption in Canada. The mean and median values for the two discretionary accruals measures are all negative (mean value of *DACC-J* (*DACC-JM*) is -0.016 (-0.016)) denoting that, on average, firms in the sample have income-decreasing accruals. The average *Size* of the sample firms is 14.457, showing that the sample consists on average of relatively large firms. This makes sense, as the main selection criteria is BoardEx coverage and only relatively large firms are included in the database. The mean values for *Growth* (mean of 0.079), *ΔLiabilities* (mean of 0.110),

Turn (mean of 0.928), *CFO* (mean of 0.076) and *Leverage* (mean of 0.264) are all in line with prior literature (Ahmed et al., 2013; Chen et al., 2010). The presented pairwise correlations in Panel C have the expected signs and none of the magnitudes presents any concerns regarding multicollinearity.

>> Insert Table 2 about here<<

Panel A of Table 3 presents the results for the estimation of the model in Eq. (6) based only on the sample of Canadian mandatory-IFRS-adopting firms. The positive and statistically significant coefficients on the interaction term *POST*IncrAcct* in column 1 (0.0394, p-val<0.05) and column 3 (0.0360, p-val<0.05) indicate that firms that increase their accounting expertise ahead of IFRS adoption exhibit on average more income-increasing discretionary accruals. This finding is confirmed by the results in columns 2 and 4, when using *POS_DACC-J* and *POS_DACC-MJ*, respectively, as dependent variables. The positive and statistically significant coefficients on *POST*IncrAcct* (0.268, p-val<0.05 in column 2 and 0.195, p-val<0.01 in column 4) show that firms that increase their accounting expertise upon IFRS adoption are 26.8 percent (19.5 percent) more likely to report income-increasing discretionary accruals.

Panel B of Table 3 presents the results of the difference-in-difference tests of the first hypothesis. The positive and statistically significant coefficients on the difference-in-differences estimator *POST*TREAT*IncrAcct* in column 1 (0.0449, p-val<0.01) and column 3 (0.0422, p-val<0.05) indicate that firms that increase their accounting expertise ahead of IFRS adoption exhibit incrementally more income-increasing discretionary accruals than benchmark firms. This finding is confirmed by the results in columns 2 and 4, when using *POS_DACC-J* and *POS_DACC-MJ*, respectively, as dependent variables. The positive and statistically significant coefficients on *POST*TREAT*IncrAcct* (0.282, p-val<0.05 in column 2 and 0.202, p-val<0.01 in column 4) show that firms that increase their accounting expertise upon IFRS adoption are 28.2 percent (20.2 percent) more likely to report income-increasing discretionary accruals than benchmark firms. Regarding mandatory IFRS adopters that do not change their accounting expertise or decrease it, I find no consistent effect on discretionary accruals (denoted by the overall insignificant coefficients on *POST*TREAT*).

Overall, given the consistently positive and statistically significant coefficients on the main independent variables of interest, I can confirm the first hypothesis by showing that firms that increase their accounting expertise upon mandatory IFRS adoption exhibit on average more income-increasing discretionary accruals. The results of this part of the analysis can be

interpreted in two ways. On the one hand, prior research claims that an increase in discretionary accruals, especially income-increasing ones, represents managerial opportunism, as top-level managers try to present a more favorable image of the firm's financial situation. Thus, it could be claimed that firms that increase their accounting expertise upon mandatory IFRS adoption are better able to use the inherent flexibility offered by IFRS as principles-based standards to their advantage, thus using existing loopholes to present a more favorable image of their financial situation. On the other hand, more recent literature claims that increased discretionary accruals do not necessarily represent decreased accounting quality, as they could be the result of managers ability to incorporate favorable forward-looking information in their financial reporting. In this case, it is plausible to assume that firms that increase their accounting expertise upon mandatory IFRS adoption are better able to incorporate positive forward-looking private information in their reported financials and thus provide a more accurate image of the firm's future financial development.

>> Insert Table 3 about here<<

4.2 Accounting expertise and income smoothing

Table 4 presents summary statistics for the variables used in the tests of the second hypothesis. The number of observations in this part of the analysis is slightly higher than in the analysis for the first hypothesis, due to better availability of data for calculating the income smoothing measure. However, the summary statistics are highly comparable. Regarding accounting expertise, the average change for Canadian firms (4.2 percent) is still higher than that of EU firms (2.3 percent), and the magnitudes of positive and negative changes are also higher for Canadian than for EU firms. Regarding the variables used in the regression models, I find a mean of 0.138 for *IncrAcct* and an average value of *SMTH* of 1.403, showing that firms' operating earnings are on average more volatile than their operating cash flows. The correlations in Panel C all have the expected signs and none of the magnitudes presents any concerns regarding multicollinearity.

>> Insert Table 4 about here<<

Panel A of Table 5 presents the results for the first tests of the second hypothesis. Column 1 presents the results for the simple difference analysis when using only the sample for Canadian mandatory IFRS adopters. The negative and statistically significant coefficient on *POST*IncrAcct* (-0.305, p-val<0.05) indicates that firms that increase their accounting expertise ahead of IFRS adoption exhibit more income smoothing. The results in column 2

confirm this finding. Column 2 presents the results of the estimation of the difference-in-difference model in Eq. (9) for the test of hypothesis two. The negative and statistically significant coefficient on the difference-in-difference estimator *POST*TREAT*IncrAcct* (-0.356, p-val<0.05) shows that mandatory IFRS adopters that increase their accounting expertise exhibit incrementally more income smoothing than benchmark firms. Regarding firms that do not change or decrease their accounting expertise upon IFRS adoption, the positive and statistically significant coefficient on *POST*TREAT* denotes that they exhibit incrementally less income smoothing than benchmark firms.

Panels B and C present the results of tests of hypothesis two following the methodology in Barth et al. (2008) and Ahmed et al. (2013). Panel B presents the results based on subsamples of Canadian firms that increase their accounting expertise upon IFRS adoption and EU firms that increase their accounting expertise in the year prior to mandatory IFRS adoption in Canada. I observe that the increase in income smoothing for Canadian firms between the pre- and the post-IFRS adoption period is statistically significant (3.314, t-stat 2.39) and 2.2 times higher than the increase in income smoothing documented for EU firms that increase their accounting expertise. Panel C presents the results based on the subsample of Canadian firms that increase their accounting expertise upon IFRS adoption and all EU firms in the sample, regardless of the direction of change in accounting expertise. Similarly, I document that the increase in income smoothing for Canadian firms is still approximately 2.2 times higher than that documented for EU firms. Altogether, the results in Table 5 confirm the second hypothesis by showing that firms' increasing their accounting expertise ahead of IFRS adoption leads to an increase in income smoothing following mandatory IFRS adoption. The interpretation of this result is, however, not clear. While traditional research claims that higher income smoothing is a sign of earnings management and thus lower accounting quality, more recent research shows that higher income smoothing can be indicative of managers' ability to incorporate forward-looking information in current earnings.

>> Insert Table 5 about here<<

4.3 Accounting expertise and timely loss recognition

Table 6 presents the summary statistics for the variables used in the test of the third hypothesis. The means for negative and positive changes in accounting expertise for Canadian mandatory IFRS adopters are similar to those presented in prior tables. The average *EPS* in the sample is negative (-0.069) in line with prior studies (Ahmed et al., 2013); the median return is 18.5

percent and on average 34.0 percent of the sample represents "bad news." The correlations in Panel C raise no concerns of multicollinearity.

>> Insert Table 6 about here<<

Table 7 presents the results of the estimation of the model in Eq. (12). As expected, the coefficient on the interaction term *POST*DR*Ret*IncrAcct* is statistically significant and negative (-2.129, p-val<0.05), indicating that mandatory IFRS adopters that choose to increase their accounting expertise exhibit incrementally less timely loss recognition, in other words, less conservative accounting. However, I also find that the coefficient on *POST*DR*Ret* is positive and statistically significant, indicating that firms that do not change or decrease their accounting expertise upon mandatory IFRS adoption exhibit more timely loss recognition, in other words practice more accounting conservatism. Overall, the results confirm the third hypothesis by showing that increasing accounting expertise ahead of mandatory IFRS adoption significantly impacts the timeliness of loss recognition.

However, from an accounting quality point of view there are two competing explanations for these results. From a traditional perspective, these results can be interpreted as firms choosing to increase their accounting expertise upon IFRS adoption leading to less accounting conservatism and thus lower accounting quality, as prior studies (especially if US based) widely claim that firms should recognize losses in a more timely manner in order to not try to hide any potential loss risk. However, in the IFRS setting, the opposite view is taken, as regulators and standard-setters do not necessarily see conservatism as a desirable quality of accounting information when reporting under IFRS. Thus, in this case the results can be interpreted as firms that increase their accounting expertise being better documented and better at implementing the new standards and thus complying more with standard-setters' recommendations, which leads them to exhibit less accounting conservatism.

>> Insert Table 7 about here<<

5 Additional analysis

5.1 US firms as control sample

To further enhance the validity of the results, I conduct the difference-in-differences tests with an alternative control sample. Existing research on IFRS adoption presents contradictory views on what the most appropriate control sample is when using a difference-in-differences research design. In order to eliminate concerns that the results could be driven by the chosen control

sample (i.e., EU firms reporting under IFRS over the whole sample period), as an alternative I use US firms reporting under US GAAP. One reason why this could be more appropriate is that Canadian firms are more similar to US firms than to EU firms given their geographical proximity. Second, supporters of this alternative claim that US firms are expected to present a more stable control sample, as US GAAP generally underwent less (major) developments over the used sample period than IFRS. Thus, I run the difference-in-differences tests for the first and second hypothesis with US firms as the control sample. The sample selection procedure follows the same steps as presented in Table 1. However, the size of the final samples for the tests is considerably higher, as the coverage for US firms in BoardEx is significantly better than that for international firms.

Table 8 presents the results for the difference-in-differences test of the first hypothesis. Regarding changes in accounting expertise, shown in Panel A, these are even lower for US firms than those documented for EU firms. The summary statistics in Panel B for the variables used in the regression models are, however, very similar to those presented in Table 2. Panel C presents the regression results. For ease of comprehension, I hide the control variables as the estimated coefficients are highly similar to those reported in Table 3. Overall, the results are qualitatively similar to the main results. The positive and statistically significant coefficients on the difference-in-differences estimator *POST*TREAT*IncrAcct* in columns 1 and 3 (0.0360, p-val<0.10 and 0.0321, p-val<0.10, respectively) indicate that firms choosing to increase their accounting expertise ahead of mandatory IFRS adoption exhibit incrementally more income increasing discretionary accruals than those who do not. This result is confirmed by the positive and statistically significant coefficients on *POST*TREAT*IncrAcct* in columns 2 and 4 (0.242, p-val<0.01 and 0.155, p-val<0.01, respectively), which present the results of the difference-in-differences model with *POS_DACC-J* and *POS_DACC-JM* as dependent variables. Regarding firms that do not change or decrease their accounting expertise upon IFRS adoption, once again the results depict no reliable pattern regarding the effect on discretionary accrual use. Thus, this confirms the first hypothesis.

>> Insert Table 8 about here <<

Table 9 presents the results for the difference-in-differences tests of the second hypothesis when using US firms as control sample. Once again, the presented summary statistics are highly similar to those of the sample in the main tests. Panel C presents the results of the estimation of the model in Eq. (9), which are consistent with the main results. The coefficient on *POST*TREAT*IncrAcct* is negative and statistically significant (-0.306, p-val<0.01)

confirming that firms that choose to increase their accounting expertise upon mandatory IFRS adoption exhibit incrementally more income smoothing. Panels D and E present equivalent results to the tests presented in Table 5, Panel B and C, respectively, having used the approach in Barth et al. (2008) and Ahmed et al. (2013) to test the second hypothesis. The difference in the used income smoothing measure for Canadian firms between pre- and post-IFRS adoption is still high and statistically significant (2.392, t-stat 2.02), while the difference for US firms is, similarly to those reported for EU firms, lower (1.495, t-stat 4.66 in Panel E). Altogether, these results confirm the second hypothesis. This additional analysis with US firms as control sample contributes to increasing the overall validity of the main results.

>> Insert Table 9 about here <<

5.2 Further robustness tests

I perform a series of additional tests to ensure the robustness of the main results. First, I use an alternative definition for total accruals, following Bartov et al. (2000) when computing the discretionary accruals measures. Second, I also estimate all models with industry- and country-fixed effects instead of firm-fixed effects. Both these alternative tests lead to qualitatively similar results. Third, I perform the analysis by defining an additional independent variable of interest, *DecrAcct*. This is an indicator variable taking the value of one if a firm decreases its accounting expertise one year prior to mandatory IFRS adoption in Canada, zero otherwise. I include this additional variable in the models for the tests of hypotheses one and two, as well as all necessary interaction terms. This is because I want to analyze whether firms that choose to decrease their accounting expertise experience different outcomes from those that make no changes. The untabulated results show that firms choosing to decrease their accounting expertise do not exhibit any statistically significant changes in discretionary accruals used, but they do experience increased income smoothing. The coefficients on the main variables of interest containing *IncrAcct* in all these alternative models remain statistically significant and have similar magnitudes as those in the main tests. For the third hypothesis I run the model in Eq. (12) only with *DecrAcct* instead of *IncrAcct*, as including both plus the necessary interaction terms would not be feasible from an econometric point of view. However, even when only using *DecrAcct* as the main independent variable of interest, I document no statistically significant effect on the timeliness of loss recognition. Thus, firms' choice to decrease their accounting expertise upon mandatory IFRS adoption has no significant effect on accounting quality changes following IFRS adoption. A decrease in accounting expertise most likely signals firms' disinterest in the upcoming change in accounting standards; it could also be the result of prior,

IFRS-unrelated, decisions regarding board composition. These firms may be more likely to take a ticking-a-box approach when implementing IFRS thus making no significant changes to their accounting practices, which could explain the lack of impact on accounting quality.

6 Conclusion

This paper analyzes the impact of firms' choice to increase their accounting expertise in preparation for mandatory IFRS adoption on the quality of subsequent accounting outcomes. For this, I focus on three aspects of accounting quality: discretionary accruals use, income smoothing, and timely loss recognition. The results show that firms that deliberately choose to improve their level of accounting expertise at the board level in preparation for the switch to IFRS exhibit more income increasing discretionary accruals, higher income smoothing, and less accounting conservatism following mandatory IFRS adoption. These results hence show that firms' decisions on the personal qualities, in this case accounting expertise, of members who play a major role in the implementation of IFRS represent one important factor affecting the quality of accounting outcomes after adoption. Overall, the results confirm that firms' choice of level of accounting expertise ahead of mandatory IFRS adoption is one of the as yet unexplored factors that help explain the contradictory results of prior research regarding the impact of mandatory IFRS adoption on accounting quality. However, from an accounting quality point of view these results can be interpreted in two ways. While some studies, especially US GAAP based ones, argue that higher discretionary accruals and income smoothing as well as lower accounting conservatism are signs of lower accounting quality, more recent internationally based studies claim the opposite. Discretionary accruals, especially income-increasing ones as well as income smoothing, can be indicative of management's ability to incorporate favorable forward-looking information on the firm's financial development, leading firms to provide financial information that is more informative to financial statement users (Baik et al., 2019). Additionally, international standard-setters also claim that accounting conservatism is not necessarily a desirable quality in accounting (IASB, 2006), which means that less accounting conservatism could indicate that firms are better able to follow standard-setters' recommendations. Further, changes in accounting quality measures may only reflect the appropriate implementation of new valuation rules for the different items used. In this case, the observed changes could be due to firms with an increase in accounting expertise making thorough changes to the valuation of items according to the new standards, indicating more accurate implementation of the new standards and not necessarily a decrease in accounting

quality. My analysis does not allow me to differentiate between these two alternative explanations, which constitutes one of the limitations of this study. At the same time, this limitation can be seen as potential for future research. For example, future studies could explore whether the change in the three accounting quality metrics associated with increased board member accounting expertise translates into higher value relevance, better analysts' forecasts, or lower information asymmetry in terms of bid-ask spreads. Another limitation of this study is that, due to large variety of measures used to capture the concept of accounting quality in prior literature, those used in this study may not exhaustively capture it. However, I do choose some of the most widely used measures in existing accounting quality literature to try to capture a significant portion.

Overall, the results of my study are of importance to accounting researchers, seeing as even after the many years since IFRS adoption and all the accompanying intensive research, there is still no consensus on whether or not it has helped improve accounting quality. I follow prior research recommendations that studies should focus on complementary factors (such as enforcement or corporate governance) that have the potential to influence the general documented impact of IFRS adoption on accounting quality in order to be able to better explain the thus far contradictory results. Hereby I also address one of the general trends in practice regarding the increasing demand for accounting and financial expertise among board directors that is mainly induced by the changing accounting standards, challenging accounting rules, and regulatory changes. By taking a different approach, I focus on firms' deliberate choice to increase their level of accounting expertise on the board of directors in preparation for the exogenous switch in accounting standards due to mandatory IFRS adoption. Thus, I show that firms' deliberate choice to boost their accounting expertise in preparation for mandatory IFRS adoption is an important factor that helps explain subsequent changes in the quality of accounting outcomes. This should be of interest to standard-setters and regulators as they can interpret firms' decisions to increase their accounting expertise as indicating a commitment to more fully and accurately implementing the new accounting standards. Lastly, but maybe most importantly, the findings of this study are of major relevance to practitioners, as they offer proof that investing in accounting expertise in the shape of appointing more members with accounting expertise to the board of directors is definitely fruitful as this can aid firms in significantly changing the quality of their accounting outcomes, especially during a period of increased outsider scrutiny, such as the transition to IFRS.

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Appendix: Variable definitions

Variable	Definition
IncrAcct	Indicator variables taking the value of 1 if a firm increases the number of directors on board with accounting expertise in the year prior to mandatory IFRS adoption in Canada, zero otherwise.
DACC-J	Discretionary accruals calculated based on the cross-sectional Jones model.
DACC-JM	Discretionary accruals calculated based on the cross-sectional Modified Jones model.
POS_DACC-J	Indicator variable taking the value of one if the discretionary accruals calculated based on the cross-sectional Jones model have a positive value, zero otherwise.
POS_DACC-JM	Indicator variable taking the value of one if the discretionary accruals calculated based on the cross-sectional Modified Jones model have a positive value, zero otherwise.
SMTH	Income smoothing measure defined as the ratio of variation in operating income scaled by variation in operating cash flows.
EPS	Earnings per share scaled by beginning of year total assets.
POST	Indicator variable taking the value of one for all years starting with the year of mandatory IFRS adoption in Canada, zero otherwise.
TREAT	Indicator variable taking the value of 1 for Canadian firms, zero otherwise.
Ret	12-month cumulative return for the current fiscal year.
DR	Indicator variable taking the value of 1 if Ret<0, zero otherwise.
BoardSize	Total number of directors on board.
IndepDir	Percentage of independent directors out of the total number of directors on board.
Size	Natural logarithm of total assets at beginning of year.
Leverage	Ratio of total debt scaled by beginning of year total assets.
Growth	Percentage change in total revenue from prior to current year.
ΔLiabilities	Percentage change in total liabilities from prior to current year.
Turn	Ratio of total revenue to total assets.
CFO	Net operating cash flow scaled by total assets.
ΔStock	Percentage change in common stock from prior to current year.
ROA	Ratio of net income scaled by beginning of year total assets.
MTB	Ratio of market value of equity scaled by beginning of year total assets.
ACC	Total accruals calculated following Dechow et al. (1995) scaled by beginning of year total assets.
ΔCA	Change in current assets equal to difference between current and prior year's current assets.
ΔCash	Change in cash and cash equivalents equal to the difference between current and prior year's cash and cash equivalents.
ΔCL	Change in current liabilities equal to the difference between current and prior year's current liabilities.
ΔStDebt	Change in short-term debt equal to the difference between current and prior year's short-term debt.
ΔTaxPayable	Change in tax payable equal to the difference between current and prior year's tax payable.
Depreciation	Depreciation expense.
TA	Total assets.
ΔSales	Change in total revenue (current minus prior year's total revenue) scaled by beginning of year total assets.
PPE	Property, plant and equipment scaled by beginning of year total assets.
ΔAR	Change in accounts receivable (current minus prior year's accounts receivable) scaled by beginning of year total assets.

Table 1: Sample selection procedure

Criteria	Observations
Unique firm-year observations for EU firms using IFRS and Canadian mandatory IFRS adopters with BoardEx coverage 2005 – 2017	15,354
1) – less firm-year observations for financial firms	2,763
2) – less firm-years for which discretionary accruals cannot be calculated	1,384
3) – less firm-years with unavailable data for control variables	434
4) - less firm-years of firms without at least one observation in the PRE and one observation in the POST IFRS adoption period	739
= sample for testing Hypothesis 1	**10,034**
Unique firm-year observations for EU firms using IFRS and Canadian mandatory IFRS adopters with BoardEx coverage 2005 – 2017	15,354
1) – less firm-year observations for financial firms	2,763
2) – less firm-years for which discretionary accruals cannot be calculated	158
3) – less firm-years with unavailable data for control variables	699
4) - less firm-years of firms without at least one observation in the PRE and one observation in the POST IFRS adoption period	391
= sample for testing Hypothesis 2	**11,343**
Unique firm-year observations for Canadian mandatory IFRS adopters with BoardEx coverage 2005 – 2017	3,570
1) – less firm-year observations for financial firms	491
2) – less firm-years with missing data on EPS and returns	290
3) – less firm-years with unavailable data for control variables	52
4) - less firm-years of firms without at least one observation in the PRE and one observation in the POST IFRS adoption period	473
= sample for testing Hypothesis 3	**2,264**

This table presents the sample selection criteria. The complete sample for the test of the first hypothesis covers the period 2005-2017 and is composed of 139 Canadian firms that are first-time mandatory IFRS adopters for fiscal years starting on January 1, 2011 and 742 firms in the EU that reported using IFRS during the whole sample period. The complete sample for the test of the second hypothesis covers the period 2005-2017 and is composed of 207 Canadian firms that are first-time mandatory IFRS adopters for fiscal years starting on January 1, 2011 and 775 firms in the EU that reported using IFRS during the whole sample period. The complete sample for the test of the third hypothesis covers the period 2005-2017 and is composed of 215 Canadian firms that are first-time mandatory IFRS adopters for fiscal years starting on January 1, 2011.

Table 2: Summary statistics – Discretionary accruals analysis

Panel A: Accounting expertise

Variable	N	Mean	SD	P25	Median	P75
# directors w/ Acct Exp	10,034	1.868	1.522	1.000	2.000	3.000
ΔAcct Exp	10,034	0.027	0.637	0.000	0.000	0.000
ΔAcct Exp Canada	1,291	0.072	0.580	0.000	0.000	0.000
ΔAcct Exp EU	8,743	0.020	0.645	0.000	0.000	0.000
Positive Δ Acct Exp EU	1,183	1.172	0.428	1.000	1.000	1.000
Positive Δ Acct Exp Canada	150	1.300	0.642	1.000	1.000	1.000
Negative Δ Acct Exp EU	957	-1.265	0.526	-1.000	-1.000	-1.000
Negative Δ Acct Exp Canada	90	-1.133	0.342	-1.000	-1.000	-1.000

Panel B: Regression variables

Variable	N	Mean	SD	P25	Median	P75
DACC-J	10,034	-0.016	0.097	-0.056	-0.013	0.026
DACC-MJ	10,031	-0.016	0.097	-0.057	-0.014	0.025
IncrAcct	10,034	0.133	0.339	0.000	0.000	0.000
BoardSize	10,034	10.672	4.398	8.000	10.000	13.000
IndepDir	10,034	0.752	0.174	0.667	0.800	0.889
Size	10,034	14.457	1.887	13.178	14.361	15.763
Leverage	10,034	0.264	0.197	0.120	0.244	0.371
Growth	10,034	0.079	0.315	-0.028	0.047	0.131
ΔLiabilities	10,034	0.110	0.454	-0.058	0.029	0.151
Turn	10,034	0.928	0.580	0.516	0.840	1.212
CFO	10,034	0.076	0.093	0.042	0.076	0.116

Panel C: Pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)DACC-J	1									
(2) IncrAcct	0.016	1								
(3) Size	0.019	0.056*	1							
(4)Leverage	0.070*	0.057*	0.172*	1						
(5)Growth	-0.006	0.008	-.0110*	0.109*	1					
(6)ΔLiabilities	0.054*	0.011	-0.099*	0.305*	0.383*	1				
(7)Turn	-0.038*	-0.023*	-0.156*	-0.247*	-0.035*	-0.119*	1			
(8)CFO	-0.122*	-0.006	0.180*	-0.093*	0.023*	-0.030*	0.182*	1		
(9)BoardSize	0.011	0.082*	0.556*	0.103*	-0.054*	-0.035*	-0.103*	0.075*	1	
(10)IndepDir	-0.007	0.079*	0.321*	0.052*	-0.063*	-0.053*	-0.072*	0.019	0.260*	1

This table presents summary statistics for the variables used in the test of Hypothesis 1. Panel A presents descriptive statistics related to accounting expertise. Panel B presents descriptive statistics for the variables used in the model in Eq. (7). The model in Eq. (6) uses a subsample consisting of only the Canadian firms in the sample of the model in Eq. (7). Panel C reports pairwise correlations for the dependent and control variables used for the model in Eq. (7). The sample covers the period 2005-2017 and consists of 139 Canadian firms that are mandatory IFRS adopters and 742 EU firms reporting under IFRS for the whole sample period. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. In Panel C, * indicates significance at the 5% level or lower.

Table 3: Main test of Hypothesis 1 –Accounting expertise & discretionary accruals

Panel A: Accounting expertise and discretionary accruals				
Variables	(1) DACC-J	(2) POS_DACC-J	(3) DACC-MJ	(4) POS_DACC-MJ
*POST*IncrAcct*	0.0394**	0.268***	0.0360**	0.195**
	(0.019)	(0.001)	(0.039)	(0.013)
BoardSize	-0.00122	0.000515	-0.00102	0.00892
	(0.727)	(0.971)	(0.784)	(0.549)
IndepDir	-0.0767*	-0.286*	-0.0804*	-0.216
	(0.060)	(0.087)	(0.055)	(0.159)
Size	-0.0226**	-0.0438	-0.0228**	-0.0637*
	(0.036)	(0.212)	(0.043)	(0.099)
Leverage	0.0720**	0.208*	0.0750**	0.199
	(0.049)	(0.083)	(0.048)	(0.111)
Growth	-0.00430	0.0218	0.00344	0.0511
	(0.698)	(0.471)	(0.768)	(0.107)
ΔLiabilities	-0.00370	-0.00161	-0.00541	0.0102
	(0.715)	(0.948)	(0.605)	(0.711)
Turn	-0.0408	-0.0928	-0.0312	-0.0372
	(0.180)	(0.380)	(0.323)	(0.766)
CFO	-0.0987	-0.469**	-0.105*	-0.625***
	(0.119)	(0.035)	(0.097)	(0.008)
Constant	0.261*	1.113**	0.262*	1.212**
	(0.079)	(0.022)	(0.089)	(0.022)
Observations	1,291	1,291	1,291	1,291
R-squared	21.2%	22.5%	20.0%	22.2%
Firm & year FE	YES	YES	YES	YES
Panel B: Difference in Difference Analysis				
Variables	(1) DACC-J	(2) DACC-J>0	(3) DACC-JM	(4) POS_DACC-JM
*POST*TREAT*	-0.0152*	-0.0343	-0.00986	-0.0168
	(0.063)	(0.361)	(0.223)	(0.633)
*POST*TREAT*IncrAcct*	0.0449***	0.282***	0.0422**	0.202**
	(0.007)	(0.001)	(0.017)	(0.012)
	-0.000485	-0.00458	-0.000563	-0.00305
	(0.475)	(0.204)	(0.423)	(0.404)
	-0.0219*	-0.0837	-0.0245**	-0.117**
	(0.053)	(0.122)	(0.033)	(0.029)
Size	-0.0165***	-0.0515***	-0.0198***	-0.0694***
	(0.000)	(0.001)	(0.000)	(0.000)
Leverage	0.0494***	0.163***	0.0487***	0.163***
	(0.002)	(0.002)	(0.003)	(0.004)
Growth	-0.00468	0.0168	0.0102	0.0680***
	(0.517)	(0.409)	(0.181)	(0.002)
ΔLiabilities	0.00375	0.0248	0.00714	0.0319*
	(0.509)	(0.111)	(0.216)	(0.050)
Turn	-0.0213**	-0.0775**	-0.0164*	-0.0612*
	(0.020)	(0.025)	(0.099)	(0.085)
CFO	-0.132***	-0.896***	-0.128***	-0.881***
	(0.0015)	(0.000)	(0.002)	(0.000)
Constant	0.252***	1.212***	0.299***	1.455***
	(0.001)	(0.000)	(0.000)	(0.000)
Observations	10,034	10,034	10,031	10,031
R-squared	17.8%	21.0%	17.7%	20.4%
firm & year FE	YES	YES	YES	YES

Panel A reports the results of the model in Eq. (6). The sample consists of 139 Canadian firms that are mandatory IFRS adopters and covers the period 2005-2017. Panel B reports the results of the difference-in-difference analysis based on the model in Eq. (7). The sample consists of 139 Canadian firms that are mandatory IFRS adopters and 742 EU firms reporting under IFRS for the whole sample period. The sample covers the period 2005-2017. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm and year-fixed effects. Estimated coefficients are followed by p-values in parentheses. Presented p-values are based on clustered standard errors at firm level, which account for heteroscedasticity. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 4: Summary statistics – Income smoothing analysis

Panel A: Accounting expertise

Variables	N	Mean	SD	P25	Median	P75
# directors w/ Acct Exp	11,343	1.863	1.498	1.000	2.000	3.000
ΔAcct Exp	11,343	0.027	0.656	0.000	0.000	0.000
ΔAcct Exp Canada	2,130	0.042	0.720	0.000	0.000	0.000
ΔAcct Exp EU	9,213	0.023	0.640	0.000	0.000	0.000
Positive Δ Acct Exp Canada	315	1.203	0.532	1.000	1.000	1.000
Positive Δ Acct Exp EU	1,247	1.174	0.427	1.000	1.000	1.000
Negative Δ Acct Exp Canada	204	-1.422	0.859	-1.000	-1.000	-1.000
Negative Δ Acct Exp EU	1,000	-1.252	0.515	-1.000	-1.000	-1.000

Panel B: Regression variables

Variables	N	Mean	SD	P25	Median	P75
SMTH	11,343	1.403	1.381	0.654	1.058	1.663
IncrAcct	11,343	0.138	0.345	0.000	0.000	0.000
BoardSize	11,343	10.393	4.315	7.000	10.000	13.000
IndepDir	11,343	0.752	0.171	0.667	0.800	0.888
Size	11,343	14.333	1.944	13.058	14.261	15.672
Leverage	11,343	0.264	0.204	0.114	0.242	0.371
ΔStock	11,343	0.045	0.186	0.000	0.000	0.009
Growth	11,343	0.085	0.336	-0.030	0.049	0.139
ΔLiabilities	11,343	0.123	0.507	-0.061	0.031	0.158
Turn	11,343	0.906	0.585	0.489	0.818	1.202
CFO	11,343	0.075	0.096	0.040	0.076	0.117

Panel C: Pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1)SMTH	1										
(2)IncrAcct	-0.032*	1									
(3) Size	-0.001	0.051*	1								
(4)Leverage	-0.005	0.054*	0.174*	1							
(5) ΔStock	0.070*	0.029*	-0.128*	0.110*	1						
(6)Growth	-0.007	0.006	-0.104*	0.119*	0.143*	1					
(7)ΔLiabilities	-0.001	0.015	-0.104*	0.278*	0.142*	0.374*	1				
(8)Turn	-0.089*	-0.026*	-0.128*	-0.235*	-0.127*	-0.042*	-0.126*	1			
(9)CFO	-0.070*	-0.003	0.207*	-0.087*	-0.199*	0.037*	-0.021*	0.188*	1		
(10)BoardSize	-0.037*	0.067*	0.574*	0.100*	-0.085*	-0.057*	-0.048*	-0.068*	0.094*	1	
(11)IndepDir	0.034*	0.084*	0.306*	0.030*	0.001	-0.063*	-0.052*	-0.062*	0.025*	0.246*	1

This table presents summary statistics for the variables used in the test of Hypothesis 2. Panel A presents descriptive statistics related to accounting expertise. Panel B presents descriptive statistics for the variables used in the model in Eq. (9). The model in Eq. (8) uses a subsample consisting of only the Canadian firms in the sample of the model in Eq. (9).Panel C reports pairwise correlations for the dependent and control variables used for the model in Eq. (9). The sample covers the period 2005-2017 and consists of 207 Canadian firms that are mandatory IFRS adopters and 775 EU firms reporting under IFRS for the whole sample period. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. In Panel C, * indicates significance at the 5% level or lower.

Table 5: Main test of Hypothesis 2 – Accounting expertise & income smoothing

Panel A: Regression results

Variables	(1) SMTH	(2) SMTH
*POST*IncrAcct*	-0.305**	
	(0.047)	
*POST*TREAT*		0.464***
		(0.000)
*POST*TREAT*IncrAcct*		-0.356**
		(0.023)
BoardSize	-0.0334	-0.0434***
	(0.220)	(0.000)
IndepDir	0.763*	0.195
	(0.070)	(0.124)
Size	-0.215**	-0.164***
	(0.033)	(0.000)
Leverage	-0.108	-0.192
	(0.737)	(0.165)
Growth	-0.115	-0.0506
	(0.204)	(0.389)
ΔStock	-0.107	0.143
	(0.446)	(0.106)
ΔLiabilities	0.0366	-0.0121
	(0.615)	(0.751)
Turn	0.482**	0.196**
	(0.014)	(0.016)
CFO	-0.307	-0.471**
	(0.628)	(0.028)
Constant	1.963	3.390***
	(0.112)	(0.000)
Observations	2,130	11,343
R-squared	46.0%	43.7%
Firm & year FE	YES	YES

Panel B: t-tests of differences in means of residual SMTH(increasing accounting expertise CA & EU)

	PRE-IFRS	POST-IFRS	Diff	t-stat
Canada	5.2079	1.8944	3.3135***	2.39
EU	2.9602	1.4667	1.4935***	3.83

Panel C: t-tests of differences in means of residual SMTH (increasing accounting expertise CA & all EU)

	PRE-IFRS	POST-IFRS	Diff	t-stat
Canada	5.2079	1.8944	3.3135***	2.39
EU	3.056	1.508	1.548***	5.72

Panel A reports the results of the models in Eq. (8) and (9). The sample in column 1 consists of 207 Canadian firms that are mandatory IFRS adopters and covers the period 2005-2017. The sample in column 2 covers the same period and consists of 207 Canadian mandatory IFRS adopters and 775 EU firms reporting under IFRS for the whole period. Panel B (C) presents t-tests of differences in means of the residuals calculated based on the Model in Eq. (10). The sample in Panel B consists of Canadian and EU firms with an increase in accounting expertise one year prior to mandatory IFRS adoption in Canada. The sample in Panel C consists of Canadian firms with an increase in accounting expertise one year prior to mandatory IFRS adoption and all EU sample firms. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm- and year-fixed effects. Estimated coefficients are followed by p-values in parentheses. Presented p-values are based on robust standard errors, which account for heteroscedasticity. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 6: Summary statistics – Timely loss recognition analysis

Panel A: Accounting expertise

Variables	N	Mean	SD	P25	Median	P75
# directors w/ Acct Exp	2,264	2.255	1.358	1.000	2.000	3.000
Δ Acct Exp	2,264	0.049	0.740	0.000	0.000	0.000
Negative Δ Acct Exp	224	-1.384	0.828	-1.000	-1.000	-1.000
Positive Δ Acct Exp	330	1.276	0.614	1.000	1.000	1.000

Panel B: Regression variables

Variables	N	Mean	SD	P25	Median	P75
EPS	2,264	-0.069	0.387	-0.057	0.030	0.067
Ret	2,264	0.537	1.169	-0.088	0.185	0.645
DR	2,264	0.340	0.474	0.000	0.000	1.000
IncrAcct	2,264	0.146	0.353	0.000	0.000	0.000
BoardSize	2,264	8.526	2.697	7.000	8.000	10.000
IndepDir	2,264	0.769	0.148	0.700	0.818	0.875
Size	2,264	13.572	2.080	12.322	13.700	14.967
Leverage	2,264	0.223	0.227	0.010	0.185	0.346
ROA	2,264	-0.020	0.183	-0.056	0.024	0.069
MTB	2,264	0.775	0.817	0.331	0.560	0.915

Panel C: Pairwise correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)EPS	1									
(2)Ret	-0.027	1								
(3) DR	-0.105*	-0.444*	1							
(4)IncrAcct	-0.039	-0.002	0.031	1						
(5)Size	0.256*	-0.209*	-0.001	-0.015	1					
(6)Leverage	-0.021	-0.103*	0.043*	0.098*	0.221*	1				
(7)ROA	0.562*	-0.128*	-0.057*	-0.009	0.462*	0.011*	1			
(8)MTB	-0.204*	-0.091*	-0.178*	-0.064*	0.009	-0.154*	-0.059*	1		
(9)BoardSize	0.228*	-0.173*	0.026	0.043*	0.716*	0.171*	0.272*	-0.121*	1	
(10)IndepDir	0.042*	-0.123*	0.036	0.084*	0.274*	0.103	0.091*	0.013	0.245*	1

This table presents summary statistics for the variables used in the test of Hypothesis 3. Panel A presents descriptive statistics related to accounting expertise. Panel B presents descriptive statistics for the variables used in the model in Eq. (12). Panel C reports pairwise correlations for the dependent and control variables used for the model in Eq. (12). The sample covers the period 2005-2017 and consists of 215 Canadian firms that are mandatory IFRS adopters. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. In Panel C, * indicates significance at the 5% level or lower.

Table 7: Main test of Hypothesis 3 –Accounting expertise & timely loss recognition

Variables	(1) EPS
DR	0.0307
	(0.242)
Return	0.0815***
	(0.000)
*DR*Ret*	-0.0252
	(0.852)
*POST*DR*	0.0435
	(0.211)
*POST*Ret*	0.00715
	(0.675)
*POST*DR*Ret*	0.664***
	(0.004)
*DR*IncrAcct*	0.251*
	(0.078)
*Ret*IncrAcct*	0.00184
	(0.965)
*DR*Ret*IncrAcct*	1.462*
	(0.075)
*POST*DR*IncrAcct*	-0.304*
	(0.054)
*POST*Ret*IncrAcct*	-0.123
	(0.158)
*POST*DR*Ret*IncrAcct*	-2.129**
	(0.021)
BoardSize	0.00539
	(0.395)
IndepDir	0.0256
	(0.741)
Size	-0.108***
	(0.000)
Leverage	0.0431
	(0.361)
ROA	1.281***
	(0.000)
MTB	-0.00417
	(0.881)
Constant	1.172***
	(0.000)
Observations	2,264
R-squared	64.1%
Firm & year FE	YES

This table reports the results of the model in Eq. (12). The sample consists of 215 Canadian firms that are mandatory IFRS adopters and covers the period 2005-2017. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm- and year-fixed effects. Estimated coefficients are followed by p-values in parentheses. Presented p-values are based on clustered standard errors at firm level, which account for heteroscedasticity. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 8: Accounting expertise & discretionary accruals (US as control sample)

Panel A: Accounting expertise

Variables	N	Mean	SD	P25	Median	P75
# directors w/ Acct Exp	14,839	2.197	1.281	1.000	2.000	3.000
ΔAcct Exp	14,839	0.031	0.488	0.000	0.000	0.000
ΔAcct Exp US	13,548	0.027	0.478	0.000	0.000	0.000
Positive Δ Acct Exp US	1,198	1.149	0.486	1.000	1.000	1.000
Negative Δ Acct Exp US	932	-1.082	0.401	-1.000	-1.000	-1.000

Panel B: Regression variables

Variables	N	Mean	SD	P25	Median	P75
DACC-J	14,839	-0.015	0.135	-0.065	-0.012	0.035
DACC-JM	14,815	-0.015	0.137	-0.067	-0.012	0.036
IncrAcct	14,839	0.091	0.287	0.000	0.000	0.000
BoardSize	14,839	8.425	2.279	7.000	8.000	10.000
IndepDir	14,839	0.836	0.093	0.800	0.875	0.909
Size	14,839	13.574	2.109	12.072	13.499	15.058
Leverage	14,839	0.229	0.249	0.004	0.173	0.355
Growth	14,839	0.126	0.421	-0.030	0.064	0.182
ΔLiabilities	14,839	0.187	0.660	-0.066	0.046	0.221
Turn	14,839	0.952	0.715	0.450	0.773	1.270
CFO	14,839	0.059	0.170	0.035	0.087	0.140

Panel C: Regression results

Variables	(1) DACC-J	(2) DACC-J>0	(3) DACC-JM	(4) DACC-JM>0
*POST*TREAT*	-0.0217**	-0.0297	-0.0175*	-0.00664
	(0.019)	(0.408)	(0.060)	(0.843)
*POST*TREAT*IncrAcct*	0.0360*	0.242***	0.0321*	0.155**
	(0.051)	(0.004)	(0.097)	(0.046)
Controls & Constant	YES	YES	YES	YES
Observations	15,194	15,194	15,168	15,168
R-squared	15.3%	21.7%	15.3%	21.2%
Firm & year FE	YES	YES	YES	YES

This table presents results for the test of hypothesis 1 with US as control sample. Panel A presents descriptive statistics related to accounting expertise. Panel B presents descriptive statistics for the variables used in the model in Eq. (7). Panel C reports the results of the difference-in-difference analysis based on the model in Eq. (7). The sample covers the period 2005-2017 and consists of 139 Canadian firms that are mandatory IFRS adopters and 1,411 US firms reporting under US GAAP for the whole sample period. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm- and year-fixed effects. Estimated coefficients are followed by p-values in parentheses. Presented p-values are based on clustered standard errors at firm level, which account for heteroscedasticity. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Table 9: Accounting expertise & income smoothing (US as control sample)

Panel A: Accounting expertise

Variables	N	Mean	SD	P25	Median	P75
# directors w/ Acct Exp	26,666	2.178	1.282	1.000	2.000	3.000
ΔAcct Exp	26,666	0.034	0.535	0.000	0.000	0.000
ΔAcct Exp US	24,536	0.033	0.516	0.000	0.000	0.000
Positive Δ Acct Exp US	2,630	1.141	0.418	1.000	1.000	1.000
Negative Δ Acct Exp US	1,985	-1.101	0.370	-1.000	-1.000	-1.000

Panel B: Regression variables

Variables	N	Mean	SD	P25	Median	P75
SMTH	26,666	1.475	1.270	0.761	1.146	1.713
IncrAcct	26,666	0.110	0.313	0.000	0.000	0.000
BoardSize	26,666	8.402	2.289	7.000	8.000	10.000
IndepDir	26,666	0.836	0.093	0.800	0.875	0.909
Size	26,666	13.493	2.061	12.077	13.496	14.911
Leverage	26,666	0.249	0.252	0.024	0.201	0.371
ΔStock	26,666	0.057	0.236	0.000	0.005	0.032
Growth	26,666	0.117	0.397	-0.028	0.062	0.175
ΔLiabilities	26,666	0.177	0.650	-0.069	0.040	0.205
Turn	26,666	1.040	0.750	0.491	0.874	1.398
CFO	26,666	0.064	0.160	0.039	0.087	0.137

Panel C: Regression results

Variables	(1) SMTH
*POST*TREAT*	0.395***
	(0.000)
*POST*TREAT*IncrAcct*	-0.306**
	(0.019)
Controls & Constant	YES
Observations	26,666
R-squared	44.3%
Firm & year FE	YES

Panel D: t-tests residuals SMTH increase accounting expertise CA & US

	PRE-IFRS	POST-IFRS	Diff	t-stat
Canada	4.4759	2.0842	2.3917**	2.02
US	3.5779	1.609	1.968***	3.08

Panel E: t-tests residuals SMTH increase accounting expertise CA & all US

	PRE-IFRS	POST-IFRS	Diff	t-stat
Canada	4.4759	2.0842	2.3917**	2.02
US	3.1747	1.6788	1.495***	4.66

This table presents results for the test of hypothesis 2 with US firms as control sample. Panel A presents descriptive statistics related to accounting expertise. Panel B presents descriptive statistics for the variables used in the models in Eq. (9). Panel C reports the results of the difference-in-difference analysis based on the model in Eq. (9). The sample covers the period 2005-2017 and consists of 207 Canadian firms that are mandatory IFRS adopters and 2,089 US firms reporting under US GAAP for the whole sample period. Panel B presents t-tests of differences in means of the residuals calculated based on the Model in Eq. (10). The sample consists of Canadian and US firms with an increase in accounting expertise one year prior to mandatory IFRS adoption in Canada. Panel B presents t-tests of differences in means of the residuals calculated based on the Model in Eq. (10). The sample consists of Canadian firms with an increase in accounting expertise one year prior to mandatory IFRS adoption in Canada and all US firms, independent of changes in accounting expertise. Detailed definitions of all variables are provided in Appendix. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. The regressions include firm- and year-fixed effects. Estimated coefficients are followed by p-values in parentheses. Presented p-values are based on clustered standard errors at firm level, which account for heteroscedasticity. Two-tailed significance levels at 10%, 5%, and 1% are indicated by *, **, and ***, respectively.

