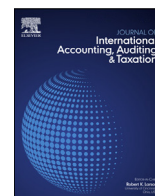


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## Exploring the relationship between valuation and stewardship uses of accounting information: Empirical evidence from German listed firms



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### ABSTRACT

While there is scarce empirical research on the relationship between valuation and stewardship uses of accounting information, existing studies on the basis of US data show a positive relationship. Motivated by recent analytical literature which suggests a context-specific relationship, our study analyzes the relationship between valuation and stewardship uses in a non-US-setting, using data from German listed firms from 2006 to 2015. In line with prior US studies, we find a positive relationship for Chief Executive Officer (CEO) compensation in univariate analyses. However, the relationship does not remain positive when considering firms' extent of free float in multivariate analyses, which suggests that firms' governance structures affect the relationship. For non-CEO management board members' compensation, we find no significant valuation/stewardship relationship in univariate and multivariate analyses. This finding might reflect differences in managerial characteristics, such as risk aversion, between CEOs and non-CEO board members. Highlighting the role of firm and managerial characteristics, our study offers more nuanced empirical insights into the relationship of valuation and stewardship uses. Our findings also raise doubts on whether the normative statement that valuation encompasses stewardship usefulness made by the International Accounting Standards Board (IASB) in its recent conceptual frameworks has empirical substance.

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## 1. Introduction

Accounting information has multiple uses. In particular, for listed firms the use of financial reporting information in informing current and potential shareholders' investment decisions (valuation usefulness) and its use in providing incentives for and measuring the performance of employed managers (stewardship usefulness) are repeatedly analyzed in the accounting literature. [Bushman and Smith \(2001, p. 270\)](#) maintain that "it is widely accepted that reported earnings play a fundamental role in both determining stock prices, and in evaluating and compensating executives. However, the relationship between the governance and value relevance of earnings is not well understood." Most of the existing literature has focused on analyzing each use of accounting information separately, while far less research exists on the interplay between the two

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uses (O'Connell, 2007). Along this line, Murphy, O'Connell, and Óhógartaigh (2013, p. 81) note that "there is a surprising dearth of . . . capital market research on the nature of, and the relationship between, stewardship and decision-usefulness."

Our paper aims to extend the scarce empirical research on the relationship between valuation and stewardship usefulness of accounting information. A few empirical studies based on US data find a positive association of the empirical proxies chosen for the valuation and stewardship uses of earnings (Banker, Huang, & Natarajan, 2009; Bushman, Engel, & Smith, 2006; Peng, 2011). However, more recent analytical literature has suggested that the "valuation/stewardship-relationship might be sensitive to the local circumstances of the areas where accounting standards are applied" and "that studies in countries with different economic structures or governance systems might yield different empirical conclusions [from the US]" (Kuhner & Pelger, 2015, p. 395; see also Walker, 2010; Whittington, 2008).

We take Germany as a setting to explore empirically the relationship between the valuation and stewardship uses of accounting information. While being one of the largest economies in the world (IMF, 2019), the German economy has been far less capital market driven than the US (or the UK) (Aktas, Andries, Croci, & Ozdakak, 2019; Allen & Gale, 2000; La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1998). Elshandidy, Fraser, and Hussainey (2015) note that "in common (code) law countries such as the US and the UK (Germany), firms tend to be more transparent (secretive) and place a higher priority on protecting investors (creditors)." Thus, German firms tended to rely less on resolving information asymmetries through public financial reporting information (Ball, Kothari, & Robin, 2000), which becomes manifest in less disclosure than is typical in common law countries (e.g., Franzen & Weißenberger, 2018). However, in recent years, the governance of listed German companies, for example with regard to ownership structures and executive compensation, has become more similar to Anglo-American countries (Engelen, 2015). As current evidence on the valuation/stewardship relationship is so far limited to the US setting, the German case provides a setting to test the stability of these existing empirical findings.

According to findings from analytical research, the valuation/stewardship-relationship might not only be sensitive to the country setting, but might also be sensitive to characteristics of the executives whose performance is assessed by using accounting-based performance measures, such as their risk aversion (Kuhner & Pelger, 2015). As German listed firms are generally required to publish individual compensation by members of the management board since 2006, this enables us to contrast the valuation/stewardship relationship for Chief Executive Officers (CEOs) vs. other members of the management board. Following evidence on different characteristics between CEOs and other management board members, such as levels of risk aversion (Graham, Harvey, & Puri, 2013; Kaplan & Sorensen, 2017), we use the CEO vs. non-CEO distinction as a proxy for different managerial characteristics.

Methodologically, our study follows the empirical approach by Bushman et al. (2006) employing a three-stage regression model to assess the association between valuation and stewardship uses of earnings. In a first stage, we measure the valuation coefficient of earnings in line with the value relevance literature (e.g. Banker et al., 2009; Barth, Beaver, Hand, & Landsman, 1999; Bushman et al., 2006; Engel, Hayes, & Wang, 2003). The second regression examines the stewardship coefficient of earnings by relating compensation changes to changes in earnings while controlling for other information in the form of firms' stock returns. Finally, the third regression combines both coefficients from the first two regressions to analyze the association between valuation and stewardship uses of accounting information. For the third step, we conduct univariate as well as multivariate analyses, the latter including controls for firm size and free float as firm-specific characteristics.

Our empirical analyses indicate that, in our sample of German firms, the valuation and stewardship uses of accounting information are positively associated for CEOs in a univariate setting. This result suggests that similar findings to the relationship for US CEO compensation data by Banker et al. (2009) and Bushman et al. (2006) can be obtained in the German setting. However, when using the compensation of management board members but excluding CEOs, we find no significant association between the two uses of accounting information. This finding shows that the association between valuation and stewardship for our sample is sensitive to the scope of managers being considered, which could be explained by the different characteristics of CEOs vs. other management board members. This finding can be linked to empirical studies highlighting a lower risk aversion of CEOs compared to other management board members (Kaplan & Sorensen, 2017).

In multivariate analyses, we include interaction variables with the firm-specific characteristics of firm size and free float. While we find no consistent effect of firm size, we show that the relationship for the CEO is sensitive to free float. Considering this variable leads the relationship only to remain positive for higher levels of free float. This finding suggests that the firms' governance structure affects the relationship of the valuation and stewardship uses of accounting information.

Our paper offers two contributions to the accounting literature. First, we extend the scarce empirical evidence on the relationship between stewardship and valuation uses of accounting information (Banker et al., 2009; Bushman et al., 2006; Peng, 2011) by showing that the relationship is context-specific (Kuhner & Pelger, 2015). In particular, our findings suggest that firms' governance structures (Engelen, 2015) and differences in managerial characteristics between CEOs and non-CEO board members (Kaplan & Sorensen, 2017) influence the relationship. Thus, we provide more nuanced empirical insights into the relationship between the valuation and stewardship uses.