Part V: Managerial Style in Cost Asymmetry and Shareholder Value

Kerstin Lopatta, Thomas Kaspereit & Laura-Maria Gastone

Abstract

We show that CEOs' contribution to SG&A cost asymmetry is associated with lower shareholder value. CEO-related excess SG&A cost stickiness of CEOs with compensation less tied to shareholder value creation and high power drive this association. Last, we provide first evidence that cost asymmetry incorporates a harmful element to the firm and shareholders, namely CEO-related excess SG&A cost asymmetry.

Keywords: Cost stickiness; cost asymmetry; CEO-fixed effect; shareholder value

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1 Introduction

Traditional cost models separate costs into fixed and variable costs under the assumption that the variable costs vary symmetrically with activity levels while fixed costs remain constant (Noreen, 1991). However, recent literature has found SG&A costs to behave asymmetrically.[1] On average, SG&A costs increase more rapidly when the activity level increases than they decrease when the activity level decreases – a phenomenon known as "sticky costs" (M. C. Anderson et al., 2003). Under an excess capacity assumption, the response of SG&A costs to a decrease in activity level exceeds the SG&A cost response to an equivalent increase in activity, in which case they are labeled "anti-sticky costs" (Banker, Byzalov, Ciftci, & Mashruwala, 2014).

Existing research on SG&A cost asymmetry mostly focuses on explaining this phenomenon with firm-specific and macro-economic factors, such as asset intensity, employee intensity, life cycle of the company, and gross domestic product growth (M. C. Anderson et al., 2003; Banker & Byzalov, 2014; Banker, Byzalov, & Plehn-Dujowich, 2014; Dierynck et al., 2012). However, there has been little to no research on the direct effects of top management on the asymmetry of SG&A costs or on its economic consequences. We close this literature gap by investigating how individual CEO-induced SG&A cost asymmetry in excess of the firm-specific level is associated with shareholder value.

We follow Bertrand and Schoar (2003) and assume that individual CEOs' direct contribution to SG&A cost asymmetry is supported by extensions of agency theory and neoclassical theory. Having identified the part of SG&A cost asymmetry which is induced by decisions of individual CEOs and is in excess of the firm-specific level of SG&A cost asymmetry determined by firm-specific and macro-economic factors, labeled as a CEO-related excess level of SG&A cost asymmetry, we explore whether it has a significant association with shareholder value.

Following two different threads of agency theory, we expect that - independently of the direction in which it deviates - individual CEO-related excess SG&A cost asymmetry is negatively associated with shareholder value, as it represents agency costs due to a CEO's idiosyncratic style that is imposed on the firm and its shareholders. On the one hand, individual CEOs' cost management decisions may be biased by potential personal benefits resulting from

[1] The focus on SG&A costs is justified as they play a significant role, representing approximately 27 percent of the total cost of operations (C. X. Chen et al., 2012).

empire-building activities, in which case we expect an excess level of SG&A cost stickiness. On the other hand, CEOs' myopia due to potential gains from meeting or beating current earnings targets could motivate them to make sub-optimal decisions regarding cost management, leading to excess SG&A cost anti-stickiness. However, under this assumption it is also possible that capital markets do not punish firms in terms of shareholder value if they are also short-term oriented, as cost anti-stickiness leads to higher current earnings per share (EPS). Although we acknowledge that CEOs' cost adjustment decisions could also stem from stewardship (e.g., because CEOs have private information), we conjecture that on average, the effects described by agency theory dominate.

To test our predicted association between CEO-related excess cost asymmetry and shareholder value, we follow a two-step approach. In a first step, we model firm-level SG&A cost asymmetry as a function of firm-specific and macro-economic factors identified by prior literature. For this we use a self-developed extended version of the cost asymmetry model in M. C. Anderson et al. (2003).[2] By analogy to the literature on abnormal audit fees and abnormal accruals, we assume that the firm-specific level depends only on firm-specific and macro-economic factors and thus interpret any deviation from it as a deviation from the firm-specific level of SG&A cost asymmetry. To determine how CEOs contribute to this, we add CEO-fixed effects to our model and interpret the personal contribution of each CEO to the level of cost asymmetry as excess cost asymmetry that is induced by their decisions. We use the method outlined in Bertrand and Schoar (2003) to estimate CEO-fixed effects on SG&A cost asymmetry for moving CEOs.[3] In a second step, we use these effects to conduct our main test on the association between CEO-related excess SG&A cost asymmetry and shareholder value, measured by *Tobin's Q* (Kaldor, 1966; Tobin & Brainard, 1976).

Our results show that individual CEOs' contribution to the level of SG&A cost asymmetry is statistically significant. The results also support our second prediction that the CEO-related excess level of cost asymmetry is associated with lower shareholder value, this association being mainly driven by CEO-related excess SG&A cost stickiness. Additional tests help us confirm the robustness of our results by eliminating the possibility that the identified CEO-fixed effects are the result of CEO overconfidence or only representative of the decisions of newly appointed CEOs. Furthermore, we show that the documented negative association of CEO-related excess cost asymmetry with shareholder value is stronger for CEOs whose

[2] Hereafter, the "ABJ model."
[3] i.e., CEOs who worked for at least two different firms over the observed period.

compensation is less dependent on shareholder value creation. Finally, we find that powerful CEOs (in terms of control rights) who contribute to CEO-related excess cost stickiness as well as CEOs with less power who contribute to CEO-related excess cost anti-stickiness drive the negative association with shareholder value.

This study contributes to the literature by providing empirical proof of the association between individual CEO-related SG&A cost asymmetry and shareholder value, thus linking the strand of managerial accounting literature on cost asymmetry (M. C. Anderson et al., 2003; Banker & Byzalov, 2014) to finance literature (Cunat et al., 2012; Kaspereit et al., 2017). It also contributes to the literature on individual CEOs' cost management decisions as an important factor in explaining SG&A cost asymmetry (C. X. Chen et al., 2012; C. X. Chen et al., 2013; J. V. Chen et al., 2017; Dierynck et al., 2012; Kama & Weiss, 2013). Furthermore, it follows prior research recommendations in that it identifies the harmful part of cost asymmetry (Banker & Byzalov, 2014), represented in this paper by CEO-related excess SG&A cost asymmetry.

The remainder of this paper is organized as follows. In section 2 we review the existing literature and develop our hypotheses. In section 3 we discuss the sample and methodology. Section 4 presents the results, and section 5 concludes.

2 Literature review and hypothesis development

Most of the existing literature on the topic of cost asymmetry focuses on explaining it through economic factors such as asset or employee intensity, stock performance, demand uncertainty, life cycle (M. C. Anderson et al., 2003; M. C. Anderson et al., 2016; M. C. Anderson & Lee, 2016; Dierynck et al., 2012; Zhu & Xu, 2011), capacity utilization (Balakrishnan et al., 2004), the criticality of cost (Balakrishnan & Gruca, 2008), pattern of sales changes (Banker, Byzalov, Ciftci, & Mashruwala, 2014), management expectations (J. V. Chen et al., 2017), employment protection legislation (Banker et al., 2013), or national culture (Kitching et al., 2016).

Few studies examine potential top managerial influence on cost asymmetry. C. X. Chen et al. (2012), C. X. Chen et al. (2013), Dierynck et al. (2012) or Kama and Weiss (2013) examine the influence of agency problem-induced management incentives on SG&A cost asymmetry at firm level. C. X. Chen et al. (2012) find that management's agency problem-induced empire-building incentives (proxied by free cash flow, CEO tenure, CEO horizon, and CEO fixed pay) lead to increased SG&A cost stickiness. Conversely, Kama and Weiss (2013) find that agency problem-induced incentives to meet earnings targets or to avoid losses lessen

the degree of SG&A cost stickiness at firm level. Dierynck et al. (2012) also find this to hold true for a sample of private Belgian firms. Additionally, C. X. Chen et al. (2013) find that SG&A cost stickiness increases with CEO overconfidence. However, to the best of our knowledge, there is no study that examines the direct impact of individual top managers' leadership style on SG&A cost asymmetry.

Beyond the part of SG&A cost asymmetry, which arises from incentives due to the agency problem and other economic determinants, it is plausible to assume that the idiosyncratic characteristics of top executives, particularly CEOs,[4] have an additional impact on the level of SG&A cost asymmetry. First, extensions of standard agency models imply that top managers have discretion inside their firm and are able to influence corporate choices through their idiosyncratic style, especially if corporate controls are limited. Second, based on extensions of the neoclassical model, top managers are purposefully chosen by firms because of their idiosyncratic characteristics, which means they are a good fit for the firm's strategy. However, as also argued by Bertrand and Schoar (2003), regardless of the underlying theory we expect top managers to play a significant role in corporate decisions because of differences in style. This is also supported by academic literature's widely shared belief that CEOs are the most powerful individuals in a modern corporation (Pearce & DeNisi, 1983; Pearce & Robinson, 1987; Tone Hosmer, 1982) because of unique attributes such as their legitimate authority and broad knowledge about the firm they lead (Roth, 1995; Wallace et al., 1990). In the context of managerial accounting, we assume that CEOs have to make strategic cost adjustment choices and are often faced with a trade-off between the potential costs (e.g., reputational damage when laying off employees) and potential benefits (e.g., maintaining profitability margins) of cost reduction. As different managers have distinctive idiosyncratic characteristics which guide their decisions, their interpretation of such current complex decision problems will differ.

Bertrand and Schoar (2003) provide the first comprehensive empirical evidence of the existence of specific patterns in managerial decision-making, indicating differences in style across managers. By requiring managers in their sample to have worked for at least two different firms over the analyzed period (so-called "moving" managers), they are able to appropriately separate manager- from firm-fixed effects and relate the former to idiosyncratic managerial style. Other archival studies show that personal managerial style and talent, too,

[4] CEOs, unlike CFOs, are directly responsible for resource allocation decisions. Bertrand and Schoar (2003) also find that CEOs have a larger impact on organizational strategy than CFOs.

impact voluntary disclosure and earnings guidance (Bamber et al., 2010; Brochet et al., 2011; Yang, 2012), earnings management (Dejong & Ling, 2013; Ge et al., 2011), executive compensation (Graham et al., 2012), tone of conference calls (Davis et al., 2015), and firms' competitive position (Molina et al., 2004).

Although the direct impact of CEOs is not obvious in the case of cost adjustment decisions, as resource allocation decisions take place at different levels of the firm (e.g., business unit level), there is reasonable proof to sustain this assumption. First, prior literature has shown that tone at the top matters (Merchant, 1990; Rotemberg & Saloner, 2000; Schaubroeck et al., 2012) and that it can influence how lower-level managers make organizational decisions. Similarly, there is evidence that CEOs play a role at division level through their capital allocation decisions, causing lower-level managers to base their organizational decisions on the allocated resources (Gaspar & Massa, 2011; Xuan, 2009). Second, beyond the theoretical arguments, there is also supporting anecdotal and practice evidence. Figure 1 depicts the development of sales and corresponding SG&A costs at IBM between 1994 and 2011, when Louis V. Gerstner Jr. and Samuel J. Palmisano served as CEOs. Louis V. Gerstner Jr. was in charge from 1994 to 2002 and his leadership style was based on the idea that "the last thing IBM needs right now is a vision" (Charan & Colvin, 1999). He focused on execution, decisiveness, and changes to simplify the organization and regain advantage through efficiency. This leadership style is also observable in the way SG&A costs behaved relative to changes in sales. Even in years with high sales increases, SG&A costs exhibited only a slight increase or even a decrease, indicating the results of an efficiency-based strategy. However, we observe a drastic change in 2003, when Samuel J. Palmisano took over as CEO. Unlike his predecessor, Palmisano's leadership strategy was innovation-driven. He argued that IBM needs to "go to a space where" it would be "uniquely positioned" (Lohr, 2011), thus focusing on developing unique products with high profit margins and reinventing IBM as a whole. As before, the SG&A cost behavior in relation to sales reflects this strategy. In most years, the increase in SG&A costs was almost as high as or even exceeded the increase in sales, in one year even increasing although sales declined.[5]

>> Insert Figure 1 about here <<

[5] Three of the years in our example exhibit unusual SG&A cost and sales behavior. In 2001 and 2002 the dotcom bubble burst, explaining the decreasing sales and the corresponding SG&A cost behavior. The financial crisis peaked in 2009, explaining the decrease in both sales and SG&A costs.

Building on Bertrand and Schoar (2003), the aforementioned theory, and anecdotal evidence, we assume that an additional part of SG&A cost asymmetry at the firm level results from differences in style due to a CEO's idiosyncratic characteristics:

Hypothesis 1: *CEO fixed effects contribute significantly to excess SG&A cost asymmetry at firm level.*

The assumption that CEO fixed effects significantly contribute to the level of SG&A cost asymmetry at firm level provides a setting that allows us to address an important under-researched part of the literature on cost asymmetry: the potential economic consequences of asymmetric cost behavior. To the best of our knowledge, only two studies exist in this area of research. Weiss (2010) explores the influence of cost stickiness on analysts' earnings forecasts and finds that on average, firms with stickier costs have less accurate analysts' earnings forecasts, lower analyst coverage, and a weaker market response to their earnings surprises. Similarly, Ciftci et al. (2016) analyze the implications of cost behavior on analysts' earnings forecasts and find that analysts do not fully understand cost asymmetry, which leads to lower earnings forecast accuracy. We extend this part of cost asymmetry literature by investigating how CEO fixed effects on cost asymmetry are associated with shareholder value.

Prior research on the effect of individual management characteristics on firm value has found that managerial decisions concerning discretionary general and administrative expenses (Capozza & Seguin, 1998) as well as excessive CEO compensation (Brick et al., 2006) are negatively associated with firm value (Capozza & Seguin, 1998). Conversely, female representation in top management (Dezsö & Ross, 2012), CEO ownership (Griffith, 1999), and CEO talent (Falato et al., 2015; Gabaix & Landier, 2008; Jung & Subramanian, 2017) all improve firm value. Last, Berson et al. (2008) find that CEOs' psychological characteristics, as a form of tone at the top, are indirectly associated with firms' financial performance. We extend this literature stream by linking CEO style in cost asymmetry to shareholder value.

In analogy to the literature on abnormal audit fees (Choi et al., 2010) and abnormal accruals (Bartov et al., 2000), we assume that firm-specific and macroeconomic variables determine the firm-specific level of SG&A cost asymmetry. However, we assume that CEO fixed effects represent a deviation from this firm-specific level, defined as CEO-related excess SG&A cost asymmetry. Extensions of standard agency models show that top managers can impose their own idiosyncratic style on a company, especially if they have enough decision-making power within the company (Bertrand & Schoar, 2003). Placing this in the SG&A cost asymmetry setting, managers may choose a suboptimal SG&A cost management strategy due

to personal empire-building aspirations, bounded rationality, or cognitive limitation (Cyert & March, 1963; March & Simon, 1993), which could either lead to excess cost stickiness or anti-stickiness. Possibly, the CEO-related excess SG&A cost anti-stickiness is due to CEOs myopically chasing short-term gains (Cadman & Sunder, 2014; Edmans et al., 2015; Graham et al., 2005), which leads them to sacrificing long-term shareholder value. However, if capital markets also focus on current earnings and thus short-term gains, this would even maximize current shareholder value, making a case for a neutral or even positive relationship between CEO-related excess SG&A cost-anti stickiness and current market valuation. Conversely, managers dislike the negative emotions associated with laying off employees or closing production sites (Cascio, 1993; Clair & Dufresne, 2004; Gandolfi & Hansson, 2015). Here, the adjustment costs perceived by the CEO are too high compared to the potential savings from cutting resources. In this case, we expect the resulting excess SG&A cost stickiness to be negatively related to shareholder value, given that even if capital markets focused mainly on the short-term, not cutting resources would lead to lower current EPS. Furthermore, managers have certain incentives to act in their own interest without regard for the company's shareholders. Numerous empirical studies suggest that the resulting agency costs are directly imposed on the firm and its shareholders (Lang & Stulz, 1994; Malmendier & Tate, 2008; Rajan et al., 2000; Schoar, 2002). Thus, we expect that, regardless of the direction of the deviation, CEO-related excess cost asymmetry on average is harmful to shareholder value. Furthermore, Van der Stede (2000) finds that corporate management can mandate more slack (i.e., reserve of available resources for operating costs) depending on the budget strategy they follow. Although we acknowledge that CEOs' cost adjustment decisions could also stem from stewardship, as would be the case of CEOs possessing private information that leads them to not adjust costs downwards, we conjecture that on average the effects described by agency theory dominate. Thus, we formulate our second hypothesis as follows:

Hypothesis 2: *The CEO-related excess level of SG&A cost asymmetry is negatively associated with shareholder value.*

3 Methodology and sample

3.1 Cost asymmetry model

For the first step of our analysis, we use an extended version of the ABJ model to identify asymmetric SG&A cost behavior[6]:

$$\begin{aligned}\log(\Delta \text{SG\&A})_{it} = {} & \beta_0 + \beta_1 \log(\Delta \text{Sale})_{it} + \beta_2 D_{it} + \beta_3 D_{it} * \log(\Delta \text{Sale})_{it} + \sum \beta_k \text{DET}_{it} \\ & + \sum \beta_l \text{DET}_{it} * \log(\Delta \text{Sale})_{it} + \sum \beta_m D_{it} * \text{DET}_{it} + \sum \beta_n \text{DET}_{it} * D_{it} * \log(\Delta \text{Sale})_{it} \\ & + \mu_i + \tau_t + \varepsilon_{it}, \end{aligned} \quad (1)$$

where $\log(\Delta Sale)_{it}$ represents the logarithm of the annual change in sales revenue and $\log(\Delta SG\&A)_{it}$ represents the corresponding annual change in SG&A costs. D_{it} is an indicator variable, which takes the value of one if sales decrease in the current period and zero otherwise. DET_{it} represents the list of cost asymmetry determinants identified by prior literature, μ_i and τ_t are firm- and time-fixed effects. The change in sales is a proxy for changes in activity levels, which drive the changes in SG&A costs, as these are not directly observable. We follow prior literature and use a logarithmic specification to alleviate heteroscedasticity and to facilitate the economic interpretation of the estimated coefficients. Additionally, the ratio form of the dependent variable and the driver variable, change in sales revenue, improves comparability across firms.

For the second step of our analysis, we include CEO-fixed effects (Bertrand & Schoar, 2003):

$$\begin{aligned}\log(\Delta \text{SG\&A})_{it} = {} & \beta_0 + \beta_1 \log(\Delta \text{Sale})_{it} + \beta_2 D_{it} + \beta_3 D_{it} * \log(\Delta \text{Sale})_{it} + \sum \beta_k \text{DET}_{it} \\ & + \sum \beta_l \text{DET}_{it} * \log(\Delta \text{Sale})_{it} + \sum \beta_m D_{it} * \text{DET}_{it} + \sum \beta_n \text{DET}_{it} * D_{it} * \log(\Delta \text{Sale})_{it} \\ & + \sum \gamma_k CEO_{jt} + \sum \gamma_l CEO_{jt} * \log(\Delta SAle)_{it} + \sum \gamma_m D_{it} * CEO_{jt} \\ & + \sum \gamma_n CEO_{jt} * D_{it} * \log(\Delta Sale)_{it} + \mu_i + \tau_t + \varepsilon_{it}, \end{aligned} \quad (2)$$

where CEO_{jt} are indicator variables for each individual CEO in our sample of 3,989 different CEOs. The use of indicator variables for CEO-fixed effects allows us to estimate these for all moving CEOs within our sample (i.e., CEOs employed by at least two different firms in our sample over the observed period).[7] We include firm- and time-fixed effects in all our equations

[6] We choose the ABJ model as it the most accepted and validated model on cost asymmetry in prior literature and can be seen as state of the art in cost asymmetry-related empirical analysis.

[7] Although we initially include all CEOs in our sample in the regression (whether they moved or not), we only obtain estimated coefficients for the moving CEOs because our regression includes firm-fixed effects. Thus, if a CEO is only employed in one single firm over our sample period, the fixed effect of that particular CEO would already be captured by the firm-fixed effect and the variables corresponding to that CEO would thus be omitted from the estimation. Furthermore, we follow Bertrand and Schoar (2003) and keep observations with non-moving CEOs in our sample to improve the accuracy of the estimated coefficients on other variables that are not related to CEO fixed effects. The results remain qualitatively unchanged if we restrict our sample to observations with moving CEOs.

to account for possible correlation between CEO-fixed effects and other firm- and time-specific characteristics, which would lead to a biased estimation (Bertrand & Schoar, 2003). The estimation of Eq. (2) thus allows us to identify each moving CEO in our sample, each represented by a dummy variable, as an additional determinant of SG&A cost asymmetry, similar to previously identified firm-specific determinants with proxies in the form of dummy variables (e.g., successive sales decrease or incentives to meet earnings targets). To test our first hypothesis, we follow Bertrand and Schoar (2003) and perform an F-test of the joint statistical significance of the identified CEO-fixed effects on cost asymmetry, represented by the estimated coefficients γ_n on the three-way interaction terms $CEO_{jt}*D_{it}*\log(\Delta Sale)_{it}$. Additionally, we test whether the increase in explanatory power of the model by including CEO-fixed effects is statistically significant by running a firm-cluster robust version of the Vuong test (Vuong, 1989).

We select the cost asymmetry determinants for our model based on prior research. The complete definitions of the variables are provided in Table 1. Anderson et al. (2003) identify four main determinants of cost stickiness: asset intensity (*AINT*), employee intensity (*EINT*), economic growth (ΔGDP), and successive sales decrease (*SUC*). They argue that when SG&A activities rely more on assets owned and staff employed, the adjustment costs are likely to be higher, which would lead to higher SG&A cost stickiness, as managers are not willing to incur those costs given the uncertainty about the permanence of the change in activity level. However, C. X. Chen et al. (2012) find a positive association between the degree of SG&A cost stickiness and employee intensity, arguing that in more recent years firms have come to use more temporary labor, which allows for more flexibility. A successive sales decrease is a proxy for a more permanent change in activity levels, which would lead to lower cost stickiness. Conversely, during periods of economic growth managers consider decreases in sales to be more transitory, which should lead to a higher degree of SG&A cost stickiness. Further, we control for the impact of stock performance (*STOCK_RET*) on SG&A cost asymmetry which is, however, ambiguous (Chen et al. 2012). Either firms with good stock performance are better at cutting unutilized resources, leading to lower SG&A cost stickiness, or good stock performance may signal positive expectations about future earnings, meaning a higher activity level in the future and thus higher SG&A cost stickiness. Kama and Weiss (2013) argue that management incentives to meet expectations/targets lead to lower SG&A cost stickiness, as managers are more willing to cut (refrain from increasing) costs if sales decrease (increase). We use two dummy variables to proxy for these incentives, *AVOID_LOSS*

and *AVOID_DECREASE*. Next, following C. X. Chen et al. (2012) we use *FCF* and *CEO_HORIZON* to proxy for CEOs' empire-building incentives. We expect a positive coefficient on the three-way interaction term containing *FCF* following M. C. Anderson and Lee (2016). Since empire-building incentives arise mostly in the case of CEOs who expect to be in office for a long time, we expect a negative coefficient on the three-way interaction term of *CEO_HORIZON*. We use the measure for *LIFE_CYCLE* as defined in Dickinson (2011) to control for resource adjustment needs across different life stages of a company, given that introduction-, growth- and decline-stage firms tend to hold more slack resources than mature firms (M. C. Anderson and Lee (2016). Thus, we expect the coefficient on the three-way interaction term to be negative. We follow Dierynck et al. (2012) and include *ABN_ACCRUAL* (defined by following DeFond and Park (2001)) to control for the level of accrual-based earnings management, although we cannot predict the sign of the coefficient as accruals can be used for both decreasing and increasing earnings, depending on the incentives available to management. We also include an indicator variable (*PR_LOSS*) expected to lead to lower cost stickiness, following the same intuition as in the case of successive sales decreases. M. C. Anderson et al. (2016) argue that changes in SG&A costs are also driven by assets managed and markets reserved. To control for this, we use the logarithm of Δ*PP&E* and an interaction term (*INT_PPE*) defined as the Δ*PP&E* variable times an indicator variable taking the value of one if PP&E decreases in the current year and zero otherwise. We expect a significant positive coefficient on the Δ*PP&E* variable and a negative one on the interaction term.

3.2 Shareholder value model

We use the previously estimated CEO-fixed effects for our main analysis of the association between CEO-related excess SG&A cost asymmetry and shareholder value by estimating the following model:

$$Q_{it} = \alpha + \delta_1 |CEO_{it}| + \delta_2 \widehat{CS\_DET}_{it} + \delta_3 \hat{\epsilon}_{it} + \sum \delta_z Controls_{it} + \mu_i + \tau_t + \epsilon_{it}, \quad (3)$$

where Q_{it} is either *Tobin's Q* as defined in Kaplan and Zingales (1997)[8] or *Total Q* as defined by Peters and Taylor (2017)[9], $|CEO_{it}|$ are the absolute values of the estimated CEO-fixed effects on SG&A cost asymmetry ($\hat{\gamma}_n$) from Eq. (2), $\widehat{CS\_DET}_{it}$ is the firm-specific cost asymmetry attributable to previously identified factors (i.e., excluding CEO-fixed effects on SG&A cost

[8] This version of *Tobin's Q* is the most widely accepted, being used in numerous prior studies such as Baxter et al. (2013), L. A. Bebchuk and Cohen (2005), C. X. Chen et al. (2012), Gompers et al. (2003), and Servaes and Tamayo (2013).

[9] This measure can be downloaded directly from COMPUSTAT.

asymmetry and calculated as $\widehat{\beta_3} + \Sigma\widehat{\beta_n} DET_{it,}$ estimated in Eq. 2), $\hat{\varepsilon}_{it}$ are the error terms of the estimation of Eq. (2) and represent abnormal changes in SG&A costs, μ and τ are firm- and time-fixed effects, and *Controls* represent a set of control variables identified by prior research. We use absolute values of CEO-fixed effects on SG&A cost asymmetry, as we interpret any deviation from the level of SG&A cost asymmetry attributable to economic and firm-specific factors as excess individual CEO-induced cost asymmetry (i.e., excess cost stickiness or excess cost anti-stickiness) that is expected to be negatively associated with shareholder value. According to Hypothesis 2, we expect a significant negative coefficient δ_1. In additional analysis, we also differentiate between positive and negative values of CEO-fixed effects.

We follow prior corporate finance literature and use *Tobin's Q* as a proxy for shareholder value (Baxter et al., 2013; Gompers et al., 2003; Servaes & Tamayo, 2013) as it is said to dominate other performance measures such as stock return or other accounting measures because it does not require any risk adjustment or normalization (Lang & Stulz, 1994). We run additional analyses with the recently developed *Total Q* measure by Peters and Taylor (2017). They argue that, especially in recent years as the economy has shifted toward service- and technology-based industries, the level of intangible assets at firm level has increased considerably and that traditional *Tobin's Q* measures do not account for differences in the speed of response to changes in investment opportunities of intangible versus physical capital.

We also include the firm-specific SG&A level of cost asymmetry that is attributable to economic and firm-specific determinants (excluding CEO-related excess SG&A cost asymmetry). Its association with shareholder value has not been examined before, thus it is challenging to express expectations regarding its coefficient. However, we acknowledge the possibility that it may be negatively associated with shareholder value, as the factors determining the firm-specific level of cost asymmetry may potentially harm shareholder value (e.g., if top management have incentives to achieve current targets, this will be reflected in firm-level cost asymmetry but it may also harm long-term shareholder value because of short-term oriented decisions). In addition, we include the abnormal (i.e., unexplained) change in SG&A costs, proxied by the error term of the estimation of the model in Eq. (2), to further alleviate any omitted variable bias concern.

Table 1 provides definitions of control variables. We control for *SIZE* as previous research has found a significant negative association between market value and firm size (Allayannis & Weston, 2001; Baxter et al., 2013; C. R. Chen & Steiner, 2000; Lang & Stulz, 1994). We also include *LEVERAGE* to control for the relationship between capital structure

and firm value (Allayannis & Weston, 2001; Hoyt & Liebenberg, 2011). We include *BETA* to control for variation in *Tobin's Q* due to greater stock volatility (Hoyt & Liebenberg, 2011; Huselid et al., 1997). Further, we include *log(ΔSALE),* defined as in the cost asymmetry models, and *R&D* expenditures as well as advertising expenses (*ADVERT*) to control for the effect of growth opportunities (C. R. Chen & Steiner, 2000; Himmelberg et al., 1999; Huselid et al., 1997; La Porta et al., 2002). Given that firms are not required to disclose non-material research and development or advertising expenses, we follow prior literature and assign the value of zero to any observations with missing R&D or advertising expenses (Harjoto & Laksmana, 2016; Servaes & Tamayo, 2013; Woidtke, 2002). Following Allayannis and Weston (2001) and Lang and Stulz (1992), we include a dividend payment indicator (*DIVIDEND*) to control for access to financial markets. We also include *CF* to control for better investment opportunities due to higher cash flow (Bates et al., 2009). Additionally, we include *MKT_SHARE* to control for a firm's negotiating power (Vomberg et al., 2015) and *CAPITAL_INT* to control for managerial discretionary spending opportunities (Himmelberg et al., 1999). Lastly, we include return on operating assets *(ROA)* as a measure of profitability, which is expected to positively impact market value (Allayannis & Weston, 2001; C. R. Chen & Steiner, 2000; Hall, 1993; Hirschey, 1982).

>> Insert Table 1 about here <<

3.3 Sample selection

We construct our dataset using annual data for industrial firms from the COMPUSTAT Annual Files and the Federal Reserve Bank of St. Louis database, from which we obtain data on SG&A costs, sales revenue, and determinants of cost asymmetry. Data from the ExecuComp Annual Compensation files are used to estimate CEO-fixed effects on SG&A cost asymmetry. Because the ExecuComp data start in 1992, our sample covers the period 1992-2016.

We start with 307,429 firm-year observations in the COMPUSTAT annual files. Following prior research, we exclude financial companies (SIC code 6000-6999) because the structure of their financial statements is not comparable to that of other companies (Kama and Weiss, 2013), as well as observations with missing data on SG&A costs and sales revenue, with negative SG&A costs or negative sales revenue, and observations for which SG&A costs are higher than sales revenue (M. C. Anderson et al., 2003; Banker & Byzalov, 2014; C. X. Chen et al., 2012). This results in a sample of 146,549 firm-year observations. Next, we exclude any observations with missing data on any of our explanatory variables and trim the top and

bottom one percentile of observations with extreme values in all dependent and independent variables. This result in a sample of 72,493 firm-year observations.

The main limitation of our sample is the lower coverage of CEO data in ExecuComp (first year of data is 1992; 3,300 firms compared to 24,000 in COMPUSTAT). We merge data from COMPUSTAT with CEO data in ExecuComp and exclude any observations for which CEO information is unavailable, which reduces our sample to 26,544 firm-year observations. Last, we exclude any singleton groups.[10] Our final test sample consists of 24,234 observations for 2,252 firms, with an average of around eleven observations per firm, which is substantially larger than the samples used in prior studies also executive information (e.g., C. X. Chen et al., 2012).

Data availability for the main part of our analysis is mostly dependent on the number of identified CEO-fixed effects in the first step of our analysis. We exclude all observations for which we cannot estimate CEO-fixed effects on cost asymmetry, which reduces our sample to 13,020 firm-year observations. Due to missing financial data, we cannot compute *Tobin's Q* for a further 960 firm-year observations. We exclude another 35 due to missing data for independent variables. We also exclude 823 extreme observations by trimming our variables at the first and 99th percentile. This results in a final sample of 11,202 observations for the main regression in the second part of the analysis. The number of observations differs slightly for each of the used *Tobin's Q* measures based on differences in data availability for their computations. Table 2 shows the data selection procedure.

>> Insert Table 2 about here <<

4 Results and discussion

4.1 Estimating CEO-fixed effects on cost asymmetry

4.1.1 Descriptive statistics

Table 3 provides descriptive statistics and correlations of the variables for the first step of the analysis. Table 3 Panel A provides descriptive statistics on annual sales revenue and SG&A costs. On average, firms have $4,913.04 million in annual sales revenue (median = $1,164.55 million) and $950.17 million in SG&A costs (median = $222.2 million). The mean value of SG&A costs represents 25.2 percent of sales revenue (median 22.03 percent), highly

[10] Singleton groups are groups, which, based on the multiple levels of fixed effects regressions, consist of only one observation. Keeping them in the sample would lead to overstated statistical significance of the coefficients and thus incorrect inference of results Correia (2015).

comparable to M. C. Anderson et al. (2003) and C. X. Chen et al. (2012). Our sample also shows a frequency of sales declines of 22.9 percent, just slightly lower than those reported in S. W. Anderson and Lanen (2007) – 27.8 percent, Kama and Weiss (2013) – 27.4 percent, and M. C. Anderson et al. (2003) – 27 percent, which could be because our sample is more recent and includes an additional ten years. The mean and median values presented in Table 3, Panel B for the control variables are in line with the values reported in prior research. For example, the mean and median values of *AINT*, *EINT*, *FCF*, and *STOCK_RET* are in line with the ones reported in M. C. Anderson et al. (2016) and C. X. Chen et al. (2012), and the values for Δ*PP&E* are in line with M. C. Anderson et al. (2016).

Table 3 Panel C presents the Pearson and Spearman correlations for our continuous variables. The majority of the correlations are significant but small in magnitude, though comparable to those reported in existing literature (C. X. Chen et al., 2012). The distribution of our sample across years and industries (not tabulated) is fairly equal.

>> Insert Table 3 about here <<

4.1.2 Regression results

Table 4 presents the results of the fixed effects models in Eq. (1) and (2). The first column presents the results of the model in Eq. (1), which includes the known determinants of SG&A cost asymmetry and only controls for firm- and time-fixed effects. The second column presents the results of the estimation of the model in Eq. (2) also including CEO-fixed effects. The coefficients and p-values reported are based on firm-clustered standard errors, which address the heteroscedasticity and intrafirm error correlation problems associated with panel data.

>> Insert Table 4 about here <<

The results for the model in Eq. (1) are in line with prior research. The variables of interest are the three-way interaction terms, which indicate the degree of SG&A cost asymmetry determined by the different firm-specific or macro-economic factors. Although many have significant coefficients with the expected signs, the results also reveal that the coefficients on some of the most acclaimed determinants, such as *AINT*, *CEO_HORIZON*, *AVOID_LOSS* and *AVOID_DECREASE*, become insignificant once a complete model is estimated. To eliminate any concerns that this is due to our sample, we estimate a cost asymmetry model exactly as defined in M. C. Anderson et al. (2003), Model III, for our sample period (1992 to 2016) and obtain highly comparable results (i.e., coefficients on *AINT, EINT,*

SUC and *ΔGDP* are significant and have the expected signs).[11] Another important reason for the different results may be the use of firm- and time-fixed effects, which are absent in most of the prior models (M. C. Anderson et al., 2003; Banker & Byzalov, 2014; Kama & Weiss, 2013).[12] The R^2 of the model is 66.69 percent, exceeding most of the values reported in prior literature (M. C. Anderson et al., 2003; Banker, Byzalov, & Plehn-Dujowich, 2014; C. X. Chen et al., 2012). The results of the estimation of the SG&A cost asymmetry model including CEO-fixed effects (Eq. 2) are presented in Table 4, column 2.[13] The results of the test of joint significance of the coefficients estimated on CEO-related excess cost asymmetry[14] confirm their statistical significance with an F-statistic of 1.91 (Prob>F=0.000). Furthermore, we observe a noticeable increase of R^2 to 84.6 percent. By running a firm cluster-robust Vuong (1989) test, we find that the difference in explanatory power between the two models is statistically significant with a t-statistic of 22.52 (not tabulated).[15] These results support our first hypothesis that CEO fixed effects have a significant impact on the level of SG&A cost asymmetry at firm level.

Interestingly, we observe that most of SG&A cost asymmetry is explained by the CEO-fixed effects used and some of the firm-specific determinants, while the coefficients on others, such as those on *EINT*, Δ*GDP*, *STOCK_RET or log(ΔSale*), become insignificant.[16] Thus, the cost asymmetry thought to exist due to these determinants could actually be attributable to CEO-specific decisions.

Data on 3,989 different CEOs are available for estimating CEO-fixed effects in this step of the analysis. However, as our approach towards estimating CEO-fixed effects only allows us to estimate fixed effects for moving CEOs, we do so for only 1,793 unique CEO-fixed effects.[17]

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[11] The results are not tabulated, however available upon request.

[12] We run the regression in Eq. (2) without any firm- or time-fixed effects. The results remain similar, although some of the coefficients on the three-way interaction terms gain significance, for example the coefficient on the free cash flow determinant, which goes from being marginally significant at the ten percent level to having a p-value lower than 0.001 (results are not tabulated).

[13] Table 4 does not report the estimated coefficients on each of the CEO dummies, as this would mean having a results table with roughly 1,800 different variables, which is not practicable.

[14] The coefficients γ_n on the three-way interaction terms $CEO_{jt}*D_{it}*\log(\Delta Sale)_{it}$.

[15] Because we have two nested regression models (Eq. (1) is nested in Eq. (2)), we use a cluster-robust version of the Vuong test. The corresponding statistic is in this case a t-statistic and not the traditional Z-statistic.

[16] From an econometrical point of view, introducing multiple interaction terms with log(Δ*Sale*) inflates the standard errors of coefficients an thus diminishes statistical power. In untabulated correlation analysis we observe that the mean (median) correlation between log(Δ*Sale*) and CEO dummies is 0.564 (0.639), with a maximum (minimum) value of 0.999 (-0.999).

[17] Although we are not able to estimate CEO-fixed effects for non-moving CEOs, we estimate SG&A cost asymmetry (based on a simple ABJ model) for firms with and without moving CEOs separately to see whether/how they are different. Untabulated results show that firms without moving CEOs have stickier SG&A

4.2 CEO-related excess level of SG&A cost asymmetry and shareholder value

4.2.1 Descriptive statistics

The mean (median) values of the absolute values of CEO-fixed effects, which are tabulated in Panel A of Table 5 and which we consider - following agency theory - CEO-related excess SG&A cost asymmetry, are 1.659 (0.742). The untabulated mean (-0.167) and median (-0.232) values of the CEO-fixed effects are negative, indicating that CEOs contribute on average to cost stickiness. The firm-specific level indicates anti-stickiness (mean = 0.197, median = 0.206). The mean and median values of *Tobin's Q* for our sample are 1.760 and 1.473, comparable to those reported in prior literature (Baxter et al., 2013; C. R. Chen & Steiner, 2000; Hoyt & Liebenberg, 2011). The mean and median values for our control variables are also similar to those reported in prior research (Hoyt & Liebenberg, 2011; Jo & Harjoto, 2011).

Panel B of Table 5 presents Pearson and Spearman correlations of *Tobin's Q* and its determinants. The generally low correlation coefficients between the variables used in the shareholder value equation suggests that multicollinearity should not be a problem in our analysis. Although both of the correlation coefficients between *Tobin's Q* and CEO-related excess cost asymmetry are negative, neither is statistically significant.[18]

>> Insert Table 5 about here <<

4.2.2 Regression results

Our hypothesis predicts that CEO-related excess cost asymmetry is negatively associated with shareholder value (Eq. (3)). We focus on the coefficient on the absolute values of CEO-fixed effects on cost asymmetry, which represent the CEO-related excess SG&A cost asymmetry at firm level. Table 6 reports the estimation results.

The results in Column 1 of Table 6 confirm our hypothesis. The negative significant coefficient δ_1 (coefficient = -0.0121, p-value = 0.024) implies that CEO-related excess SG&A cost asymmetry is associated with a lower *Tobin's Q* and thus lower shareholder value. This confirms our expectations that CEOs act in their own interest and thus impose the related agency costs on the firm and its shareholders. Column 2 of Table 6 reports the results of the regression based on Eq. (3) with *Total Q* as the dependent variable.[19] The coefficient of CEO-

costs overall (coefficient on D*log(Δ*Sale*)=-0.373) than firms with moving CEOs (coefficient on D* log(Δ*Sale*)=-0.248). Thus, excluding these firms from our analysis would only make it less likely to find significant results.

[18] Untabulated Pearson and Spearman correlation coefficients between *Total Q* and CEO-related excess cost asymmetry are also negative, however still not statistically significant.

[19] Because the *Total Q* measure is available only up to 2015, the number of firm-year observations used for this estimation is slightly lower.

related excess SG&A cost asymmetry (coefficient = -0.0154, p-value = 0.057) is negative and statistically significant at the ten percent level, which reinforces the robustness of our results. As an additional robustness check we also run the regression in Eq. (3) with two additional yet not widely used versions of *Tobin's Q* (see detailed definitions in Table 1), as defined in Chung and Pruitt (1994) and in Klapper and Love (2004). The results, reported in columns 3 and 4 of Table 6, are qualitatively similar to those reported in the first two columns. The coefficient on CEO-related excess SG&A cost asymmetry in the third (fourth) column is -0.0121 (-0.0130) and is statistically significant with a p-value of 0.020 (0.012). We complement our main analysis by performing an additional test equivalent to those in Bertrand and Schoar (2003), Table 7, where we estimate a separate set of CEO-fixed effects directly on shareholder value[20] and correlate these with the estimated CEO-fixed effects on SG&A cost asymmetry. Untabulated correlation analysis shows that the two CEO-fixed effects sets are negatively correlated (-0.1043, p-value=0.006), supporting the results of our main analysis.

>> Insert Table 6 about here <<

Overall (although not fully consistent in terms of statistical significance), we observe a negative coefficient on the level of SG&A cost asymmetry attributable to previously identified economic and firm-specific factors. This is in line with our prediction that the firm-specific SG&A cost asymmetry level is not necessarily neutrally associated with shareholder value, due to its determinants also potentially contributing to lower shareholder value. However, all coefficients on abnormal changes in SG&A costs, ε_{it}, are negative and statistically significant (coefficient in main model = -1.810, p-value = 0.038) in all four model specifications.

The R^2 of our main model (and the ones of the additional models) is similar to that reported in some of the prior literature on *Tobin's Q* (Jo & Harjoto, 2011; La Porta et al., 2002), however comparatively lower than that reported in other studies such as Baxter et al. (2013). One explanation could be the reduced number of observations we have for this part of the study. With regard to the control variables, we note that most of their coefficients are significant and have the expected signs.

Our results provide the first empirical evidence that overall cost asymmetry, on average, also incorporates a so-called "bad" part, as indicated by Banker and Byzalov (2014). We show that the excess CEO-related SG&A cost asymmetry represents "bad" cost asymmetry, i.e., cost

[20] For this we use the following model: $Q_{it} = \alpha + \Sigma\delta_k CEO_{jt} + \Sigma\delta_Z Controls_{it} + \mu_i + \tau_t + \epsilon_{it}$

asymmetry in excess of the optimal level, which is negatively associated with shareholder value and thus harmful to the firm and its shareholders.

4.3 Additional analysis

We conduct a series of additional tests and robustness checks to eliminate potential alternative explanations regarding the origin of the identified CEO fixed effects on cost asymmetry and to shed light on CEOs' potential characteristics that drive cost asymmetry. First, we split our sample based on the sign of the CEO-fixed effects to examine whether there are any differences between the associations of shareholder value with excess CEO-related SG&A cost stickiness (negative CEO-fixed effect) versus excess CEO-related SG&A cost *anti*-stickiness (positive CEO-fixed effects). The former is the result of CEOs selfishly chasing personal benefits due to agency problems in the form of empire-building incentives; the latter is the result of CEO myopia, which could result from incentives to meet or beat certain earnings targets, such as performance bonuses. We use the model in Eq. (3) and present the results in Table 7. To preserve space, the coefficients on all of the control variables, except firm-level SG&A cost asymmetry and abnormal change in SG&A costs, are suppressed in the table as they remain essentially unchanged.

>> Insert Table 7 about here <<

Panel A presents the results based on the sub-sample of negative CEO-fixed effects. For each of the four models, the coefficients on CEO-related excess cost stickiness are negative and highly significant with a p-value lower than 0.01. Panel B of Table 7 presents the results for the sub-sample of positive CEO-fixed effects. None of the coefficients on excess CEO-related cost anti-stickiness is statistically significant, which may be explained by capital markets focusing on the short term, therefore not punishing firms for overcutting current costs, as this leads to higher current earnings. The findings in the sub-sample analysis indicate that the negative association between CEO-related excess cost asymmetry and shareholder value is mainly driven by CEOs contributing to higher-than-necessary SG&A cost stickiness, thus confirming the agency theory implication that CEOs act in their own interest and satisfy their empire-building aspirations.

>> Insert Table 8 about here <<

Second, if we consider agency problems as the main driver of our results for the second hypothesis, we expect the documented effects to be less pronounced if CEO compensation is

tied more heavily to shareholder value creation, as CEOs would then care more about shareholder value (Firth, 1996; Griffith, 1999). We test this by splitting our sample based on the median CEO variable pay component, and expect a negative association between CEO-related excess SG&A cost asymmetry and shareholder value for CEOs with a below-median variable pay component. The results in Table 8 confirm our intuition. The coefficient on $|CEO_{jt}|$ is insignificant (negative and significant; coefficient in main specification = -0.0135, p-value = 0.029) for the sub-sample of CEOs with above-median (below-median) variable pay.

Similarly, we expect the documented effects in the shareholder value model to become weaker in the presence of strong corporate governance (i.e., if the CEO has less power within the firm). To test this, we split our sample based on the median Entrenchment Index developed by L. Bebchuk et al. (2009), a higher value representing weaker corporate governance and thus more CEO power. Table 9 presents the results. CEO-related excess cost stickiness (Panel A) drives the association with shareholder value for firms with weak corporate governance (coefficient in main specification=-0.0437, p-value<0.01), in line with agency costs being imposed on shareholders in the absence of strong corporate governance. Conversely, CEO-related excess cost anti-stickiness (Panel B) drives the association with shareholder value for firms with strong corporate governance (coefficient in main specification=-0.0704, p-value<0.01). This may be due to CEOs not maintaining excess capacities in the case of a sales decline if they have less power, or if they are even inclined to over-adjust costs to meet or beat short-term performance targets set by the board of directors.

>> Insert Table 9 about here <<

Third, although we argue in the hypothesis development section that cost asymmetry arising from CFOs' decisions is not expected to play a significant role for shareholder value (as CFOs' ability to make resource related decisions is restricted), we run our main analysis with CFO- instead of CEO-fixed effects to provide a complete picture. Untabulated results confirm that the identified CFO-fixed effects on SG&A cost asymmetry are not significantly associated with shareholder value (coefficient in main model=-0.0075, p-value=0.306).

Next, we examine alternative explanations for the existence of the identified CEO-fixed effects on cost asymmetry.[21] First, our identified CEO-fixed effects on SG&A cost asymmetry could be the result of the effect of CEO overconfidence on SG&A cost asymmetry, rather than

[21] We choose not to incorporate either of these two alternative specifications in our main analysis because (1) limited data availability on stock options awarded to CEOs and (2) the exclusion of each first year of CEO tenure would significantly decrease our sample size.

the product of a CEO's managing style. C. X. Chen et al. (2013) claim that overconfident CEOs are more likely to overestimate future demand as well as their ability to restore future demand, thus being less likely to cut SG&A costs when sales decline. We follow C. X. Chen et al. (2013) and include CEO overconfidence (see definition in Table 1) as an additional determinant in our SG&A cost asymmetry model. Untabulated results confirm that our identified CEO-fixed effects do not represent CEO overconfidence, but do capture the excess level of SG&A cost asymmetry arising due to CEOs' personal style. The coefficients on CEO-related excess SG&A cost asymmetry in the shareholder value model are still negative and statistically significant (coefficient in main specification=-0.0156, p-value=0.010). Second, the identified CEO fixed effects on SG&A cost asymmetry may occur mainly in the first year of a CEO on the job and thus are not representative of CEOs' style over the entire duration of their tenure. CEOs may be tempted to apply so-called "big-bath" accounting techniques during their first year of tenure to wipe the slate clean in preparation for the remainder of their tenure, or they may not yet be completely familiar with the firm's needs and tend to not adjust SG&A costs properly. Although we partly eliminate these possibilities by only estimating CEO-fixed effects for moving CEOs and by controlling for CEO horizon in our model, one way to directly eliminate this possibility is to exclude the firm-year observations corresponding to each CEO's first year of tenure in each of the firms they have worked for. Our untabulated results are robust to this alternative specification, the coefficients on CEO-related excess SG&A cost asymmetry in the shareholder value model still being negative and statistically significant (coefficient in main model=-0.0144, p-value=0.016).

Last, we analyze whether the identified CEO-fixed effects of cost asymmetry vary depending on CEO characteristics. For this, we regress the absolute values of CEO-fixed effects on CEO gender, CEO age and CEO tenure. (Untabulated) results show that male CEOs, older CEOs, and CEOs with a shorter tenure contribute to higher SG&A cost asymmetry levels.

5 Conclusion

In this study, we examine how excess SG&A cost asymmetry resulting from individual CEOs' decisions is associated with shareholder value. Following extensions of agency theory and of neoclassical theory, we expect CEOs to contribute significantly to the level of cost asymmetry due to their idiosyncratic management style. After identifying CEO-fixed effects on SG&A cost asymmetry, we test our main prediction of the negative association between excess CEO-related cost asymmetry and shareholder value. Agency theory offers a strong theoretical

foundation for the hypothesized association. Cost management decisions of individual CEOs that lead to excess levels of SG&A cost asymmetry can be thus interpreted as arising from CEOs' intentions to derive personal gains from empire-building or from myopically trying to meet or beat earnings targets. Our results confirm these predictions. We find that CEOs significantly contribute to the level of SG&A cost asymmetry and that this CEO-related excess cost asymmetry is associated with lower shareholder value. We also find that our results are mainly driven by CEOs who contribute to higher-than-necessary levels of SG&A cost stickiness, while CEOs contributing to excess levels of cost anti-stickiness have no significant association with shareholder value when this aspect is analyzed separately. Furthermore, we find that the negative association with shareholder value is driven by CEOs whose compensation is less tied to shareholder value creation and by powerful CEOs who under-adjust SG&A costs (CEO-related SG&A cost stickiness), as well as CEOs with less power who over-adjust SG&A costs (CEO-related excess SG&A cost anti-stickiness) in the case of a decrease in activity levels. Finally, an additional analysis helps us strengthen the identification of CEO-fixed effects on SG&A cost asymmetry as arising from individual CEOs' idiosyncratic style, mitigating concerns that they exist due to CEOs' overconfidence or unusual behavior of newly appointed CEOs.

Our study contributes to the literature on cost asymmetry in two ways. First, we identify an additional important determinant of asymmetric cost behavior and extend the findings of C. X. Chen et al. (2012), who are the first to explore the cost asymmetry phenomenon from an agency perspective. By documenting the effect individual CEOs' decisions have on SG&A cost asymmetry, we offer additional proof of systematic differences in top managers' corporate decision-making behavior. Second, we extend the rather scarce research on the potential consequences of asymmetric cost behavior by providing the first large-sample empirical evidence on the relationship between cost asymmetry and shareholder value, thus linking managerial accounting to financial literature. We show that the excess level of SG&A cost asymmetry induced by decisions of individual CEOs is associated with lower shareholder value. The implication is that CEOs do sometimes act in their own interest if they have the necessary power in the firm they lead. By doing so, they impose the related agency costs on the firm and its shareholders.

There are certain caveats to our analysis. In the absence of theory, it is challenging to build a model that controls for all possible economic determinants; also, our proxies may not be perfect. Nonetheless, we believe that our findings provide evidence of individual top manager discretion in cost management. Additionally, our methodology follows the suggestion

of Banker and Byzalov (2014) and contributes to the development of an empirical model which can identify “bad” (i.e., excessive) cost asymmetry.

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Figure 1: The International Business Machine Corporation (IBM) example of selling, general, and administrative cost behavior in relation to changes in sales based on the management styles of two different CEO

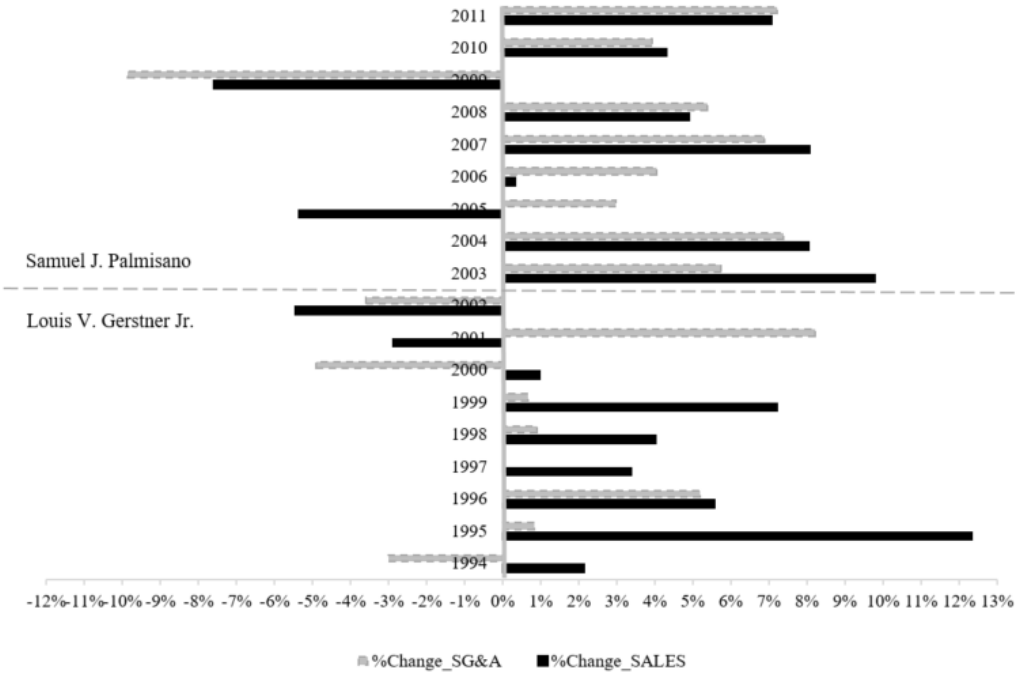

Table 1: Variable definitions

Variable Name	Definition
log(ΔSG&A)	Log-change in selling, general and administrative (SG&A) costs (Compustat item XSGA) defined as the ratio of current year's SG&A costs to prior year's SG&A costs.
log(ΔSale)	Log-change in sales revenue (Compustat item SALE) defined as the ratio of current year's sales revenue to prior year's sales revenue.
AINT	Asset Intensity: log-ratio of current year's total assets (Compustat item AT) to current year's sales revenue.
EINT	Employee Intensity: log-ratio of current year's number of employees (Compustat item EMP) to current year's sales revenue.
SUC	Indicator variable taking the value of 1 if sales revenue in year *t-2* is higher than the sales revenue in year *t-1*, 0 otherwise.
PR_LOSS	Indicator variable taking the value of 1 if prior year's net income (Compustat item NI) was negative, 0 otherwise.
Δ*GDP*	% GDP growth in current year.
FCF	Operating cash flow (Compustat item OANCF) less common and preferred dividends (DVC and DVP), all scaled by total assets.
AVOID_DECREASE	Indicator variable taking the value of 1 if the change in net income in the current year compared to the prior year is between 0% and 1% of beginning-of-year market value of equity (Compustat item PRCC_F * CSHO), 0 otherwise.
AVOID_LOSS	Indicator variable taking the value of 1 if the current year's net income is between 0% and 1% of beginning-of-year market value of equity, 0 otherwise.
ABN_ACCRUAL	Annual measure of abnormal accruals following the model in DeFond and Park (2001).
LIFE_CYCLE	Indicator variable defined as in Dickinson (2011), based on cash flows. Takes the value of 1 if the firm is in the initial, growth or decline stage, 0 otherwise.
Δ*PP&E*	Log-change in gross property, plant and equipment (Compustat item PPEGT) defined as the ratio of current year's gross PP&E to prior year's gross PP&E.
INT_PP&E	Interaction term between ΔPP&E and an indicator variable taking the value of 1 if current year's gross PP&E is higher than prior year's PP&E, 0 otherwise.
STOCK_RET	Annualized raw stock returns (CRSP monthly file) over the 12 months prior to the fiscal year end.
CEO_HORIZON	Indicator variable taking the value of 1 if the current year is a year of CEO change or a year immediately preceding a CEO change, 0 otherwise.
SIZE	Logarithm of lagged total assets.
LEVERAGE	Ratio of total liabilities (Compustat items DLC and DLTT) divided by total assets.
BETA	Market Model Beta calculated based on all available daily returns for each firm-year observation from CRSP daily files. For each fiscal year, we keep the last value estimated for that year.
CF	Operating cash flow (Compustat item OANCF) divided by total assets.
MKT_SHARE	Firm sales revenue divided by total industry sales, based on 4-digit industry SIC codes.
DIVIDENDS	Cash dividends (Compustat item DV) divided by the market value of equity.
R&D	Research and development expenses (Compustat item XRD) divided by sales revenue.
ADVERT	Advertising expenses (Compustat item XAD) divided by net property, plant and equipment (Compustat item PPENT).
CAPITAL_INTENSITY	Gross PP&E divided by total assets.
ROA	Ratio of operating income (Compustat item IB) to total assets.
Tobin's Q	*Tobin's Q* defined as total assets plus market value of equity less book value of common equity (Compustat item CEQ) and deferred taxes (Compustat item TXDB), all scaled by total assets.
Total Q	*Total Q* measure as developed by Peters and Taylor (2017). Available for download on WRDS – Peters and Taylor *Total Q*.
Tobin's Q (Chung & Pruitt, 1994)	*Tobin's Q* defined as total debt (Compustat items DLC + DLTT) plus liquidation value of preferred stock (Compustat item PSTKL) plus market value of equity

	(Compustat items PRCC_F*CSHO), all scaled by total assets (Compustat item AT)
Tobin's Q *Klapper and Love (2004)*	*Tobin's Q* defined as market value of equity (Compustat items PRCC_F*CSHO) plus total liabilities (Compustat item LT), scaled by total assets (Compustat item AT)
VP	Difference between total pay and fixed pay as defined by Chen et al. (2012)
$\lvert CEO_{jt} \rvert$	Absolute values of the estimated CEO-fixed effects on SG&A cost asymmetry from Eq. (2), $\lvert \gamma_n \rvert$, representing CEO-related excess SG&A cost asymmetry.
$\widehat{CS\_DET}$	Firm-specific SG&A cost asymmetry determined by macro-economic and firm-specific factors (excluding CEO-related excess SG&A cost asymmetry), calculated based on estimated coefficients from the model in Eq. (2) as $\widehat{\beta_3} + \Sigma\widehat{\beta_n} DET_{it}$.
$\hat{\varepsilon}_{it}$	Abnormal (i.e. unexplained) change in SG&A costs, represented by the error term of the estimation of the model in Eq. (2).
CEO_overconfidence	Equals 1 if the average intrinsic value of the CEO stock options exceeds 67 percent of the average exercise price at least twice over the sample period, starting with the first time an option has been held too long, zero otherwise.

Table 2: Data selection procedure

Criteria	Observations
Available unique firm-year observations in Compustat Annual file (1990-2015)	307,429
1) – less firm-year observations for financial companies (SIC 60-69)	83,669
2) – less firm-years with missing SG&A costs and sales revenue information	45,258
3) – less firm-years with SG&A costs higher than sales revenue or SG&A or sales negative	31,953
4) – less firm-years with missing accounting data	67,251
5) – less firm-years with extreme observations	6,805
6) – less firm-years for which no CEO information is available	45,949
7) – less firm-year observations which are singletons	2,310
= Final number of firm-year observations used in estimating CEO-fixed effects on SG&A cost stickiness	24,234
8) – less firm-year observations for which no estimated CEO-fixed effects are available	11,214
9) – less firm-years for which Tobin's Q cannot be computed	960
10) – less firm-years with missing accounting data on control variables for Tobin's Q	35
11) – less firm-years with extreme observations	823
= Final number of firm-year observations used to analyze the association between the CEO-related excess level of SG&A cost asymmetry and Tobin's Q	11,202

Table 3: Descriptive statistics – Test of Hypothesis 1

Variables	N	Mean	S.D.	Median
Panel A: Revenue and SG&A costs				
Sales revenue ($mil)	24,234	4913.04	15717.59	1164.55
SG&A costs ($mil)	24,234	950.17	3065.34	222.20
SG&A as % of revenue	24,234	25.20%	16.68%	22.03%
Panel B: Summary Statistics				
log(Δ*SG&A*)	24,234	0.091	0.190	0.075
log(Δ*Sale*)	24,234	0.094	0.212	0.079
AINT	24,234	0.016	0.594	-0.008
EINT	24,234	-5.488	0.804	-5.461
SUC	24,234	0.245	0.430	0.000
PR_LOSS	24,234	0.163	0.369	0.000
Δ*GDP*	24,234	0.024	0.016	0.026
FCF	24,234	0.092	0.080	0.089
AVOID_DECREASE	24,234	0.196	0.397	0.000
AVOID_LOSS	24,234	0.029	0.169	0.000
ABN_ACCRUAL	24,234	-0.048	0.099	-0.047
LIFE_CYCLE	24,234	0.656	0.475	1.000
log(ΔPP&E)	24,234	0.106	0.194	0.075
INT_PP&E	24,234	-0.018	0.080	0.000
STOCK_RET	24,234	0.176	0.500	0.115
CEO_HORIZON	24,234	0.141	0.348	0.000

Panel C: Pearson and Spearman Correlations

	1	2	3	4	5	6	7	8	9
1. log(Δ*SG&A*)	1	0.7365 (0.0000)	0.0276 (0.0000)	0.0137 (0.0329)	0.1898 (0.0000)	0.1310 (0.0000)	0.0276 (0.0000)	0.1353 (0.0000)	0.5628 (0.0000)
2. log(Δ*Sale*)	0.7329 (0.0000)	1	0.0140 (0.0292)	-0.0073 (0.2562)	0.2164 (0.0000)	0.1406 (0.0000)	0.0826 (0.0000)	0.2211 (0.0000)	0.5444 (0.0000)
3. AINT	0.0308 (0.0000)	-0.0003 (0.9616)	1	-0.1799 (0.0000)	-0.0899 (0.0000)	-0.0847 (0.0000)	-0.0027 (0.6759)	-0.0216 (0.0008)	0.0459 (0.0000)
4. EINT	0.0052 (0.4216)	-0.0104 (0.1054)	-0.1556 (0.0000)	1	0.2137 (0.0000)	-0.0050 (0.4347)	-0.0327 (0.0000)	-0.0090 (0.1625)	0.0316 (0.0000)
5. Δ*GDP*	0.1916 (0.0000)	0.2327 (0.0000)	-0.066 (0.0000)	0.1433 (0.0000)	1	-0.0288 (0.0000)	0.0101 (0.1174)	0.0860 (0.0000)	0.01427 (0.0000)
6. FCF	0.0969 (0.0000)	0.1213 (0.0000)	-0.0753 (0.0000)	-0.0139 (0.0301)	-0.0363 (0.0000)	1	-0.2936 (0.0000)	0.1450 (0.0000)	0.1557 (0.0000)
7. ABN_ACCRUAL	0.0144 (0.0251)	0.0767 (0.0000)	-0.0207 (0.0012)	-0.0086 (0.1796)	0.0328 (0.0000)	-0.2417 (0.0000)	1	0.0544 (0.0000)	-0.0031 (0.6313)
8. STOCK_RET	0.1249 (0.0000)	0.2093 (0.0000)	-0.0219 (0.0007)	-0.0059 (0.3565)	0.0755 (0.0000)	0.1297 (0.0000)	0.031 (0.0000)	1	0.0849 (0.0000)
9. log(Δ*PP&E*)	0.5836 (0.0000)	0.5621 (0.0000)	0.0696 (0.0000)	0.0247 (0.0001)	0.1185 (0.0000)	0.0917 (0.0000)	0.0102 (0.1107)	0.1038 (0.0000)	1

Descriptive statistics for variables used in the first step of the analysis. All variable definitions are provided in Table 1. N represents the number of unique firm-year observations included. The column "S.D." presents the standard deviation of each of the variables. Panel C presents Pearson (bottom triangle) and Spearman (upper triangle) correlations. P-values provided in parentheses.

Table 4: Main results – Test of Hypothesis 1

Variables	Expected sign	(1) log(Δ*SG&A*)	(2) log(Δ*SG&A*)
log(Δ*Sale*)	+	1.083***	0.0673
		(0.000)	(0.791)
D		0.00962	–
		(0.623)	
*D*log(Δ*Sale*)	-	-0.600***	0.737
		(0.000)	(0.323)
Three-way interaction terms (*D*log*(Δ*Sale*)**DET*)			
AINT	+	-0.00573	0.0795
		(0.753)	(0.330)
EINT	?	-0.0585***	0.0867
		(0.000)	(0.273)
SUC	+	0.268***	0.0769
		(0.000)	(0.124)
Δ*GDP*	-	2.590***	-1.286
		(0.000)	(0.275)
STOCK_RET	?	0.0704***	0.0140
		(0.000)	(0.715)
LIFE_CYCLE	-	-0.181***	-0.139***
		(0.000)	(0.004)
PR_LOSS	+	0.235***	0.216***
		(0.000)	(0.000)
ABN_ACCRUAL	?	0.375***	0.713***
		(0.000)	(0.002)
AVOID_LOSS	+	-0.0130	-0.0928
		(0.829)	(0.439)
AVOID_DECREASE	+	-0.0652	-0.0124
		(0.233)	(0.913)
FCF	?	0.190*	0.794***
		(0.095)	(0.001)
CEO_HORIZON	-	-0.0276	-0.324***
		(0.366)	(0.000)
Two-way interaction terms (log(Δ*Sale*)**DET*)			
AINT		-0.0669***	-0.0393
		(0.000)	(0.227)
EINT		0.0729***	-0.0362
		(0.000)	(0.217)
SUC		-0.0861***	-0.0490**
		(0.000)	(0.027)
Δ*GDP*		0.733	2.129***
		(0.108)	(0.001)
STOCK_RET		-0.0352***	-0.00259
		(0.000)	(0.830)
LIFE_CYCLE		0.0335*	0.0633***
		(0.056)	(0.007)
PR_LOSS		-0.168***	-0.0725***
		(0.000)	(0.002)
ABN_ACCRUAL		-0.184***	-0.114**
		(0.000)	(0.019)
AVOID_LOSS		0.0971***	0.118***
		(0.000)	(0.005)
AVOID_DECREASE		0.0559***	0.0114
		(0.002)	(0.613)
FCF		-0.318***	-0.293**
		(0.000)	(0.015)
CEO_HORIZON		0.0446**	0.0913***
		(0.023)	(0.008)

(Table 4 continued)

*Two-way interaction terms (D*DET)*		
AINT	0.000321	-0.00278
	(0.943)	(0.877)
EINT	0.00242	-0.0222
	(0.466)	(0.218)
SUC	0.000804	0.00158
	(0.884)	(0.838)
Δ*GDP*	0.505***	-0.122
	(0.001)	(0.588)
STOCK_RET	0.00346	0.00755
	(0.507)	(0.315)
LIFE_CYCLE	0.00516	0.0103
	(0.316)	(0.171)
PR_LOSS	-0.0120*	-0.00225
	(0.071)	(0.822)
ABN_ACCRUAL	-0.0773***	0.0130
	(0.006)	(0.768)
AVOID_LOSS	0.0264*	0.00861
	(0.062)	(0.671)
AVOID_DECREASE	-0.00679	-0.0207
	(0.418)	(0.109)
FCF	-0.116***	-0.0183
	(0.001)	(0.768)
CEO_HORIZON	-0.00225	-0.00690
	(0.734)	(0.552)
Standalone variables:		
AINT	0.0252***	0.0237***
	(0.000)	(0.005)
EINT	-0.000604	0.0167**
	(0.871)	(0.029)
SUC	0.00243	-0.00178
	(0.467)	(0.655)
Δ*GDP*	–	–
STOCK_RET	-0.00610**	-0.0129***
	(0.029)	(0.000)
LIFE_CYCLE	-0.00190	-0.00253
	(0.511)	(0.473)
PR_LOSS	-0.0323***	-0.0424***
	(0.000)	(0.000)
ABN_ACCRUAL	0.00957	-0.0117
	(0.481)	(0.466)
AVOID_LOSS	-0.00141	0.00177
	(0.857)	(0.848)
AVOID_DECREASE	-0.00690**	-0.00298
	(0.037)	(0.429)
FCF	0.0525**	0.0709**
	(0.013)	(0.018)
CEO_HORIZON	-0.00506	-0.0149***
	(0.184)	(0.007)
INT_PPE	-0.0653***	-0.0563***
	(0.000)	(0.004)
log(Δ*PP&E*)	0.157***	0.117***
	(0.000)	(0.000)
Observations	24,324	24,234
R-squared	66.69%	84.61%
Firm-fixed effects	YES	YES
Year-fixed effects	YES	YES
CEO-fixed effects	NO	YES

log(ΔSale) × CEO-fixed effects	NO	YES
D × CEO-fixed effects	NO	YES
D × log(ΔSale) × CEO-fixed effects	NO	YES
Number of firms	2,252	2,252
Available unique CEOs		3,989
Estimated unique CEO-fixed effects		1,793

Results of the regression following equations (1) and (2), corresponding to the first step of the analysis. Our sample consists of 2,252 different firms and 3,989 CEOs. However, as the approach we take in estimating CEO-fixed effects only allows the estimation of fixed effects for moving CEOs, we estimate only 1,793 unique CEO-fixed effects. Definitions of all variables provided in Table 1. P-values presented in parentheses. Significance levels indicated as follows: *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Descriptive statistics – Test of Hypothesis 2

Variables	N	Mean	S.D.	Median
Panel A: Summary Statistics				
Tobin's Q	11,202	1.795	1.152	1.488
CEO-related excess cost asymmetry (|CEO_{jt}|)	11,202	1.559	2.749	0.742
$\widehat{CS\_DET}_{it}$	11,202	0.197	0.178	0.206
$\hat{\varepsilon}_{it}$	11,202	0.004	0.009	0.001
SIZE	11,202	7.086	1.461	6.957
LEV	11,202	0.185	0.166	0.169
BETA	11,202	1.130	0.529	1.096
RD	11,202	0.042	0.074	0.005
CAP_INT	11,202	0.586	0.388	0.497
log(Δ*Sale*)	11,202	0.041	0.221	0.038
ROA	11,202	0.036	0.106	0.048
DIVIDEND	11,202	0.558	0.497	1.000
ADVERT	11,202	0.094	0.278	0.000
MKT_SHARE	11,202	0.004	0.005	0.002
CF	11,202	0.098	0.077	0.097
Total Q	10,839	1.124	1.585	0.739
Tobin's Q (Chung & Pruitt 1994)	12,087	1.524	1.139	1.223
Tobin's Q (Klapper & Love 2004)	12,090	1.811	1.131	1.513

Panel B: Pearson and Spearman Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.Tobin's Q	1.00	-0.02 (0.05)	-0.02 (0.02)	-0.00 (0.97)	-0.07 (0.00)	-0.24 (0.00)	0.08 (0.00)	0.44 (0.00)	-0.04 (0.00)	0.30 (0.00)	0.13 (0.00)	-0.19 (0.00)	0.27 (0.00)	0.59 (0.00)
2. |CEO_{jt}|	-0.00 (0.70)	1.00	-0.00 (0.84)	-0.08 (0.00)	-0.03 (0.0023)	0.01 (0.40)	-0.11 (0.00)	0.02 (0.10)	-0.07 (0.00)	-0.06 (0.00)	-0.01 (0.30)	0.05 (0.00)	-0.01 (0.60)	-0.02 (0.01)
3. $\widehat{CS\_DET}_{it}$	-0.01 (0.12)	-0.03 (0.00)	1.00	0.03 (0.00)	-0.04 (0.00)	-0.01 (0.24)	0.03 (0.00)	0.04 (0.00)	-0.05 (0.00)	0.03 (0.00)	0.03 (0.00)	0.06 (0.00)	-0.11 (0.00)	-0.34 (0.00)
4. $\hat{\varepsilon}_{it}$	-0.03 (0.00)	-0.03 (0.00)	0.03 (0.00)	1.00	-0.07 (0.00)	-0.02 (0.01)	0.06 (0.00)	0.00 (0.62)	-0.10 (0.00)	-0.01 (0.12)	-0.07 (0.00)	0.03 (0.00)	0.24 (0.00)	0.04 (0.00)
5. SIZE	-0.11 (0.00)	-0.00 (0.38)	-0.04 (0.00)	-0.03 (0.00)	1.00	0.40 (0.00)	0.03 (0.00)	0.07 (0.00)	0.52 (0.00)	-0.10 (0.00)	-0.04 (0.00)	0.17 (0.00)	-0.09 (0.00)	-0.00 (0.91)
6. LEV	-0.20 (0.00)	0.03 (0.00)	0.01 (0.12)	0.02 (0.11)	0.34 (0.00)	1.00	-0.13 (0.00)	-0.14 (0.00)	0.24 (0.00)	-0.30 (0.00)	-0.09 (0.00)	0.029 (0.00)	-0.06 (0.00)	-0.23 (0.00)
7. BETA	0.09 (0.00)	-0.10 (0.00)	0.04 (0.00)	0.04 (0.00)	0.02 (0.03)	-0.11 (0.00)	1.00	-0.06 (0.00)	-0.05 (0.00)	0.19 (0.00)	-0.00 (0.79)	-0.11 (0.00)	0.04 (0.00)	-0.05 (0.00)
8. CF	0.36 (0.00)	0.00 (0.73)	0.05 (0.00)	-0.03 (0.01)	0.08 (0.00)	-0.11 (0.00)	-0.06 (0.00)	1.00	0.03 (0.00)	-0.04 (0.00)	0.08 (0.00)	0.15 (0.00)	0.14 (0.00)	0.60 (0.00)
9. MKT_SHARE	-0.04 (0.00)	-0.03 (0.00)	-0.06 (0.00)	-0.09 (0.00)	0.41 (0.00)	0.11 (0.00)	-0.04 (0.00)	0.04 (0.00)	1.00	-0.25 (0.00)	0.04 (0.00)	0.01 (0.14)	-0.03 (0.00)	0.11 (0.00)
10. R&D	0.23 (0.00)	-0.03 (0.01)	0.05 (0.00)	0.03 (0.01)	-0.15 (0.00)	-0.27 (0.00)	0.22 (0.00)	-0.10 (0.00)	-0.21 (0.00)	1.00	-0.00 (0.98)	-0.31 (0.00)	0.02 (0.04)	0.01 (0.12)
11.ADVERT	0.07 (0.00)	0.00 (0.99)	-0.03 (0.00)	-0.04 (0.00)	-0.07 (0.00)	-0.07 (0.00)	-0.04 (0.00)	0.01 (0.52)	0.01 (0.20)	-0.02 (0.02)	1.00	-0.19 (0.00)	-0.02 (0.09)	0.09 (0.00)
12. CAP_INT	-0.17 (0.00)	0.04 (0.00)	0.05 (0.00)	0.09 (0.00)	0.17 (0.00)	0.27 (0.00)	-0.09 (0.00)	0.14 (0.00)	-0.07 (0.00)	-0.30 (0.00)	-0.19 (0.00)	1.00	-0.12 (0.00)	-0.10 (0.00)
13. log*ΔSale*	0.24 (0.00)	0.01 (0.37)	-0.08 (0.00)	0.08 (0.00)	-0.09 (0.00)	-0.04 (0.00)	0.02 (0.09)	0.15 (0.00)	-0.00 (0.65)	-0.03 (0.00)	-0.01 (0.47)	-0.11 (0.00)	1.00	0.38 (0.00)
14. ROA	0.34 (0.00)	-0.00 (0.98)	0.01 (0.44)	-0.04 (0.00)	0.05 (0.00)	-0.13 (0.00)	-0.06 (0.00)	0.50 (0.00)	0.08 (0.00)	-0.17 (0.00)	0.01 (0.15)	-0.08 (0.00)	0.34 (0.00)	1.00

Summary statistics for variables used in the second part of the analysis. All variable definitions are provided in Table 1. N represents the number of unique firm-year observations included. The slight deviations in the total number of available observations for the different Tobin's Q measures is due to differences in how the measures are computed. The column "S.D." presents the standard deviation of each of the variables. Panel C presents Pearson (lower triangle) and Spearman (upper triangle) correlations. P-values provided in parentheses.

Table 6: Main results – Test of Hypothesis 2

Variables	(1) *Tobin's Q*	(2) *Total Q*	(3) *Tobin's Q* Chung & Pruitt (1994)	(4) *Tobin's Q* Klapper & Love (2004)
$\lvert CEO_{jt}\rvert$	-0.0121**	-0.0154*	-0.0121**	-0.0130**
	(0.024)	(0.058)	(0.020)	(0.012)
$\widehat{CS\_DET}_{it}$	-0.0615	-0.172**	-0.0835*	-0.0905**
	(0.205)	(0.018)	(0.068)	(0.049)
$\hat{\varepsilon}_{it}$	-1.810**	-2.353*	-1.846**	-2.005**
	(0.038)	(0.075)	(0.026)	(0.016)
SIZE	-0.538***	-0.562***	-0.459***	-0.499***
	(0.000)	(0.000)	(0.000)	(0.000)
LEVERAGE	-0.288***	-0.173	-0.236***	-0.316***
	(0.001)	(0.167)	(0.002)	(0.000)
BETA	0.253***	0.377***	0.237***	0.238***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D	0.345	-2.212***	0.468*	0.385
	(0.241)	(0.000)	(0.089)	(0.168)
ADVERT	-0.0200	-0.134	-0.0259	-0.0143
	(0.721)	(0.156)	(0.634)	(0.793)
CF	2.257***	2.204***	2.215***	2.258***
	(0.000)	(0.000)	(0.000)	(0.000)
MKT_SHARE	33.01***	20.50***	27.49***	28.83***
	(0.000)	(0.000)	(0.000)	(0.000)
CAPITAL_INT	-0.225***	-1.305***	-0.304***	-0.217***
	(0.000)	(0.000)	(0.000)	(0.000)
DIVIDEND	0.00501	-0.0154	0.00816	-0.00340
	(0.870)	(0.739)	(0.777)	(0.906)
log(Δ*Sale*)	0.434***	0.755***	0.403***	0.423***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.830***	0.901***	0.987***	0.873***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	4.893***	5.363***	4.257***	4.725***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	11,202	10,839	12,087	12,090
R-squared	22.9%	19.7%	22.3%	22.5%
Firm fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES

Results of the regression following Equation (3) corresponding to the second part of the analysis. Definitions of all variables provided in Table 1. P-values presented in parentheses. Significance levels indicated as follows: *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Sub-sample analysis - CEO-related cost asymmetry & shareholder value

Variables	(1) *Tobin's Q*	(2) Total Q	(3) *Tobin's Q* Chung & Pruitt (1994)	(4) *Tobin's Q* Klapper & Love (2004)
Panel A: Regression including only negative CEO-fixed effects – CEOs contributing to excess cost stickiness				
$\lvert CEO_{jt}\rvert$	-0.0432***	-0.0773***	-0.0496***	-0.0520***
	(0.000)	(0.000)	(0.000)	(0.000)
$\widehat{CS\_DET}_{it}$	0.0037	-0.117	0.0038	-0.0119
	(0.949)	(0.232)	(0.945)	(0.830)
$\hat{\varepsilon}_{it}$	-2.662***	-3.235*	-2.351**	-2.500***
	(0.007)	(0.054)	(0.013)	(0.008)
Constant	4.792***	5.638***	4.345***	4.765***
	(0.000)	(0.000)	(0.000)	(0.000)
Controls	YES	YES	YES	YES
Observations	6,956	6,755	7,481	7,481
R-squared	26.1%	21.0%	25.8%	25.7%
Firm-fixed effects	YES	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES
Panel B: Regression including only positive CEO-fixed effects – CEOs contributing to excess cost anti-stickiness				
$\lvert CEO_{jt}\rvert$	-0.0037	0.0022	-0.0028	-0.0041
	(0.700)	(0.858)	(0.769)	(0.671)
$\widehat{CS\_DET}_{it}$	-0.137	-0.195*	-0.187**	-0.198**
	(0.124)	(0.094)	(0.026)	(0.019)
$\hat{\varepsilon}_{it}$	-0.697	-1.369	-1.257	-1.465
	(0.678)	(0.537)	(0.437)	(0.365)
Constant	5.443***	5.490***	4.422***	4.919***
	(0.000)	(0.000)	(0.000)	(0.000)
Controls	YES	YES	YES	YES
Observations	4,246	4,084	4,606	4,609
R-squared	17.4%	16.6%	16.6%	16.9%
Firm-fixed effects	YES	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES

Results of the regression following Equation (3) using different sub-samples. Panel A presents the results of the estimation of Eq. (3) using the sub-sample containing only negative CEO-fixed effect (represent excess CEO-related SG&A cost stickiness). Panel B presents the results of the estimation of Eq. (3) using the sub-sample containing only positive CEO-fixed effects (represent excess CEO-related SG&A cost anti-stickiness). Definitions of all variables provided in Appendix 1. P-values presented in parentheses. Significance levels indicated as follows: *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Sub-sample analysis – CEO variable pay

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobin's Q		Tobin's Q Chung & Pruitt (1994)		Tobin's Q Klapper & Love (2004)		Total Q	
	VP<med(VP)	VP>med(VP)	VP<med(VP)	VP>med(VP)	VP<med(VP)	VP>med(VP)	VP<med(VP)	VP>med(VP)
$\lvert CEO_{jt}\rvert$	-0.0135**	-0.0126	-0.0128**	-0.0125	-0.0143**	-0.0126	-0.0149	-0.0196
	(0.029)	(0.211)	(0.037)	(0.202)	(0.020)	(0.199)	(0.121)	(0.198)
$\widehat{CS\_DET}_{it}$	-0.0215	-0.0512	-0.0509	-0.0620	-0.0534	-0.0769	-0.0620	-0.152
	(0.707)	(0.543)	(0.343)	(0.434)	(0.323)	(0.333)	(0.478)	(0.227)
$\hat{\varepsilon}_{it}$	-1.176	-2.521	-1.570*	-2.428	-1.619*	-2.463	-2.175	-1.487
	(0.213)	(0.115)	(0.079)	(0.112)	(0.073)	(0.107)	(0.128)	(0.545)
Constant	4.833***	5.486***	4.258***	4.982***	4.670***	5.469***	5.449***	6.376***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	5,545	5,410	6,116	5,970	6,116	5,973	5,486	5,352
R-squared	28.2%	23.5%	27.1%	24.5%	26.9%	24.7%	24.2%	20.7%
Firm-fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES	YES	YES	YES

Results of the regression following Equation (3) using different sub-samples based on the value of variable pay (lower or higher than the median variable pay) as the difference between total pay and fixed pay as defined by Chen et al. (2012). Definitions of all variables provided in Appendix 1. P-values presented in parentheses. Significance levels indicated as follows: *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Sub-sample analysis – Entrenchment Index

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tobin's Q		Tobin's Q Chung & Pruitt (1994)		Tobin's Q Klapper & Love(2004)		Total Q	
	EI<med(EI)	EI>med(EI)	EI<med(EI)	EI>med(EI)	EI<med(EI)	EI>med(EI)	EI<med(EI)	EI>med(EI)
Panel A: Regression including only negative CEO-fixed effects – CEOs contributing to excess cost stickiness								
$\mid CEO_{jt} \mid$	-0.0654	-0.0437***	-0.0543	-0.0515***	-0.0654	-0.0524***	-0.810***	-0.0482***
	(0.241)	(0.000)	(0.331)	(0.000)	(0.242)	(0.000)	(0.000)	(0.000)
$\widehat{CS\_DET}_{it}$	0.150	-0.0388	0.104	-0.0546	0.0972	-0.0794	-0.0425	-0.0359
	(0.297)	(0.495)	(0.448)	(0.321)	(0.480)	(0.152)	(0.862)	(0.571)
$\hat{\varepsilon}_{it}$	-1.629	-0.651	-1.234	-0.639	-2.056	-0.359	-0.804	-1.168
	(0.471)	(0.526)	(0.574)	(0.522)	(0.356)	(0.722)	(0.836)	(0.314)
Constant	4.823***	3.866***	4.262***	3.353***	4.649***	3.955***	6.421***	2.506***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,660	3,594	1,816	3,847	1,815	3,845	1,715	3,415
R-squared	22.5%	25.0%	21.7%	24.5%	21.7%	24.9%	22.9%	21.0%
Firm-fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Panel B: Regression including only positive CEO-fixed effects – CEOs contributing to excess cost anti-stickiness								
$\mid CEO_{jt} \mid$	-0.0704***	-0.00427	-0.0619***	-0.00401	-0.0633***	-0.00491	-0.0410	-0.00734
	(0.001)	(0.603)	(0.009)	(0.625)	(0.008)	(0.549)	(0.283)	(0.490)
$\widehat{CS\_DET}_{it}$	0.0778	-0.115*	-0.0647	-0.104	-0.0610	-0.117*	-0.182	-0.0667
	(0.635)	(0.086)	(0.698)	(0.107)	(0.715)	(0.069)	(0.491)	(0.445)
$\hat{\varepsilon}_{it}$	0.999	1.075	-0.392	0.232	-0.599	0.177	-0.649	-0.667
	(0.737)	(0.402)	(0.900)	(0.856)	(0.848)	(0.889)	(0.895)	(0.696)
Constant	7.100***	3.990***	6.877***	3.477***	7.441***	3.990***	8.155***	4.015***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	1,008	2,230	1,108	2,394	1,109	2,393	1,032	2,091
R-squared	30.1%	23.6%	29.1%	23.5%	29.9%	23.4%	20.0%	21.0%
Firm-fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Year-fixed effects	YES	YES	YES	YES	YES	YES	YES	YES

Results of the regression following Equation (3) using different sub-samples based on the value of the Entrenchment Index (EI) as defined by Bebchuk et al. (2009). Definitions of all variables provided in Appendix 1. P-values presented in parentheses. Significance levels indicated as follows: *** p<0.01, ** p<0.05, * p<0.1.