Second, our findings contribute to literature on the valuation and stewardship relationship in the context of the International Accounting Standards Board (IASB)'s conceptual framework (e.g., Cascino et al., 2014; Lennard, 2007; Murphy et al., 2013; Pelger, 2016; Pelger, 2020). As the IASB regards stewardship merely as an input to valuation decisions (IASB, 2018, BC1.35(a)), it feels comfortable to include stewardship into the objective of valuation usefulness in its conceptual framework (Pelger, 2020). However, we find that the relationship is context-specific and affected by firms' governance structures and by the set of managers considered (CEOs vs. non-CEO board members). Thus, our study raises doubts on whether the general

normative statement by the IASB that a focus on valuation automatically captures stewardship concerns is reflective of real-world empirical settings.

The remainder of the paper is organised as follows. [Section 2](#) discusses the terminology employed in this paper, related literature, and develops our hypotheses. [Section 3](#) explains the empirical model and describes our data. [Section 4](#) presents the results, while [Section 5](#) offers a discussion and some concluding remarks.

## 2. Valuation and stewardship uses of accounting information

### 2.1. Terminology

Numerous definitions and meanings of valuation and stewardship circulate in the accounting literature. Especially, the concept of stewardship is difficult to define and to operationalize empirically (e.g., [O'Connell, 2007](#)).<sup>1</sup> In its conceptual framework, the IASB posits “decision usefulness” as its objective of financial reporting: “The objective of general purpose financial reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions relating to providing resources to the entity” ([IASB, 2018](#), par. 1.2, notes omitted). Such decisions in the understanding of the IASB include buying, selling, and holding decisions of capital providers as well as the exercise of rights to vote on, or otherwise influence, management's actions ([IASB, 2018](#), par. 1.2). The IASB then outlines that all these decisions are based on the expected returns which depend on capital providers' “assessment of the amount, timing and uncertainty of (the prospects for) future net cash inflows to the entity and on their assessment of management's stewardship of the entity's economic resources” ([IASB, 2018](#), par. 1.3). In line with the terminology of the [IASB, 2018](#) conceptual framework, in this paper we distinguish between the usefulness of accounting information for valuation and stewardship decisions (e.g., also see [Cascino et al., 2014](#); [Gassen, 2008](#)).

We concentrate on one particular aspect of stewardship, the use of accounting earnings for performance evaluation of employed managers, and more specifically its link to management compensation. We acknowledge that this reflects a narrow understanding of the complex stewardship issue as regards broader accountability of managers and/or firms to stakeholders and the public at large (for broader perspectives see [Chen, 1975](#); [Messner, 2009](#); [Roberts, 2009](#)). However, our approach is in line with much of prior theoretical (e.g., [Gjesdal, 1981](#); [Heinle & Hofmann, 2011](#); [Kuhner & Pelger, 2015](#); [Lambert, 2001](#); [Paul, 1992](#)) and empirical (e.g., [Banker et al., 2009](#); [Bushman et al., 2006](#); [Voulgaris, Stathopoulos, & Walker, 2014](#)) economics-based research. Moreover, the focus on performance evaluation is also consistent with the basis for conclusions to the IASB's conceptual framework where it is outlined that information for stewardship purposes shall assist “shareholders who vote on whether to retain directors or replace them, and on how members of management should be remunerated for their services” ([IASB, 2018](#), par. BC1.28; also see BC1.36). This statement points to management's remuneration as one important concern with regard to stewardship.

### 2.2. Valuation/stewardship relationship

The nature of the relationship between valuation and stewardship has been a contentious issue both in standard-setting and academic accounting research (e.g., [Murphy et al., 2013](#); [Pelger, 2016](#)). We now provide an overview of the debate and the literature, on the basis of which we then develop the hypotheses for our empirical study.

#### 2.2.1. Standard-setting debate

In the first generation of conceptual frameworks, developed by the Financial Accounting Standards Board ([FASB, 1978](#)) and the International Accounting Standards Committee ([IASC, 1989](#)), standard-setters attempted to officially define the objective(s) of financial reporting (e.g., [Zeff, 2013](#)). While the FASB framework regarded valuation usefulness, defined as the provision of information about the amount, timing, and uncertainty of future cash flows, as the core objective of financial reporting, it also mentioned stewardship, though not as an explicit separate objective ([FASB, 1978](#), par. 1.37–39; 50–53). In contrast, the IASC positioned both valuation and stewardship on an equal level as objectives of financial reporting ([IASC, 1989](#), par. 12–14). The IASB, the successor of the IASC, adopted the IASC's conceptual framework without any changes in 2001.

In 2004, the FASB and IASB started a joint revision project on the conceptual framework aiming to harmonize their existing frameworks and to update the document ([Whittington, 2008](#)). It was during the first part of this revision project, between 2004 and 2010, that a controversial debate arose on whether stewardship should or should not be stated as a separate objective next to valuation usefulness ([Lennard, 2007](#); [O'Connell, 2007](#); [Pelger, 2016](#)). In the end, the boards decided not to position stewardship as a separate objective ([Zeff, 2013](#)), but instead argued that stewardship is encompassed in the objective of valuation usefulness ([IASB, 2010](#), OB4). According to the detailed process-tracing by [Pelger \(2016\)](#), one important reason for this decision was that US board members on the IASB and FASB did not see the importance of stewardship. Indeed, in response to strong resistance in comment letters to dropping the stewardship objective, a FASB member is quoted saying “that it would be helpful to identify why European constituents heavily support stewardship” ([Pelger, 2016](#), p. 61).

<sup>1</sup> For different definitions and views on stewardship, see [Murphy et al. \(2013\)](#).

The debate showed that different views existed, in particular in the US vs. the rest of the world on whether stewardship is an independent concern or can be included in the valuation objective. This provides some indication that the relationship between valuation and stewardship uses of accounting information might be sensitive to the local context (e.g., [Bush, 2005](#); [Kuhner & Pelger, 2015](#); [Walker, 2010](#)).

The publication of the 2010 framework did not stop further discussions about the role of stewardship. When the IASB announced in 2012 that it wanted to restart the revision of the conceptual framework as an IASB only project without the FASB, the role of stewardship was one of the main issues re-discussed. While the IASB was initially sceptical towards reopening the chapter on the objective of financial reporting, many constituents in response to the 2013 Discussion Paper argued for more emphasis on stewardship. The IASB reacted to these comments as the 2015 Exposure Draft and then the 2018 conceptual framework somewhat elevated the role of stewardship (see [Pelger, 2020](#), for further analysis of the 2018 conceptual framework).