Part VI: Sustainability Assurance and Cost Asymmetry

Laura-Maria Gastone, Kerstin Lopatta, Anna Rudolf & Sebastian Tideman

Abstract

This paper investigates whether sustainability assurance (SA) affects a firm's cost structure. We argue that SA should improve internal information systems and processes, allowing managers to make better cost decisions. Specifically, we analyze the effect of sustainability assurance on deliberate management decisions regarding cost adjustments and the resulting effects on shareholder value using a sample of firms from 42 countries. We find that SA leads to faster cost adjustments in the event of a sales decline and provide evidence that the SA-related part of cost asymmetry is associated with an increase in shareholder value. An increase by one standard deviation in SA-related SG&A cost asymmetry is associated with a 1.759 percent increase in Tobin's q relative to the sample means of Tobin's q. Our results are robust when we control for endogeneity employing the Heckman (1979) correction technique and using a 2SLS IV estimation.

Keywords: sustainability assurance, cost asymmetry, shareholder value, SG&A costs, SG&A cost asymmetry

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1 Introduction

With the emerging importance of corporate social responsibility (CSR) reporting, sustainability assurance (SA) as a voluntary third-party assurance of environmental, social, and governance figures has gained popularity in recent years. Reflecting this trend, KPMG (2017) reported a steady increase in the number of SA adopters among the 250 largest companies worldwide over the last twelve years. Specifically, the proportion of companies with SA increased from 30 percent to 67 percent between 2005 and 2017. With SA as a new assurance service, a new and rapidly developing field of research has emerged. This paper takes a novel approach and investigates how SA creates benefits beyond the primary goal of increasing investor confidence in CSR disclosures. Specifically, we analyze how SA processes generate internal effects in terms of improved cost management decisions. While the primary benefits (i.e., increased investor confidence) have been examined in a variety of contexts, to the best of our knowledge no study has yet looked at the internal effects of SA on firm factors beyond CSR performance. Thus, we analyze how SA processes produce internal effects that translate into real economic benefits beyond CSR performance in the form of more timely cost adjustments, the impact of which is reflected in shareholder value. By taking an international approach, we investigate how SA influences international internal structures outside the CSR context based on a sample of firms from 42 countries, which distinguishes it from existing studies that focus only on the US market.

As the term “SA” has no standard legal definition, we refer to the review and assurance of CSR reporting by an independent third party, where the role of the provider is to express an opinion on credibility and reliability (Farooq & Villiers, 2019). One of the main objectives of SA is seen in improving confidence in and the credibility of sustainability-related disclosures and reducing information asymmetries among external users (Cuadrado-Ballesteros et al., 2017; Simnett et al., 2009). Thus, initial studies have examined the use case for SA in a way that aims to understand SA and its evolving processes, legitimacy, and determinants (Edgley et al., 2010; O’Dwyer, 2011; O’Dwyer, Owen, & Unerman, 2011; Simnett et al., 2009). However, SA providers increasingly promote SA as contributing to process optimization through the assessment of reporting, information systems and processes, and supporting the integration of sustainability aspects into a company’s overall strategy (O’Dwyer, Owen, & Unerman, 2011). These advantages are seen as just as important as the external benefits for SA providers and companies that purchase SA (Owen et al., 2000). Particularly during initial SA engagements,

SA providers are confronted with poor reporting and data collection standards resulting in inadequate data quality, which encourages them to consult with clients to validate and review information systems and reporting processes to create an auditable environment for future SA engagements (O'Dwyer, 2011; O'Dwyer, Owen, & Unerman, 2011). Thus, SA engagements involve a necessary combination of audit and advice (O'Dwyer, Owen, & Unerman, 2011). Consequently, SA is seen as a tool that supports internal management in reviewing internal controls, information systems, and processes to identify strengths and weaknesses (Ball et al., 2000; O'Dwyer, 2011) and thus contribute to their development. This highlights the usefulness of SA to practitioners, indicating that SA-related spending can be highly beneficial to managers of firms with internal controls and processes that are not optimized. The advice from SA providers can aid them in significantly improving any existing weak spots and thus increasing the effectiveness of their internal systems. This is important, as in an environment with internal asymmetric information distribution, company-internal information systems are a key factor for reviewing and updating available information, the underlying quality of which determines the quality of management decisions. Numerous empirical studies suggest that internal controls and information systems lead to an improved internal information environment and reduced information uncertainty (Dorantes et al., 2013; Feng et al., 2009; Goodman et al., 2014). By analogy, if SA contributes to the improvement of internal controls and information systems, we expect to observe positive outcomes through improved management decisions. Further, since managers increasingly integrate ESG indicators in their strategic decisions and controlling (Banerjee, 2002; Gates & Germain, 2010; Henri & Journeault, 2010; Perego & Hartmann, 2009), we argue that this is an additional channel through which SA is likely to improve managerial decision making. Overall, both improved internal controls and information systems and better information on ESG indicators are expected to lower uncertainty when taking decisions regarding resource adjustments, resulting in more timely adjustment decisions. The insights gained from analyzing these effects also ought to be of importance to regulators, given their increasing attention to firms' environmental performance and their reporting thereon. Thus, the findings of this study can further the debate on whether a mandatory requirement for SA would be meaningful (Technical expert group on sustainable finance [TEG], 2020).

One area where the positive effects of enhanced internal information systems through SA may be particularly tangible is cost management. Although traditional cost models claim that costs vary symmetrically with activity levels, more recent research provides a different picture. Existing research shows that managers are reluctant to scale back their committed resources and postpone it until they are better informed about the development of activity levels (M. C.

Anderson et al., 2003). Uncertainties regarding the future development of activity levels increase the difficulty in estimating the net present value of today's adjustment costs (i.e., severance payments), future installation, re-employment, or training costs (M. C. Anderson et al., 2003). Thus, in the context of deliberate management decisions concerning cost adjustments, this leads to the phenomenon of cost asymmetry, which can manifest in two different ways. If an organization adjusts its resources less in the event of a decline in activity levels relative to an equivalent increase in activity levels, this is referred to as cost stickiness, as resources are maintained and thus the firm exhibits an under-adjustment of costs (M. C. Anderson et al., 2003). However, under an excess capacity assumption, firms can exhibit an over-adjustment of costs in the case of a decrease in their activity level relative to an equivalent increase in activity levels, which is labeled as cost anti-stickiness (Banker & Byzalov, 2014; Weiss, 2010). Over the longer term, cost asymmetry is expected to decrease, as consistent developments over subsequent periods enhance the underlying information environment of management and thus decrease uncertainty (M. C. Anderson et al., 2003). Similarly, Lee et al. (2020) show that temporary external uncertainty reinforces cost stickiness until it is removed. Kim et al. (2019) emphasize that strengthened internal controls lead to a better internal information environment, which in turn reduces internal uncertainty, resulting in more timely resource adjustments and less cost stickiness. Thus, we hypothesize that firms' decisions to undergo voluntary SA will produce a similar effect, significantly reducing the degree of cost asymmetry, as SA improves the underlying internal information environments and thus aids managers in taking better informed and more timely adjustment decisions. Prior research has shown that improved management decisions based on better information environments can increase the quality of overall outputs (Antle & Fellingham, 1995), such as M&A quality, the effectiveness of internal capital allocation, and operating performance (Abernathy et al., 2019; Q. Cheng et al., 2018). By analogy, we claim that the reduction in cost asymmetry related to SA – the result of better-informed decisions – will have positive consequences in terms of value creation. Thus, we hypothesize that cost adjustment decisions due to improved information environment through SA are positively associated with shareholder value.

As the market for SA in the US lags behind the international market (Casey & Grenier, 2015; KPMG, 2011; Simnett et al., 2009), we choose to apply a cross-country setting to fully reflect the international SA market and its consequences. At the same time, this allows us to use cross-country differences in SA and SA media attention for identification strategy purposes to mitigate endogeneity concerns. We use all available observations at the intersection between Compustat (Global and North America) and Asset4 Thomson Reuters. This results in 10,611

observations across 42 different countries covering the period 2005-2018. To test our hypotheses, we build our research design on a two-step approach. First, to determine the part of cost asymmetry that relates to SA, we employ the measure developed by Kaspereit and Lopatta (2019) and add SA as our variable of interest. This allows us to estimate a firm-level measure for the part of SG&A cost asymmetry that corresponds to SA by estimating rolling five-year pooled cross-sectional regressions of changes in SG&A expenditure by global industry classification standard (GICS) sector. In a second step, we use the measure of SA-related firm-level cost asymmetry to test its association with shareholder value, defined as Tobin's q (Tobin, 1969).

To mitigate endogeneity concerns, we perform two additional tests. First, firms' decision to adopt SA may be the result of systematic differences in terms of profitability, capital structure, or other firm-specific characteristics to firms without SA, which could also be the drivers of documented differences in cost asymmetry levels. Based on these differences in characteristics, certain firms could be more likely to adopt SA as they regard the resulting increase in credibility and improvement in reputation as highly valuable, either because of their need for greater visibility in terms of size and profitability or because of a regulatory environment in which a higher level of assurance strengthens the trust of external users of CSR reports (Branco et al., 2014; Casey & Grenier, 2015; Kolk & Perego, 2010; Sierra et al., 2013). We correct for the possibility of a non-random selection of firms into adopting SA by using the approach in Heckman (1979). Second, the decision to adopt SA is made by top management (Simnett et al., 2009), which is most likely also responsible for decisions on cost adjustments. Thus, the documented effects on cost asymmetry may not be the result of SA but rather the result of a common management style influencing both the decision to adopt SA and to adjust costs. To mitigate this concern, we conduct a two-stage least squared (2SLS) instrumental variable (IV) regression analysis. We use the external pressure in news articles as a firm-independent factor that determines the decision in favor of adopting SA. In additional robustness tests, performed to mitigate the possibility of our results being driven by the chosen estimation technique, we employ a single pooled regression model that incorporates effects that are fixed in terms of time and firm, instead of rolling regressions. This also enhances the comparability of our results with those of several other studies that are also based on the method developed by M. C. Anderson et al. (2003).

Our results of the first part of the analysis show a significant effect of SA on the asymmetric behavior of SG&A costs. Specifically, we provide evidence for our hypothesis that the SA process provides improved information to management, thus mitigating uncertainty,

which in turn results in more timely cost reductions in response to declines in activity levels. The validity of these results is supported by our additional tests, as the results based on the Heckman (1979) correction, the 2SLS IV estimation, and the fixed-effects model remain qualitatively similar and statistically significant. The overall homogeneous results support our first hypothesis, indicating that SA produces additional internal effects that go beyond increased credibility of provided CSR information. For the second part of our analysis, our results provide evidence of an increase in shareholder value associated with the SA-related part of SG&A cost asymmetry. More precisely, one increase in the standard deviation of SA-related cost asymmetry is associated with a 0.293 increase in Tobin's q, which translates to a 1.759 percent increase in Tobin's q relative to the sample mean of Tobin's q. Additional subsample analysis provides evidence that this positive relationship is driven by SA processes contributing to increased cost anti-stickiness (i.e., more timely cost adjustments in case of a decrease in the level of activity).

Our study contributes to the literature in mainly four ways. First, to the best of our knowledge we are the first to analyze the internal effects of SA beyond CSR performance as we show that SA affects internal managerial decisions regarding cost adjustments. Thus, we contribute to audit literature by contributing additional evidence to the debate on the usefulness of voluntary audits (DeFond & Zhang, 2014). While Blackwell et al. (1998), Kim et al. (2011) and Minnis (2011) find a beneficial effect of voluntary financial audit on private companies' cost of debt and Lennox and Pittman (2011) document a positive effect of voluntary financial audits on private companies' credit ratings, we show that voluntary audit (i.e., SA) has a beneficial spillover effect on the overall cost structure of a firm. The only other empirical study to address the effects of SA on internal firm decisions is the recent work by Steinmeier and Stich (2019), which investigates the relationship between SA and the optimal level of CSR activities. Since their analysis focuses on CSR activities, we arguably differ from their study as we focus on the overall cost structure beyond CSR. Second, our study contributes to the literature series describing the relationship between CSR activities and shareholder value. We add to Jo and Harjoto (2011), Servaes and Tamayo (2013), and Harjoto and Laksmana (2018) as we establish a positive relationship between cost adjustment decisions related to SA and shareholder value. While the aforementioned three studies investigate how overall CSR activities influence managerial risk-taking behavior, we focus on SA as a specific CSR element that has become increasingly important over the last years. Our analysis thus helps to identify which specific CSR activities (here, voluntary SA) drive shareholder value. Third, we contribute to the literature on determinants of cost asymmetry, by showing that SA as a specific

component of a company's CSR activity affects asymmetric cost behavior. This literature has not previously focused on the impact of CSR on the internal information environment as a potential factor affecting managerial decisions regarding cost adjustments. Fourth, we add to the scarce literature on the consequences of cost asymmetry on external market participants. By showing that there is a positive association between the SA-related part of cost asymmetry and shareholder value, we add to the work of Weiss (2010) and Ciftci et al. (2016), which shows that analysts find it difficult to assess cost asymmetry, and of Lopatta et al. (2020), who provide evidence that cost asymmetry attributable to CEO managerial style reduces firm value.

Our study is relevant to investors, regulators, and companies as it shows that SA has real economic benefits that go beyond the primary goal of strengthening investor confidence in sustainability disclosures. In June 2020 the European Parliament adopted the Taxonomy Regulation as part of the European Commission's Action Plan on Financing Sustainable Growth, which includes amendments to mandatory CSR reporting requirements. Within this context, best practice recommendations encourage firms to provide external assurance of their disclosed CSR-related information, while the EU technical expert group on sustainable finance also recommends the external assurance of Taxonomy-related disclosures. Further, the EU Commission plans to review the European non-financial reporting Directive, as communicated through the European Green Deal, which should include changes based on recommendations from practitioners (European Commission, 2019; TEG, 2020). As part of this process, a majority of respondents in the public stakeholder consultation, which ended in June 2020, argued in favor of stricter requirements for the assurance of company disclosures under the EU non-financial reporting Directive (European Commission, 2020). There is hence considerable potential for an increase in demand for SA services and their applications, as companies have the opportunity not only to improve their information environment for external shareholders but also to benefit from improvements in their internal activities. This holds particularly true for US firms, where SA is less common than in the remainder of the sample (US: 68 percent engaged in SA as of 2018 vs. non-US: 84 percent).

The remainder of this paper is organized as follows. Section II gives an overview of the existing literature and develops our hypotheses. Section III discusses the methodology and introduces the sample. Section IV presents the results, and Section V concludes.

2 Literature review and hypothesis development

2.1 Sustainability assurance and internal information environment

Applying content-based analysis of sustainability reports and their assurance statements as well as qualitative interviews with industry practitioners, researchers aim to understand how the assurance process of sustainability data and reports has evolved as a "new assurance service" (Ball et al., 2000; Canning et al., 2019; Edgley et al., 2010; Manetti & Toccafondi, 2012; O'Dwyer, 2011; O'Dwyer, Owen, & Unerman, 2011; O'Dwyer & Owen, 2005). Various aspects of the SA process are examined and addressed, such as the dominant role of management in the SA process, increasing demand for stakeholder inclusiveness, the independence of auditors within the process, and the creation of demand and legitimacy for SA by SA providers (Manetti & Toccafondi, 2012; Michelon et al., 2019; O'Dwyer, 2011; O'Dwyer, Owen, & Unerman, 2011; Owen et al., 2000). An important component of this research string is why companies are motivated to adopt SA in the first place. According to Simnett et al. (2009), the purpose of SA is to increase the credibility of provided CSR-related information, since companies with a need for greater credibility are more likely to engage in SA. Cohen and Simnett (2015) emphasize that CSR information is used by external shareholders as well as internal managers in their decision-making process, further highlighting the importance of that information being reliable and credible.

However, practitioners increasingly advertise improved internal information environments as an additional benefit of SA. Besides the objectives of accountability, democracy, and sustainability, social and environmental audits are intended to aid managerial controls, such as risk assessments, to avoid surprises and thus facilitate the implementation of a corporate strategy (Gray, 2000, p. 245). SA providers argue that audits help to optimize reporting processes by evaluating reporting and information systems and processes (O'Dwyer, Owen, & Unerman, 2011). Insights from practice indicate that the process of sustainability data collection is rather rudimentary and that environmental information gathered internally in companies rarely follows a structured process and is often of insufficient quality (O'Dwyer, Owen, & Unerman, 2011). This leads providers to advise their clients on how to improve internal control and reporting structures to create an auditable environment (O'Dwyer, 2011; O'Dwyer, Owen, & Unerman, 2011). Consequently, in identifying strengths and weaknesses of control systems, SA can yield valuable company insights (Ball et al., 2000, p. 19) and therefore enhance stability and mitigate exposure to unexpected shocks (Owen et al., 2000, p. 85). In line with this, qualitative studies indicate that providers of SA and companies that

engage in CSR consider these internal benefits of SA to be at least as important as its external benefits (Ball et al., 2000; Edgley et al., 2010; O'Dwyer, 2011; O'Dwyer, Owen, & Unerman, 2011; Owen et al., 2000).

The importance of a good internal information environment is also supported by theory. Theoretical models of the application of agency theory conclude that internal information asymmetries lead to inefficient capital and resource allocations (Lambert, 2001). As the quality of managerial decisions is mainly determined by the underlying information environment, internal controls are a crucial part of the information environment and contribute significantly to the quality of management decisions (Dorantes et al., 2013; Feng et al., 2009; Goodman et al., 2014; Kinney, 1999). Improved internal controls provide managers with more reliable and timely information which aids them in better assessing future investment decisions due to less uncertainty in their decisions, and enhances their ability to reallocate capital in a more timely manner (Goodman et al., 2014; Heitzman & Huang, 2019; Ittner & Michels, 2017). If SA processes help to improve the internal information environment through reviewing internal control and informational processes, as SA providers suggest, then we would expect this to also have positive effects in terms of better resource adjustment decisions. Further, improved quality of reported environmental performance measures through SA should contribute to better resource adjustment decisions, as prior research shows that managers use such measures in their controlling processes and incorporate them in their strategic decision making (Banerjee, 2002; Gates & Germain, 2010; Henri & Journeault, 2010; Perego & Hartmann, 2009).

2.2 Cost-related decisions and the internal information environment

To examine the effect of SA on resource adjustment decisions, we choose to focus on the concept of cost asymmetry. Management decisions on ongoing capital and resource allocations are largely cost-related decisions. According to the traditional textbook cost model, costs consist of two components: fixed (pre-determined) and variable (mechanically determined) costs (Cooper & Kaplan, 1992). In this cost model, there is no discretionary scope for management concerning short-term changes in cost structures and thus variable costs are assumed to vary symmetrically with changes in activity levels. However, more recent research suggests otherwise. The model by M. C. Anderson et al. (2003) indicates that many resources are neither fixed nor variable. They consider so-called "sticky resources," which require a conscious decision by management because they cannot be added or subtracted at a continuous level. This is because short-term adjustments are related to significant but expendable costs, such as severance payments to dismissed employees or search and training costs for new

employees. If current activity levels increase or decline, managers must decide whether and to what extent they want to adjust the level of "sticky resources" while considering the adjustment costs associated with such changes. Empirically observed, companies adjust their resources (measured in SG&A expenses) to a lesser degree when activity levels drop (i.e., sales revenue) compared to an equivalent increase in activity levels. Since companies hold on to their resources when activity levels drop, this observation is referred to as cost stickiness (M. C. Anderson et al., 2003). Vice versa, a disproportionate reduction in resources in case of a drop in activity levels can be observed, especially under an excess capacity assumption, which is labeled cost anti-stickiness (Weiss, 2010). As firm-specific conditions and circumstances influence managers' decisions regarding cost adjustments, the degree of cost asymmetry varies across time and companies. Prior literature on the drivers of asymmetric cost behavior has identified four categories: (1) adjustment costs of reduction and replacement of resources when activity levels rebound, (2) existing and future required slack resources, (3) managerial expectations regarding future economic and demand conditions, and (4) agency and behavioral factors influencing managers' cost-related decisions (Banker & Byzalov, 2014). Consequently, existing literature has identified a variety of factors at the firm and economy level capturing these drivers, such as asset or employee intensity, economic activity and development of previous activity levels (M. C. Anderson et al., 2003), managerial empire building (C. X. Chen et al., 2012), earnings management (Dierynck et al., 2012; Kama & Weiss, 2013), employment protection legislation (Banker, Byzalov, & Chen, 2013), time-series patterns of sales changes (Banker et al., 2014), life cycle stages (M. C. Anderson et al., 2015), political uncertainty (Lee et al., 2020), managerial expectations (J. V. Chen et al., 2019), managerial style (Lopatta et al., 2020), and generalized trust (Hartlieb et al., 2020).

Maintaining "sticky" resources in the event of a decline in activity levels may be rational from an economic point of view if the savings are outweighed by current adjustment costs (e.g., severance payments) and future reinstatement costs (e.g., search costs), especially if there is significant uncertainty about the future development of activity levels and required resources (M. C. Anderson et al., 2003). Thus, managers postpone their decisions regarding sticky resource adjustments until the prevailing uncertainty is resolved. M. C. Anderson et al. (2003) show that sticky cost behavior declines when the decrease in activity levels persists over periods, as managers reduce their uncertainty about future developments and reduce committed resources. Similarly, Lee et al. (2020) show that sticky cost behavior increases during prevailing uncertainty due to elections, which declines as soon as uncertainty drops. However, the only study to analyze the impact of the internal information environment on deliberate managerial

resource adjustments is a recent study by Kim et al. (2019). They provide evidence of slower resource adjustments in response to a decline in activity levels for firms with poor internal information environments (captured through reported control weaknesses) as an inverse measure of internal information quality (Feng et al., 2009). This is in line with M. C. Anderson et al. (2003) who emphasize the role of information acquisition in the decision to postpone resource adjustments. Thus, it is reasonable to assume that an improved information environment helps managers to make more timely resource adjustments, which leads to less "sticky" cost behavior. On the one hand, if SA leads to improvements in reporting structures and processes, this should result in more timely and higher quality information that aids management's decision-making process. Thus, we argue that SA enhances firms' internal information environments and reduces "sticky" cost behavior as decisions on cost adjustments can be implemented more promptly due to reduced managerial uncertainty. On the other hand, a better information environment can result in a more efficient allocation of resources (Heitzman & Huang, 2019) and thus a lower need to maintain slack resources in the case of a future increase in activity levels, thus reducing "anti-sticky" cost behavior. Both aspects result in accelerated cost adjustments as activity levels decline.

However, it is also possible that this effect does not materialize, as top management has considerable power in actively shaping the assurance process by specifying what is assured and to what extent (Owen et al., 2000). Furthermore, implementing the recommendations of the assurance providers to top management is not mandatory; instead, it depends on management's assessment of their relevance. It is well documented in the literature that the personal characteristics of top managers determine their management style (Bertrand & Schoar, 2003). Especially overconfident managers may be reluctant to implement the auditors' recommendations as they judge their reporting systems and internal controls to be adequate even before the SA is conducted (O'Dwyer, Owen, & Unerman, 2011) since they tend to overestimate their judgement (McCarthy et al., 2017). Further, overconfident CEOs tend to generally underestimate risks, which is also likely to lead to under-investment in hedging against risks from CSR activities (McCarthy, Oliver, and Song 2017). Thus, risks associated with internal controls and reporting structures that are flagged up during the SA process may be related to a conscious choice to investment little in hedging these risks. Based on these arguments, we formulate our first hypothesis as follows:

Hypothesis 1: *Firms with sustainability assurance exhibit less cost asymmetry than firms without.*

2.3 Managerial decisions, internal information environment and shareholder value

Existing research shows that in an environment with internal asymmetric information distribution, company-internal information systems lead to improved management decisions and thus increase overall output (Antle & Fellingham, 1995). Thus, companies with improved information systems and better internal controls benefit from an improved internal information environment. It has been shown that this leads to better investment decisions, lower effective tax rates, higher-quality M&As, more efficient allocation of capital, and better overall corporate performance (Chen Chen et al., 2018; Gallemore & Labro, 2015; Goodman et al., 2014). Beyond that, companies with an improved internal information environment exhibit stronger internal innovation performance (Huang et al., 2020). Since all management decisions that create positive or negative revenue streams are reflected in a company's market capitalization L. H. P. Lang and Stulz (1994), we expect these positive effects to be rewarded by outsiders. In the context of non-financial disclosures, prior research has shown that they reduce information asymmetries between the company and outsiders (Dhaliwal et al., 2011; Dhaliwal et al., 2012), resulting in beneficial economic effects such as lower cost of capital and higher analyst forecast accuracy. Focusing on SA as a specific non-financial disclosure-related element, Casey and Grenier (2015) provide evidence of lower capital costs and lower dispersion of analysts' forecasts concerning companies engaging in SA in the US market, while Cuadrado-Ballesteros et al. (2017) and Martínez-Ferrero and García-Sánchez (2017) find similar evidence in a cross-country context. The importance of SA in this context is further highlighted by M. M. Cheng et al. (2015), who find experimental evidence that verified sustainability indicators increase their perceived relevance for non-institutional investors and influence their willingness to invest. In line with SA providers' claim that SA increases the quality of internal information environments, improvements in internal management systems and information systems achieved through SA were found to add value to the company (Edgley et al., 2010, p. 538), as the improved quality of information supports strategic decision-making and resource allocation (Ballou et al., 2012). We complement these prior findings by focusing on shareholder value implications due to SA-related cost asymmetry.

While research has identified many factors that influence intentional adjustments of management resources and thus determine asymmetric cost behavior, little is known about the extent to which existing levels of cost asymmetry are beneficial or detrimental to an organization (Banker & Byzalov, 2014). A notable exception is the study by Weiss (2010). He shows that analysts covering companies with stickier cost behavior issue less precise earnings

forecasts and have less analyst coverage. In a similar vein, Ciftci et al. (2016) provide evidence that analysts find it difficult to incorporate sticky cost behavior in their forecasts as they fail to predict firms' expenses. As investors base their investment decisions on these estimates, it indirectly harms investors if these inaccurate estimates lead to inefficient investment decisions. Further, Lopatta et al. (2020) show that cost asymmetry resulting from individual CEOs' managerial style is detrimental to shareholder value. If SA improves internal information environments and helps managers make better-informed resource adjustment decisions due to lower uncertainty, then SA-related cost asymmetry should more faithfully represent firms' future development. In turn, this should decrease investors' information asymmetry and be rewarded in terms of added shareholder value (Ballou et al., 2012). Taken together, we formally state our second hypothesis as follows:

Hypothesis 2: *The sustainability assurance-related part of cost asymmetry positively influences shareholder value.*

3 Methodology

3.1 Sustainability assurance and cost asymmetry

The first step of our research design analyzes the effect of SA on SG&A cost asymmetry. For this, we build on the methodology used in Kaspereit and Lopatta (2019), which extends the model of cost asymmetry in M. C. Anderson et al. (2003) to estimate a firm-level measure. To capture the specific portion of cost asymmetry related to SA, we further extend the model in Kaspereit and Lopatta (2019) by including SA as an additional factor. We run rolling five-year pooled cross-sectional regressions by global industry classification standard (GICS) sectors on the following model:

$$\begin{aligned}\log(\Delta SG\&A)_{it} = {} & \beta_0 + \beta_1 D_{it} + (\mu_0 + \mu_1 SA_{it} + \sum \mu_n DET_{it}) D_{it} * \log(\Delta Sale)_{it} \\ & + (\lambda_0 + \lambda_1 SA_{it} + \sum \lambda_n DET_{it}) \log(\Delta Sale)_{it} + \beta_2 SA_{it} + \sum \beta_n DET_{it} + \beta_{n+1} D_{it} * SA_{it} \\ & + \sum \beta_k D_{it} * DET_{it} + COUNTRY_i + \epsilon_{it}, \end{aligned} \quad (1)$$

where *log(ΔSG&A)* is defined as the logarithm of changes in SG&A costs. *log(ΔSale)* is the logarithm of changes in sales revenue, the measure for activity levels established in prior literature. *D* is an indicator variable taking the value of one if sales decrease in the current period, zero otherwise. *SA* is an indicator variable that takes the value of one if a company undergoes sustainability assurance in the current period, zero otherwise. To identify *SA* we use the variable CSR reporting external audit from the Asset4 database, which is coded as one when the company has an external auditor for its CSR reporting. *DET* stands for a list of determinants

influencing cost asymmetry. To account for country differences in SG&A cost adjustments we include country-fixed effects. Further, we require a minimum of 100 observations per pooled cross-sectional rolling regression. The coefficients on interaction terms including *D∗log(*Δ*Sale)* (i.e. $\mu_0 + \mu_1 SA_{it} + \sum \mu_n DET_{it}$) capture the incremental change in SG&A cost adjustments in response to decreases in sales depending on the corresponding determinants. Negative values of the coefficients indicate a slower adjustment in case of a decline in sales, i.e., cost stickiness. Accordingly, a positive coefficient indicates faster adjustment in the event of a sales decline, i.e., cost anti-stickiness. The proportion of cost asymmetry associated with SA is depicted by the coefficient μ1 on the three-way interaction term of *SA∗D∗log(*Δ*Sale)*, which we expect to be positive to confirm our first hypothesis.

Our model includes all the determinants of cost asymmetry used by Kaspereit and Lopatta (2019) as these are identified as relevant in prior literature. The controls capture all four drivers that influence deliberate managerial decisions resulting in asymmetric cost behavior: adjustment costs, initial slack resources, managerial expectations, and agency conflicts (Banker & Byzalov, 2014). Adjustment costs comprise asset intensity (*logAINT*) and employee intensity (*logEINT*) (M.C. Anderson et al., 2003). Higher asset or employee intensity drives managers to a trade-off between cost reductions in the event of a decline in sales and future installment and rehire costs as activity levels rise, which is likely to increase cost stickiness. To account for initial slack resources, we include an indicator for a prior sales decrease, *PRSDEC*, which we expect to be negatively associated with cost stickiness and positively associated with cost anti-stickiness, as companies regard successive decreases in sales as more permanent and thus are more inclined to adjust their resources (M.C. Anderson et al., 2003). We also control for firms in initial, growth, or decline life-cycle stages (*LC_IGD*) tending to have higher levels of unused resources, in line with M. C. Anderson et al. (2015). As managers' expectations are influenced by macroeconomic conditions, we include real growth in gross domestic product (Δ*GDP*), which is expected to be positively associated with cost stickiness. By contrast, managers who observe a decline in property, plant and equipment (PPE) may have less optimistic expectations about future activity levels, leading to a reduction in cost stickiness. Thus, we include *PPEDEC* (M.C. Anderson et al., 2016) (2016). To account for agency conflicts, we first include a measure for prior losses (*Loss_prior*), as a prior reported loss increases the pressure on managers to report profits in the following period (Dierynck et al., 2012). Next, we include *Small_profit*, a measure that accounts for managers' incentives to meet or beat earnings expectations (Kama & Weiss, 2013). Both are expected to decrease (increase) cost stickiness (anti-stickiness). Further, we add free cash flow (*FCF*) to account for managerial empire-building, which we expect to

increase cost stickiness as managers use excess cash as an internal source of financing to maintain their capacity (C. X. Chen et al., 2012). Table 1, Panel A provides detailed definitions of all variables.

3.2 SA-related cost asymmetry and shareholder value

To test our second hypothesis, we use the estimated coefficients of the rolling five-year pooled cross-sectional regressions by GICS sectors to determine the part of SA-related cost asymmetry, which we include as the main independent variable of interest in our shareholder value model. We define SA-related SG&A cost asymmetry as the estimated coefficient from the rolling five-year pooled cross-sectional regressions multiplied with the observation specific value for SA, as depicted in Eq. (2):

$$\text{SA\_ASY}_{it} = \widehat{\mu_1}\text{SA}_{it} \tag{2}$$

The shareholder value model further includes *DET_ASY* as defined in Eq. (3), which is labeled by Kaspereit and Lopatta (2019) as the firm-specific part of cost asymmetry related to the determinants included in the model in Eq. (1):

$$\text{DET\_ASY}_{it} = \widehat{\mu_0} + \sum\widehat{\mu_n}\text{DET}_{it} \tag{3}$$

Then again, to test the association between the SA-related part of cost asymmetry and shareholder value we estimate the following model:

$$\begin{aligned}\text{Tobin's q}_{it} \; &= \delta_0 + \delta_1\text{SA\_ASY}_{it} + \delta_2\text{DET\_ASY}_{it} + \delta_3\hat{\epsilon}_{it} + \sum\delta_z\text{Controls}_{it} \\ &\quad + \text{firmFE} + \text{yearFE} + \epsilon_{it},\end{aligned} \tag{4}$$

where *Tobin's q* is our proxy for shareholder value. We choose this measure as the market value reflects all future profits and therefore includes capitalized future benefits of the effect of SA on managerial decisions regarding cost adjustments (Himmelberg et al., 1999; L. H. P. Lang & Stulz, 1994). We define *Tobin's q* following Kaplan and Zingales (1997), as their measure is widely used in finance literature (Gompers et al., 2003; Konijn et al., 2011; La Porta et al., 2002; Servaes & Tamayo, 2013). However, to increase the robustness of our results, we consider three alternative definitions for *Tobin's q* following Chung and Pruitt (1994), Klapper and Love (2004), as well as Lewellen and Lewellen (2016). $\hat{\epsilon}$ controls for the unexpected part in SG&A cost adjustments defined as the residuals obtained from the estimation of the model in Eq. (1). We control for company size (*SIZE*), as large companies tend to have less profitable investment opportunities in the future (Allayannis & Weston, 2001; Himmelberg et al., 1999; L. H. P. Lang & Stulz, 1994). To account for financial market access and capital structure, we

include dividend payments (*DIVIDENDS*) and financial structure (*LEV*) (Allayannis & Weston, 2001; C. R. Chen & Steiner, 2000; Hoyt & Liebenberg, 2011). Next, to capture the positive relationship between profitability and firm value we include return on assets (*ROA*) (Allayannis & Weston, 2001; C. R. Chen & Steiner, 2000). By adding sales growth (*log(*Δ*Sales)*), research and development expenses (*R&D*) and advertising expenses (*ADVERT*), we control for future growth opportunities (Hall, 1993; Himmelberg et al., 1999; Hirschey, 1982; Klapper & Love, 2004; La Porta et al., 2002; Servaes & Tamayo, 2013). Further, we include market share (*MKT_Share*) to account for firms' negotiating power (Vomberg et al., 2015). As capital-intensive firms are less likely to adjust to economic challenges and chances (Vomberg et al., 2015), we control for capital intensity (*CAPINT*). We include *FCF* to control for firms with higher cash flows having better investment opportunities (Bates et al., 2009). As corporate governance affects shareholder value (Cunat et al., 2012; Gompers et al., 2003; Jo & Harjoto, 2011), we include the overall Corporate Governance Score (*GOVERNANCE*). To control for transparency, we include the bid-ask spread (*BID_ASK*) as a measure of stock market liquidity and transparency (Konijn et al., 2011; M. Lang et al., 2012). Lastly, we include firm- and time-fixed effects in all our regressions to account for further firm-level differences and macroeconomic/temporal events, respectively. Table 1, Panel B provides detailed definitions of all variables.

>> Insert Table 1 around here. <<

3.3 Sample selection

Our initial sample consists of information in local currency on all available non-financial and not state-owned firms in the Compustat North and Compustat Global Database for the period between 2005 and 2018. Given our cross-country setting, we include only data from 2005 onwards in our analysis to account for the mandatory adoption of IFRS in 2005, which improves comparability between accounting figures. Further, the Asset4 database starts in 2002 and the data coverage regarding our variable of interest is not sufficient in the first years. To correct for inflation, we deflate accounting measures by the respective country-specific consumer price index. Following prior research (M. C. Anderson et al., 2003; Kaspereit & Lopatta, 2019), we exclude 45,192 observations with negative SG&A expenses, negative sales, or SG&A expenses larger than sales. We require non-missing data for all relevant accounting and economic measures, which further reduces our sample by 176,604 observations. For some variable construction two lags of observations are required. For this case we use data from 2003 and 2004. Next, we trim all continuous variables at the top and bottom one percent to limit the effect

of extreme data points in the Compustat database (Banker, Byzalov, & Chen, 2013). This results in a sample of 148,822 observations. Next, we identify 10,683 observations in the Asset4 database that match our sample and have non-missing information on external sustainability assurance. Finally, we exclude any observations corresponding to groups that do not reach the minimum of 100 observations per cross-section or are country singletons, reducing the sample by another 72 firm-year observations. Our final sample for the first-stage model thus consists of 10,611 observations corresponding to 2,011 unique firms from 42 countries, with an average of five observations per firm. The size of the sample for the second-stage model is mainly determined by the availability of estimated SA-related cost asymmetry in the first stage. Thus, we start with 7,164 observations for which the SA-related part of cost asymmetry can be determined. We lose 260 observations due to non-available data for additional controls and variables required to calculate Tobin's q. Next, we trim the additional continuous control variables at the bottom and top one percent, which leads to the exclusion of additional 1,244 observations. Lastly, following prior research (e.g., DeHaan et al., 2017) we exclude 376 singleton observations to avoid biased standard errors (Correia, 2015).This results in a sample of 5,274 observations for the main tests of our second hypothesis. The sample selection procedure is summarized in Table 2.

>>Insert Table 2 around here. <<

4 Results

4.1 Sustainability assurance and cost asymmetry

4.1.1 Descriptive statistics

Table 3, Panel A presents descriptive statistics for the variables employed in the first step of our analysis. On average, 53.2 percent of all observations in our sample have sustainability assurance, this indicating that while voluntary, the service is often used by firms. The frequency of sales decreases in our sample is 34.77 percent, which is within the range documented by prior research, Hartlieb et al. (2020) documenting a low of 28 percent and Lee et al. (2020) documenting a high of 38 percent. The mean (median) values of the controls are similar to those in prior studies. The mean values of *PRSDEC* (33.2 percent) and of *PPEDEC* (29.4 percent) are similar to those reported in Kaspereit and Lopatta (2019). The mean (median) value of 0.078 (0.072) for *FCF* is similar to that reported by C. X. Chen et al. (2012), while the mean value of *logAINT* (0.184) is comparable to that reported in J. V. Chen et al. (2019). The mean *LC_IGD*

of 46.6 percent is lower than those of M. C. Anderson et al. (2016), Kaspereit and Lopatta (2019) and Lopatta et al. (2020), which could be because the companies covered by Asset4 are more mature and thus not likely in the stages of introduction or growth defined by Dickinson (2011). Higher variations within the variables are explained by the comprehensive geographical coverage of our sample (42 countries). A large proportion of observations comprises US firms (24.54 percent) and Japanese firms (23.89 percent), similar to other recent studies on asymmetric cost behavior applying cross-country settings (Hartlieb et al., 2020; Lee et al., 2020). Panel B presents pairwise Spearman and Pearson correlations. The correlations are significant but exhibit small values between the independent variables, in line with C. X. Chen et al. (2012) and Lopatta et al. (2020). This mitigates any concerns regarding multicollinearity.

>> Insert Table 3 around here. <<

4.1.2 Regression results

Table 4 presents the results of the rolling five-year pooled cross-sectional regressions by GICS sector based on the model in Eq. (1). The first column includes the predicted effect of the individual determinants on cost asymmetry in line with Kaspereit and Lopatta (2019). The second column presents the mean coefficients weighted by the inverse standard error (Dichev & Piotroski, 2001, p. 187). We decide to report precision-weighted averages in line with Kaspereit and Lopatta (2019) as the number of observations included in each regression; consequently, precision varies substantially. Hence, equal weighting would result in over-weighting of estimates obtained from cross-sections including only a small number of observations (Dichev & Piotroski, 2001, p. 186). The third column contains t-values corresponding to the precision-weighted average coefficient divided by its standard error. While the full sample (10,611 observations) is included in the regressions, due to the rolling five-year window range from the current year up to four years after, coefficients can only be estimated for observations starting in 2009 (7,164 observations). The obtained (mean) adjusted R-squared is 46.91 percent, which is similar to the (mean) adjusted R-squared of 51.90 percent reported by Kaspereit and Lopatta (2019).

Our variable of interest is $D*log(\Delta Sale)*SA$ as it captures the effect of SA on cost asymmetry, the estimated coefficient (0.155, t-val: 3.001) being positive and statistically significant at the one percent level. More specifically, when a company undergoes SA, the adjustment of SG&A costs in the case of a one percent decline in sales is 0.11 percent higher than in firms without SA, given all other determinants remain constant. This effect size is comparable to that documented by Kim et al. (2019), who estimate that companies with internal

control weaknesses have a 0.12 percent lower adjustment of SG&A costs in reaction to a one percent decrease in sales than firms without internal control weaknesses. The positive coefficient on $D*log(\Delta Sale)*SA$ indicates a faster cost adjustment for firms undergoing SA in the event of a sales decline, which supports our first hypothesis. The coefficient on $D*log(\Delta Sale)$ (-0.412; t-val: -3.968) is negative and statistically significant at the one percent level, showing that firms in our sample exhibit on average cost stickiness, in line with prior research (M. C. Anderson et al., 2003). The effect of the other determinants on SG&A cost asymmetry is depicted by the coefficients on the interaction terms $D*log(\Delta Sale)*DET$, where *DET* represents one of the firm-level cost asymmetry determinants included in our analysis. The estimated coefficients are statistically significant and have the expected sign for *LC_IGD* (-0.187, t-val: -3.33) and *PPEDEC* (0.142, t-val: 2.64). Further, the positive and statistically significant coefficient on *logEINT* (0.027, t-val: 4.35) is in line with C. X. Chen et al. (2012) who claim that, especially in recent years, firms have come to use more temporary labor as it allows for more flexibility.

>> Insert Table 4 around here. <<

4.2 SA-related portion of cost asymmetry and shareholder value

4.2.1 Descriptive statistics

Table 5 presents descriptive statistics for the variables used in the second main model of our analysis. The summary statistics presented in Panel A indicate that the average effect of SA on cost asymmetry is positive with a mean value of 0.067. This suggests that firms' use of SA leads to timelier and greater cost adjustments that leads to either decreased cost stickiness or increased cost anti-stickiness under an excess capacity assumption. The mean value of *DET_ASY* (-0.293) determining the firm-specific portion of cost asymmetry is similar to that reported by Kaspereit and Lopatta (2019) and indicates that firms exhibit, on average, sticky cost behavior. The mean (median) value for *Tobin's q* of 1.664 (1.364) is similar to those reported in prior literature (Cunat et al. 2012; Jo and Harjoto 2011). Control variables are mainly in line with prior literature (Jo & Harjoto, 2011). Table 5, Panel B presents pairwise correlations between individual variables used in the model in Eq. (4). The significant pairwise Pearson correlation (upper triangle) between *Tobin's q* and the SA-related part of cost asymmetry provide initial evidence for their positive association and thus for our second hypothesis. The magnitudes of all other correlations are moderate and thus do not raise any multicollinearity concerns.

>> Insert Table 5 around here. <<

4.2.2 Regression results

Table 6 presents the results of the model in Eq. (4) analyzing the association between the SA-related part of cost asymmetry and shareholder value. The first column presents regression coefficients based on our main model; t-values are displayed on the side. The adjusted R-squared of our main model is 86.8 percent, similar to Servaes and Tamayo (2013) (74.0 percent). The coefficient on *SA_ASY* (0.080, t-val: 3.771) is positive and statistically significant. Thus, an increase by one standard deviation in *SA_ASY* results in a 1.759 percent increase of *Tobin's q* relative to the sample mean of *Tobin's q*. The effect size is comparable to that documented by Lopatta et al. (2020), where an increase by one standard deviation in CEO-related excess level of SG&A cost asymmetry results in a 1.853 percent reduction in Tobin's q relative to the sample mean of Tobin's q. This is in line with our second hypothesis that the cost-adjustment decisions associated with SA positively affect shareholder value. The next six columns present results using alternative model specifications in terms of used *Tobin's q* measure. All three coefficients on *SA_ASY* are positive and show significance at the one percent level, strongly supporting our previous results. As expected, the coefficient on *SIZE* is negative, as larger and more mature firms tend to have less profitable investment opportunities in line with Vomberg et al. (2015). The coefficients on *ROA* and *MKT_Share* exhibit positive values in line with Vomberg et al. (2015) and Lopatta et al. (2020). The negative coefficients on *DIVIDENDS* and *BID_ASK* are also in line with prior literature (Allayannis & Weston, 2001; M. Lang et al., 2012) The coefficients on *DET_ASY*, representing the firm-specific portion of cost asymmetry determined by firm-specific and macro-economic factors, are insignificant in all four model specifications, as are the coefficients on $\hat{\epsilon}$, representing abnormal changes in SG&A costs. This is consistent with Banker and Byzalov (2014), who argue that asymmetric cost behavior is the result of diverse management practices, which can have both value-enhancing and destructive consequences, thus decreasing the likelihood of documenting a consistent association with shareholder value.

>> Insert Table 6 around here. <<

To obtain a more nuanced picture of the exact channels through which SA determines cost behavior that is beneficial to shareholder value, we conduct a sub-sample analysis based on the direction of the association between cost asymmetry and SA. Although on average SA is positively associated with SG&A cost asymmetry, individual observations may correspond to

either increased or decreased adjustments in SG&A costs. Thus, a positive association indicates that SA contributes to increased cost adjustment, leading to either decreased cost stickiness or increased cost anti-stickiness (depending on the initial firm level of cost asymmetry). Conversely, a negative association indicates that SA leads to lower cost adjustments, thus increasing cost stickiness or decreasing cost anti-stickiness. If our predictions regarding timelier and stronger cost adjustments being the drivers of value creation due to the impact of SA on cost asymmetry are correct, then we would expect the subsample corresponding to firms with positive associations between SA and cost asymmetry, in particular, to indicate enhanced shareholder value. Table 7, Panel A presents the estimated coefficients based on the subsample of observations with timelier and higher SA-related cost adjustments. For our main model, the coefficient on *SA_ASY* (0.151, t-val: 3.034) is positive, shows significance at the one percent level, and has nearly twice the magnitude compared to the estimates obtained from the full sample. Hence, an increase by one standard deviation in *SA_ASY* results in a 3.332 percent increase in *Tobin's q* relative to the sample mean of *Tobin's q*. The estimates on the three alternative measures of *Tobin's q* draw a similar picture. Panel B contains estimated coefficients on observations for which SA increases (decreases) cost (anti-) stickiness. For all four model specifications, the coefficient on *SA_ASY* is positive but not statistically significant, indicating no consistent impact on shareholder value. The results presented in this section increase the validity of our two hypotheses, providing evidence on the channel through which SA-related cost asymmetry contributes to shareholder value and showing that timelier cost adjustments attributed to SA are the drivers of increased shareholder value.

>> Insert Table 7 around here. <<

4.3 Additional analysis

4.3.1 Heckman (1979) correction for non-random selection of SA

Although the results of the main analysis based on rolling five-year pooled cross-sectional regressions by GICS sector show a significant positive effect of SA on SG&A cost asymmetry, we acknowledge the fact that firms' engagement in SA is not an exogenous process. It is possible that firms that adopt SA are systematically different from firms that do not, meaning they are more likely to adopt SA. Certain firm-specific characteristics such as size, profitability, or capital structure are likely to influence their decision to undergo SA. To account for this possibility, we apply a correction technique for non-random selection following Heckman (1979). First, we estimate a model for the choice to adopt SA in the first stage, using several

determinants that are well known in the literature to influence the decision in favor of SA (Branco et al., 2014; Casey & Grenier, 2015; Kolk & Perego, 2010; Sierra et al., 2013; Simnett et al., 2009; Steinmeier & Stich, 2019). Based on the estimated coefficients of the first-stage model, we calculate the inverse of the Mills ratio (*Inverse Mills Ratio*), which we incorporate into the regression model of Eq. (1) as an additional control variable. We use the following first-stage model for our regression of the probability that a company will adopt SA:

$$\text{Prob(SA)}_{it} = \beta_0 + \beta_1 \text{SIZE}_{it} + \beta_2 \text{REV}_{it} + \beta_3 \text{ROA}_{it} + \beta_4 \text{LEV}_{it} + \beta_5 \text{LEGAL}_{it} + \epsilon_{it}, \quad (5)$$

where *Prob(SA)* is proxied by an indicator variable taking the value of one if firm *i* engages in SA in year *t* and zero otherwise. As large companies often exhibit greater visibility and therefore are more concerned for their credibility (Simnett et al., 2009), we include *SIZE* and total sales (*REV*) as controls. Besides, we include profitability measured by *ROA*, as more profitable companies are also subject to greater awareness on the importance of CSR (Casey & Grenier, 2015). We account for financial structure with *LEV*, as the presence of debt-holders also influences the decision in favor of SA (Casey & Grenier, 2015; Simnett et al., 2009). Further, we control for country-level differences in legal structures are these also likely influence the decision to engage in SA, which can serve as a substitute to increase the credibility of their reporting (Kolk & Perego, 2010). Table 1, Panel C provides detailed definitions of all variables.

>> Insert Table 8 around here. <<

Table 8, Panel A presents the results of t-tests for differences in mean values of the determinants included in the model in Eq. (5), which confirms our expectation that companies with SA are systematically different from companies without SA. Companies with greater visibility in terms of size (difference of 0.748, t-val: 29.98) and revenue (difference of 0.615, t-val: 24.43) are more likely to undergo SA. Further, we observe that companies headquartered in countries with weaker law enforcement are also more likely to adopt SA (difference of -0.086, t-val: -8.61). Lastly, we find that companies with SA exhibit significantly higher leverage levels (difference of 0.019, t-val: 6.29) and lower profitability (difference of -0.01, t-val: -5.21).

Table 8, Panel B displays the results from the first stage model in Eq. (5) of the Heckman (1979) correction approach. The first column presents the precision-weighted averages from rolling five-year pooled cross-sectional probit regressions; the second column presents corresponding t-values, defined as the precision-weighted average divided by its standard error. Based on these results, we calculate the inverse Mills ratio (*Inverse Mills Ratio*) for each pooled cross-sectional regression by GICS. Table 8, Panel C presents the results for the second-stage

model based on the model in Eq. (1) including the inverse Mills ratio (*Inverse Mills Ratio*) as an additional control variable. The precision-weighted coefficient on our main variable of interest $D*log(\Delta Sale)*SA$ (0.156, t-val: 2.972) is positive and statistically significant, having a similar magnitude as in our main model. Thus, the results confirm the validity of our first hypothesis. We mitigate endogeneity concerns and show that our results are robust to the possibility of non-random selection. This enforces the view that the observed results are the product of improvements in cost asymmetry due to beneficial internal effects of SA, mitigating concerns that they could be driven by systematic firm differences being the main determinants of the observed cost asymmetry levels.

4.3.2 Instrumental variable analysis

The next endogeneity-related concern is that both the decision to adopt SA and the documented lower levels of cost asymmetry may the result of a common firm-specific factor. As the decision to undergo SA is taken by top management and these managers are also those responsible for cost management decisions, it is possible that the observed results do not indicate causality of SA on cost asymmetry, but are rather the result of a shared top-level managerial style. To control for this possibility and thus further establish causality of the documented association between SA and cost asymmetry, we perform a 2SLS IV analysis (Larcker & Rusticus, 2010). For this, we follow prior literature showing that media attention towards a company strongly influences firms to engage in and report on CSR activities (Nikolaeva & Bicho, 2011) and by analogy, choose to focus media attention towards SA as an instrument. We argue that the decision of firms adopting SA is influenced by media attention towards this topic, which exerts external pressure on companies. One criticism leveled at most of the instruments applied in accounting research is that even if they cannot be determined by the company itself, they influence other factors affecting the dependent variable (Larcker & Rusticus, 2010). However, we argue that the media attention towards SA is unlikely to influence other determinants of decisions regarding SG&A cost adjustments, such as asset or employee intensity, prior-year profits, or life cycle of firms.

We define our instrument, *SA_Media*, as the logarithm of the number of all articles in the news database Factiva that contain SA-related keywords two years before the SA engagements of firms. A detailed list of all keywords is provided in Panel C of Table 1. To ensure that *SA_Media* represents the average media attention to SA and is not driven by the company in the current observation when computing *SA_Media*, we exclude the number of articles published in the country in which a firm is located from the total number of articles issued. As

the endogenous variable in our model, SA, is part of interaction terms including two other variables, we apply the three-step procedure suggested by Wooldridge (2003) and Dikolli et al. (2009) to avoid biased estimates due to endogenous interaction terms. First, the endogenous variable is regressed on the instrument *SA_Media* including all control variables from the model in Eq. (1). In the second step, the estimated coefficients allow us to compute fitted values as $\widehat{SA\_Media}$. To obtain the instruments for the endogenous interaction terms for the final step, we interact $\widehat{SA\_Media}$ with the individual variables *D* and *log(*Δ*Sale)*, as well as with *D*log(*Δ*Sale)*, which allows us to obtain *D**$\widehat{SA\_Media}$, *log(*Δ*Sale)*$*\widehat{SA\_Media}$ and *D*$*$*log(*Δ*Sale)*$*\widehat{SA\_Media}$ In the third step, the full model of Eq. (1) is estimated via 2SLS by replacing the endogenous variables including SA (i.e., *SA*, *D*SA*, *log(*Δ*Sale)*SA* and *D*(log(*Δ*Sale)*SA*) with the predicted values (instruments) estimated in the previous stage (i.e., $\widehat{SA\_Media}$, *D*$*$$\widehat{SA_Media}$, *log(*Δ *Sale)*$*\widehat{SA_Media}$ and *D*$*$*log(*Δ *Sale)*$*\widehat{SA\_Media}$)

>> Insert Table 9 around here. <<

Table 9, Panel A displays the mean coefficients from the rolling five-year pooled cross-sectional 2SLS IV analysis by GICS sector with endogenous interaction terms. For completeness, we report the results of the initial step (Pred.) and the four first-stage regressions (1. Stage), which show that our instruments are highly correlated with the potential endogenous dependent variables. The main results are reported in the last two columns corresponding to the second stage. The coefficient on our main variable of interest *D*$*$*log(*Δ*Sale)*$*SA* (0.372, t-val: 3.024) is positive and statistically significant at the one percent level. However, the magnitude of the coefficient is twice as high after applying the 2SLS IV analysis technique. Panel B of Table 9 presents model statistics assessing the overall validity of the 2SLS IV analysis. To mitigate weak instrument concerns and to test the appropriateness of our instrument, we follow the approach in Park and Vrettos (2015) and Wooldridge (2010) to calculate our test statistic. For this, we run the model in Eq. (1) without including the interactions of the endogenous variable (i.e., *D*SA*, *log(*Δ*Sale)*SA* and *D*log(*Δ*Sale)*SA*), as Wooldridge (2010) finds that this produces a more accurate F-statistic assessing the overall validity of the instrument used. Thus, the linear version of our 2SLS IV model consists of one endogenous variable, *SA* and one instrument, *SA_Media*. The corresponding mean value for the Cragg and Donald (1993) F-statistic is 17.731, exceeding the critical value of 10 suggested by Staiger and Stock (1997), indicating that our instrument is sufficiently correlated with the endogenous variable and our endogenous variable is thus not weakly identified. Further, we run a Vuong (1989) test to verify whether the regression model used in this part of the analysis has significantly increased overall

explanatory power of cost asymmetry compared to a base model (equivalent to the model in Eq. (1) without SA as an additional determinant). The corresponding mean $\chi 2$ statistic of 4.166 indicates at a one percent significance level a statistically higher explanatory power after including *SA* in the model in Eq. (1) and controlling for endogeneity. The results provide evidence for the validity of our first hypothesis, by mitigating endogeneity concerns and thus validating the idea that there is a causality effect of SA on asymmetric behavior in cost adjustments.

4.3.3 Level of sustainability assurance

In the public stakeholder consultation conducted in the context of the review of the EU Directive on non-financial reporting, the majority (70 percent) of respondents agreed that assurance requirements on CSR disclosures are necessary. However, the opinion on the required level of assurance is equally distributed across a "limited" (43.53 percent of the votes) and "reasonable" assurance level (42.99 percent of the votes) (European Commission, 2020) , "limited" indicating an acceptable but substantially higher assurance risk than that denoted by a "reasonable level" of assurance (Manetti & Toccafondi, 2012). The question of the most suitable level of assurance is thus still up for debate and is an important factor that should be taken into account by a firm when deciding to adopt SA. One the one hand, the literature on the perceived quality of sustainability disclosures finds evidence that higher assurance levels enhance the confidence towards sustainability information, resulting in more precise analyst forecasts (Cuadrado-Ballesteros et al., 2017) and greater confidence among external users (Hodge et al., 2009). Therefore, the level of assurance is particularly important for companies that mainly seek to increase the credibility of their reporting through SA. On the other hand, providers advertise SA as a way to enable companies to improve their internal information systems and processes. If this is a company's main objective when adopting SA, the opinion on the most fitting level of assurance may be different depending on a range of other factors. Prior literature shows that even when starting with a limited or moderate assurance level for their initial SA engagements, companies benefit from a review of their processes and reporting structures to create an auditable environment (O'Dwyer, Owen, & Unerman, 2011). Conversely, companies that start with a high or reasonable level of assurance are those that likely already have proper reporting processes and information systems in place and therefore likely rather seek to leverage increased information credibility effects. These companies are not likely to significantly benefit in terms of internal enhancements compared to companies with an initial limited level of assurance. The latter are more likely to have inefficient reporting

processes and information systems, initial (even limited level) SA engagements resulting in a substantial transformation of their internal information environment. Based on this reasoning, we argue that the incremental effect between a limited/moderate and a high/reasonable assurance level on internal information structures may not be significant, as in the context of our study we expect the effect of initial SA significantly improving the internal information environment and thus leading to better-informed cost adjustment decisions to be independent of the chosen level of assurance.

To analyze the effects of different SA levels on cost asymmetry, we hand-collect information on the level of assurance of the firms in our sample by manually checking the companies' websites for their disclosures on sustainability information. Similar to Braam and Peeters (2018), we observe that 84.38 percent of companies in our sample obtain only a limited or moderate assurance of their sustainability disclosures. We repeat our analysis including an additional indicator variable differentiating between firms with a high versus low level of assurance (i.e., taking a value of one for a high or reasonable level of assurance, zero otherwise) in the model in Eq. (1) as well as in the model presented in Eq. (4). Untabulated results show no evidence of a significantly different effect of high or reasonable SA on SG&A cost asymmetry compared to low or moderate SA. Neither do we find any significant difference for the effect of SA-related cost asymmetry on shareholder value based on different levels of assurance. This confirms our intuition that the documented effect of SA on cost asymmetry is the result of initial SA engagements leading to improved internal information systems and processes to create an auditable environment, independently of the chosen level of assurance.

4.3.4 Further robustness tests

To ensure that the results of our first hypothesis are not driven by the choice of our estimation design and that additional time and institutional effects do not drive our results, we estimate the model in Eq. (1) as a single pooled regression adding time- and firm (industry- and country)-fixed effects. Further, we repeat the Heckman (1979) correction on these regression models adding time-, country-, and industry-fixed effects to the first-stage model in Eq. (5). In all models, the estimates on our variable of interest strongly support our first hypothesis.

As emphasized in the previous section, we argue that the impact of SA on cost asymmetry ought to be driven by initial SA engagements. To test this, we perform our analysis only on the subset of observations corresponding to initial years after SA adoption by running the first step of our analysis as pooled regression including time- and firm-fixed effects. The coefficient on our variable of interest for initial SA engagements remains positive and statistically significant

and has a magnitude that is nearly 180 percent higher than the effect documented based on our full sample.

Further, during our hand collection we observe that, especially for Japanese companies, some reports include a third-party opinion by a university professor or an industry specialist regarding ESG issues in CSR reporting. These kinds of external reviews focus more on the assessment of the company's CSR activities and less on the accuracy and credibility of the disclosed information. As we consider this kind of review to be different from assurance on reported data, we exclude companies for which we find only a third-party opinion but no additional assurance of their most recent CSR disclosures in our sample (e.g., assurance on greenhouse gas emissions). Our results are robust to this additional test.

Next, to ensure that our results are not driven by companies' CSR activities beyond SA we include the ESG Combined Score from Asset4 (based on the reported information in the environmental, social, and corporate governance pillars accounting for ESG controversies) as an additional determinant affecting deliberate managerial decisions over cost adjustments in the model in Eq. (1). Our results are robust to this additional test, our main coefficient of interest being positive, statistically significant, and having a similar magnitude as in our main results. The coefficient determining the effect of net ESG activities on SG&A cost asymmetry in negative and statistically significant, thus indicating sticky cost behavior in line with Habib and Hasan (2019).

Last, as prior research indicates cross-national variation in CSR and SA practices (Simnett et al., 2009) we perform three additional subsample tests. First, although the assurance of sustainability disclosures is voluntary in most countries, since 2013 companies in France have been required to assure their choice of environmental indicators in their annual directors' report under the Generelle II act. Thus, to account for this non-voluntary choice, we exclude French companies after 2012 from our sample. Second, we perform our analysis on a subsample of firms that report only following IFRS starting in 2005 to mitigate concerns of decreased comparability of presented SG&A expense values. Third, we exclude the year 2005 from our analysis, as variables calculated based on lagged values would be the result of reporting under prior local GAAP and thus not comparable to IFRS values starting with 2005. All three additional subsample analyses produce results that are qualitatively similar to our main results. Together, the findings from the additional analyses increase the robustness of our main results.

5 Conclusion

The main objective of the current study is to analyze firm-internal consequences of SA beyond the CSR context. Specifically, we investigate the impact of SA on deliberate managerial decisions regarding cost adjustments resulting from improved internal information environments and the resulting consequences for shareholder value. We provide evidence based on a sample of firms from 42 countries that SA leads to prompter resource adjustments and thus reduces the asymmetric behavior of SG&A costs. In a series of tests concerning the potential influence of self-selection and omitted variables, our results collectively imply that this relationship is causal. Our results are in line with the view that SA enhances managers' underlying information environment, resulting in more timely and efficient decisions on resource adjustments. In line with prior literature on the internal effects of the SA process and on the impact of underlying internal information environment on managerial decisions, in the second part of the analysis we provide evidence that the effects of SA on resource adjustments are positively related to shareholder value.

Our study contributes to prior literature on SA, the effects of voluntary audits, and CSR activities on shareholder value, by highlighting the importance of SA, as we show that it has positive effects on firms beyond increased credibility of the provided information. Further, we contribute to the literature on cost asymmetry by identifying SA as an additional factor determining asymmetric cost behavior and providing additional insights into the consequences of cost asymmetry, in this case, manifested as increased shareholder value due to SA-related cost asymmetry. Our results are also of importance to investors, regulators, and companies as they show that SA has real economic benefits for a company that go far beyond the primary goal of strengthening investor confidence in sustainability disclosures. We show that SA represents a profitable investment especially for companies with internal weaknesses, as it enables them to review and improve internal controls and reporting structures. From a regulatory perspective, our findings are particularly important given the ongoing regulatory changes and initiatives regarding CSR related reporting (e.g., the European Commission's Action Plan on Financing Sustainable Growth and its communication on the European Green Deal), which also address the role of external assurance of CSR-related disclosures. Last, our study opens up avenues for future research. Due to the nature of the available SA data, we cannot determine which parts of the SA process improve managerial decisions and thus better cost adjustments. Future qualitative research (e.g., surveys and case studies) could therefore help determine the specific elements of the SA process that help companies to improve their

internal information environment and thus provide a more nuanced view of the mechanisms behind our documented impact of SA on cost asymmetry.

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Table 1: Variable definitions

Variables	Definition
Panel A: Variables employed in the first model of the analysis	
D	Indicator variable taking the value of 1 if the change in sales revenue in the current year was negative, 0 otherwise.
FCF	Operating cash flow (Compustat item OANCF) less common and preferred dividends (DVC and DVP), all scaled by total assets.
Δ*GDP*	Annual real gross domestic product growth (World Bank, International Monetary Fund)
LC_IGD	Indicator variable defined as in Victoria Dickinson (2011), based on cash flows. Takes the value of 1 if the firm is in the initial, growth or decline stage, 0 otherwise.
log(ΔSale)	Logarithm change in sales revenue (Compustat item SALE) defined as the ratio of the current year's sales revenue to prior year's sales revenue.
log(ΔSale)	Logarithm change in sales revenue (Compustat item SALE) defined as the ratio of the current year's sales revenue to prior year's sales revenue.
log(ΔSG&A)	Logarithm change in selling, general, and administrative (SG&A) costs (Compustat item XSGA) defined as the ratio of current year's SG&A costs to prior year's SG&A costs.
logAINT	Asset Intensity defined as the logarithm ratio of current year's total assets (Compustat item AT) to current year's sales revenue.
logEINT	Employee Intensity defined as the logarithm ratio of current year's number of employees (Compustat item EMP) to current year's sales revenue.
Loss_prior	Indicator variable taking the value of 1 if prior year's net income (Compustat item NI) was negative, 0 otherwise. For observations from Compustat Global, NI is defined as operating income (Compustat item IB) + extraordinary items (Compustat item XI) + discontinued Items (Compustat item DO).
PPEDEC	Indicator variable taking the value of 1 if the change in gross property, plant, and equipment (Compustat item PPEGT) is negative, 0 otherwise.
PRSDEC	Indicator variable taking the value of 1 if the change in sales revenue in the prior year was negative, 0 otherwise.
SA	Indicator variable taking the value of 1 if a company buys sustainability assurance in the current year, 0 otherwise. (Asset4)
Small_profit	Indicator variable taking the value of 1 if the current year's net income is between 0 and 1 percent of total assets, 0 otherwise.
Panel B: Variables employed in the second model of the analysis	
ADVERT	Advertising expenses (Compustat item XAD) divided by net property, plant, and equipment (Compustat item PPENT).
BID_ASK	Bid-ask spread, defined as the annual mean of the daily bid-ask spread for each firm-year observation. The daily bid-ask spread equals closing ask-price minus the closing bid price to the mean of the closing bid- and the closing ask-price (Datastream items PB and PA).
CAPINT	Gross property, plant, and equipment divided by total assets.
D_ASY	Cost asymmetry measure by Kaspereit and Lopatta (2019), calculated with the coefficients from the first model of the analysis.
DIVIDENDS	Dividends paid (Compustat item DVC and DVP) divided by the market value of equity (Datastream item MV).
$\hat{\epsilon}$	Observation specific residual obtained from the regression of the first model of the analysis.
GOVERNANCE	Governance Score scaled by 100 (Asset 4)
MKT_Share	Sales revenue divided by total industry sales, based on four-digit industry SIC codes. Sales converted to US dollars applying the exchange rate on December 31, 2010.
R&D	Research and development expenses (Compustat item XRD) divided by sales revenue.
SA_ASY	Cost asymmetry related to sustainability assurance. SA _ASY defined as the coefficient on D*log(ΔSale)*SA from the first model multiplied with SA itself.
Tobin's q	Tobin's q defined as total assets plus market value of equity (Datastream item MV) less book value of common equity (Compustat item CEQ) and deferred taxes (Compustat item TXDB), all scaled by total assets (Compustat item AT).
Tobin's q (Chung & Pruitt, 1994)	Tobin's q defined as total debt (Compustat items DLC and DLTT) plus liquidation value of preferred stock (Compustat item PSTKL) plus market value of equity (Datastream item MV), all scaled by total assets (Compustat item AT).

Tobin's q (Klapper and Love, 2004)	Tobin's q defined as market value of equity (Datastream item MV) plus total liabilities (Compustat item LT), scaled by total assets (Compustat item AT).
Tobin's q (Lewellen and Lewellen, 2016)	Tobin's q defined as total debt (Compustat items DLC and DLTT) plus liquidation value of preferred stock (Compustat item PSTKL) plus market value of equity (Datastream item MV), all divided by the book value of common equity (Compustat item CEQ) plus total debt (Compustat items DLC and DLTT) plus liquidation value of preferred stock (Compustat item PSTKL).
Panel C: Variables employed in the endogeneity analysis	
LEGAL	Rule of law score proposed by Kaufmann et al. (2011) of the country where firm i is domiciled in year t (World Bank)
LEV	Ratio of total liabilities (Compustat items DLC and DLTT) divided by total assets.
REV	Logarithm of total sales. Sales converted to US dollars applying the exchange rate at December 31, 2010.
ROA	Ratio of operating income (Compustat item IB) to lagged total assets.
SA_MEDIA	Logarithm of number of articles in the news-database Factiva containing the key terms "sustainability assurance," "sustainability audit," "CSR assurance," "CSR audit" or references to the prominent sustainability assurance standards "AA1000 AS," "ISAE3000," and "ISO 14064," as well as local applications. Before taking the logarithm, the number of articles issued in the country where a firm is located is deducted.
SIZE	Logarithm of total assets. Total assets converted to US dollars applying the exchange rate at December 31, 2010.
This table presents variable definitions for the variables included in the first model (Panel A), the second model (Panel B), and the endogeneity analysis (Panel C) of the analysis.	

Table 2: Sample selection

Criteria	Observations
Panel A: Sample selection for estimating the effect of SA on cost asymmetry	
Compustat Annual file (2005 -2018) unique non-financial/ not-state-owned firm-year observations reporting in native currency	386,574
- Less firm-years with SG&A expenses higher than sales revenue, negative SG&A expenses or negative sales	-45,192
- Less firm-years with missing accounting data	-155,138
- Less firm-years with missing macroeconomic data	-21,466
- Less firm-years with extreme observations (top and bottom 1 percent)	-15,956
- Less firm-years with missing data on sustainability assurance (SA) in Asset4 database	-138,139
- Less observations in cross-sections with fewer than 100 observations or country singletons	-72
Final sample for the test of Hypothesis 1	**10,611**
Panel B: Sample selection for analyzing the association between the SA-related portion of cost asymmetry and shareholder value	
Observations for the SA-related portion of cost asymmetry can be estimated	7,164
- Less firm-years with missing data for controls	-260
- Less firm-years with extreme observations (top and bottom 1 percent)	-1,244
- Less firm-year observations which are singletons	-376
Final sample for the test of Hypothesis 2	**5,284**

The table presents the sample selection criteria for the test of the first hypothesis (Panel A) and the second hypothesis (Panel B). The sample for the test of the first hypothesis covers the period 2005 to 2018 and is composed of 2,011 firms from 42 countries. The sample for the test of the second hypothesis covers the period 2009-2018 and consists of 981firms from 37 countries.

Panel A: Summary statistics

Variables	N	Mean	Median	S.D.	Min.	Max.
log(ΔSG&A)	10,611	0.033	0.028	0.151	-0.829	1.023
SA	10,611	0.532	1.000	0.499	0.000	1.000
log(ΔSale)	10,611	0.035	0.033	0.147	-0.789	1.104
logAINT	10,611	0.184	0.155	0.544	-1.368	2.451
logEINT	10,611	-7.211	-6.248	2.259	-13.827	-3.619
Loss_prior	10,611	0.094	0.000	0.292	0.000	1.000
FCF	10,611	0.078	0.072	0.056	-0.313	0.303
PRSDEC	10,611	0.332	0.000	0.471	0.000	1.000
Small_profit	10,611	0.049	0.000	0.215	0.000	1.000
LC_IGD	10,611	0.466	0.000	0.499	0.000	1.000
PPEDEC	10,611	0.294	0.000	0.455	0.000	1.000
ΔGDP	10,611	0.017	0.018	0.021	-0.054	0.090

Panel B: Correlation analysis

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) log(ΔSG&A)		-0.069*	0.598*	0.008	0.007	-0.138*	0.095*	-0.155*	-0.036*	0.181*	-0.235*	0.133*
(2) SA	-0.082*		-0.086*	0.122*	-0.084*	-0.009	-0.092*	0.102*	0.040*	-0.035*	0.006	-0.024*
(3) log(ΔSale)	0.650*	-0.104*		-0.028*	-0.004	-0.095*	0.146*	-0.170*	-0.059*	0.221*	-0.246*	0.268*
(4) logAINT	-0.012	0.129*	-0.030*		0.031*	0.070*	-0.092*	0.055*	0.013	0.062*	-0.024*	0.024*
(5) logEINT	0.000	-0.073*	-0.031*	-0.023*		0.009	0.114*	0.024*	-0.081*	-0.025*	0.068*	0.130*
(6) Loss_prior	-0.162*	-0.009	-0.113*	0.059*	0.003		-0.155*	0.223*	0.122*	0.006	0.153*	-0.089*
(7) FCF	0.128*	-0.110*	0.153*	-0.074*	0.091*	-0.145*		-0.115*	-0.102*	-0.032*	-0.128*	0.030*
(8) PRSDEC	-0.199*	0.102*	-0.214*	0.053*	0.023*	0.223*	-0.111*		0.071*	-0.063*	0.146*	-0.031*
(9) Small_profit	-0.067*	0.040*	-0.087*	0.006	-0.058*	0.122*	-0.120*	0.071*		0.012	0.028*	-0.087*
(10) LC_IGD	0.224*	-0.035*	0.256*	0.061*	-0.018	0.006	-0.038*	-0.063*	0.012		-0.206*	0.042*
(11) PPEDEC	-0.282*	0.006	-0.285*	-0.030*	0.067*	0.153*	-0.128*	0.146*	0.028*	-0.206*		0.000
(12) ΔGDP	0.149*	-0.097*	0.258*	0.023*	0.153*	-0.038*	0.082*	0.020*	-0.075*	0.030*	0.004	

Panel A presents summary statistics for variables used for the model in Eq. (1). N represents the number of unique firm-year observations included. The column "S.D." presents the standard deviation of each of the variables. The columns Min. and Max. present the minimum and the maximum values of each of the variables. Panel B presents pairwise Pearson (upper triangle) and Spearman (bottom triangle) correlations of the variables used in the model in Eq. (1). Detailed definitions of all variables are provided in Table 1. * indicates significance at the 5% level.

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Table 4: Test of Hypothesis 1- Impact of SA on SG&A cost asymmetry

Variable	Pred.	log(ΔSG&A)	
		Mean Coeff.	t-value
SA		0.000	0.075
*D*SA*		0.005	0.985
*Log(ΔSale)*SA*		-0.048	-1.611
*D*log(ΔSale)*SA*		0.155***	3.011
D		-0.003	-0.188
log(ΔSale)		0.838***	17.008
*log(ΔSale)*logAINT*	-	0.008	0.281
*log(ΔSale)*logEINT*	-	0.027***	4.349
*log(ΔSale)*PRSDEC*	-	0.041	1.191
*log(ΔSale)*Loss_prior*	-	-0.127**	-1.990
*log(ΔSale)*FCF*	+	0.196	0.657
*log(ΔSale)*Small_profit*	+	0.151	1.503
*log(ΔSale)*LC_IGD*	+	0.162***	6.106
*log(ΔSale)*PPEDEC*	-	0.081**	2.496
*log(ΔSale)*ΔGDP*	+	-0.958	-1.527
*D*log(ΔSale)*		-0.412***	-3.968
*D*log(ΔSale)*logAINT*	-	0.011	0.238
*D*log(ΔSale)*logEINT*	-	-0.013	-1.031
*D*log(ΔSale)*PRSDEC*	+	0.074	1.277
*D*log(ΔSale)*Loss_prior*	+	-0.019	-0.211
*D*log(ΔSale)*FCF*	-	0.222	0.417
*D*log(ΔSale)*Small_profit*	+	-0.160	-0.998
*D*log(ΔSale)*LC_IGD*	-	-0.187***	-3.334
*D*log(ΔSale)*PPEDEC*	+	0.142***	2.640
*D*log(ΔSale)*ΔGDP*	-	0.978	0.690
logAINT		0.002	0.581
logEINT		-0.001	-0.489
PRSDEC		-0.013***	-3.303
Loss_prior		-0.026***	-2.926
FCF		-0.012	-0.284
Small_profit		-0.003	-0.275
LC_IGD		-0.005*	-1.670
PPEDEC		-0.021***	-8.370
ΔGDP		0.093	1.255
*D*logAINT*		0.011	0.238
*D*logEINT*		-0.013	-1.031
*D*PRSDEC*		0.074	1.277
*D*Loss_prior*		-0.019	-0.211
*D*FCF*		0.222	0.417
*D*Small_profit*		-0.160	-0.998
*D*LC_IGD*		-0.187***	-3.334
*D*PPEDEC*		0.142***	2.640
*D*ΔGDP*		0.978	0.690
Total no. of obs. in rolling five-year regressions		10,611	
No. of obs. for which coefficients can be estimated		7,164	
Number of cross-sections		80	
Avg. number of obs. per cross-section		448	
(mean) Adj. R-squared		46.91%	

This table reports average coefficient estimates from rolling five-year regressions of the model in Eq. (1). Our sample consists of 2,011 distinct companies located in 42 different countries covering the period 2005 to 2018. The required minimum number of observations per regression is 100. Detailed definitions of all variables are provided in Table 1. For the five-year rolling regressions, the means given represent precision averages (weighted by the inverse of their pooled five-year regression standard error). The t-statistic reported is equal to the coefficient of the precision average divided by its standard error (Dichtev and Piotroski, 2001). The regressions include country-fixed effects. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

1: Summary statistics

es	N	Mean	Median	S.D.	Min.
Q	5,284	1.664	1.364	0.888	0.672
Q (C&P, 1994)	5,284	1.344	1.033	0.903	0.361
Q (K&L, 2004)	5,284	1.673	1.375	0.893	0.711
Q (L&L, 2016)	5,284	2.093	1.627	1.412	0.616
Y	5,284	0.067	0.000	0.366	-1.398
SY	5,284	-0.293	-0.267	0.712	-3.298
	5,284	0.001	0.000	0.076	-0.319
	5,284	9.203	9.139	1.241	6.054
ENDS	5,284	0.019	0.018	0.016	0.000
	5,284	0.232	0.225	0.132	0.000
	5,284	0.056	0.049	0.052	-0.126
T	5,284	0.634	0.592	0.385	0.023
ale)	5,284	0.022	0.023	0.130	-0.789
	5,284	0.027	0.008	0.043	0.000
RT	5,284	0.008	0.000	0.036	0.000
	5,284	0.075	0.071	0.046	-0.233
Share	5,284	0.025	0.013	0.031	0.000
SK	5,284	0.003	0.002	0.003	0.000
RNANCE	5,284	0.584	0.605	0.203	0.049

3: Correlations analysis

es	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
bin's Q		0.036*	0.008	0.011	-0.231*	-0.071*	-0.160*	0.664*	-0.221*	0.122*	0.153*	0.166*	0.397*	-0.002	-0
_ASY	0.011		-0.313*	0.016	0.014	0.011	-0.021	-0.003	-0.024	-0.002	-0.042*	0.001	-0.027	0.042*	-0
ET_ASY	0.001	-0.340*		-0.005	-0.025	0.016	-0.016	0.02	0.052*	-0.057*	-0.006	-0.004	0.006	-0.007	0
	0.003	0.025	-0.021		-0.025	-0.020	-0.004	-0.022	-0.013	0.012	-0.016	0.006	0.023	0.001	-0
ZE	-0.240*	0.053*	-0.031*	-0.030*		0.041*	0.202*	-0.150*	0.031*	-0.037*	0.114*	0.099*	-0.079*	0.090*	-0
VIDENDS	-0.052*	0.017	0.044*	-0.016	0.063*		-0.006	0.099*	0.092*	-0.090*	-0.053*	0.050*	-0.184*	-0.017	-0
V	-0	-0.022	-0.016	-0.007	0.204*	-0.015		-0.265*	0.110*	-0.040*	-0.194*	0.067*	-0.131*	0.027	0
DA	0	0.011	0.016	-0.013	-0.180*	0.109*	-0.282*		-0.158*	0.220*	0.126*	0.148*	0.458*	-0.016	-0
APINT	-0	-0.045*	0.071*	-0.006	0.029*	0.097*	0.109*	-0.151*		-0.062*	-0.186*	-0.110*	0.179*	-0.110*	0
g(ΔSale)	0	0.002	-0.090*	0.018	-0.045*	-0.104*	-0.045*	0.236*	-0.061*		0.022	-0.001	0.094*	0.024	-0
&D	0	0.014	-0.008	-0.023	0.103*	-0.006	-0.161*	0.063*	-0.066*	-0.007		0.098*	0.106*	-0.087*	-0
OVERT	0	0.005	-0.029*	0.008	0.129*	0.039*	0.051*	0.191*	-0.084*	-0.025	0.048*		0.099*	0.086*	-0
CF	0	0.011	0.015	0.024	-0.076*	-0.198*	-0.122*	0.436*	0.213*	0.108*	0.036*	0.157*		-0.053*	-0
KT_Share	0	0.030*	-0.019	0.003	0.225*	0.039*	0.035*	0.002	-0.082*	0.013	-0.007	0.137*	-0.054*		-0
D_ASK	-0	-0.009	0.025	0.002	-0.298*	-0.068*	0.014	-0.271*	0.210*	-0.032*	-0.133*	-0.336*	-0.103*	-0.184*	
OVERNANCE	0	0.018	0.040*	-0.007	0.236*	0.100*	0.029*	0.072*	-0.012	-0.034*	0.054*	0.136*	0.036*	0.070*	-0