The recent standard-setting debates show that it is difficult to approach the relationship between valuation and stewardship conceptually as endless debates may arise to what extent stewardship is or is not an independent concern. [Pelger \(2016\)](#), p. 53, reviewing the existing literature, concludes: "It . . . seems conceptually impossible to come to a clear conclusion whether valuation usefulness should incorporate stewardship concerns or not." Therefore, it is ultimately a task for empirical research to explore the nature of the relationship. Before we turn to existing empirical evidence in [Section 2.2.3](#), we next present analytical studies of the relationship.

### 2.2.2. Analytical literature

Starting with [Gjesdal \(1981\)](#), several analytical studies highlighted differences between the valuation and stewardship uses of accounting information (e.g. [Heinle & Hofmann, 2011](#); [Lambert, 2001](#); [Paul, 1992](#)). [Gjesdal \(1981\)](#) formally distinguishes between the value of accounting information for decision-making by investors and for solving the incentive (stewardship) problem between employed managers (agent) and the owners of the firm (principal). Combining the Blackwell theorem with an agency model leads [Gjesdal \(1981\)](#) to conclude that the rankings of different accounting systems might differ for valuation and stewardship uses of accounting information. In other words, accounting information optimal for solving the incentive (stewardship) problem is not necessarily optimal for valuation decisions and vice versa.

[Paul \(1992\)](#) compares stock-based and accounting-based compensation contracts in a linear agency model. He shows that different accounting signals are aggregated by the capital market in a way that is not necessarily optimal for contracting. He analytically distinguishes the two uses in that, from a stewardship perspective, accounting should be informative about managerial effort, while, from a valuation perspective, accounting should rather provide information on the stochastic (and thus uncertain) part of firm value. This difference between the two uses was also delineated by [Lambert \(2001\)](#), while [Heinle and Hofmann \(2011\)](#) extend the agency setting to the availability of soft (non-contractible) information. [Heinle and Hofmann \(2011\)](#) show that the disclosure of such information is positive from a valuation perspective but entails negative effects for stewardship uses. The study by [Kuhner and Pelger \(2015\)](#) in an agency setting shows that the association between valuation and stewardship uses of accounting information hinges on the context, that is on parameters of the manager, the firm, and characteristics of the economy or the corporate governance system as a whole. Thus, according to the authors, a universal claim of valuation encompassing stewardship might not be warranted.

While these studies tend to regard their findings as corroborating differences (or a trade-off) between valuation and stewardship, it is to stress that the information settings in these models do not necessarily capture real-world complexities in information provision and use. Nonetheless, the general take-away from the analytical literature is that there are constellations in which valuation and stewardship do require different information.

### 2.2.3. Empirical literature

In contrast to the general tenor of analytical modeling research, two empirical studies focusing on US data find a positive association between valuation and stewardship uses of accounting earnings. [Bushman et al. \(2006\)](#) empirically investigate how accounting information are used for valuation and incentive contracting (stewardship). They refine the analytical model by [Paul \(1992\)](#) to specify their null hypothesis that there is no relationship between the valuation and stewardship uses of accounting earnings. The empirical approach of [Bushman et al. \(2006\)](#) is outlined in more detail in [Section 3.1](#). [Bushman et al. \(2006\)](#) find that firm and industry specific valuation and compensation earnings coefficients are significantly positively related with respect to changes between two periods of 15 years each (1971–1985 and 1986–2000).

In a related study, [Banker et al. \(2009\)](#) analyze the relationship between the value relevance and incentive contracting relevance of earnings and cash flows for US data between 1993 and 2003. Their first regression estimates pay-sensitivity and the value relevance of earnings and cash flows. In a second regression, [Banker et al. \(2009\)](#) use cross-sectional firm and yearly regressions to analyze the association between pay-sensitivity and the value relevance coefficients of earnings. They find significant positive coefficients which shows that the compensation weight on earnings is increasing in the value relevance of earnings. The same holds for cash flows. Thus, the main result of their paper is that the value relevance of performance measures plays a major role in the use of accounting performance measures for the evaluation of CEOs.

[Gassen \(2008\)](#) analyzes the relationship of valuation and stewardship by using a different approach for a dataset of US firms between 1990 and 2005. First, instead of using the concept of value relevance employed by [Banker et al. \(2009\)](#) and [Bushman et al. \(2006\)](#), he uses an event study that focuses on the effect publication of financial statement information has on the share price in a certain (short) time frame. Second, [Gassen \(2008\)](#) does not use compensation data to approach

the stewardship perspective, but instead models a market for stewardship information, where the supply of stewardship information is proxied by conditional conservatism (asymmetric timeliness of earnings) and the demand for stewardship information by the importance of non-equity stakeholders. Gassen (2008) finds a negative relationship between the valuation usefulness of financial accounting information and his proxies for stewardship. However, it is to note that his operationalization of stewardship is not following the performance evaluation/incentive contracting perspective employed in the agency models and empirical studies outlined above. Instead, his definition of stewardship reflects a more general contracting perspective (Watts, 2003), and also considers stakeholders other than owners.

While Gassen (2008) provides evidence that valuation useful information might not necessarily be simultaneously useful for such a broader notion of contracting (at least in the US), his findings are not directly comparable to those of Bushman et al. (2006) and Banker et al. (2009). Thus, current empirical evidence from the US concentrating on value relevance and incentive contracting (also see Peng, 2011) points to a positive relationship between the use of accounting information for valuation and stewardship purposes.

### 2.3. Development of hypotheses

In developing our hypotheses, we draw on the results that Kuhner and Pelger (2015) derive from an analytical agency model. Introducing the assumption of the costly preparation of financial reporting information, and assuming that the costs are borne by the current owners of the firm and not by potential investors, Proposition 3 in Kuhner and Pelger (2015) reveals that in certain constellations accounting information can be useful for valuation decisions of investors but will not be used for performance evaluation in management compensation contracts. In other words, their results show that “the relationship of [valuation and stewardship] hinges on parameters of the environment” (Kuhner & Pelger, 2015, p. 395). To what extent this is the case, is an empirical question we try to address in this paper.

Kuhner and Pelger (2015) first refer to country-specific aspects, such as economic structures and legal and governance systems that might affect the relationship (also see Walker, 2010). Empirical findings of a positive relationship between the valuation and stewardship uses documented for the US for CEO compensation data (Banker et al., 2009; Bushman et al., 2006), therefore, might not be found in other countries with different structures (Kuhner & Pelger, 2015; Whittington, 2008).

It is well documented in the literature that the German economy has been far less capital market driven than the US (or the UK) economy (e.g., Aktas et al., 2019; Allen & Gale, 2000; La Porta et al., 1998) and, thus, providing transparent information for investors was not a primary concern in financial reporting (e.g., Elshandidy et al., 2015). Moreover, some institutional features of corporate governance differ. For example, in the German setting there is a two-tier board system, consisting of a management and a separate supervisory board (with both shareholder and employee representatives), while in the US there is a one-tier board including executives and non-executives. This structural difference more generally reflects a stronger stakeholder focus in the German setting compared to a stronger shareholder focus in the US (e.g., Weimer & Pape, 1999).

During the last decades, however, “elements associated with Anglo-American style corporate governance have gained in importance” for German listed firms (Engelen, 2015, p. 928). For example, cross-shareholdings between German firms largely disappeared, reducing the influence of blockholders, and both the levels and the pay-performance sensitivity of executive compensation changed over time (Engelen, 2015). Moreover, with the mandatory introduction of International Financial Reporting Standards (IFRS) for listed firms in 2005, financial reporting, traditionally driven by tax concerns and creditor protection, has become more investor-focused. While these developments might point to a stronger use of financial reporting information for valuation and stewardship purposes in the German setting over time, it is not clear ex ante whether the relationship between the uses would be similar to the positive association found in the US setting. Therefore, we state our hypothesis on the relationship (H1) in the null form.

**H1.** *The valuation and stewardship uses of accounting information are not related for CEO compensation.*

In addition to country-specific aspects, characteristics of the manager might also influence the valuation/stewardship relationship. In their model, Kuhner and Pelger (2015) specifically show that the extent of the manager's risk aversion can influence the relationship as there is a threshold of risk aversion above which the accounting information will only be useful for valuation but not for stewardship purposes. The explanation for this result is that it becomes more costly to incentivize the manager with variable accounting-based pay for higher levels of risk aversion. In other words, for more risk averse managers the relationship of valuation and stewardship is less likely to be positive. While the model by Kuhner and Pelger (2015) is based on the simplifying assumption of one owner (principal) and one manager (agent), in the real world the performance of, at least, the top management level will typically be measured by reference to a firm's financial reporting data.

There exists a substantial literature studying attitudes and characteristics of CEOs and how these differ from those of other top managers. A general finding from this literature is that “CEOs differ from other executives” (Kaplan & Sorensen, 2017, p. 1). In a survey of 1,180 CEOs and 549 Chief Financial Officers (CFOs), Graham et al. (2013) find that CEOs tend to be more optimistic than CFOs. Kaplan and Sorensen (2017) study a dataset of more than 2,600 assessments of candidates for top management positions and reveal that characteristics differ between candidates for CEO vs. other management board positions. Among other things, they show a lower risk aversion of CEOs compared to other management board members, in particular CFOs (Kaplan & Sorensen, 2017, p. 26).<sup>2</sup>

<sup>2</sup> Dichev, Graham, Harvey, and Rajgopal (2013) also provide evidence on the risk aversion of CFOs but do not compare this to the risk aversion of CEOs.

Following this literature, we approximate differences in managerial characteristics by studying the valuation/stewardship relationship for the non-CEO members of the management board. Hypothesis H2 is stated in the null form.

**H2.** *The valuation and stewardship uses of accounting information are not related for the compensation of management board members other than the CEO.*

We test both hypotheses by using univariate and multivariate tests. The multivariate tests are based on the finding from the [Kuhner and Pelger \(2015\)](#) model that firm characteristics may also impact the valuation/stewardship relationship.

### 3. Empirical model and sample construction

#### 3.1. Empirical model

Our study investigates the association between the valuation and stewardship uses of accounting information. Following [Bushman et al. \(2006\)](#), we examine this relationship in a three-stage regression model. This three-stage model consists of two regressions that provide the input for a third regression. The first regression estimates the valuation earnings coefficient (VEC), the second regression estimates the compensation earnings coefficient (CEC), while the third regression combines both estimated coefficients and estimates the valuation on stewardship accounting earnings coefficient (VSC). The first two regressions estimate VECs and CECs for each firm and aggregate firm-year observations. We require a firm to have at least five firm-year observations in a row for every variable included in the first and the second regression to guarantee sufficiently representative valuation and stewardship coefficients for each firm during our study period.

The first regression (1) estimates the effect of a change in earnings (*EARN*) on stock returns (*RET*) for each firm *i*. *EARN* defines the percentage change in net income between year *t* and *t* – 1. The coefficient that results from a change in *EARN* by one percent on *RET* is saved as the valuation earnings coefficient (VEC) for each firm *i*. The firms' valuation earnings coefficients reflect aggregated firm-year observations.

$$RET_{it} = \alpha_0 + VEC_i \times EARN_{it} + \epsilon_{it} \quad (1)$$

where *i* is the firm, *t* is the fiscal year, *RET<sub>it</sub>* is the 12-months cumulative stock return of firm *i* in the fiscal year *t*,<sup>3</sup>  $\alpha_0$  is the intercept, *VEC<sub>i</sub>* is the valuation earnings coefficient of firm *i*, *EARN<sub>it</sub>* is the percentage change in earnings between year *t* and *t* – 1 of firm *i*, and  $\epsilon_{it}$  is the error term for regression (1).<sup>4</sup>

Eq. (2) describes the regression we run to estimate the firms' compensation earnings coefficients, again aggregating firm years for one specific firm *i*. The compensation earnings coefficient (*CEC<sub>i</sub>*) estimates the association between the percentage change in earnings (*EARN<sub>it</sub>*) and the percentage change in CEOs' (H1) or other management board members' (H2) cash compensation (*Comp<sub>it</sub>*). In line with [Bushman et al. \(2006\)](#), we control for public information with the proxy of the 12-months stock return of firm *i*'s fiscal year *t* (*RET<sub>it</sub>*).

$$Comp_{it} = \beta_0 + CEC_i \times EARN_{it} + \beta_2 RET_{it} + \epsilon_{it} \quad (2)$$

where *Comp<sub>it</sub>* is the percentage change in compensation between year *t* and *t* – 1 of firm *i*,  $\beta_0$  is the intercept, *CEC<sub>i</sub>* is the compensation earnings coefficient of firm *i*, *EARN<sub>it</sub>* is the percentage change in earnings between year *t* and *t* – 1 of firm *i*,  $\beta_2$  is the coefficient that results from a one percent change of *RET<sub>it</sub>* on *Comp<sub>it</sub>*, *RET<sub>it</sub>* is the 12-months cumulative stock return of *i*'s fiscal year *t*, and  $\epsilon_{it}$  is the error term for regression (2). Our variable *Comp<sub>it</sub>* is either using the CEO's compensation or the average management board members' compensation after excluding the CEO.