A presents summary istics for variables used for the model in Eq. (4). N represents the number of unique firm-year observations included. The column "S.D." pres
on of each of the va es. The columns Min. and Max. present the minimum and the maximum values of each of the variables. Panel B presents pairwise Pearson (up
an (bottom triangle relations of the variables used in the model in Eq. (4). Detailed definitions of all variables are provided in Table 1. * indicate significance at t

escriptive statistics - Tests of Hypothesis 2

Table 6: Test of Hypothesis 2 - SA-related portion of cost asymmetry and shareholder value

	Tobin's q		Tobin's q Chung & Pruitt (1994)		Tobin's q Klapper & Lover (2004)		Tobin's q Lewellen & Lewellen (2016)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
SA_ASY	0.080***	3.771	0.082***	3.904	0.079***	3.721	0.101***	2.821
D_ASY	0.003	0.289	0.003	0.329	0.002	0.236	-0.005	-0.341
$\hat{\epsilon}$	0.078	1.168	0.080	1.205	0.074	1.107	0.063	0.595
SIZE	-0.476***	-6.639	-0.437***	-6.251	-0.471***	-6.640	-0.872***	-6.827
DIVIDENDS	-7.434***	-8.709	-7.340***	-8.665	-7.424***	-8.720	-11.539***	-8.357
LEV	0.161	0.804	0.380*	1.948	0.181	0.904	-0.148	-0.410
ROA	3.154***	9.355	3.331***	9.822	3.156***	9.380	4.403***	7.614
CAPINT	-0.266**	-2.333	-0.294***	-2.622	-0.274**	-2.423	-0.469**	-2.438
log(ΔSale)	-0.049	-1.082	-0.081*	-1.783	-0.050	-1.108	0.027	0.352
R&D	0.780	0.555	1.011	0.720	0.815	0.581	0.868	0.393
ADVERT	0.829	1.035	0.724	0.915	0.817	1.027	4.205	1.378
FCF	0.070	0.252	-0.059	-0.212	0.065	0.235	0.540	1.219
MKT_Share	6.357***	4.172	5.469***	3.617	6.305***	4.159	11.725***	5.045
BID_ASK	-8.220**	-2.135	-8.384**	-2.206	-8.134**	-2.129	-11.038*	-1.828
GOVERNANCE	-0.020	-0.301	-0.011	-0.165	-0.016	-0.236	-0.035	-0.303
Observations	5,284		5,284		5,284		5,284	
Adj. R-squared	86.8%		87.3%		86.9%		85.6%	
Time FE	YES		YES		YES		YES	
Firm FE	YES		YES		YES		YES	

The table presents regression results based on the estimation of the model in Eq. (4). The sample consists of 981 distinct companies located in 37 different countries covering the period from 2009-2018. Detailed definitions of all variables are provided in Table 1. t-values are displayed aside to the coefficients. Standard errors are clustered at firm level. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 7: Subsample analysis

Panel A: Regression including only effects of SA contributing to cost asymmetry larger or equal to zero								
	Tobin's q		Tobin's q Chung & Pruitt (1994)		Tobin's q Klapper & Lover (2004)		Tobin's q Lewellen & Lewellen (2016)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
SA_ASY	0.151***	3.034	0.153***	3.082	0.152***	3.059	0.245***	2.824
D_ASY	-0.004	-0.369	-0.005	-0.428	-0.005	-0.444	-0.015	-0.799
$\hat{\epsilon}$	0.031	0.379	0.040	0.485	0.027	0.332	-0.014	-0.108
Controls	YES		YES		YES		YES	
Observations	3,747		3,747		3,747		3,747	
Adj. R-squared	87.20%		87.60%		87.30%		86.40%	
Controls	YES		YES		YES		YES	
Time FE	YES		YES		YES		YES	
Firm FE	YES		YES		YES		YES	
Panel B: Regression including only effects of SA contributing to cost asymmetry smaller or equal to zero								
	Tobin's q		Tobin's q Chung & Pruitt (1994)		Tobin's q Klapper & Lover (2004)		Tobin's q Lewellen & Lewellen (2016)	
	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
SA_ASY	0.052	1.103	0.062	1.302	0.051	1.079	0.034	0.460
D_ASY	-0.000	-0.014	-0.000	-0.035	-0.000	-0.037	-0.002	-0.115
$\hat{\epsilon}$	0.072	0.791	0.049	0.542	0.062	0.681	0.124	0.834
Controls	YES		YES		YES		YES	
Observations	2,735		2,735		2,735		2,735	
Adj. R-squared	87.80%		88.10%		87.80%		86.60%	
Controls	YES		YES		YES		YES	
Time FE	YES		YES		YES		YES	
Firm FE	YES		YES		YES		YES	

The table presents regression results corresponding to the model in Eq. (1) using different subsamples, based on the documented association between SA and cost asymmetry. Panel A presents the results using the subsample containing only observations for which we estimate a positive association between SA and cost asymmetry (i.e. indicating less cost stickiness or higher cost anti-stickiness). Panel B presents the results using the subsample containing only observations for which we estimate a negative association between SA and cost asymmetry (i.e. indicating higher cost stickiness or higher cost anti-stickiness). The sample consists of 981 distinct companies located in 37 different countries covering a time span from 2009-2018. Detailed definitions of all variables are provided in Table 1. t-values are displayed aside to the coefficients. Standard errors are clustered at firm level. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

Table 8: Heckman (1979) correction for non-random selection

Panel A: Descriptive statistics for the variables used in the Heckman (1979) correction				
	SA (N=5,640)	No SA (N=4,971)	Difference	t-value
REV	9.122	8.507	0.615	24.427***
LEGAL	1.391	1.477	-0.086	-8.614***
SIZE	9.368	8.620	0.748	29.983***
LEV	0.241	0.222	0.019	6.288***
ROA	0.055	0.065	-0.010	-5.213***

Panel B: First stage for Heckman (1979) analysis		
Variable	SA	
	Mean Coeff.	t-value
REV	-0.132***	-3.099
LEGAL	-0.137***	-3.667
SIZE	0.484***	10.135
LEV	-0.491***	-4.907
ROA	-0.118	-0.588
(mean) Pseudo R-squared	13.46%	

Panel C: Regression model including inverse mills ratio			
Variable		log(ΔSG&A)	
	Pred.	Mean Coeff.	t-value
SA		0.000	0.004
*D*SA*		0.004	0.941
*log(ΔSale)*SA*		-0.046	-1.542
*D*log(ΔSale)*SA*		0.156***	2.972
D		-0.001	-0.076
log(ΔSale)		0.855***	16.839
*log(ΔSale)*logAINT*	-	0.001	0.028
*log(ΔSale)*logEINT*	-	0.028***	4.466
*log(ΔSale)*PRSDEC*	-	0.040	1.154
*log(ΔSale)*Loss_prior*	-	-0.121*	-1.912
*log(ΔSale)*FCF*	+	0.152	0.529
*log(ΔSale)*Small_profit*	+	0.150	1.485
*log(ΔSale)*LC_IGD*	+	0.164***	6.175
*log(ΔSale)*PPEDEC*	-	0.082**	2.457
*log(ΔSale)*ΔGDP*	+	-1.061*	-1.685
*D*log(ΔSale)*		-0.419***	-3.814
*D*log(ΔSale)*logAINT*	-	0.015	0.317
*D*log(ΔSale)*logEINT*	-	-0.013	-0.998
*D*log(ΔSale)*PRSDEC*	+	0.077	1.329
*D*log(ΔSale)*Loss_prior*	+	-0.036	-0.396
*D*log(ΔSale)*FCF*	-	0.192	0.360
*D*log(ΔSale)*Small_profit*	+	-0.154	-0.945
*D*log(ΔSale)*LC_IGD*	-	-0.189***	-3.332
*D*log(ΔSale)*PPEDEC*	+	0.146***	2.725
*D*log(ΔSale)*ΔGDP*	-	1.130	0.786
logAINT		0.001	0.230
logEINT		-0.001	-0.600
PRSDEC		-0.013***	-3.275
Loss_prior		-0.027***	-3.090
FCF		-0.006	-0.138
Small_profit		-0.004	-0.317
LC_IGD		-0.006*	-1.812
PPEDEC		-0.021***	-8.276
ΔGDP		0.101	1.345

(Table 8 continued)		
*D*logAINT*	0.015	0.317
*D*logEINT*	-0.013	-0.998
*D*PRSDEC*	0.077	1.329
*D*Loss_prior*	-0.036	-0.396
*D*FCF*	0.192	0.360
*D*Small_profit*	-0.154	-0.945
*D*LC_IGD*	-0.189***	-3.332
*D*PPEDEC*	0.146***	2.725
*D*ΔGDP*	1.130	0.786
Inverse Mills Ratio	-0.008*	-1.847
Total no. of obs. in rolling five-year regressions	10,611	
No. of obs. coefficients can be estimated	7,164	
Number of cross-sections	80	
Avg. number of obs. per cross-section	448.475	
(mean) Adj. R-squared	46.99%	

Panel A presents two-sample t-tests of the differences in mean values of the determinants of SA that have been identified in prior literature. Pillar "SA" contains firm-year observations that have SA. Pillar "No SA" contains firm-year observations that do not have SA. N represents the number of unique firm-year observations included. Differences in means are given followed by the t-values. Panel B presents the results of the first-stage model of the Heckman (1979) correction approach. The presented average coefficient estimates are based on rolling five-year probit regressions on SA. Panel C presents the results of the second-stage of the Heckman (1979) correction approach. The presented average coefficient estimates are based on rolling five-year regressions of changes in SG&A expenditures including the inverse of the mills ratio and country dummy variables in each cross section. For both panels of five-year rolling regressions, the means given are precision averages (weighted by the inverse of their pooled five-year regression standard error). The t-statistic reported is equal to the coefficient of the precision average divided by its standard error (Dichtev and Piotroski, 2001). The sample consists of 2,011 distinct companies located in 42 different countries covering a period from 2005-2018. The required minimum number of observations per regression is 100. Detailed definitions of all variables are provided in Table 1. ***, ** and * indicate significance at the 1%, 5% and 10% level, respectively.

el A: Regression estimates

iable	Pred.	1st Stage								2nd
	SA	SA		D*SA		log(ΔSale)*SA		D*log(ΔSale)*SA		log(Δ
	M. Coeff.	t-value	M. Coeff.	t-value	M. Coeff.	t-value	M. Coeff.	t-value	M. Coeff.	t-value	M. Coeff.
											0.014
SA											0.004
*ΔSale)*SA*											-0.113*
*og(ΔSale)*SA*											0.372***
Media	0.166***	10.052									
$\widehat{Media}$			1.048***	50.440	0.005	0.095	0.009	1.116	-0.001	-0.232	
*SA_*$\widehat{Media}$			-0.048	-1.365	1.01***	43.616	-0.011***	-3.281	-0.003	-1.052	
ΔSale) SA_*$\widehat{Media}$			-0.464***	-2.850	-0.031	-1.490	0.852***	20.089	0.006**	2.409	
og(ΔSale) SA_*$\widehat{Media}$			0.340	1.344	0.036	0.180	0.060	1.011	0.935***	24.230	
	0.001	0.020	0.026	1.376	0.015	0.688	0.009**	2.275	0.008***	3.201	0.000
ΔSale)	-0.072	-0.556	0.028	0.379	0.027	0.267	-0.016	-0.598	-0.007	-1.258	0.829***
*ΔSale)*logAINT*	-0.198**	-2.505	-0.041	-1.301	0.023	0.420	0.026*	1.943	0.000	0.049	0.026
*ΔSale)*logEINT*	-0.002	-0.081	-0.017*	-1.650	0.002	0.145	-0.003	-0.947	0.000	0.200	0.023***
*ΔSale)*PRSDEC*	0.136*	1.759	0.033	0.995	0.044	0.614	0.027*	1.822	-0.003	-0.786	0.036
*ΔSale)*Loss_prior*	-0.65***	-3.776	-0.088	-1.304	0.031	0.268	0.008	0.325	0.000	0.026	-0.151**
*ΔSale)*FCF*	1.048	1.540	0.258	1.111	0.168	0.412	0.126	1.392	-0.003	-0.082	0.008
*ΔSale)*Small_profit*	-0.263	-0.702	0.028	0.283	0.053	0.359	-0.019	-0.794	-0.006	-0.543	0.223**
*ΔSale)*LC_IGD*	-0.124*	-1.706	-0.036	-1.310	-0.032	-0.424	-0.025	-1.543	0.006*	1.745	0.163***
*ΔSale)*PPEDEC*	-0.001	-0.013	0.032	0.877	0.027	0.447	0.012	0.646	-0.001	-0.200	0.054
*ΔSale)*ΔGDP*	-0.937	-0.418	0.141	0.145	0.167	0.110	0.107	0.282	0.014	0.133	-0.446
og(ΔSale)	0.300	1.134	-0.013	-0.069	-0.005	-0.026	0.131***	2.893	0.118***	3.183	-0.464***
*og(ΔSale)*logAINT*	0.124	0.820	0.055	0.949	-0.048	-0.411	-0.004	-0.155	0.025*	1.678	0.006
*og(ΔSale)*logEINT*	0.012	0.390	0.010	0.666	0.001	0.029	0.012***	2.643	0.007*	1.945	-0.001
*og(ΔSale)*PRSDEC*	-0.197	-1.252	0.000	-0.009	-0.040	-0.403	-0.038*	-1.848	-0.013	-1.032	0.094
*og(ΔSale)*Loss_prior*	0.593**	2.212	0.067	0.481	-0.094	-0.460	-0.010	-0.303	0.002	0.102	-0.025
*og(ΔSale)*FCF*	-2.383*	-1.708	-0.736	-1.441	-0.590	-0.676	-0.233	-1.302	-0.139	-1.062	0.695
*og(ΔSale)*Small_profit*	0.584	0.514	0.013	0.072	0.034	0.087	0.023	0.179	0.008	0.221	-0.279
*og(ΔSale)*LC_IGD*	0.228	1.644	0.074	1.315	0.066	0.592	0.028	1.166	-0.007	-0.543	-0.125*
*og(ΔSale)*PPEDEC*	0.135	0.904	-0.047	-0.827	-0.006	-0.076	-0.010	-0.425	0.001	0.060	0.178**
*og(ΔSale)*ΔGDP*	-1.855	-0.483	0.138	0.078	-0.305	-0.122	-0.172	-0.328	-0.006	-0.016	1.457

Table 9: 2SLS IV Esti

logAINT	0.118***	6.968	0.005	1.057	0.005	0.418	-0.004	-1.619	-0.001	-0.819	
logEINT	-0.062***	-6.341	0.001	0.645	-0.001	-0.183	0.000	-0.212	0.000	0.721	
PRSDEC	-0.007	-0.762	-0.001	-0.383	-0.004	-0.688	-0.002**	-2.059	0.000	-0.128	-0
Loss_prior	0.022	0.833	0.006	0.681	-0.009	-0.637	-0.002	-0.694	0.000	0.120	-0
FCF	0.072	0.694	-0.031	-1.177	0.012	0.171	-0.006	-0.443	0.002	0.355	
Small_profit	0.013	0.400	0.000	0.043	-0.001	-0.064	0.000	0.142	0.000	0.123	
LC_IGD	0.002	0.254	0.003	0.926	0.000	-0.022	0.003**	2.481	0.000	-0.241	
PPEDEC	0.011	0.936	-0.002	-0.536	0.000	-0.004	0.000	-0.333	0.000	-0.114	-0.
ΔGDP	1.069***	3.888	-0.002	-0.024	0.065	0.391	-0.062*	-1.758	-0.018	-1.492	
*D*logAINT*	-0.001	-0.049	0.005	0.731	0.006	0.647	0.005**	2.339	0.002	1.239	
*D*logEINT*	-0.002	-0.570	0.002	1.050	0.003	1.150	0.000	0.999	0.001**	2.082	
*D*PRSDEC*	0.033***	2.815	0.003	0.739	0.002	0.229	0.002	1.237	0.000	-0.345	0
*D*Loss_prior*	-0.117***	-3.264	-0.001	-0.078	0.016	0.710	0.001	0.164	-0.002	-0.851	-0
*D*FCF*	-0.113	-0.898	0.026	0.676	-0.059	-0.531	-0.004	-0.179	-0.007	-0.498	-0
*D*Small_profit*	0.064	0.973	0.007	0.573	0.002	0.084	-0.002	-0.612	-0.003	-1.247	
*D*LC_IGD*	-0.02*	-1.861	-0.002	-0.376	0.002	0.216	-0.003*	-1.886	0.001	0.535	
*D*PPEDEC*	0.016	0.876	0.002	0.391	-0.001	-0.122	0.001	0.378	0.000	-0.004	0.
*D*ΔGDP*	-0.608*	-1.668	-0.028	-0.178	-0.222	-0.972	0.058	1.039	0.006	0.213	
(mean) Adj. R-squared	31.50%		31.78%		67.24%		75.38%		77.96%		4

Panel B: 2SLS model statistics

(mean) χ^2	4.166**
(mean) Cragg and Donald F-statistic	17.731
Total No. of obs. in rolling five-year regressions	10,611
No. of obs. coefficients can be estimated	7,164
Number of cross-sections	80
Avg. number of obs. per cross-section	448.475

Panel A presents mean coefficients of rolling five-year two-stage least squares (2SLS) instrumental variable (IV) regression analyses by GICS S model in Eq. (1). All cross-sections include country-fixed effects. Our sample consists of 2,011 distinct companies located in 42 different countries c 2005-2018. The required number of observations in each regression is 100. The procedure applied is equivalent to Wooldridge (2003) imple endogenous interacting variables to obtain undistorted estimates. The variable $\widehat{SA\_Media}$ contains the fitted values on *SA_Media* obtained fro reported in the first column "Pred.". The columns under "1st Stage" contain the mean coefficients from the four first-stage regression equation estimation. Column "2nd Stage" reports mean coefficients of the second stage of the 2SLS analysis corresponding to the model in Eq. (1). For ea rolling regressions, the means presented are precision averages (weighted by the inverse of their pooled five-year regression standard error). The t are equal to the coefficient of the precision average divided by its standard error (Dichev and Piotroski, 2001). Detailed definitions of all variabl Table 1. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively. The mean adjusted R-squared reported for the "2.Stage equivalent OLS estimations. Panel B presents the overall 2SLS model statistics. The F-statistic reported is Cragg and Donald (1993) F-statistic fo (1) without endogenous interaction terms of SA (i.e., *D*SA*, *log(ΔSale)*SA*, and *log(ΔSale)*D*SA*).

(Table 9 continued)

Part VII: To Report or Not to Report about Coronavirus? The Role of Periodic Reporting in Explaining Capital Market Reactions during the COVID-19 Pandemic

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Abstract

We use a hand-collected sample of roughly 300 international firms included in leading stock-market indices in ten countries to investigate how firms' reporting practices during the coronavirus (COVID-19) pandemic impact stock market reactions in term of stock performance and risk. For this, we claim that it is important to analyze whether firms are capable of early risk-detection and of adapting their reporting practices accordingly by examining whether firms promptly and appropriately incorporate critical current global developments, such as the coronavirus pandemic, in their reporting process. We hand-collect firms' 2019 annual reports and analyze if and how extensively they include assessments of the coronavirus pandemic and its potential impact on their business activities by employing textual analysis. Next, we examine if and how this is incorporated in capital market reactions in terms of stock risk and stock performance. Our results highlight two main findings. First, by using the capital market model, we find that firms' reporting on COVID-19 in early released annual reports leads to decreases in beta values. Thus, firms' increased ability to detect risks early and report on the impact of COVID-19 leads to better stock risk assessments by capital markets, an effect that is amplified by state ownership. Second, we show that firms reporting about the coronavirus pandemic in their annual report exhibit a significant improvement in their abnormal returns compared to those that do not. Our findings indicate that investors value firms' transparency and their ability to promptly incorporate critical global developments in their reporting process. Thus, we show that firms' reporting practices play an important role in better understanding the current capital markets' reactions to the ongoing coronavirus pandemic.

Keywords: COVID19, coronavirus, annual reports, stock risk, stock performance;

1 Introduction

This study investigates how prompt incorporation of information about current events in annual reports helps explain the short-term capital market developments arising from the ongoing coronavirus pandemic. More exactly, we examine how firms' reporting about the coronavirus (COVID-19) pandemic in their annual reports explains stock price developments since early February 2020.

Following the initial coronavirus outbreak in December 2019, its later categorization as a pandemic triggered an economic upheaval on global stock markets that is still ongoing in early April 2020. To slow down the further spread of the disease, governments have implemented strict preventive measures including the complete lockdown of citizens in high-risk, high-exposure areas that have severely restricted public life (WHO, 2020). However, social differences between countries have led governments to put different action plans in place, with diverging measures. While most countries agree that social distancing is necessary, some, such as China, Italy, or Spain, have implemented strict lockdowns. Conversely, Germany, the UK, and the USA have adopted less strict measures, with people still being able to go outside for recreational activities as long as they adhere to distancing rules. Sweden even has almost no social distancing measures, with life going on almost as normal (BBC, 2020; Deutsche Welle, 2020). These measures also have varying degrees of effectiveness. Surprisingly, Germany is the European country with the lowest death rate due to COVID-19 although it is one of the most affected countries in terms of the number of infected persons. By contrast, countries such as Italy or Spain with considerably stricter lockdown measures have both higher infection and death rates. These differences can be explained by societal differences, such as healthcare system quality, habits of countries' citizens (e.g., in Germany the coronavirus outbreak started among a group of skiers), citizens' trust in their governments, or greater acceptance of the imposed measures on the part of high-risk groups due to different mentalities (NYTimes, 2020). Despite these drastic measures, the globalization and urbanization of the modern age have amplified the speed with which the disease spreads globally (Wu et al., 2017), with infections and deaths rising by the day. As the media covers the unsettling progress of the virus, fears of a recession reminiscent of the 2008 financial crisis are intensifying. The potential for crises, whether natural or man-made, has increased as the modern business environment becomes more turbulent (Smart & Vertinsky, 1984). The International Monetary Fund (IMF) forecasts that the current pandemic will plunge the global economy in the deepest crisis since the Great

Depression (FAZ, 2020). Indeed, current stock market developments indicate a considerably negative outlook, with the MSCI world index recently recording a drop of over 30 percent in the month following 19 February (onvista, 2020). One important constituent of today's societies is corporations, which play a significant role as they provide jobs and frequently needed products and services and contribute to the general financial development of societies. In the given situation, corporations also face difficulties as affected stakeholders worry about their investments. Although events such as the COVID-19 outbreak are for the most part unpredictable, their high-impact nature directly threatens the longevity of corporations. Thus, businesses face the challenge of preparing a strategic response that is capable of handling the event, including contingency plans and possible business adaptation (Carmeli & Schaubroeck, 2008). First, it is vital for companies to promptly address the coronavirus-related risks by drawing up suitable short-term and concrete action plans, such as adapting workplaces, building necessary accounting reserves, holding out on paying dividends in order to assure company liquidity, or protecting key employees in high-risk groups. Second, it is imperative that corporations use this situation to find a sustainable response to unpredictable crises. Experts agree on one aspect: the key element of a viable long-term solution is business flexibility (McKinsey, 2018). For firms to be able to continuously adapt to unpredictable situations such as the current coronavirus pandemic, it is imperative that they are as flexible as possible, for which the unanimously accepted solution is business digitalization (European Investment Bank, 2020; McKinsey, 2020b). Consequently, the way corporations communicate their preparedness pre-crisis and their ability to address the inherent risks post-crisis in line with corporate disclosure requirements come under closer scrutiny as affected stakeholders try to assess present and future risks. Standard-setters, too, highlight the importance of thorough financial reporting in these times of crisis, mentioning that a diligent analysis of the impact on businesses and based on that, real action plans are crucial for guaranteeing the accuracy and usefulness of the financial information provided (DRSC, 2020; IASB, 2020a, 2020b; IDW, 2020; SEC, 2020).

We take a firm-level based approach and investigate if and how firms proactively choose to address the COVID-19 pandemic and its implications. By taking this new perspective in light of the current situation, we pose the following question: Does it pay to be a crisis management leader in terms of handling and reporting about COVID-19 related risks and the potential effects on one's business? Specifically, we are interested in analyzing how firms' explicit reporting on the coronavirus crisis and its (potential) effect on firm activities helps explain current short-term stock price developments. For this, we use the uniqueness of the current situation, namely

the timing of the coronavirus outbreak. The first cases of COVID-19 were identified at the end of December 2019 and the big outbreak that followed in the first three months of 2020, provides an ideal opportunity to analyze how quickly firms react to new unexpected events. Since firms with fiscal year-ends at 31 December usually publish their annual reports in the first three or four months of the following year, we can directly examine if and to which extent firms decide to incorporate information on significant events subsequent to the end of the fiscal year in their annual reports. This is of major importance, as such events have a strong probability of affecting communicated business outlooks for the coming fiscal year, thus significantly influencing the reliability and usefulness of the provided information and consequently, investor expectations. We analyze two aspects of stock price developments: changes in stock performance and changes in stock risk following the publication of 2019 annual reports, which (at least partly) capture capital markets' reactions to the provided information. First, we hypothesize that firms that provide COVID-19 related information on risk assessment and potential negative business-related outcomes in their 2019 annual reports demonstrate that they have a successful early-warning and risk-detection system which allows them to communicate meaningful information on the COVID-19 crisis' (possible) impact on their business. We expect this to be especially the case for firms that release their annual reports before the COVID-19 disease was declared a pandemic and report on it, as they can be considered the leaders in early risk detection capability. This can lead to an improved stock risk assessment, as prior literature shows that more detailed reporting on possible risks is useful in explaining markets' perceptions of stock price sensitivity to market developments (betas) (Abrahamson & Amir, 1996; Jorion, 2002; Rajgopal, 1999). Second, we hypothesize that reporting on COVID-19 allows firms to achieve increased transparency of financial information and decreased information asymmetry. Increased transparency and higher-quality disclosure decreases information asymmetry and is thus associated with better stock performance (C. Botosan, 1997; C. A. Botosan & Plumlee, 2002; Healy et al., 1999; Lang & Lundholm, 2000; Welker, 1995). Thus, we expect firms that report about the coronavirus pandemic to benefit from improved stock performance.

In order to test our predictions, we hand-collect 2019 annual reports for all the firms included in the leading stock market indices in ten countries from different world regions. Specifically, we include China, the four most affected EU countries - France, Germany, Italy, Spain -, the UK and Switzerland as European non-EU countries, Australia, Brazil, and the USA. We then perform a textual analysis of the 2019 annual reports and identify whether and to what extent the firms mention the coronavirus pandemic. Based on this we compute our main variable of interest *COVID19*, which is a count variable that depicts the total number of times

the coronavirus pandemic is mentioned in the corresponding annual report. Additionally, we construct a dummy variable that identifies all firms that mention COVID-19 at least once in their 2019 annual report. We find that 70.9 percent of the firms in our sample report about COVID-19 in their 2019 annual reports, with the coronavirus pandemic referenced on average 5.5 times in an annual report. The percentage of firms that report on COVID-19 and the number of times it is mentioned in annual reports increases the later in the year the annual reports are published. The discrepancy between firms reporting on COVID-19 and those that do not widens considerably starting in the 11th calendar week of 2020, after which point at least 80 percent of the firms publishing 2019 annual reports address the coronavirus pandemic in their report.

To analyze the association between COVID-19 reporting and stock market developments, we focus on two aspects: stock performance and stock risk. For this, we compute two variables measuring the change in stock performance and risk, respectively, following the publication of the 2019 annual reports. We use standard event study methodology based on the constant mean model to estimate the change in stock performance, measured by the change in cumulative abnormal returns, and use the market model to calculate the change in stock risk, measured by changes in beta.

In line with our assumptions, our empirical tests show that firms reporting about COVID-19 in their 2019 annual reports benefit from improved stock performance and stock risk over those which do not report. First, we find that firms releasing their annual reports before COVID-19 was declared a pandemic and reporting about COVID-19 in their 2019 annual report experience an incremental decrease in stock risk, following the publication of the annual report compared to firms that do not address the COVID-19 pandemic, which experience an increase in stock risk. Conversely, firms with later annual report release dates that report on COVID-19 exhibit almost no change in stock risk. This can be explained by the fact that once a pandemic was declared and the negative repercussions on businesses worsened, reporting on COVID-19 was no longer really a choice – so it was no longer representative of increased early risk detection capability, but instead an expected action by firms. Second, we find that firms' reporting about the COVID-19 pandemic in 2019 annual reports is associated with a mitigated negative development of stock performance compared to firms whose reports do not mention COVID-19. Specifically, we find that firms reporting on COVID-19 in their 2019 annual report experience an incremental 14.3 percentage point increase in cumulative abnormal returns following the release of their annual report compared to firms that do not. We perform a series of additional analyses to confirm the robustness of our results. First, we correct for non-random selection of firms choosing to report about the coronavirus pandemic in their 2019 annual report

by using a two-stage estimation approach following Heckman (1979). The results remain qualitatively similar in terms of both effect magnitude and significance. Second, we perform additional analysis considering state ownership as an additional factor with the potential of explaining the documented positive effect of early risk detection capability on stock risk. Especially in the current context, it is reasonable to assume that firms with state ownership are less likely to end up in severe financial distress, as they are more likely to be financially backed by governments. Indeed, our results show that early annual report releasers that address COVID-19 and have any type of state ownership benefit from an incremental decrease in stock risk over those without state ownership. Third, we adapt our methodology to exclude any potential effects arising from an announcement of changes in earnings guidance (withdrawal or update). We do so because a large number of firms already changed their earnings guidance for 2020 due to increased uncertainty arising from the COVID-19 crisis or bad first-quarter results. Such an announcement could thus drive our results. For this reason, we adapt the methodology for calculating our stock performance and risk change variables to exclude any data that may capture the effect of a change in guidance. The results remain qualitatively similar.

The contribution of this paper is threefold. First, it adds to the vast literature on the importance of reporting for different types of market participants. More specifically, this study enhances our understanding of how markets react to the immediate risk assessment and transparency in company disclosures during a pandemic. Second, it shows that firms need to prepare for and report about risks before they appear to reduce the impacts of such events on their business, however uncertain they may be. If firms react before a crisis and maintain transparency throughout, they can provide more information resulting in less uncertainty, which in turn is rewarded by more optimistic financial expectations among market participants. Third, the study reinforces the importance of the relationship between business and society. It addresses the circular relationship between these two factors, as unforeseen events affecting societies have an impact on business activities, leading to a propagated effect on societies as changes in corporate activity lead to subsequent changes in society, such as loss of jobs or the negative macroeconomic effects of a subsequent financial recession.

The remainder of this paper is structured as follows. Section 2 discusses prior literature and hypothesis development. Section 3 presents the research design. Section 4 reports the main results and additional analyses. Section 5 concludes.

2 Literature review and hypothesis development

The current coronavirus pandemic represents an unprecedented global crisis that has enveloped the entire planet. Not only does it have a negative human impact due to health concerns; a significant commercial impact, too, is being felt globally. Governments have taken unprecedented measures in an attempt to contain the spread of the disease, such as strict social distancing, travel restrictions, and lockdowns (CDC, 2020). While much needed, these measures are affecting businesses worldwide and are significantly increasing the risk of major financial losses for firms as they cause significant disruptions to their business activities. Firms dependent on global sourcing are experiencing especially significant supply chain disruptions, while others are seeing a sharp decline in demand. Some are forced to repurpose their production lines, some lack online delivery options, and some are losing liquidity due to the total shutdown of their activities, especially if they are in the tourism industry (Davis, 2020; KPMG, 2020; Wharton, 2020).

The extent to which individual businesses are affected also determines the potential negative macroeconomic consequences. Current studies estimate that due to the imposed governmental restrictions and their impact on businesses, the world-wide losses could rise to approximately $280 billion, representing on average 0.5 percent of global GDP (Ayittey et al., 2020). Similar scenarios are proposed in country-level studies for Germany (Michelsen et al., 2020) or China (Ruiz Estrada et al., 2020). Other studies, such as McKibbin and Fernando (2020), paint an even worse picture with estimated losses of around $2.4 trillion in global GDP, or an average 3-6 percent decrease in GDP (Fernandes, 2020). Additionally, the International Monetary Fund (IMF) forecasts that the current pandemic will plunge the global economy in the deepest crisis since the Great Depression (FAZ, 2020). Against this backdrop, Gourinchas (2020) mentions that bold policy initiatives are needed to prevent further human contagion, followed by fiscal and financial policies to prevent economic contagion. Governments have responded to the possible economic repercussions with a variety of financial aid schemes. The EU provides coordinated action to provide liquidity to affected firms (Boot et al., 2020), while the US plans a government intervention amounting to $2 trillion (Megginson & Fotak, 2020). Some studies highlight necessary policy priorities such as potential payroll tax holidays (Nersisyan & Wray, 2020), measures to ensure the proper management of systemic financial and economic risk (Hafiz et al., 2020) or the establishment of a World Technical Council on Coronavirus (Evans, 2020). The current developing scenario obviously poses new strategic management challenges for firms worldwide, forcing them to develop and implement

comprehensive strategies for handling pandemics (Fadel et al., 2020). For this, firms have to consider an array of new factors affecting their usual business, such as the need for remote work options (Koshle et al., 2020) or, if remote work is not possible, additional safety precautions for the workplace (Ramesh et al., 2020); the need for a business continuity plan while also accounting for the possible psychological effects of the current situation on their workforce (Fadel et al., 2020); or solutions for new types of liabilities and disputes that may arise (Gore & Camp, 2020). Business consultants, too, acknowledge the exceptional nature of this situation and have proposed stage-based approaches for dealing with the current crisis and its potential repercussions (McKinsey, 2020a). It is also imperative that corporations use this situation to find a sustainable response to unpredictable crises. Experts agree on one aspect: the answer to a viable long-term solution is business flexibility (McKinsey, 2018). For this, the unanimously accepted solution is business digitalization (European Investment Bank, 2020; McKinsey, 2020b).

Current stock market developments indicate a considerably negative outlook, with the MSCI world index recently recording a drop of over 30 percent in the month following February (onvista, 2020). Existing literature on the impact of the coronavirus crisis tries to better understand the factors at play. Gormsen and Koijen (2020) show that beyond changes in growth expectations, dividend futures help explain current stock market developments. Furthermore, they find that information about economic relief schemes lowers risk perceptions and improves long-term growth expectations. Ramelli and Wagner (2020) find that sophisticated investors start pricing effects earlier, while broad attention of participants grew once human-to-human transmission was confirmed. Furthermore, they find that after the end of February the aggregate market fell, as investors became increasingly more worried about corporate debt and liquidity issues. Alfaro et al. (2020) find that the coronavirus infection trajectory also plays a role in explaining stock market reactions, which decline as the trajectory of the pandemic becomes clearer, while Mamaysky (2020) shows that financial markets, too react to coronavirus media coverage. Albulescu (2020a) finds that coverage of death rates and the increasing number of affected countries contribute to increasing financial market volatility, which also negatively impacts oil prices. (Kingsly & Henri, 2020) find that oil prices are also negatively affected by decreases in industrial production. Furthermore, Tashanova et al. (2020) and Feng et al. (2020) identify investment opportunities such as in online education or healthcare, which are expected to remain profitable due to the ongoing pandemic. Similarly, as a profitable investment opportunity Yan et al. (2020) propose shorting stocks of firms in affected industries (such as travel and entertainment) and buying back once prices drop.

Recently, standard setters have started paying increased attention to the impact of the coronavirus crisis on firms' financial situation. They are particularly concerned about how this situation will impact the accuracy of financial disclosures, pointing out that COVID-19 will play a significant role in preparing financial disclosures for the period ending 31 March 2020 and those after (IDW, 2020). On 25 March 2020 the SEC's Division of Corporation Finance published guidance stating explicitly that COVID-19 represents a material risk for all public companies and thus has to be fully incorporated in coming financial reporting. The Division also draws attention to the public that for many firms the coronavirus crisis has already had an impact on their operating results, financial condition, and liquidity (SEC, 2020; Sidley, 2020). IFRS-based studies also claim that, especially when reporting in uncertain times, it is crucial to provide users of financial statements with adequate information that can aid them in accurately evaluating a firm's financial situation (IASB, 2020a, 2020b). For reporting periods ending 31 December 2019, the consensus is that it is generally appropriate to at least consider the COVID-19 outbreak impacts as results of events that arose after the reporting date that require disclosure in financial statements, although adjusting the recognized amounts is not necessary (BDO, 2020; Deloitte, 2020; EY, 2020).

Although most standard setters' recommendations are aimed at future reporting activities, we claim that in light of the gravity of the coronavirus outbreak it is essential to see how prompt firms have been in starting to consider possible repercussions. First, it is vital for companies to promptly address coronavirus-related risks by drawing up suitable short-term and concrete action plans, such as adapting workplaces, building necessary accounting reserves, holding out on paying dividends in order to assure company liquidity, or protecting key employees in high-risk groups. Second, it is imperative that corporations use this situation to find a sustainable long-term response to unpredictable crises, such as future possible epidemics or disease outbreaks. Thus, we claim that the debate should start with a thorough assessment of how firms include the current developments related to the coronavirus outbreak in their financial reporting that took place during the initial period of the coronavirus outbreak. The timing of the ongoing coronavirus pandemic offers a unique setting for analyzing the promptness of firms in addressing significant unexpected events and their impact on business activities. Given the starting point in late December 2019, it is reasonable to assume that information on the effects of the coronavirus outbreak is included in the annual reports that were published between the beginning of 2020 and the time of writing. As stakeholders increasingly worry and try to assess present and future risks, we claim it is important to investigate if and how firms are able to demonstrate a timely response to this crisis and include relevant information related to the

consequences of the coronavirus crisis on their business activities in their disclosures. It is also imperative to evaluate whether firms indeed consider it necessary to adopt new measures due to the current situation and if so, to what extent they implement these or adapt their strategy to deal with the negative consequences. Finally, it is also important to analyze whether firms that are leaders in reporting about the possible effects of the outbreak are able to mitigate the negative consequences of the crisis on their business.

The importance of periodic reporting and its quality in providing publicly available information and thus mitigating information asymmetry is widely acknowledged by prior literature (Bushman & Smith, 2001; Kanodia & Lee, 1998; Leuz & Verrecchia, 2000). Referring to the financial and economic crisis of 2007/2008, Barth and Landsman (2010) find that a lack of transparency in financial reporting contributed to its severity. Thus, we claim that providing qualitative financial reporting that incorporates a discussion of critical current global events - in this case, the coronavirus pandemic - is crucial to the success of firms' attempts to overcome the current crisis. Carmeli and Schaubroeck (2008) emphasize the importance of learning from past crises due to the uncertain but high-impact nature of such events on a company's viability and highlight the necessity of appropriate preparation and risk assessment for future events. In a similar vein, Maldin-Morgenthau et al. (2007) summarize the steps corporations have to undertake during public health emergencies such as pandemics. Their idea of corporate preparedness requires, among others, emergency response plans and clear communication channels.