After running the first two regressions, we obtain firm specific valuation and compensation earnings coefficients included as variables in the third regression. The third regression then tests our hypotheses and estimates the association between valuation usefulness (*VEC<sub>i</sub>*) and stewardship usefulness (*CEC<sub>i</sub>*), aggregated by firms. Our resulting coefficient (*VSC*) indicates the association between valuation and stewardship uses of earnings based on firm specific estimations. This firm specific aggregation is necessary to have sufficient variation in the observations for each firm to estimate a valuation and compensation earnings coefficient. Different firm specific valuation and compensation earnings coefficients are important for the variation in the third regression stage and for estimating an overall association between the two uses of accounting information.<sup>5</sup>

$$VEC_i = \gamma_0 + VSC \times CEC_i + \epsilon_i \quad (3)$$

where *VEC<sub>i</sub>* is the valuation earnings coefficient of firm *i*,  $\gamma_0$  is the intercept, *VSC* is the valuation stewardship coefficient, *CEC<sub>i</sub>* is the compensation earnings coefficient of firm *i*, and  $\epsilon_i$  is the error term of regression (3).

The mechanism of our three-stage empirical model works for negative and positive values of the VEC (valuation usefulness) and the CEC (stewardship usefulness). Whenever there are different signs for CEC and VEC in stage three, the VSC (valuation

<sup>3</sup> In line with [Bushman et al. \(2006\)](#), we use the firms' 12-months stock returns (*RET<sub>it</sub>*) calculated from the beginning to the end of the fiscal year *t*.

<sup>4</sup> We always consider the change from one year to another, as we want to compare how the sign of the change in accounting earnings (positive or negative development) is reflected in the change of stock returns (positive or negative change in firm valuation on the capital market) and in the change of CEOs' (other management board members') compensation (positive or negative change in short term compensation).

<sup>5</sup> If we ran the first and the second regression over the whole sample, we would obtain exactly one valuation earnings coefficient from the first regression and one compensation earnings coefficient from the second regression. Thus, a third regression would not provide any meaningful results.

stewardship coefficient) is negative. This would then indicate that the accounting information is useful for either stewardship or valuation uses but not for both purposes at the same time. For instance, if the VEC is positive but the CEC is negative, a negative VSC would result. In this case, accounting information is useful for valuation but not for stewardship and the overall association between the two uses of accounting information is negative, i.e. they react differently to changes in earnings.

If we find no association in the univariate analysis of regression (3), we can support our hypotheses. In our multivariate tests of H1 and H2, we consider firm-specific characteristics. More specifically, we add an interaction term with  $CEC_i$  in regression (3). We run regressions (1) and (2) and then use regression (4) or (5) including an interaction term between either  $DFFLOAT_i$  or  $DSIZE_i$  and  $CEC_i$ . Our variable  $DFFLOAT_i$  is defined as a dummy for the firm's free float, that takes the value of 1 if the free float is higher than the mean of the free float of our sample firms and 0 otherwise. Our variable  $DSIZE_i$  is defined as a dummy for the firm's size, that takes the value of 1 if the respective size variable is higher than the mean of the size variable of our sample firms and 0 otherwise.

$$VEC_i = \gamma_0 + VSC \times CEC_i + \gamma_1 DFFLOAT_i + \gamma_2 (DFFLOAT \times CEC)_i + \epsilon_i \quad (4)$$

$$VEC_i = \gamma_0 + VSC \times CEC_i + \gamma_1 DSIZE_i + \gamma_2 (DSIZE \times CEC)_i + \epsilon_i \quad (5)$$

Using an interaction term means multiplying a dummy with  $CEC_i$ . A significant interaction coefficient, for example with free float, indicates that the association between the uses of accounting information is different for higher values of free float compared to lower values. When using an interaction term between a dummy for firm size and the  $CEC_i$ , we distinguish between three different proxies for firm size: the logarithm of total assets (e.g., [Hitz & Werner, 2012](#)), the logarithm of market capitalization (e.g., [Israel & Moskowitz, 2013](#)), and the management board size (according to [Guest \(2009\)](#) larger firms tend to have larger boards).

The interpretation of the results changes because we do not only consider the "pure" association between the independent and dependent variable, but also the association of the dummy and the independent variable that has to be added to the "pure" association. If the "pure" association is significant and the interaction association is not significant, this would indicate no sensitivity to the firm-specific characteristics. In contrast, if the "pure" association and the interaction association are both significant, this would indicate sensitivity. Additionally, if the "pure" association is not significant but the interaction association is significant, this would indicate a difference in the groups of firms. In other words, for one group there is no association while for the other group there is a positive association, which points to the sensitivity of the relationship to the dummy variable.

### 3.2. Sample and data

We use hand-collected compensation data and data from the commercial database Datastream Worldscope for firm years between 2006 and 2015. The hand-collected data contains executive compensation and corporate data. The data from the commercial database provides financial statement and stock market information for the firms in our sample. The executive compensation information was hand-collected from the annual reports of German index-listed firms. The dataset on compensation distinguishes between the CEO's compensation and the other management board members' compensation defined as the average board members' compensation excluding the CEO. Furthermore, the dataset distinguishes between annual cash compensation and total compensation. Similar to prior studies ([Banker et al., 2009](#); [Bushman et al., 2006](#), [Core, Guay, & Verrecchia, 2003](#), [Ozkan, Singer, & You, 2012](#)), we focus on the change in executive cash compensation in our main analysis because accounting performance measures are rather linked to the cash component than to the equity component of executive compensation. While we use cash compensation (defined as the sum of the fixed salary, fringe benefits, and short term incentives (bonus)) in our main analysis, we consider total compensation for robustness tests.<sup>6</sup>

Our sample selection is based on firms listed in the main indices of the German stock market, DAX, MDAX, TecDAX, and SDAX, in the fiscal years 2006 to 2015. The total number of firm years for these indices between 2006 and 2015 is 1,600 (160 per year). From this number of firm years, we excluded foreign firms, firm-year observations with incomplete compensation data for the CEO and the management board members, firms applying US-GAAP (Generally Accepted Accounting Principles), and firm-year observations with a lack of data availability (missing information on earnings or stock returns). Furthermore, we excluded firms with less than six years in a row data availability or were not listed constantly.<sup>7</sup>

This leads us to 854 firm-year observations (94 firms) with available compensation data for both CEO and board members. As we use the change in CEO and average management board members' compensation, another 94 firm-year observations from 2006 cannot be considered due to a lack of compensation data for 2005. The German Executive Board Compensation Disclosure Act (VorstOG) requires the publication of executives' (management board members') compensation data from 2006 onwards.<sup>8</sup> This ultimately leads to 760 firm-year observations for our empirical analysis.

<sup>6</sup> Compared to cash compensation, total compensation additionally includes long-term (equity) incentives. This total compensation measure is not comparable to the use of total compensation in US datasets, as the latter include equity grants and portfolio value changes ([Hitz & Müller-Bloch, 2015](#)).

<sup>7</sup> This is important as our first two stages in the regression model require at least five years of observations per firm. As our regressions use changes between year  $t$  and  $t-1$ , we then need observations from at least six years in a row.

<sup>8</sup> While it is, in general, mandatory to present separate compensation for the members of the management board, firms can avoid this individualized disclosure if the annual shareholder meeting supports this proposal with a majority of at least 75%. [Hitz and Werner \(2012\)](#) analyze factors that explain firms' decisions to avoid individualized disclosure of compensation.

**Table 1**  
List of variables and summary statistics.

| Variable      | Name  | Obs | Mean    | Std Dev | Min      | Max    |
|---------------|---|-----|---------|---------|----------|--------|
| EARN          | %-change in net income (NI)                                     | 760 | -2.18   | 55.17   | -1513.33 | 77.38  |
| RET           | Firm's stock return (%-change in Return index (RI))             | 760 | 0.15    | 0.47    | -0.88    | 3.94   |
| CCOMP Board   | %-change in average (non-CEO) board members' cash compensation  | 760 | 0.07    | 0.41    | -0.84    | 3.31   |
| CCOMP CEO     | %-change in CEOs' cash compensation                             | 760 | 0.11    | 0.78    | -0.87    | 17.57  |
| TCOMP Board   | %-change in average (non-CEO) board members' total compensation | 760 | 0.12    | 0.52    | -0.87    | 5.35   |
| TCOMP CEO     | %-change in CEOs' total compensation                            | 760 | 0.16    | 0.84    | -0.90    | 17.57  |
| Cash Board    | Average (non-CEO) board members' cash compensation              | 760 | 1022.99 | 782.61  | 178      | 10,679 |
| Cash CEO      | CEOs' cash compensation   | 760 | 1783.12 | 1501.40 | 135      | 11,361 |
| Total Board   | Average (non-CEO) board members' total compensation             | 760 | 1513.91 | 1242.29 | 205      | 15,037 |
| Total CEO     | CEOs' total compensation  | 760 | 2658.03 | 2366.34 | 135      | 17,456 |
| FFLOAT        | Mean of firms' (i) shares in free float                         | 94  | 0.73    | 0.21    | 0.18     | 1      |
| SIZE (TA)     | Mean of firms' (i) logarithm of total assets (ta)               | 94  | 15.26   | 2.11    | 10.97    | 21.26  |
| SIZE (MCAP)   | Mean of firms' (i) logarithm of market capitalization (mcap)    | 94  | 14.81   | 1.61    | 12.10    | 18.02  |
| SIZE (BOARD)  | Mean of firms' board size                                       | 94  | 4.33    | 1.83    | 2        | 10     |
| DFFLOAT       | Dummy variable free float                                       | 94  |         |         | 0        | 1      |
|               | 1 if FFLOAT > 0.73  | 53  | 0.89    | 0.08    | 0.74     | 1      |
|               | 0 otherwise   | 41  | 0.53    | 0.15    | 0.18     | 0.73   |
| DSIZE (TA)    | Dummy variable size   | 94  |         |         | 0        | 1      |
|               | 1 if SIZE(TA) > 15.26   | 40  | 17.24   | 1.59    | 15.36    | 21.26  |
|               | 0 otherwise   | 54  | 13.80   | 0.93    | 10.97    | 15.23  |
| DSIZE (MCAP)  | Dummy variable size   | 94  |         |         | 0        | 1      |
|               | 1 if SIZE(MCAP) > 14.81   | 40  | 16.37   | 1.09    | 14.84    | 18.02  |
|               | 0 otherwise   | 54  | 13.66   | 0.71    | 12.10    | 14.76  |
| DSIZE (BOARD) | Dummy variable size   | 94  |         |         | 0        | 1      |
|               | 1 if SIZE(BOARD) > 4.33   | 33  | 6.35    | 1.49    | 4.33     | 10     |
|               | 0 otherwise   | 61  | 3.23    | 0.76    | 2        | 4.17   |

Notes: The %-change defines the change between year t and t-1 (divided by the value in t-1). Board members are the members of the management board.

### 3.3. Descriptive statistics

Table 1 provides summary statistics of the main sample variables. Free float (FFLOAT) and the three size variables (SIZE (TA), SIZE (MCAP), and SIZE (BOARD)) reflect mean values of *i*'s firm-year observations because we only include these variables in the third regression. Every variable that is included in regression (1) or (2) has 760 observations which are then aggregated to 94 firm specific valuation and compensation earnings coefficients. Thus, all variables included only in regression (3), (4), or (5) contain 94 observations, one for each firm. The summary statistics in Table 1 show some extreme values, such as for the variable EARN. Therefore, we also run our regressions with winsorized variables (at the 5% level) in our univariate analyses to check if the extreme values influence the results. Table 1 not only reports the percentage change in CEOs' or average board members' cash and total compensation but also summarizes the absolute amounts of compensation (Cash Board, Cash CEO, Total Board, and Total CEO) for illustrative purposes. For our 94 firms, the management board (including the CEO) consists of at least two and at most ten members. The average size of the management board is four members.

## 4. Results

### 4.1. Valuation and stewardship usefulness

Table 2 reports our firm specific VECs and CECs for the CEO and for the average non-CEO management board members resulting from the first two regression stages according to Eqs. (1) and (2). Furthermore, Table 2 lists our ID, the trading symbol, firm name, industry, first year, last year, and the number of total years included in the dataset. It also includes the sign of the valuation stewardship coefficient (VSC) for the CEO and the average non-CEO management board members.<sup>9</sup>

Table 3 summarizes the total number of positive, negative, and equal signs of VSCs for the CEO and the average non-CEO management board members at the industry level. Table 3 also states the number of firms representing each industry in our sample. For the CEO, 64% (60 firms) of our 94 firms show a positive association between the valuation and stewardship uses of earnings, while 36% (34 firms) show a negative association. For the average management board members (excluding the CEO), 56% (53 firms) indicate a positive and 44% (41 firms) a negative association.