The positive effects of qualitative financial reporting in the current context are twofold. First, existing studies show that the coronavirus pandemic is having adverse effects on market (systemic) risk (Albulescu, 2020b; Ramelli & Wagner, 2020). One way for firms to proactively respond to this is prompt risk detection and higher transparency. Prior literature shows that, generally, qualitative financial reporting is the main conduit for increasing transparency of firms' financial situations, which in turn enables market participants to better assess systemic firm risks (Barry & Brown, 1985; Biddle et al., 2009; Bushman & Smith, 2003; Diamond & Verrecchia, 1991). Furthermore, especially regarding risk reporting, prior studies show that more detailed reporting on possible risks is useful in explaining markets' perception of stock price sensitivity to market developments (betas) (Abrahamson & Amir, 1996; Jorion, 2002; Rajgopal, 1999). Prior literature recognizes risk awareness as one of the fundamental pillars of risk culture (Collier et al., 2006; Mikes, 2009, 2011) and that its importance for successful business management is increasing (Braumann et al., 2020; Melnyk et al., 2014). Concerning the present situation, we claim that especially for firms with an early reporting date, managers'

decision to report transparently about the coronavirus crisis in their firms‘ 2019 annual reports above all demonstrates a strong capacity for early risk-detection and enhanced crisis management. We categorize firms to exhibit an increased capability of early risk detection as those that are true leaders in reporting on COVID-19 in their annual reports. We identify these as the ones that publish their 2019 annual report before or on 11 March 2020. We choose this cut-off point as this was the day when the WHO officially declared the coronavirus outbreak a pandemic. Firms publishing after that date are less likely to not address the matter given the unprecedented nature and gravity of the situation, public pressure, and consistently deteriorating developments worldwide. This is not expected to significantly decrease stock risk, as the motivation for disclosing information related to COVID-19 in the annual report is attributable to firms' inability to escape the adverse consequences of the situation on business activities and thus making it a necessity to address the matter, rather than to a firm's increased early risk detection capability. Conversely, firms that published their annual report before 11 March 2020 and mentioned the coronavirus pandemic in their report can be regarded as having an enhanced awareness of early risk detection and an ability and willingness to manage that risk. This can hence help to boost capital markets' confidence in the firms' financial situation and lower their perceived investment risk. Thus, we formulate our first hypothesis as follows:

Hypothesis 1: *Firms' capacity for early risk-detection and its incorporation in the annual report is associated with a lower stock risk (beta).*

Second, the importance of financial disclosures to investors and other stakeholders when appraising firms' management practices (Hodge et al., 2006; Koonce et al., 2011) and financial situation is long established in prior literature (Ball & Brown, 1968; Barth et al., 2017; W. Beaver, 1998; Francis & Schipper, 1999). This also shows that increased and higher-quality disclosure decreases information asymmetry and is thus associated with better stock performance (C. Botosan, 1997; C. A. Botosan & Plumlee, 2002; Healy et al., 1999; Lang & Lundholm, 2000; Welker, 1995). We consider that reporting on the current coronavirus crisis shows that (1) firm management is able to incorporate current global developments in the financial reporting process, thus providing more detailed, transparent and accurate information, and (2) firms signal proactive management practices and are thus better prepared to deal with any adverse consequences of the coronavirus outbreak. Thus, we expect firms that report on the crisis to exhibit better stock performance arising mainly from lower information asymmetry but also from being better informationally equipped and therefore able to successfully manage future negative outcomes arising from the current crisis. This can lead to the incurred losses

being lower than those of firms that ignore the crisis and do not report on it. As the current crisis is still a developing one, it is not possible to analyze the effect on longer-term profitability measures. We can however investigate how the additional provided information on COVID-19 in 2019 annual reports affects firms' financial well-being in the short term in the form of stock performance. Thus, we formulate our second hypothesis as follows:

Hypothesis 2: *Firms' explicit reporting on early-detected, significant new risks in the annual report is associated with improved stock performance (abnormal returns).*

3 Methodology

3.1 Hand-collected annual report information on COVID-19

The timing of the current coronavirus pandemic allows us to examine the content of annual reports from a unique perspective. Given the uniqueness of this setting, we are able to directly explore to what extent firms are prepared to promptly address new risks that are expected to have a major impact on their business outlook. We use 2019 annual reports as the main constituent of our study to analyze how firms choose to incorporate significant unpredictable events – in our case the coronavirus outbreak – in their reporting process. Our main variable of interest is based on references to the coronavirus pandemic in 2019 annual reports. We construct our variable *COVID19* by performing a text analysis of the hand-collected 2019 annual reports. We hereby search for two terms, "corona" and "covid." We choose these two terms as the exact designation differs from firm to firm. Some use the term "coronavirus," others "COVID-19". We use "corona" instead of "coronavirus" as a search term to ensure we also identify cases where firms use the phrase "corona virus." This allows us to identify each instance where the current COVID-19 pandemic is being referenced and construct our variable *COVID19* as a count variable equal to the number of times the pandemic is mentioned in the annual report. For firms that use both terms (coronavirus and COVID-19), we construct our *COVID19* variable based on the more frequently used term. We do so in order to adjust for the following scenario: "[…] the coronavirus (covid-19) epidemic has a […]" and thus avoid double counting. By computing this count variable we are able to differentiate between the extent to which the coronavirus pandemic is addressed as a potential risk in the 2019 annual reports of different firms. This is important because we claim that it does make a difference if, for example, a firm just mentions the coronavirus pandemic once as one of a number of risks it is exposed to or if it goes beyond that and discusses it in more detail (in which case we expect it to be mentioned more than once). For example, a firm may minimally adjust its risk section by naming the

current coronavirus pandemic as one of several standard potential risks, as in this example: "Natural disasters, pandemic illness, including the current COVID-19 outbreak, equipment failures, power outages or other unexpected events could result in physical damage to and complete or partial closure of one or more of our manufacturing facilities" (Caterpillar Inc., 2020). If this remains the one and only mention of the coronavirus pandemic, we claim this is different from, for example, a firm providing a whole section on coronavirus in their annual report, which should be accounted for.

We also manually inspect the annual reports to gain some more insight into firms' practices in reporting on COVID-19. This yields initial evidence on the variety with which firms choose to incorporate information on the COVID-19 pandemic in their 2019 annual reports. We identify different types of firms. First, we find firms that do not address the coronavirus pandemic at all, such as Bayer, Deutsche Telekom, IBM, Campari or BBVA (Bayer, 2020; BBVA, 2020; Campari, 2020; Deutsche Telekom, 2020; IBM, 2020). Second, there are firms such as Caterpillar Inc., Fresenius Medical Care, or Lloyds Banking Group that merely mention the coronavirus pandemic in passing (Caterpillar Inc., 2020; Fresenius Medical Care, 2020; Lloyds Banking Group, 2020). Third, there are firms that use the ongoing pandemic to justify the decision to omit parts of the annual report. For instance, MTU Aero Engines state in their annual report that "In view of the exceptional situation created by the corona crisis at the time of the publication of the 2019 annual report, MTU Aero Engines will forego its letter to the shareholders, as reliable prospective announcements are not possible at this time" (MTU Aero Engines, 2020). Fourth, we identify firms such as Adidas or Air Liquide, which acknowledge the importance of the current coronavirus outbreak but choose to not report on it when presenting their business outlook data (Adidas, 2020; Air Liquide, 2020). Last, we identify firms that choose to promptly and properly include information on the coronavirus pandemic in their annual reports. BMW is one of the leaders in this respect, structuring their entire business outlook section to take into account possible effects of the COVID-19 pandemic (BMW, 2020). Figure 1 depicts the heading of BMW's business outlook section. Similarly, Deutsche Lufthansa and Saipem incorporate the coronavirus pandemic as a major factor in their forecast reports, as depicted by Figures 2 and 3, respectively (Deutsche Lufthansa, 2020; Saipem, 2020).

>> Insert Figure 1 about here <<

>> Insert Figure 2 about here <<

>> Insert Figure 3 about here <<

3.2 Reporting on COVID-19 and stock risk

To test our first hypothesis, we examine how stock risk changes with the publication of the 2019 annual report, which we proxy by using the dependent variable *ΔRisk*. To calculate *ΔRisk* we use an extended version of the market model, which claims that the return on a security depends on the return on the market's and the firms' risk in relation to market performance, depicted by beta (Binder, 1998). We are thus interested how beta values change after the publication of the 2019 annual report. For our research design, we use the standard market model regression and include an additional period specific variable, *POST*. The following equation depicts the used model:

$$\text{Return}_t = \gamma_0 + \gamma_1 \text{RM}_t + \gamma_2 \text{POST}_t + \gamma_3 \text{RM}_t \times \text{POST}_t + u_t, \quad (1)$$

where *Return* represents the firm's actual realized returns for each day included in the regression, *RM* represents the market return proxied by the return on the MSCI World index, and *POST* is a dummy variable taking the value of 1 after the 2019 annual report publication date, zero otherwise. For the estimation of this model, we use a sample period starting at 1 January 2019 and ending 20 April 2020. We restrict this part of the analysis to firms that published their 2019 annual report at least 15 days prior to 5 May 2020, in order to ensure a sufficiently large post-event period (at least 15 days). We run the regression based on the model in equation (1) separately for each firm in our sample. This allows us to estimate each firm's *beta* prior to the publication date of the 2019 annual report, represented by $\hat{\gamma}_1$ and the change in each firm's *beta* following publication, represented by $\hat{\gamma}_3$. Thus, our dependent variable *ΔRisk* equals $\hat{\gamma}_3$. To test our first hypothesis, we use the following model:

$$\begin{aligned}\Delta\text{Risk}_i = {} & \beta_0 + \beta_1 \text{COVID19}_i + \beta_2 \text{POST}_i + \beta_3 \text{COVID19}_i * \text{POST}_i + \beta_4 \text{D\_pandemic}_i \\ & + \beta_5 \text{LEV}_i + \beta_6 \text{SIZE}_i + \beta_7 \text{ROA}_i + \beta_8 \text{OP}_i + \beta_9 \text{GROWTH}_i + \beta_{10} \text{DIV}_i + \varepsilon_i, \end{aligned} \quad (2)$$

where *POST* is an indicator variable taking the value of one if a firm published its 2019 annual report after or on 11 March 2020, zero otherwise. This variable allows us to implement the differentiation between true leaders in early risk detection and the other firms. *COVID19* is our main independent variable of interest. Alternatively, we also use *D_COVID19* as independent variable of interest, which takes the value of one if a firm mentions the coronavirus pandemic at least once in its 2019 annual report, zero otherwise. We include *D_pandemic* to control for whether the firm mentioned pandemics or epidemics as general risk factors in its 2018 and 2017 annual reports. We do so because we want to ensure that the documented effect is not driven by the general practice of mentioning pandemics in annual reports, but by the direct addressing

of the current coronavirus pandemic. Further, we include six different control variables, which are defined based on 2018 reported values to ensure that the used amounts do not include any effects related to the coronavirus pandemic. It is possible that, for example, certain firms are particularly cautious and have started to build reserves for possible negative outcomes related to the coronavirus pandemic that could thus affect their reported figures for 2019. We control for firm size by including *SIZE* as prior studies show a negative association with risk (Ben-Zion & Shalit, 1975; Breen & Lerner, 1973). We also control for leverage (*LEV*), firm profitability by including *ROA*, dividend payout policies (*DIV*), operating efficiency (*OP*) and firm growth (*GROWTH*) as prior literature identifies these factors as determinants of risk (William Beaver et al., 1970; Dhingra, 1982; Hong & Sarkar, 2007; Melicher & Rush, 1974). To confirm our first hypothesis we expect β_1 to be negative and statistically significant. We expect the overall effect for firms reporting after 11 March 2020 (β_1+β_3) to be close to zero.

3.3 Reporting on COVID-19 and stock performance

To calculate our second dependent variable, *ΔCAR*, we start by employing a standard event study methodology for which we use the constant mean model. We make this design choice in light of the aggregate market movements during the coronavirus crisis. The constant mean model allows us to estimate abnormal returns during the coronavirus crisis based on stock price developments before the crisis, thus disregarding aggregate market changes taking place during the coronavirus outbreak. As estimation window, we use the entire year 2019 in the following model:

$$\widehat{\text{Return}}_i = \frac{1}{\#\text{ of days in estimation window}} \sum_{e=\tau_1}^{\tau_2} \text{Return}_{i,e}, \quad (3)$$

where *Return* represents the actual realized returns for each day during the estimation window and $\widehat{Return}$ represents the estimated expected constant return for firm i during the event window. Next, we calculate *CARs* for two 15-day different event windows based on the publication date of the 2019 annual report. The PRE event window consists of the 15 days prior to the publication date. The POST event window corresponds to the 15 days after the publication date. The corresponding *CARs* are calculated as follows:

$$\text{CAR}_{\text{PRE}_i} = \sum_{t=\text{pubdate}-15}^{\text{pubdate}-1} \text{Return}_{i,t} - \widehat{\text{Return}}_i, \quad (4)$$

$$\text{CAR}_{\text{POST}_i} = \sum_{t=\text{pubdate}+15}^{\text{pubdate}+1} \text{Return}_{i,t} - \widehat{\text{Return}}_i, \quad (5)$$

where *Return* is the actual stock return for firm i in day t and $\widehat{Return}$ is the estimated return based on equation (3). We then calculate *ΔCAR* as the difference between CAR_{POST} and CAR_{PRE}

and use it as dependent variable in our main test of Hypothesis 2 using the following regression model:

$$\Delta CAR_i = \beta_0 + \beta_1 COVID19_i + \beta_2 D\_pandemic_i + \beta_3 LEV_i + \beta_4 SIZE_i + \beta_5 ROA_i + \beta_6 OP_i + \beta_7 GROWTH_i + \beta_8 DIV_i + \varepsilon_i, \quad (6)$$

where all variables are as defined in the model in equation (2). We also use *D_COVID19* as our alternative independent variable of interest. To confirm our second hypothesis we expect β_1 to be positive and statistically significant.

3.4 Sample selection

We construct our sample by selecting the most affected developed countries as of 21 March 2020 in various world regions. Specifically, we include China, the four most affected EU countries - France, Germany, Italy, and Spain -, the UK and Switzerland as European non-EU countries, Australia, Brazil, and the USA. For each country, we identify firms that are constituents of the leading stock market index. Table 1 provides an overview.

>> Insert Table 1 about here <<

Most index sizes range from 20 to 50 firms. To avoid over-representation of certain countries, we restrict our sample to the top 30 firms in terms of market capitalization in the FTSE 100 index for the UK and the BOVESPA index for Brazil. We thus have an initial sample of 325 firms. For each firm in our sample we hand-collect the 2019 annual report. We also hand-collect all annual reports for 2017 and 2018. For inclusion in our analysis sample, we require firms to have published their 2019 annual reports, collecting all 2019 annual reports that were published by 4 May 2020. We will continue to update our sample in the coming period by including annual reports that were published after that date. We hence exclude 105 firms that either have a fiscal year-end at 31 December 2019 and had not published their annual report by 4 May, or have a fiscal year-end after 31 December 2019 and thus are not required to have published an annual report yet. To ensure the validity of our research design, we exclude another three firms with publication dates earlier than 30 January 2020. This is when the *World Health Organization* (WHO) declared the coronavirus outbreak a global health emergency, which affects our research in two ways. (1) It is the date after which firms had reliable information about the gravity of the coronavirus outbreak and thus a clear motivation to include it in their disclosure. (2) It is the date after which the most significant market responses in terms of changes in stock prices due to the coronavirus pandemic were expected. We exclude another eleven firms with a publication date later than 20 April 2020, as our research design requires

availability of at least 15 days' worth of stock price information after the publication date. Missing firm-level data for the control variables in Datastream leads us to exclude another three firms. Thus, our final sample for the main tests of our hypotheses consists of 203 firms. Table 2 provides an overview of the sample selection procedure.

>> Insert Table 2 about here <<

4 Results

4.1 COVID-19 in 2019 annual reports

Panel A of Table 3 provides an overview of publishing dates for the 2019 annual reports by 2020 calendar weeks. We observe that most of the annual reports are published between week 8 and week 13. 162 of the 203 annual reports in our sample are published in that period, with the highest number published in calendar week 9. We can also observe an increasing trend both in the number of reports mentioning COVID-19 and in the number of times the pandemic is mentioned in the annual reports. Panel B of Table 3 reports descriptive statistics for variables used in the main tests of our two hypotheses. 70.9 percent of the firms in our sample mention the coronavirus pandemic in their 2019 annual reports. In the annual reports where this is the case, the coronavirus pandemic is mentioned on average 5.5 times. Following the publication of their 2019 annual report, firms exhibit an overall -0.042 decrease in their stock risk (*beta*) and they also experience on average more positive abnormal returns, *ΔCAR* having a mean value of 4.289. The median change in *CAR* is negative (-1.371). This is, however, justified considering that most of the annual reports in our sample were published in late February or after, this being the point in time when the aggregate capital market began to decline. The mean (median) value of *SIZE* is 18.01 (18.03), indicating that our sample contains mainly large firms. The mean (median) *ROA* is 4.9 percent (3.5 percent), showing that firms in our sample enjoy above-average profitability, and the mean (median) *GROWTH* is 19.7 percent (4.7 percent), both of which is expected given that the selected firms are the leading businesses in their respective countries.

The pairwise correlations presented in Panel C of Table 3 are consistent with the expected associations. Their magnitudes do not raise any multicollinearity concerns. Furthermore, the negative and significant correlation between *D_COVID_19* and *ΔRisk* (-0.158, p-val>0.05) offers preliminary evidence for our first hypothesis, while the positive and significant correlation between *COVID19* and *ΔCAR* (0.234, p-val<0.05) offers preliminary evidence for our second hypothesis.

>> Insert Table 3 about here <<

For more insight into firms' practices of reporting about COVID-19 in their 2019 annual reports, Figure 4 presents a graphical depiction of the percentage of firms that report about it versus those who do not based on the time of the 2019 annual report release date. We observe that until week 10 of 2020, both groups of firms (those reporting on COVID-19 and those who do not) present similar patterns. Until week 11 of 2020, we have on average almost a 50/50 split between these groups. However, from week 11 of 2020 onwards we observe a drastic change in the number of firms choosing to report about COVID-19 and those who do not. Beginning in calendar week 12, at least 80 percent of firms of all those that publish their 2019 annual report that week include information about COVID-19. This could be due to two different factors. First, it is plausible to assume that firms with a later 2019 annual report release date have more time to incorporate information on COVID-19 and its effects on business more thoroughly in their annual report. Second, as also mentioned in our hypothesis development section, it is plausible that only certain firms in the early-adopter group are true leaders in early risk detection and thus report on COVID-19, while firms reporting at a later date (in this case starting with calendar week 11, which also included 11 March 2020, when the WHO declared the pandemic) are essentially pressured into reporting about COVID-19 as global developments worsen as the disease spreads and thus an adverse impact on businesses is imminent.

Figure 4 further presents the development of the frequency of mentioning the coronavirus pandemic in the annual reports of firms that address it. Overall, we observe an increasing trend. Consistent with our assumptions that following the declaration of the coronavirus spread as a pandemic and that firms reporting later have more time to properly incorporate information in their annual report, we observe a clear increase in the average number of times the pandemic is mentioned starting in calendar week 11. Before calendar week 11 we have on average a maximum of six mentions of the pandemic in annual reports of firms that choose to address it, while after that we have a minimum of eight mentions (calendar week 16) and a maximum of twelve mentions (calendar week 14).

>> Insert Figure 4 about here <<

4.2 Test of Hypothesis 1

Panel A of Table 4 presents the results of the univariate tests of differences in means of changes in stock risk following the publication of the 2019 annual reports between the group of firms that report about the coronavirus pandemic and those that do not. The positive and statistically

significant difference of 0.127 (t-stat 2.11) offers preliminary evidence in support of our first hypothesis. Thus, firms explicitly addressing the coronavirus pandemic in their 2019 annual report exhibit, on average, a -0.078 decrease in stock risk after publication compared to firms that do not, which experience, on average, a 0.049 increase in stock risk after publication.

Panel B of Table 4 presents the regression results for the tests of Hypothesis 1. Column (1) presents the results from the estimation of the model in Eq. (2) without the *D_pandemic* control variable. The negative and statistically significant coefficient on our main variable of interest *COVID19* (-0.023, p-val<0.01) provides evidence that firms that release their 2019 annual report early (i.e. before coronavirus was officially declared a pandemic) and report on the coronavirus pandemic enjoy an incremental reduction in *beta* value of -0.023 following publication compared to those that do not. Furthermore, as expected, the effect of reporting about COVID-19 for the firms releasing their annual reports after 11 March 2020 is almost zero (0.003). Column (2) of Panel B presents the results of the full model specification in Eq. (2). The negative and statistically significant coefficient on *COVID19* (-0.0243, p-val<0.01) confirms the negative association between reporting on coronavirus and stock risk. Furthermore, the effect for firms publishing at a later date is again close to zero (0.002). The coefficient on *D_pandemic* is positive (0.103) and statistically significant at the ten percent level, showing that our decision to include it was a justified one and alleviating concerns that it could drive our results. Columns (3) and (4) of Panel B present the results for the model in Eq. (2) when using *D_COVID19* as independent variable of interest. The negative and statistically significant coefficient of -0.223 (p-val<0.01) (-0.246 (p-val<0.01)) on *D_COVID19* in column 3 (4) provides additional evidence on the negative association between early reporting on COVID-19 in the 2019 annual report and stock risk. Altogether, these results show that firms' capacity for early risk-detection and the fact they include information on the coronavirus crisis in their early-released 2019 annual reports indeed gives them an advantage over those that do not because they can secure lower estimations of stock risk. Additionally, these firms also enjoy an advantage over the ones publishing at a later date and reporting about coronavirus, further highlighting the importance of promptness in early risk detection. Thus, we can confirm our first hypothesis.

>> Insert Table 4 about here <<

4.3 Test of Hypothesis 2

Panel A of Table 5 presents the results of the univariate tests of differences in means of changes in stock cumulative abnormal returns following the publication of the 2019 annual reports between the group of firms that report about the COVID-19 versus those that do not. The negative and statistically significant difference of -14.605 (t-stat -4.39) offers preliminary evidence in support of our first hypothesis, showing that firms that explicitly address the coronavirus pandemic in their 2019 annual report experience an increase in cumulative abnormal returns after publication compared to those that do not report on coronavirus. Thus, firms that report about the coronavirus pandemic in their annual report seem to benefit from a mitigated effect of the ongoing crisis on their stock price development.

Panel B of Table 5 presents the regression results for the tests of Hypothesis 2. Column (1) presents the results from the estimation of the model in Eq. (6) without the *D_pandemic* control variable. The positive and statistically significant coefficient on our main variable of interest *COVID19* (0.686, p-val<0.05) provides evidence that firms that report on the coronavirus pandemic in their 2019 annual report enjoy an improvement in stock price development following publication compared to those that do not. Column (2) of Panel B presents the results of the full model specification in Eq. (6). The positive and statistically significant coefficient on *D_COVID19* (0.708, p-val<0.05) confirms the positive association between reporting on coronavirus and improved stock performance. Furthermore, the coefficient on *D_pandemic* is not statistically significant, alleviating concerns that it could be the one driving our results. The positive coefficients on *COVID19* also provide evidence that, besides mentioning the coronavirus pandemic in the 2019 annual report, it matters to what extent firms choose to report about it. Columns (3) and (4) of Panel B present the results for the model in Eq. (2) when using *D_COVID19* as main independent variable of interest. The positive and statistically significant coefficient of 14.08 (p-val<0.01) (14.26 (p-val<0.01)) on *D_COVID19* in Column 3 (4) provides additional evidence on the positive association between firms' reporting about COVID-19 in their annual report and their stock performance. Altogether, these results show that firms that report about the coronavirus crisis indeed have an advantage over those that do not, because they can mitigate the negative effects of the coronavirus pandemic on their stock prices. Thus, we can confirm our second hypothesis.

>> Insert Table 5 about here <<

4.4 Heckman correction for non-random selection

We acknowledge that firms may self-select to report about the coronavirus pandemic in their 2019 annual reports and that those that do so are systematically different from those that do not. To correct for firms choosing to report on the coronavirus pandemic in their 2019 annual report as a non-random process, we use the Heckman (1979) correction technique, which consists of a two-step analysis. In the first stage, we estimate a COVID-19 reporting choice model for which we identify a range of factors that are generally known in literature to have some type of impact on the amount or accuracy of information provided through financial reporting. Based on the estimation of the first stage model, we calculate the inverse of Mills ratio (Heckman's lambda) and include it as an additional variable in the second-stage regression. We use the following model for our first-stage regression of the probability of a firm reporting about coronavirus by using factors that likely influence this decision:

$$\begin{aligned}\text{Prob}(\text{COVID}_{19})_i = {} & \beta_0 + \beta_1 \text{D\_pandemic}_i + \beta_2 \text{Industry}_i + \beta_3 \text{International}_i + \beta_4 \text{Complexity}_i \\ & + \sum \beta_x \text{Governance}_i + \sum \beta_y \text{Controls}_i + \varepsilon_i \end{aligned} \quad (7)$$

where *Prob(COVID_19)* is an indicator variable taking the value of one if a firm reports about the coronavirus pandemic in their 2019 annual report, zero otherwise. As determinant, we include *D_pandemic*, which is as previously defined in the models in Eq. (2) and (6). Additionally, we include factors that are not part of our second stage model (models in Eq. (2) and (6)) to guarantee the validity of the Heckman correction approach. We include various governance-related variables, as prior studies have shown that better governed firms are more likely to provide more accurate information (Ajinkya et al., 2005; Larcker et al., 2007). These include *Board_tenure, Board_affiliation, Board_size, Board_skills, Board_diversity, Board_independent* and *Governance*. Additionally, we also include measures of internationalization (*International*), likelihood of industry to be negatively affected by COVID-19 (*Industry*), and complexity (*Complexity*), which we believe to play a role in whether the firm chooses to promptly report on the ongoing coronavirus pandemic. We also include other general firm characteristics, such as *LEV, OP, GROWTH, ROA, DIV* and *SIZE* as additional controls. We use robust standard errors to account for heteroscedasticity. Due to the inclusion of additional variables in the first-stage regression, we lose an additional 24 observations due to the lack of data. We compute the inverse of the Mills ratio (*Inverse_Mills*) based on the Probit estimation of the model in Eq. (7) and include it in our second-stage regression (based on models in Eq. (2) and (6)) as an additional control variable.

Table 6 Panel A provides results for a test of difference in means between characteristics of firms that refer to COVID-19 in their 2019 annual report and those without. We can observe that firms mentioning the COVID-19 pandemic are systematically different from firms that do not. First, firms in industries that are more vulnerable to the ongoing pandemic (e.g., transportation or entertainment) are more likely to report on COVID-19 than those in less affected industries (e g., pharmaceuticals). Second, we observe that more international firms, too, are more likely to report about the coronavirus pandemic as they are also more likely to suffer supply chain disruptions. Third, we find that firms reporting about COVID-19 have boards with a shorter tenure and are more gender diverse. Generally, we also observe that firms reporting on COVID-19 are more successful in terms of having higher growth and better operating efficiency. Although the differences are not statistically significant, we also observe that firms reporting on COVID-19 exhibit a higher degree of internationalization and also reported more often on pandemics in the past years.

The results of the first-stage model estimation are presented in Panel B of Table 6. Panel C of Table 6 presents the results of the second-stage regressions. Columns 1 and 2 present the results based on the model in Eq. (2) testing out first hypothesis, which is extended by including the *Inverse_Mills* ratio. The coefficients of our main variables of interest *COVID19* (-0.0271, p-val<0.01) and *D_COVID19* (-0.282, p-val<0.01) are statistically significant in both model specifications and have the same signs and similar magnitudes as in our main models. Columns 3 and 4 present the results based on the model in Eq. (6) for the association between reporting on COVID-19 in annual reports and stock performance, which is extended by including the *Inverse_Mills* ratio. The coefficients of our main variables of interest *COVID19* (0.638, p-val<0.05) and *D_COVID19* (11.89, p-val<0.01) are statistically significant in both model specifications and have the same signs and similar magnitudes as in our main models. Overall, after controlling for self-selection, we document that early-publishing firms that reported on the coronavirus pandemic in their 2019 annual reports enjoy an incremental reduction in *beta* value and that firms reporting on COVID-19 exhibit an overall improvement in stock price development of 11.9 percentage points following publication compared to those that do not. These results help confirm the validity of our main results and thus of our two hypotheses.

>> Insert Table 6 about here <<

4.5 State ownership

The triggering factors for the stock price decline documented during the current crisis were the lockdown, travel and/or social-distancing restrictions imposed by governments worldwide (CDC, 2020). In this part of the analysis, we investigate whether state involvement in firms' ownership helps to further explain the documented effect of early risk detection capability (and thus early reporting on COVID-19) on stock risk. We focus this part of the analysis only on stock risk for two main reasons: (1) firms that are partly state-owned are, especially in the current situation, more likely not exposed to insolvency or bankruptcy risks as they are more likely to be backed financially by governments (Acharya & Kulkarni, 2010). Thus, we expect that if firms have any type of state ownership, the documented effect of early risk detection and reporting will be further amplified versus firms without state ownership. (2) We do not expect to observe any additional impact of state ownership on the documented association between reporting on COVID-19 and stock performance, as the source of this association lies in decreased information asymmetry through more and increased-transparency information. Additionally, prior literature shows that state ownership is mostly associated with lower information transparency (Bushman et al., 2004), which makes it even less likely to play a role in explaining the documented positive association between reporting on COVID-19 and stock performance.

Thus, we claim that state ownership plays a role in explaining the documented association between reporting on COVID-19, as a proxy for early risk detection capability, and stock risk. In order to test this assumption we use the following model, which is an extended version of the model in Eq. (2):

$$\begin{aligned}\Delta\mathrm{Risk}_i = {} & \beta_0 + \beta_1 \mathrm{State}_i + \beta_2 \mathrm{COVID19}_i + \beta_3 \mathrm{POST}_i + \beta_4 \mathrm{State}_i \times \mathrm{COVID19}_i + \beta_5 \mathrm{State}_i \times \mathrm{POST}_i \\ & + \beta_6 \mathrm{COVID19}_i \times \mathrm{POST}_i + \beta_7 \mathrm{State}_i \times \mathrm{POST}_i \times \mathrm{COVID19}_i + \beta_8 \mathrm{D\_pandemic}_i + \beta_9 \mathrm{LEV}_i \\ & + \beta_{10} \mathrm{SIZE}_i + \beta_{11} \mathrm{ROA}_i + \beta_{12} \mathrm{OP}_i + \beta_{13} \mathrm{GROWTH}_i + \beta_{14} \mathrm{DIV}_i + \varepsilon_i, \end{aligned} \quad (8)$$

where *State* is one of the following four variables measuring state ownership: *D_state, %_state, D_state20, D_state50*. *D_state* (*D_state20, D_state50*) takes the value of one if the corresponding firms has state ownership different than zero (of at least 20 percent/50 percent respectively), zero otherwise. *%_state* is a continuous variable defined as the actual percentage of state ownership. Our main variable of interest in this model is the interaction term *State×COVID19*, which represents the incremental effect of state ownership on stock risk for early publishers of annual reports that address the COVID-19 pandemic in their reports, making them leaders in early risk detection capability. To confirm our expectations, we expect β_4 to be

negative and statistically significant. This would provide evidence that early risk detecting capability of firms and thus the reporting on COVID-19 in early-released annual reports is additionally rewarded in the shape of decreased stock risk if the firms have any type of state ownership, as in the current situation they are also more likely to have the financial backing of national governments. All other variables are as defined before. For this part of the analysis, we exclude all Chinese firms from our sample, as most are state-owned and we would thus run the risk of our results being only driven by them. In untabulated analysis, we run the model in Eq. (8) on our full sample and the results remain qualitatively similar.

Table 7 presents the results. Panel A presents summary statistics for our state ownership variables. Overall, 11.4 percent of the firms in our sample have state ownership, with 7.4 (3.4) percent of the firms having at least 20 (50) percent state ownership. The average (median) percentage of state ownership in our sample is 3.7 (0). Panel B presents the results for the regression of the model in Eq. (8). The coefficient on *State×COVID19* is negative and statistically significant (-0.492, p-val<0.05 in first model specification) in all four model specifications. Thus, independent on the variable use to measure state ownership, early publishers of annual reports that choose to address the COVID-19 pandemic enjoy an additional decrease in stock risk if they have state ownership over those without state ownership. This confirms our assumption that state ownership plays an additional role in explaining the documented association between early risk detection capability and change in stock risk.

>> Insert Table 7 about here <<

4.6 Earnings guidance withdrawal or update

One significant factor that could drive the documented results is the withdrawal of or update to 2020 earnings guidance by multiple firms during the period under review. A large number of companies decided to withdraw or update their 2020 earnings guidance in the past months (Forbes, 2020) owing to continuously increasing uncertainty over the development of the economy in light of the current crisis, but also to lower reported earnings in the first quarter of 2020. We acknowledge the fact that the documented associations in our main tests could be driven by the effects of firms' announcements of guidance withdrawal or updates if they occur within our analysis period. We correct for this as follows. To calculate cumulative abnormal returns, we adjust both pre- and post-annual report release date windows so that they do not overlap with the date of guidance withdrawal/update. For example, if a firm publishes its annual report on 23 March 2020 and announces a guidance withdrawal on 30 March 2020, we shorten

both the pre- and post-release date windows to six days (instead of 15 days as in our main analysis). To calculate the change in stock risk (*beta*) we use the following approach: (1) if the guidance is withdrawn/updated after the publication of the annual report, we shorten the period after publication so that it ends on the day before guidance withdrawal/update (e.g., if a firm publishes its annual report on 23 March 2020 and announces a guidance withdrawal on 30 March 2020, we include all days up to 29 March 2020); (2) if the guidance is withdrawn/updated before the publication of the annual report, we exclude the period between guidance withdrawal/update and publication of annual report from our *beta* estimation (e.g., if a firm publishes its annual report on 23 March 2020 and announces a guidance withdrawal on 10 March 2020, we exclude all days starting with 10 March 2020 until 22 March 2020). Last, we exclude any firms from our sample that announce changes in earnings guidance the day before, the day of or the day after the release of the 2019 annual report. This ensures that the calculated change in *CARs* and risk (*beta*), which we use as dependent variables in our analysis, are not subject to any effect arising from the announcement of guidance withdrawals or updates.

Table 8 presents the results for our main tests of hypotheses 1 and 2 with the adjusted calculation of *ΔCAR* and *ΔRisk* considering earnings guidance withdrawal/update. The coefficient on *COVID19* in column 1 stays positive and statistically significant (0.707, p-val<0.01) and in column 3 negative and statistically significant (-0.0241, p-val<0.01) confirming the validity of our results and thus our two hypotheses. The results when using *D_COVID19* in columns 2 and 4 also remain qualitatively similar to our main results.

>> Insert Table 8 about here <<

In untabulated analysis, we also use the following approaches to correct for earnings guidance withdrawal/update effects. (1) For *CAR* calculation, we only adjust the corresponding window affected by guidance changes (i.e. either pre- or post-annual report release). (2) To account for the fact that due to shortening of the event windows the calculated *CARs* of firms with guidance changes are lower because fewer days are available for calculation, we calculate average *CARs* (i.e., we divide the calculated *CARs* for the pre- and post-annual report release windows by the number of days in the corresponding event windows) which we then use to calculate *ΔCAR*. The (untabulated) results for these alternative approaches are qualitatively similar to our main results. Overall, the results reported in this section show that possible effects arising from announcements of earnings guidance withdrawal or updates do not drive our findings.

4.7 Further robustness tests

We perform a series of additional tests to ensure the robustness of our main results. First, to avoid including in our analysis stock price developments prior to the WHO's pronouncement of a global health emergency (30 January 2020), we run our analysis by only including firms that published their 2019 annual report on or after 14 February 2020, as we require our PRE publication date event window for the stock performance analysis to correspond to the previous 15 days. We do so as the WHO announcement was the first clear confirmation of the severity of the coronavirus outbreak and its potential to affect economies on a global scale rather than just in individual regions or countries such as China. This is relevant because the global capital markets' negative response was clearly amplified once information on the potential for a global crisis became available. Second, we restrict the post 2019 annual report publication date window in the stock risk analysis to a maximum of 15 days for better comparability between the stock risk and stock performance analysis. Third, we run our whole analysis with an alternatively calculated *COVID19* variable. We compute this variable as the total number of times either of the two terms ("corona" or "covid") are mentioned in annual reports, whether or not only one or both are mentioned within the same annual report. Fourth, we include industry-fixed effects in our main model specifications. Fifth, we run our main tests on a subsample of only non-financial firms. Sixth, we run our tests on a subsample excluding Chinese firms, as China's government system is unique over all other countries in our sample, which could bias our results. The (untabulated) results for all these alternative specifications for the tests of both hypotheses are qualitatively similar (have the same signs, similar magnitude and similar significances) to our main results.

5 Conclusion

This study is motivated by the uniqueness of the current global setting in light of the ongoing COVID-19 pandemic. We take a firm level-based approach and examine how early risk detection capability and thus prompt inclusion of information about current adverse events in annual reports help explain the capital market's short-term responses to the ongoing coronavirus pandemic. More precisely, we examine if and how firms proactively choose to address the COVID-19 pandemic as a significant unexpected event by analyzing the content of 2019 annual reports. In a further step we analyze how reporting about COVID-19 helps explain stock market developments in terms of stock performance and stock risk beginning in early February 2020.

We find that 70.9 percent of the firms in our sample report about COVID-19 in their 2019 annual reports, with coronavirus being mention on average 5.5 times in an annual report. Furthermore, we find that both the percentage of firms choosing to report on COVID-19 and the number of times in gets mentioned increase the later in the year the reports are published. As for stock market developments, we document two main findings. First, we find that firms that are leaders in early risk detection capability and thus report on the COVID-19 pandemic in early released annual reports (before it was officially declared a pandemic on 11 March 2020) experience an incremental decrease in stock risk (as measured by *beta*) following the publication of the annual report. Firms publishing annual reports after 11 March 2020 and reporting on COVID-19 experience almost no change in beta following the publication of the annual report, while firms that do not address COVID-19 at all experience overall an increase in stock risk. Furthermore, we find that state ownership plays an additional role in explaining this association. We show that state-owned firms that are leaders in early risk detection (i.e., have an early release date and report on COVID-19) enjoy an incremental decrease in stock risk following the publication of their annual reports. This confirms the intuition that state-owned firms are perceived as more stable and less likely to go bankrupt in the current crisis, as they are more likely to receive governmental financial aid. Second, we find that firms' reporting about the COVID-19 pandemic in 2019 annual reports is associated with a mitigated negative development of stock performance compared to firms that do not report about COVID-19. More precisely, we find that firms reporting about COVID-19 in their 2019 annual reports, and thus providing more transparent and accurate information, experience decreased information asymmetry benefits in the form of an incremental increase in cumulative abnormal returns of 14.3 percentage points over firms that do not report about it. Thus, our results suggest that capital market participants value both firms' ability to detect risks early on and thus respond proactively in times of crisis, as well as the transparency and accuracy of their financial reporting, which helps them mitigate negative stock market outcomes.

Our study contributes to existing literature by shedding light on the various factors, in our case firms' prompt and proactive response to new significant risks in the form of up-to-date reporting, that contribute to stock market responses to the ongoing coronavirus outbreak. We highlight the importance of good quality reporting especially in times of uncertainty and draw attention to the relationship between society and businesses. We claim it is crucial to understand how promptly and effectively firms choose to address and manage the potential negative impacts of the coronavirus pandemic on their business so they can provide timely, useful, and

accurate financial information as current developments catch the attention of practitioners, standard setters, capital market participants, and researchers worldwide.

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Figure 1: BMW Annual Report 2019, excerpt


REPORT ON OUT-
LOOK, RISKS AND
OPPORTUNITIES

Economic development significantly slowed by spread of coronavirus

Automobile markets in decline as consequence worldwide

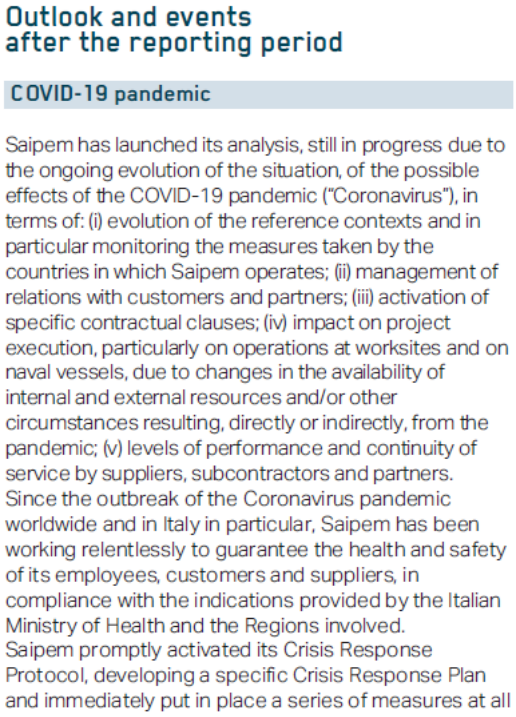
BMW Group outlook for 2020 significantly impacted by coronavirus

Figure 2: Deutsche Lufthansa Annual Report 2019, excerpt


Forecast

Outbreak of coronavirus burdens global economic growth and performance of the Lufthansa Group. | IATA expects a significant fall in global passenger traffic. | Lufthansa Group expects a significant decline in Adjusted EBIT for 2020.

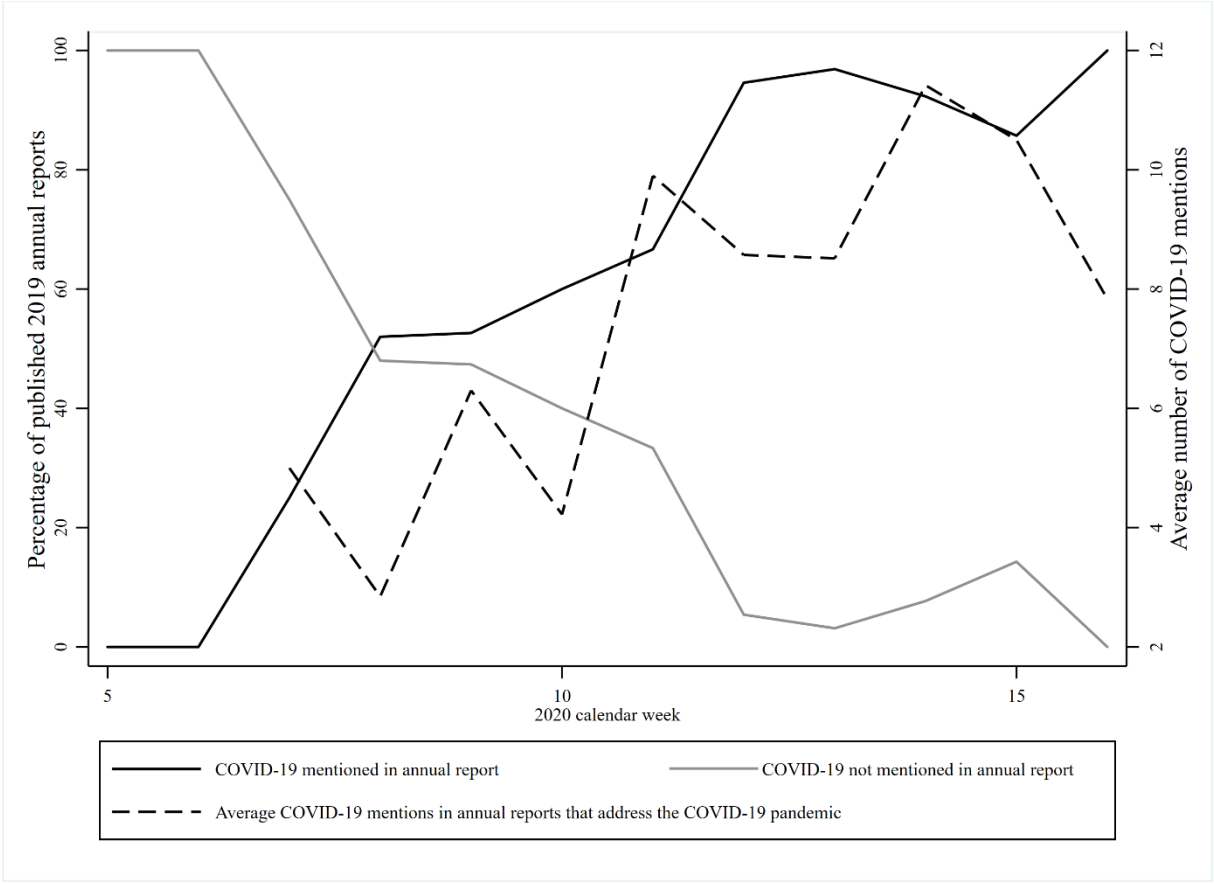
Figure 3: Saipem Annual Report 2019, excerpt


Outlook and events after the reporting period

COVID-19 pandemic

Saipem has launched its analysis, still in progress due to the ongoing evolution of the situation, of the possible effects of the COVID-19 pandemic ("Coronavirus"), in terms of: (i) evolution of the reference contexts and in particular monitoring the measures taken by the countries in which Saipem operates; (ii) management of relations with customers and partners; (iii) activation of specific contractual clauses; (iv) impact on project execution, particularly on operations at worksites and on naval vessels, due to changes in the availability of internal and external resources and/or other circumstances resulting, directly or indirectly, from the pandemic; (v) levels of performance and continuity of service by suppliers, subcontractors and partners.
Since the outbreak of the Coronavirus pandemic worldwide and in Italy in particular, Saipem has been working relentlessly to guarantee the health and safety of its employees, customers and suppliers, in compliance with the indications provided by the Italian Ministry of Health and the Regions involved.
Saipem promptly activated its Crisis Response Protocol, developing a specific Crisis Response Plan and immediately put in place a series of measures at all

Figure 4: COVID-19 in 2019 annual reports. This figure depicts 2020 calendar weeks on the X axis. The left Y axis depicts the percentages based on the total number of annual reports published in the corresponding 2020 calendar week. The right Y axis depicts the average number of times the coronavirus pandemic is mentioned in annual reports that address it. The black line denotes the percentage of firms reporting about COVID-19 in their annual report out of all the published annual reports in the corresponding calendar week. The grey line denotes the percentage of firms not reporting about COVID-19 in their annual report out of all the published annual reports in the corresponding calendar week. The dotted black line depicts the average number of times the coronavirus pandemic is mentioned in annual reports that are published in the corresponding 2020 calendar week and that address it.