76% (71 firms) have an equal sign of the association between valuation and stewardship usefulness (VSC) for the CEO as well as for the average management board member. Comparing industries, we can see that in three industries, Financials, Healthcare, and Oil & Gas, over 50% of the firms have negative associations between valuation and compensation earnings

<sup>9</sup> As mentioned above, the regressions to estimate VECs and CECs are not based on the total years in Table 2 but on the total years minus one, as we focus on changes in our analysis.



**Table 2**

List of valuation earnings coefficients (VECs) and compensation earnings coefficients (CECs) by firm.

| ID | TRADE | Firm name                     | Industry           | First year | Last year | Years | VEC   | CEC CEO | CEC BOARD | VSC CEO | VSC BOARD |
|----|-------|-------------------------------|--------------------|------------|-----------|-------|-------|---------|-----------|---------|-----------|
| 1  | AAD   | AMADEUS FIRE AG               | Industrials        | 2010       | 2015      | 6     | 3.06  | 3.94    | -0.40     | +       | -         |
| 2  | ADS   | ADIDAS AG                     | Consumer Goods     | 2006       | 2015      | 10    | 0.28  | 0.17    | 0.16      | +       | +         |
| 3  | AFX   | CARL ZEISS MEDITEC AG         | Healthcare         | 2007       | 2015      | 9     | 0.33  | -0.91   | -0.13     | -       | -         |
| 4  | AIXA  | AIXTRON SE                    | Technology         | 2006       | 2015      | 10    | 0.58  | 0.37    | 0.37      | +       | +         |
| 5  | ALV   | ALLIANZ SE                    | Financials         | 2006       | 2015      | 10    | 0.17  | 0.04    | 0.11      | +       | +         |
| 6  | ARL   | AAREAL BANK AG                | Financials         | 2006       | 2015      | 10    | 0.12  | -0.21   | -0.09     | -       | -         |
| 7  | BAS   | BASF SE                       | Basic Materials    | 2006       | 2015      | 10    | 0.30  | 0.38    | 0.33      | +       | +         |
| 8  | BAYN  | BAYER AG                      | Healthcare         | 2006       | 2015      | 10    | -0.09 | 0.04    | -0.35     | -       | +         |
| 9  | BEI   | BEIERSDORF AG                 | Consumer Goods     | 2006       | 2015      | 10    | 0.07  | 0.67    | 0.34      | +       | +         |
| 10 | BIO   | BIOTEST AG                    | Healthcare         | 2007       | 2015      | 9     | -0.01 | 0.01    | -0.01     | -       | +         |
| 11 | BMW   | BMW AG                        | Consumer Goods     | 2006       | 2015      | 10    | 0.03  | 0.04    | 0.04      | +       | +         |
| 12 | CBK   | COMMERZBANK AG                | Financials         | 2006       | 2015      | 10    | 0.00  | 0.00    | 0.00      | +       | +         |
| 13 | CEV   | CENTROTEC SUSTAINABLE AG      | Oil & Gas          | 2008       | 2013      | 6     | -0.00 | 0.01    | 0.07      | -       | -         |
| 14 | COM   | COMDIRECT BANK AG             | Financials         | 2006       | 2015      | 10    | 0.13  | -0.18   | -0.22     | -       | -         |
| 15 | CON   | CONTINENTAL AG                | Consumer Goods     | 2006       | 2015      | 10    | 0.06  | 0.25    | 0.07      | +       | +         |
| 16 | CWC   | CEWE STIFTUNG & CO KGAA       | Consumer Services  | 2009       | 2015      | 7     | 0.64  | 0.13    | 0.20      | +       | +         |
| 17 | DAI   | DAIMLER AG                    | Consumer Goods     | 2006       | 2015      | 10    | 0.09  | -0.30   | -0.22     | -       | -         |
| 18 | DB1   | DEUTSCHE BOERSE AG            | Financials         | 2006       | 2015      | 10    | 0.48  | -0.48   | -0.67     | -       | -         |
| 19 | DBAN  | DEUTSCHE BETEILIGUNGS AG      | Financials         | 2006       | 2015      | 10    | 0.13  | -0.04   | 0.01      | -       | +         |
| 20 | DBK   | DEUTSCHE BANK AG              | Financials         | 2006       | 2015      | 10    | 0.08  | 0.06    | 0.08      | +       | +         |
| 21 | DEQ   | DEUTSCHE EUROSHOP AG          | Financials         | 2006       | 2015      | 10    | 0.04  | 0.07    | 0.12      | +       | +         |
| 22 | DEX   | DELTICOM AG                   | Consumer Goods     | 2008       | 2014      | 7     | 0.52  | 0.25    | 0.37      | +       | +         |
| 23 | DEZ   | DEUTZ AKTIENGESELLSCHAFT      | Industrials        | 2006       | 2015      | 10    | -0.07 | -0.02   | 0.04      | +       | -         |
| 24 | DIC   | DIC ASSET AG                  | Financials         | 2006       | 2015      | 10    | 2.13  | -0.15   | -0.22     | -       | -         |
| 25 | DOU   | DOUGLAS HOLDING AG            | Consumer Services  | 2006       | 2011      | 6     | 0.69  | 0.66    | -1.27     | +       | -         |
| 26 | DPW   | DEUTSCHE POST AG              | Industrials        | 2006       | 2015      | 10    | 0.09  | 0.05    | 0.01      | +       | +         |
| 27 | DTE   | DEUTSCHE TELEKOM AG           | Telecommunications | 2006       | 2015      | 10    | 0.02  | 0.01    | -0.00     | +       | -         |
| 28 | DWNI  | DEUTSCHE WOHNEN SE            | Financials         | 2008       | 2015      | 8     | 0.06  | -0.11   | 0.04      | -       | +         |
| 29 | EOAN  | E.ON SE                       | Utilities          | 2006       | 2015      | 10    | -0.04 | -0.03   | -0.04     | +       | +         |
| 30 | EVD   | CTS EVENTIM AG                | Consumer Services  | 2006       | 2015      | 10    | 0.31  | 1.08    | 0.02      | +       | +         |
| 31 | EVT   | EVOTEC AG                     | Healthcare         | 2009       | 2015      | 7     | 0.02  | 0.01    | 0.02      | +       | +         |
| 32 | FIE   | FIELMANN AG                   | Consumer Services  | 2006       | 2015      | 10    | -0.50 | 0.56    | 0.95      | -       | -         |