Appendix: Variable definitions

Variable	Definition
COVID19	Number of times "corona" or "covid" has been mentioned in the 2019 annual report. If firm uses both terms, the more frequently used term is taken into account to adjust for the following scenario: "[…] the coronavirus (covid-19) epidemic has a […]"
D_COVID19	Indicator variable taking the value of 1 if the firm mentions the coronavirus pandemic in their 2019 annual report, 0 otherwise.
ΔRisk	Change in stock risk measured by the change in beta following the publication of the 2019 annual report using the extended market model described in Eq. (1).
ΔCAR	Change in stock performance measured as the change in cumulative abnormal returns following the publication of the 2019 annual report (15 days prior and 15 days after the publication date of the 2019 annual report used for calculation of CARs).
D_pandemic	Indicator variable taking the value of 1 if the firm addresses pandemics or epidemics as business risks in their 2017 or 2018 annual report, 0 otherwise.
LEV	Leverage calculated by the ratio of total debt to total assets for 2018.
OP	Operating efficiency, calculated by the ratio of total revenue to total assets for 2018.
ROA	Return on assets, calculated by the ratio of net income available to common to total assets for 2018.
GROWTH	Firm growth, calculated by the annual percentage change in earnings before interest and taxes.
DIV	Dividend payout, calculated by the ratio of annual dividend payment to net income available to common for 2018.
SIZE	Firm size, calculated by taking the natural logarithm of total assets for 2018.
Board_tenure	Average number of years each board member has been on the board based on directors on the board in 2018.
Board_affiliation	Average number of other corporate affiliations for the board members in 2018.
Board_size	The total number of board members at the end of 2018.
Board_skills	Percentage of fiscal year 2018 board members with either an industry-specific or strong financial background.
Board_diversity	Percentage of women on the board in 2018.
Board_independent	Percentage of independent board members as reported by the company in 2018.
Governance	Asset 4 Governance Score from Thompson Reuters Datastream for year 2018.
Industry	Indicator variable equaling 1 if the Fama French 48 industry is likely negatively affected by the COVID-19 pandemic, 0 otherwise.
International	International sales divided by total sales of firm in 2018.
Complexity	Number of business segments in 2018.
POST	Indicator variable equaling 1 if the firm published its 2019 annual report after the WHO declared COVID-19 outbreak as a pandemic (11 March 2020), 0 otherwise.
Inverse_Mills	Inverse Mills ratio calculated based on the probability model in Eq. (7).
D_state	Indicator variable taking the value of 1 if a national government agency or the state have any amount of ownership in the firm, 0 otherwise.
%_state	Percentage of ownership by a national government agency or the state.
D_state20	Indicator variable taking the value of 1 if at least 20 percent of the firm is owned by a national government agency or the state, 0 otherwise.
D_state50	Indicator variable taking the value of 1 if at least 50 percent of the firm is owned by a national government agency or the state, 0 otherwise.

Table 1: Sample distribution by country

Country	Index	Number of firms
Australia	S&P/ASX 20	20
Brazil	BOVESPA	30
China	SSE 50	50
France	CAC 40	40
Germany	DAX	30
Italy	FTSE MIB	40
Spain	IBEX 35	35
Switzerland	SPE 20	20
UK	FTSE 100	30
USA	Dow Jones IA	30

This table depicts the distribution of the initially selected firms in our sample by country. The second column presents the corresponding stock market index for each country in our sample. The last column lists the number of firms in each selected stock index.

Table 2: Sample selection

Selection criteria	Firm-year observations
Firms in leading stock market indices	325
- less firms that did not yet publish their 2019 annual reports	105
- less firms with 2019 annual report publication date before 30 January 2020	3
- less firms with 2019 annual report publication date after 20 April 2020	11
- less firms with no available data for control variables in 2018	3
= Final sample for the main tests of Hypothesis 1 and Hypothesis 2	203

This table presents the sample selection criteria. The complete sample for the test of the hypotheses contains 203 international firms. We use one observation per firm in our analysis as our main independent variable of interest is based on information from the 2019 annual reports.

Table 3: Descriptive statistics

Panel A: Annual reports summary statistics

Calendar week of publication	# reports	# reports with COVID-19	# reports without COVID-19	average COVID-19 word-count
5 (27 Jan – 2 Feb)	2	0	2	0
6 (3 Feb – 9 Feb)	5	0	5	0
7 (10 Feb – 16 Feb)	8	2	6	5
8 (17 Feb – 23 Feb)	25	13	12	2.846
9 (24 Feb – 1 Mar)	38	20	18	6.3
10 (2 Mar – 8 Mar)	15	9	6	4.222
11 (9 Mar – 15 Mar)	15	10	5	9.9
12 (16 Mar – 22 Mar)	37	35	2	8.571
13 (23 Mar – 29 Mar)	32	31	1	8.516
14 (30 Mar – 5 April)	13	12	1	11.417
15 (6 April – 12 April)	7	6	1	10.5
16 (13 April – 19 April)	6	6	0	7.833

Panel B: Variable summary statistics

Variables	N	Mean	SD	P25	Median	P75
COVID19	203	5.527	7.280	0.000	3.000	8.000
D_COVID19	203	0.709	0.455	0.000	1.000	1.000
ΔRisk	203	-0.042	0.369	-0.260	-0.060	0.173
ΔCAR	203	4.289	25.435	-14.102	-1.371	17.743
D_pandemic	203	0.345	0.476	0.000	0.000	1.000
LEV	203	0.259	0.155	0.146	0.248	0.370
OP	203	0.494	0.370	0.169	0.489	0.709
ROA	203	0.049	0.048	0.011	0.035	0.072
GROWTH	203	0.197	1.069	-0.079	0.047	0.203
DIV	203	0.542	0.679	0.131	0.424	0.718
SIZE	203	18.010	1.730	16.686	18.032	19.087

Panel C: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) COVID19	1.000										
(2) D_COVID19	0.486*	1.000									
(3) ΔRisk	-0.033	-0.158*	1.000								
(4) ΔCAR	0.234*	0.261*	0.075	1.000							
(5) D_pandemic	0.092	0.076	0.101	-0.020	1.000						
(6) LEV	-0.094	-0.132	0.006	-0.179*	-0.076	1.000					
(7) OP	-0.032	0.113	-0.083	-0.070	-0.022	-0.046	1.000				
(8) ROA	-0.109	0.047	-0.075	-0.147*	0.092	-0.028	0.505*	1.000			
(9) GROWTH	-0.062	0.093	-0.016	0.006	0.033	-0.138*	-0.012	0.032	1.000		
(10) DIV	0.074	-0.068	0.063	0.104	0.088	-0.085	-0.018	-0.109	-0.071	1.000	
(11) SIZE	0.116	0.090	0.025	0.192*	0.188*	-0.187*	-0.450*	-0.529*	0.042	0.022	1.000

Panel A presents the distribution of 2019 annual report publication dates by 2020 calendar weeks. Panel B presents summary statistics for the variables used in the main tests of our two hypotheses. Panel C presents pairwise correlations. * indicates significance at the 5% level. Detailed definitions of all variables are provided in the Appendix.

Table 4: Test of Hypothesis 1

Panel A: Two sample t-test with unequal variances (Welch)				
	D_COVID19 = 0 (59)	D_COVID19 = 1 (144)	Difference (t-stat)	
ΔRisk	0.0490	-0.0787	0.1277**	(2.11)
Panel B: Regression results				
Variables	(1) *ΔRisk*	(2) *ΔRisk*	(3) *ΔRisk*	(4) *ΔRisk*
COVID19	-0.0225***	-0.0243***		
	(0.006)	(0.007)		
D_COVID19			-0.223***	-0.246***
			(0.083)	(0.085)
POST	-0.112	-0.0877	-0.214	-0.183
	(0.068)	(0.069)	(0.132)	(0.133)
COVID19 × POST	0.0259***	0.0267***		
	(0.007)	(0.008)		
D_COVID19 × POST			0.313**	0.316**
			(0.144)	(0.143)
D_pandemic		0.103*		0.113**
		(0.055)		(0.057)
LEV	-0.0413	-0.0248	-0.00316	0.0171
	(0.207)	(0.205)	(0.208)	(0.206)
OP	-0.0640	-0.0606	-0.0537	-0.0468
	(0.079)	(0.078)	(0.077)	(0.076)
ROA	-0.419	-0.648	-0.192	-0.413
	(0.835)	(0.822)	(0.839)	(0.829)
GROWTH	-0.00293	-0.00380	0.00202	0.00237
	(0.023)	(0.022)	(0.021)	(0.019)
DIV	0.0354	0.0286	0.0379	0.0286
	(0.031)	(0.030)	(0.032)	(0.031)
SIZE	-0.00269	-0.0105	0.00139	-0.00671
	(0.022)	(0.022)	(0.022)	(0.022)
Constant	0.120	0.228	0.0698	0.183
	(0.470)	(0.464)	(0.465)	(0.462)
Observations	203	203	203	203
R-squared	0.049	0.064	0.057	0.075

Panel A reports the results of the Welch's t-test, showing the differences in means of our dependent variable, *ΔRisk,* between the group of firms that report on COVID-19 in their 2019 annual reports and those that do not. Panel B presents the regression results for the main test of Hypothesis 1. Columns 1 and 2 present results based on the model in Eq. (2), with Column 1 reporting the results of the model without *D_pandemic*. Columns 3 and 4 present results of the model in Eq. (2) when using *D_COVID19* as independent variable. Column 3 reports the results of the model without *D_pandemic.* Detailed definitions of all variables are provided in the Appendix. Robust standard errors are reported in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Test of Hypothesis 2

Panel A: Two sample t-test with unequal variances (Welch)				
	D_COVID19 = 0 (59)	D_COVID19 = 1 (144)	Difference (t-stat)	
ΔCAR	-6.0716	8.5336	-14.6052***	(-4.39)

Panel B: Change in Cumulative Abnormal Returns (CAR)				
Variables	(1) *ΔCAR*	(2) *ΔCAR*	(3) *ΔCAR*	(4) *ΔCAR*
COVID19	0.686**	0.708**		
	(0.273)	(0.278)		
D_COVID19			14.08***	14.26***
			(3.415)	(3.400)
D_pandemic		-4.114		-3.816
		(3.889)		(3.812)
LEV	-22.07**	-21.92*	-21.18*	-21.08*
	(11.18)	(11.29)	(11.25)	(11.36)
OP	1.266	1.164	-1.005	-1.119
	(6.386)	(6.387)	(6.335)	(6.341)
ROA	-37.94	-25.84	-52.30	-41.41
	(38.15)	(40.24)	(37.82)	(39.37)
GROWTH	0.0478	0.0916	-0.697	-0.671
	(2.280)	(2.377)	(2.263)	(2.353)
DIV	2.557	2.872	3.565	3.876
	(2.985)	(2.973)	(2.972)	(2.968)
SIZE	1.665	2.032	1.263	1.603
	(1.202)	(1.277)	(1.191)	(1.257)
Constant	-23.94	-30.02	-21.72	-27.32
	(24.16)	(25.47)	(23.95)	(25.10)
Observations	203	203	203	203
R-squared	0.108	0.113	0.131	0.135

Panel A reports the results of the Welch's t-test, showing the differences in means of our dependent variable, *ΔCAR,* between the group of firms that report on COVID-19 in their 2019 annual reports and those that do not. Panel B presents the regression results for the main test of Hypothesis 1. Columns 1 and 2 present results based on the model in Eq. (6), with Column 1 reporting the results of the model without *D_pandemic*. Columns 3 and 4 present results based on slightly modified versions of the model in Eq. (6), with D_*COVID19* as alternative independent variable. Column 3 reports the results of the model without *D_pandemic.* Detailed definitions of all variables are provided in the Appendix. Robust standard errors are reported in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Heckman correction for non-random selection

Panel A: Two sample t-test with unequal variances (Welch)				
	D_COVID19 = 0 (56)	D_COVID19 = 1 (123)	Differences (t-stat)	
Board_tenure	6.9702	6.2090	0.7612*	(1.70)
Board_affiliation	1.2032	1.3429	-0.1397	(-1.20)
Board_size	12.625	13.0163	-0.3913	(-0.77)
Board_skills	40.3793	37.8567	2.5226	(0.84)
Board_diversity	26.6311	29.3691	-2.7380	(-1.57)
Board_independent	62.9993	62.9372	0.0620	(0.01)
Governance	67.3861	69.3183	-1.9322	(-0.64)
D_pandemic	0.3036	0.3740	-0.0704	(-0.93)
Industry	0.2857	0.5285	-0.2427***	(-3.20)
International	0.4787	0.5434	-0.0647	(-1.17)
Complexity	1.4427	1.4003	0.0424	(0.52)
LEV	0.2892	0.2372	0.0520**	(2.10)
OP	0.4302	0.5353	-0.1051*	(-1.85)
ROA	0.0447	0.0472	-0.0025	(-0.36)
GROWTH	0.0224	0.2882	-0.2659**	(-1.99)
DIV	0.6176	0.5313	0.0863	(0.73)
SIZE	17.7889	18.2217	-0.4329	(-1.56)

Panel B: Results of the first-stage estimation	
Variables	(1) *D_COVID19*
Board_tenure	-0.103**
	(0.047)
Board_affiliation	0.148
	(0.164)
Board_size	-0.0154
	(0.039)
Board_skills	-0.00771
	(0.007)
Board_diversity	0.0199**
	(0.010)
Board_independent	-0.00558
	(0.005)
Governance	-0.00563
	(0.008)
D_pandemic	0.298
	(0.259)
Industry	0.688**
	(0.293)
International	0.284
	(0.380)
Complexity	-0.489*
	(0.256)
LEV	-0.553
	(0.744)
OP	0.730*
	(0.391)
ROA	0.0275
	(3.158)
GROWTH	0.186**
	(0.081)
DIV	-0.147
	(0.179)
SIZE	0.287**
	(0.112)
Constant	-3.491*
	(2.013)

(Table 6 continued)

Observations			179	
Pseudo R2			0.177	
Panel C: Results of the second-stage estimation				
Variables	(1) *ΔRisk*	(2) *ΔRisk*	(3) *ΔCAR*	(4) *ΔCAR*
COVID19	-0.0271***		0.638**	
	(0.008)		(0.293)	
D_COVID19		-0.282***		11.89***
		(0.082)		(3.755)
POST	-0.0814	-0.150		
	(0.076)	(0.136)		
COVID19 × POST	0.0295***			
	(0.008)			
D_COVID19 × POST		0.316**		
		(0.146)		
D_pandemic	0.105*	0.110*	-1.946	-1.459
	(0.056)	(0.058)	(4.066)	(4.028)
LEV	-0.101	-0.0738	-16.56	-14.93
	(0.214)	(0.214)	(12.35)	(12.84)
OP	-0.0177	0.00324	-1.847	-3.527
	(0.091)	(0.087)	(7.061)	(6.941)
ROA	-1.204	-0.895	-58.32	-70.00
	(0.877)	(0.878)	(45.16)	(44.93)
GROWTH	-0.000680	0.00697	-0.853	-1.447
	(0.023)	(0.021)	(2.010)	(2.000)
DIV	0.0185	0.0135	6.279**	6.691**
	(0.032)	(0.033)	(2.942)	(3.032)
SIZE	-0.00753	-0.00364	1.702	1.445
	(0.024)	(0.024)	(1.224)	(1.226)
Inverse_Mills	-2.36e-05	-2.15e-05	0.0109**	0.0102*
	(0.000)	(0.000)	(0.005)	(0.005)
Constant	0.283	0.237	-64.95**	-61.68**
	(0.492)	(0.490)	(28.97)	(28.91)
Observations	179	179	179	179
R-squared	0.083	0.098	0.179	0.189

Panel A reports the results of the Welch's t-test, showing the differences in means of firms' characteristics that are likely to influence the choice of reporting about COVID-19 in 2019 annual reports between the group of firms that report on COVID-19 in their 2019 annual reports and those that do not. Panel B presents the results of the first-stage Probit estimation for the Heckman (1979) approach. Panel C presents the results for the corresponding second-stage estimation. Column 1 presents the results for the test of our first hypothesis based on the model in Eq. (2). Column 2 presents the results for the test of our first hypothesis based on the model in Eq. (2), with *D_COVID19* as alternative independent variable. Column 3 presents the results for the test of our first hypothesis based on the model in Eq. (6). Column 4 presents the results for the test of our first hypothesis based on the model in Eq. (6), with *D_COVID19* as alternative independent variable. All models are extended by including the Inverse Mills Ratio variable calculated based on the estimation in the first stage of the Heckman approach. Detailed definitions of all variables are provided in the Appendix. Robust standard errors are reported in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 7: The role of state ownership

Panel A: Summary statistics for state ownership variables						
Variables	N	Mean	SD	P25	Median	P75
D_state	175	0.114	0.319	0	0	0
%_state	175	0.037	0.120	0	0	0
D_state20	175	0.074	0.263	0	0	0
D_state50	175	0.034	0.182	0	0	0

Panel B: Regression results based on model in Eq. (8)				
Variables	(1) *D_state*	(2) *%_state*	(3) *D_state20*	(4) *D_state50*
State	0.249***	0.634**	0.251***	0.148**
	(0.090)	(0.318)	(0.096)	(0.059)
POST	-0.0331	-0.0222	-0.0163	-0.0249
	(0.084)	(0.084)	(0.083)	(0.081)
COVID19	-0.0217***	-0.0223***	-0.0224***	-0.0229***
	(0.008)	(0.008)	(0.008)	(0.007)
State × COVID19	-0.492**	-1.136**	-0.507**	-0.407*
	(0.242)	(0.475)	(0.246)	(0.236)
State × POST	-0.462**	-1.212**	-0.472**	-0.163
	(0.190)	(0.542)	(0.194)	(0.142)
COVID19 × POST	0.0207**	0.0219**	0.0226***	0.0231***
	(0.008)	(0.009)	(0.009)	(0.009)
State × COVID19 × POST	0.527**	1.208**	0.517**	0.297
	(0.241)	(0.480)	(0.246)	(0.244)
Controls	YES	YES	YES	YES
Constant	0.432	0.437	0.443	0.366
	(0.540)	(0.538)	(0.538)	(0.536)
Observations	175	175	175	175
R-squared	0.103	0.089	0.086	0.093

This table presents results for the additional tests of Hypothesis 2 when taking firms' state ownership into account. All columns present results based on the model in Eq. (8). The dependent variable in all models is *ΔRisk.* The state ownership variable in columns 1, 2, 3 and 4 is *D_state, %_state, D_state20 and D_state50*, respectively. The sample for this part of the analysis consists of all firms outside of China. Detailed definitions of all variables are provided in the Appendix. Robust standard errors are reported in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% levels, respectively.

Table 8: Changes in 2020 earnings guidance (withdrawal or update)

Variables	(1) *ΔCAR*	(2) *ΔCAR*	(3) *ΔRisk*	(4) *ΔRisk*
COVID19	0.707***		-0.0241***	
	(0.266)		(0.007)	
D_COVID19		15.04***		-0.260***
		(3.471)		(0.085)
POST			-0.0790	-0.181
			(0.069)	(0.133)
COVID19 × POST			0.0247***	
			(0.008)	
D_COVID19 × POST				0.313**
				(0.143)
D_pandemic	-2.737	-2.519	0.0915	0.101*
	(4.131)	(4.058)	(0.0571)	(0.059)
LEV	-31.03***	-29.81**	-0.0366	0.00499
	(11.57)	(11.59)	(0.210)	(0.211)
OP	-1.730	-3.972	-0.0881	-0.0719
	(6.331)	(6.291)	(0.080)	(0.077)
ROA	-23.92	-40.85	-0.552	-0.293
	(42.25)	(41.91)	(0.844)	(0.852)
GROWTH	-0.0661	-0.868	0.000162	0.00747
	(2.576)	(2.549)	(0.023)	(0.021)
DIV	1.953	3.054	0.0276	0.0265
	(3.070)	(3.012)	(0.032)	(0.033)
SIZE	1.407	0.956	-0.0103	-0.00597
	(1.346)	(1.311)	(0.022)	(0.022)
Constant	-15.62	-13.08	0.228	0.177
	(26.52)	(25.86)	(0.475)	(0.474)
Observations	199	199	199	199
R-squared	0.116	0.144	0.061	0.079

This table presents results of our main tests for Hypotheses 1 and 2 when accounting for firms withdrawing or adjusting their 2020 earnings guidance. Thus, when calculating our dependent variables we adjust our event windows to exclude the announcement of changes in earnings guidance. For *ΔCAR*, if the announcement of changes in earnings guidance takes place in either the 15 day pre- or post-annual report publication event windows, we shorten both windows by the same number of days. For *ΔRisk,* if the announcement of changes in earnings guidance takes place after the annual report publishing date, we shorten the 15-day window post publication. If the announcement of changes in earnings guidance takes place before the annual report publication date, we exclude the period between earnings guidance change and 2019 annual report publication date from our calculation. Column 1 presents the results for the test of our first hypothesis based on the model in Eq. (2). Column 2 presents the results for the test of our first hypothesis based on the model in Eq. (2), with *D_COVID19* as alternative independent variable. Column 3 presents the results for the test of our first hypothesis based on the model in Eq. (6). Column 4 presents the results for the test of our first hypothesis based on the model in Eq. (6), with *D_COVID19* as alternative independent variable. Detailed definitions of all variables are provided in the Appendix. Robust standard errors are reported in parentheses. ∗, ∗∗, and ∗∗∗ indicate significance at the 10%, 5%, and 1% levels, respectively.

Part VIII: List, Short Summary, and Current Status of Papers (§6 (2, 7) PromO)

Does Reporting Flexibility under IFRS Impact Analysts' Forecasts? *Joseph Comprix, Kerstin Lopatta, and Laura-Maria Gastone*

Abstract in English: We examine the impact of reporting flexibility under IFRS on the presentation of income statements following IFRS adoption and whether this affects analysts' forecasts. We use mandatory IFRS adoption in Canada as an exogenous shock to financial reporting flexibility and EU firms using IFRS as a control group. We capture the consequences of reporting flexibility under IFRS by analyzing the changes in the number of unique line items reported based on 'as reported' income statements. We find that 45.3 percent (44.3 percent) of first-time IFRS adopters exhibit an average marginal increase (decrease) of 2.762 (-1.369) items in the number of unique items reported. These changes lead to a decrease in analysts' absolute forecast errors, both for firms with increases and decreases. Additional analysis reveals that our main findings are driven by changes in the number of unique recurring (and not transitory) items presented due to reporting flexibility under IFRS.

Abstract in German: Wir untersuchen die Auswirkungen der Flexibilität der Berichterstattung nach IFRS auf die Darstellung der Gewinn- und Verlustrechnung nach der Anwendung der IFRS und ob dies die Prognosen der Analysten beeinflusst. Wir verwenden die obligatorische IFRS-Übernahme in Kanada als exogenen Schock für die Flexibilität der Finanzberichterstattung und EU-Unternehmen, die IFRS verwenden, als Kontrollgruppe. Wir erfassen die Konsequenzen der Flexibilität der Berichterstattung nach IFRS, indem wir die Änderungen der Anzahl der ausgewiesenen Einzelposten auf der Grundlage der Gewinn- und Verlustrechnung analysieren. Wir stellen fest, dass 45,3 Prozent (44,3 Prozent) der erstmaligen IFRS-Anwender einen durchschnittlichen Anstieg (Rückgang) von 2,762 (-1,369) Posten bei der Anzahl der berichteten Einzelposten aufweisen. Diese Änderungen führen zu einer Verringerung der absoluten Prognosefehler der Analysten, sowohl für Unternehmen mit Zu- als auch Abnahmen. Zusätzliche Analysen zeigen, dass unsere Ergebnisse auf Änderungen in der Anzahl der wiederkehrenden (und nicht vorübergehenden) Posten zurückzuführen sind, die aufgrund der Flexibilität der Berichterstattung nach IFRS dargestellt werden.

Current status: Working paper

Reporting of Operating Income Subtotals in IFRS and Debt Financing *Joseph Comprix, Kerstin Lopatta, and Laura-Maria Gastone*

Abstract in English: This study investigates how EU firms reporting under IFRS define the operating income subtotals (OIS) they disclose in their income statements and how a high reliance on debt financing acts as an incentive for the strategic choice of a tailored definition of OIS. We find that 76.7 percent of the firms in our sample use a tailored definition for their reported OIS. We find firms with high reliance on debt financing are 7.9 percent more likely to report a tailored version of OIS in terms of items included and strategically include recurring items, which on average increase the values of reported OIS. Included uncommon recurring items are on average 4.7 percentage points more income increasing for firms with high reliance on debt financing as compared to those without. Furthermore, we document that the announcement of upcoming ECB guidance on leveraged lending based on assessments of total debt-to-EBITDA ratios further amplifies the incentives of firms highly relying on debt financing and having abnormally high levels of leverage to strategically include higher recurring gains in their reported OIS.

Abstract in German: In dieser Studie wird untersucht, wie EU-Unternehmen, die nach IFRS Bericht erstatten, die in ihren Gewinn- und Verlustrechnungen angegebenen Zwischensummen für Betriebserträge (OIS) definieren und wie eine hohe Abhängigkeit von Fremdfinanzierungen als Anreiz für die strategische Wahl einer maßgeschneiderten Definition von OIS fungiert. Wir stellen fest, dass 76,7 Prozent der Unternehmen in unserer Stichprobe eine maßgeschneiderte Definition für ihre gemeldeten OIS verwenden. Wir stellen fest, dass Unternehmen mit einer hohen Abhängigkeit von Fremdfinanzierungen mit einer um 7,9 Prozent höheren Wahrscheinlichkeit eine maßgeschneiderte Version von OIS in Bezug auf enthaltene Elemente und strategisch wiederkehrende Elemente melden, was im Durchschnitt die Werte der gemeldeten OIS erhöht. In OIS enthaltene, ungewöhnliche wiederkehrende Posten erhöhen das berichtete Einkommen für Unternehmen mit hoher Abhängigkeit von Fremdfinanzierung um durchschnittlich 4,7 Prozentpunkte im Vergleich zu Unternehmen ohne. Darüber hinaus dokumentieren wir, dass die Ankündigung der bevorstehenden Leitlinien der EZB zu *Leveraged Lending* (auf der Grundlage von Einschätzungen des Verhältnisses von Gesamtverschuldung zu EBITDA) die Anreize für Unternehmen, die in hohem Maße auf Fremdfinanzierung angewiesen sind und einen ungewöhnlich hohen Verschuldungsgrad haben, um strategisch höhere wiederkehrende Gewinne in deren OIS einzubeziehen, weiter verstärkt.

Current status: Working paper

Do You Need Accounting Experts? How Firms Prepare for IFRS Adoption and Its Consequences on Accounting Quality *Laura-Maria Gastone*

Abstract in English: This paper takes a distinctive approach by examining how firms' decisions to change individual-level characteristics of board members, such as their level of accounting expertise, play a significant role in explaining accounting quality outcomes following IFRS adoption. I claim and find evidence that the quality of provided accounting information following IFRS adoption is influenced by firms' decisions to increase their level of accounting expertise on the board of directors in preparation for the switch to IFRS. I use mandatory IFRS adoption in Canada as an exogenous shock to financial reporting practices and, as control groups, EU firms using IFRS as well as US firms following US GAAP in a difference-in-differences analysis. I capture the impact on accounting quality by analyzing discretionary accruals use, income smoothing, and accounting conservatism in the form of timelines of loss recognition. I find that firms that increase accounting expertise on the board of directors one year prior to mandatory IFRS adoption are more likely to report income-increasing discretionary accruals, have higher income smoothing, and exhibit less accounting conservatism. Considering recent findings, this could be the result of firms doing a better job on accurately implementing the new standards, thus including more accurate forward-looking information in presented accounting figures and following standard-setters' recommendations to reduce accounting conservatism. Conversely, considering the traditional view, this could represent firms being better able to use the flexibility inherent in IFRS to provide a more favorable picture of their financial situation through earnings management.

Abstract in German: In dieser Studie wird untersucht, wie die Entscheidungen von Unternehmen, die Merkmale der Vorstandsmitglieder auf individueller Ebene zu ändern, eine wichtige Rolle bei der Erklärung der Ergebnisse der Rechnungslegungsqualität nach der Übernahme der IFRS spielen. Ich behaupte und finde Beweise dafür, dass die Rechnungslegungsqualität nach der Übernahme der IFRS von den Entscheidungen der Unternehmen beeinflusst wird, ihre Buchhaltungskompetenz im Verwaltungsrat zu erhöhen, um die Umstellung auf IFRS vorzubereiten. In einer Differenz-in-Differenz-Analyse verwende ich die obligatorische IFRS-Übernahme in Kanada als exogenen Schock für die Rechnungslegungspraktiken und EU-Unternehmen, die IFRS anwenden, sowie US-Unternehmen, die US-GAAP anwenden, als Kontrollgruppen. Ich messe die Rechnungslegungsqualität, indem ich die Verwendung diskretionärer Rückstellungen, die Glättung der Einnahmen und den konservativen Ansatz der Rechnungslegung analysiere. Ich finde heraus, dass Unternehmen, die ein Jahr vor der obligatorischen Anwendung der IFRS die Buchhaltungskompetenz im Verwaltungsrat erhöhen, mit größerer Wahrscheinlichkeit einkommenssteigernde Ermessensabgrenzungen melden, eine höhere Einkommensglättung aufweisen und weniger konservativ im Rechnungswesen sind. Einerseits könnte dies darauf zurückzuführen sein, dass Unternehmen die neuen Standards besser umsetzen und so genauere zukunftsgerichtete Informationen in die vorgelegten Rechnungslegungszahlen aufnehmen und den Empfehlungen der Standardsetzer folgen, um den konservativen Ansatz der Rechnungslegung zu verringern; andererseits könnte dies nach traditioneller Auffassung bedeuten, dass Unternehmen die den IFRS innewohnende Flexibilität besser nutzen können, um durch das Ergebnismanagement ein günstigeres Bild ihrer finanziellen Situation zu erhalten.

Current status: Working paper

Managerial Style in Cost Asymmetry and Shareholder Value *Kerstin Lopatta, Thomas Kaspereit, and Laura-Maria Gastone*

Abstract in English: We show that CEOs' contribution to SG&A cost asymmetry is associated with lower shareholder value. CEO-related excess SG&A cost stickiness of CEOs with compensation less tied to shareholder value creation and high power drive this association. Last, we provide first evidence that cost asymmetry incorporates a harmful element to the firm and shareholders, namely CEO-related excess SG&A cost asymmetry.

Abstract in German: Wir zeigen, dass der Beitrag der CEOs zu der Asymmetrie in Vertriebs-, allgemeine und Verwaltungskosten mit einem geringeren Unternehmenswert verbunden ist. CEO-bedingte Überschussasymmetrie in Vertriebs-, allgemeine und Verwaltungskosten von CEOs mit einer Vergütung, die weniger an die Wertschöpfung der Aktionäre gebunden ist, und von CEOs mit viel Autorität im Unternehmen treibt diese Assoziation an. Zuletzt liefern wir erste Beweise dafür, dass die mit dem CEO verbundene übermäßige Kostenasymmetrie ein schädliches Element der Kostenasymmetrie für das Unternehmen und die Aktionäre darstellt.

Current status: Published in Managerial and Decision Economics

Sustainability Assurance and Cost Asymmetry *Laura-Maria Gastone, Kerstin Lopatta, Anna Rudolf, and Sebastian Tideman*

Abstract in English: This paper investigates whether sustainability assurance (SA) affects a firm's cost structure. We argue SA should improve internal information systems and processes allowing managers to make better cost decisions. Specifically, we analyze the effect of sustainability assurance on deliberate management decisions regarding cost adjustments and the resulting effects on shareholder value using a sample consisting of firms from 42 countries. We find that SA leads to faster cost adjustments in the event of a sales decline and provide evidence that the SA-related part of cost asymmetry is associated with an increase in shareholder value. One increase in the standard deviation of SA-related SG&A cost asymmetry is associated with a 1.759 percent increase in Tobin's q relative to the sample means of Tobin's q. Our results are robust to controlling for endogeneity by employing the Heckman (1979) correction technique and using a 2SLS IV estimation.

Abstract in German: In dieser Studie wird untersucht, ob die Nachhaltigkeitssicherung (*sustainability assurance*) die Kostenstruktur eines Unternehmens beeinflusst. Wir nehmen an, dass *sustainability assurance* interne Informationssysteme und -prozesse verbessern sollte und somit Manager bessere Kostenentscheidungen treffen können. Insbesondere analysieren wir anhand einer Stichprobe von Unternehmen aus 42 Ländern die Auswirkungen der Nachhaltigkeitssicherung auf bewusste Managemententscheidungen in Bezug auf Kostenanpassungen und die daraus resultierenden Auswirkungen auf den Unternehmenswert. Wir stellen fest, dass die Auswirkung der Nachhaltigkeitssicherung auf Kostenanpassungen im Durchschnitt zu schnelleren Kostenanpassungen im Falle eines Umsatzrückgangs führt. Wir liefern Belege dafür, dass der durch Nachhaltigkeitssicherung bedingte Teil der Kostenasymmetrie mit einer Steigerung des Unternehmenswertes verbunden ist. Ein Anstieg der Standardabweichung der Nachhaltigkeitssicherung-bezogenen Kostenasymmetrie ist mit einem Anstieg des Tobin's Q um 1,759 Prozent im Vergleich zum Stichprobenmittel des Tobin's Q verbunden. Unsere Ergebnisse sind robust gegenüber der Kontrolle auf Endogenität unter Verwendung der Heckman-Korrekturtechnik (1979) und unter Verwendung einer 2SLS IV-Schätzung.

Current status: Working paper

To Report or Not to Report about Coronavirus? The Role of Periodic Reporting in Explaining Capital Market Reactions during the COVID-19 Pandemic *Kerstin Lopatta, Laura-Maria Gastone, Thomas Tammen and Kenji Alexander*

Abstract in English: We use a hand-collected sample of roughly 300 international firms included in leading stock-market indices in ten countries to investigate how firms' reporting practices during the coronavirus (COVID-19) pandemic impact stock market reactions in term of stock performance and risk. For this, we claim that it is important to analyze whether firms are capable of early risk-detection and of adapting their reporting practices accordingly by examining whether firms promptly and appropriately incorporate critical current global developments, such as the coronavirus pandemic, in their reporting process. We hand-collect firms' 2019 annual reports and analyze if and how extensively they include assessments of the coronavirus pandemic and its potential impact on their business activities by employing textual analysis. Next, we examine if and how this is incorporated in capital market reactions in terms of stock risk and stock performance. Our results highlight two main findings. First, by using the capital market model, we find that firms' reporting on COVID-19 in early released annual reports leads to decreases in beta values. Thus, firms' increased ability to detect risks early and report on the impact of COVID-19 leads to better stock risk assessments by capital markets, an effect that is amplified by state ownership. Second, we show that firms reporting about the coronavirus pandemic in their annual report exhibit a significant improvement in their abnormal returns compared to those that do not. Our findings indicate that investors value firms' transparency and their ability to promptly incorporate critical global developments in their reporting process. Thus, we show that firms' reporting practices play an important role in better understanding the current capital markets' reactions to the ongoing coronavirus pandemic.

Abstract in German: Wir verwenden eine von Hand gesammelte Stichprobe von rund 300 internationalen Unternehmen, die in zehn Ländern in führenden Börsenindizes enthalten sind, um zu untersuchen, wie sich die Berichtspraktiken von Unternehmen während der Coronavirus (COVID-19)-Pandemie auf die Börsenreaktionen in Bezug auf Aktienperformance und Risiko auswirken. Wir behaupten, dass es wichtig ist zu analysieren, ob Unternehmen in der Lage sind, Risiken frühzeitig zu erkennen und ihre Berichtspraktiken entsprechend anzupassen, indem geprüft wird, ob Unternehmen kritische aktuelle globale Entwicklungen wie die Coronavirus-Pandemie unverzüglich und angemessen in ihren Berichtsprozess einbeziehen. Wir sammeln Jahresberichte aus dem Jahr 2019 der Unternehmen von Hand und analysieren anhand von Textanalysen, ob und wie umfassend sie Bewertungen der Coronavirus-Pandemie und ihrer möglichen Auswirkungen auf ihre Geschäftstätigkeit enthalten. Als nächstes untersuchen wir, ob und wie dies in Bezug auf das Aktienrisiko und die Aktienperformance in die Kapitalmarktreaktionen einbezogen wird. Unsere Ergebnisse heben zwei Haupterkenntnisse hervor. Erstens stellen wir anhand des Kapitalmarktmodells fest, dass die Berichterstattung von Unternehmen über COVID-19 in früh veröffentlichten Jahresberichten zu einem Rückgang der *beta*-Werte führt. Die verbesserte Fähigkeit der Unternehmen, Risiken frühzeitig zu erkennen und über die Auswirkungen von COVID-19 zu berichten, führt daher zu einer besseren Bewertung des Aktienrisikos durch die Kapitalmärkte. Dieser Effekt ist in Unternehmen mit staatlichen Eigentümer verstärkt. Zweitens zeigen wir, dass Unternehmen, die in ihrem Jahresbericht über die Coronavirus-Pandemie berichten, eine signifikante Verbesserung ihrer abnormalen Renditen im Vergleich zu Unternehmen aufweisen, die dies nicht tun. Unsere Ergebnisse zeigen, dass Anleger die Transparenz von Unternehmen und ihre

Fähigkeit schätzen, kritische globale Entwicklungen umgehend in ihren Berichtsprozess einzubeziehen. Wir zeigen daher, dass die Berichtspraktiken der Unternehmen eine wichtige Rolle spielen, um die aktuellen Reaktionen der Kapitalmärkte auf die anhaltende Coronavirus-Pandemie besser zu verstehen.

Current status: Working paper

Part IX: Statement of Personal Contribution (§6 (3) PromO)

This table displays my personal contribution to the articles contained in this dissertation. The categories used are based on PromO, the extent to which I contributed is outlined based on the following scale:

- My own contribution is 67-100%: A
- My own contribution is 31-66%: B
- My own contribution is 5-30%: C

Paper I

Does Reporting Flexibility under IFRS Impact Analysts' Forecasts? *(Joseph Comprix, Kerstin Lopatta, and Laura-Maria Gastone)*	
Theory and Design	B
Empirical Execution	A
Preparation of Manuscript	B

Paper II

Reporting of Operating Income Subtotals in IFRS and Debt Financing *(Joseph Comprix, Kerstin Lopatta, and Laura-Maria Gastone)*	
Theory and Design	B
Empirical Execution	A
Preparation of Manuscript	B

Paper III

Do You Need Accounting Experts? How Firms Prepare for IFRS Adoption and Its Consequences on Accounting Quality *(Laura-Maria Gastone)*	
Theory and Design	A
Empirical Execution	A
Preparation of Manuscript	A

Paper IV

Managerial Style in Cost Asymmetry and Shareholder Value *(Kerstin Lopatta, Thomas Kaspereit, and Laura-Maria Gastone)*	
Theory and Design	C
Empirical Execution	A
Preparation of Manuscript	B

Paper V

Sustainability Assurance and Cost Asymmetry *(Laura-Maria Gastone, Kerstin Lopatta, Anna Rudolf, and Sebastian Tideman)*	
Theory and Design	A
Empirical Execution	C
Preparation of Manuscript	B

Paper VI

To Report or Not to Report about Coronavirus? The Role of Periodic Reporting in Explaining Capital Market Reactions during the COVID-19 Pandemic *(Kerstin Lopatta, Laura-Maria Gastone, Thomas Tammen, and Kenji Alexander)*	
Theory and Design	B
Empirical Execution	C
Preparation of Manuscript	A

Part X: Statutory Declaration (§6 (6) PromO)

Erklärung

Hiermit erkläre ich, Laura-Maria Gastone, dass ich keine kommerzielle Promotionsberatung in Anspruch genommen habe. Die Arbeit wurde nicht schon einmal in einem früheren Promotionsverfahren angenommen oder als ungenügend beurteilt.

Hamburg, 30. Juli 2020 Laura-Maria Gastone

Eidesstattliche Versicherung

Ich, Laura-Maria Gastone, versichere an Eides statt, dass ich die Dissertation mit dem Titel: „Financial Reporting and Managerial Decisions: An International Analysis of Current Topics" selbstständig und bei einer Zusammenarbeit mit anderen Wissenschaftlerinnen oder Wissenschaftlern gemäß den beigefügten Darlegungen nach § 6 (3) der Promotionsordnung der Fakultät für Wirtschafts- und Sozialwissenschaften vom 18. Januar 2017 verfasst habe. Andere als die angegebenen Hilfsmittel habe ich nicht benutzt.

Hamburg, 30. Juli 2020 Laura-Maria Gastone

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Unterschrift Verwaltung