| 33 | FNTN  | FRENET AG                     | Telecommunications | 2006       | 2015      | 10    | -0.10 | 0.01    | 0.02      | -       | -         |
| 34 | FRA   | FRAPORT AG                    | Industrials        | 2006       | 2015      | 10    | 0.33  | 0.31    | -0.19     | +       | -         |
| 35 | G1A   | GEA GROUP AG                  | Industrials        | 2006       | 2015      | 10    | -0.01 | -0.07   | -0.07     | +       | +         |
| 36 | GBF   | BILFINGER SE                  | Industrials        | 2006       | 2015      | 10    | -0.07 | -0.09   | 0.17      | +       | -         |
| 37 | GFK   | GFK AG                        | Consumer Services  | 2006       | 2015      | 10    | -0.03 | -0.00   | -0.02     | +       | +         |
| 38 | GIL   | DMG MORI AG                   | Industrials        | 2006       | 2015      | 10    | 0.04  | 0.17    | 0.02      | +       | +         |
| 39 | GLJ   | GRENKE AG                     | Financials         | 2006       | 2015      | 10    | 1.00  | 0.51    | 0.95      | +       | +         |
| 40 | GMM   | GRAMMER AG                    | Consumer Goods     | 2006       | 2015      | 10    | 0.36  | 0.11    | 0.07      | +       | +         |
| 41 | GSC   | GESCO AG                      | Industrials        | 2008       | 2014      | 7     | 0.45  | -0.58   | -0.78     | -       | -         |
| 42 | GW11  | GERRY WEBER INT. AG           | Consumer Goods     | 2008       | 2015      | 8     | 0.32  | 1.73    | -0.03     | +       | -         |
| 43 | HDD   | HEIDELBERGER DRUCKM. AG       | Industrials        | 2006       | 2015      | 10    | 0.01  | 0.01    | -0.00     | +       | -         |
| 44 | HEN3  | HENKEL AG AND CO. KGAA        | Consumer Goods     | 2006       | 2015      | 10    | 0.59  | -0.10   | -0.02     | -       | -         |
| 45 | HHFA  | HAMBURGER HAFEN & LOGISTIK AG | Industrials        | 2009       | 2015      | 7     | 0.82  | 0.69    | 0.15      | +       | +         |
| 46 | HOT   | HOCHTIEF AG                   | Industrials        | 2006       | 2015      | 10    | 0.21  | 0.34    | -0.22     | +       | -         |
| 47 | IFX   | INFINEON TECHNOLOGIES AG      | Technology         | 2006       | 2015      | 10    | -0.14 | -0.03   | 0.06      | +       | -         |
| 48 | IVG   | IVG IMMOBILIEN AG             | Financials         | 2006       | 2012      | 7     | 0.03  | -0.04   | -0.03     | -       | -         |
| 49 | JEN   | JENOPTIK AG                   | Industrials        | 2008       | 2015      | 8     | 0.12  | 0.01    | 0.03      | +       | +         |
| 50 | KBC   | KONTRON AG                    | Industrials        | 2006       | 2014      | 9     | 0.08  | 1.46    | -0.01     | +       | -         |
| 51 | KCO   | KLOECKNER & CO SE             | Basic Materials    | 2010       | 2015      | 6     | 0.03  | -0.01   | 0.00      | -       | +         |
| 52 | KU2   | KUKA AG                       | Industrials        | 2006       | 2015      | 10    | 0.02  | 0.03    | 0.08      | +       | +         |
| 53 | KWS   | KWS SAAT SE                   | Consumer Goods     | 2006       | 2015      | 10    | 0.49  | 0.55    | 0.63      | +       | +         |
| 54 | LEO   | LEONI AG                      | Industrials        | 2006       | 2015      | 10    | 0.04  | -0.02   | -0.02     | -       | -         |
| 55 | LHA   | DEUTSCHE LUFTHANSA AG         | Consumer Services  | 2006       | 2015      | 10    | 0.01  | -0.00   | -0.00     | -       | -         |
| 56 | LIN   | LINDE AG                      | Basic Materials    | 2006       | 2015      | 10    | 0.12  | 0.02    | 0.07      | +       | +         |
| 57 | LXS   | LANXESS AG                    | Basic Materials    | 2007       | 2015      | 9     | 0.08  | 0.10    | 0.10      | +       | +         |
| 58 | MAN   | MAN SE                        | Industrials        | 2006       | 2014      | 9     | 0.06  | -0.28   | -0.41     | -       | -         |
| 59 | MLP   | MLP SE                        | Financials         | 2006       | 2015      | 10    | -0.04 | 0.14    | 0.06      | -       | -         |
| 60 | MOR   | MORPHOSYS AG                  | Healthcare         | 2006       | 2015      | 10    | 0.02  | 0.03    | 0.03      | +       | +         |
| 61 | MRK   | MERCK KGAA                    | Healthcare         | 2010       | 2015      | 6     | -0.01 | 0.02    | 0.08      | -       | -         |
| 62 | MTX   | MTU AERO ENGINES AG           | Industrials        | 2007       | 2015      | 9     | 0.45  | 0.11    | 0.63      | +       | +         |
| 63 | MUV2  | MUNICH RE AG                  | Financials         | 2006       | 2015      | 10    | -0.07 | 0.11    | 0.10      | -       | -         |
| 64 | MVV1  | MVV ENERGIE AG                | Utilities          | 2006       | 2012      | 7     | 0.11  | 0.02    | 0.01      | +       | +         |
| 65 | NDA   | AURUBIS AG                    | Basic Materials    | 2007       | 2015      | 9     | -0.00 | -0.12   | -0.08     | +       | +         |
| 66 | P1Z   | PATRIZIA IMMOBILIEN AG        | Financials         | 2008       | 2015      | 8     | 0.23  | -0.25   | -0.09     | -       | -         |
| 67 | PFV   | PFEIFFER VACUUM TECHNOLOGY AG | Industrials        | 2006       | 2015      | 10    | 0.23  | 0.78    | 1.13      | +       | +         |

(continued on next page)

Table 2 (continued)

| ID | TRADE | Firm name                | Industry          | First year | Last year | Years | VEC   | CEC<br>CEO | CEC<br>BOARD | VSC<br>CEO | VSC<br>BOARD |    |
|----|-------|--------------------------|-------------------|------------|-----------|-------|-------|------------|--------------|------------|--------------|----|
| 68 | PRA   | PRAKTIKER AG             | Consumer Services | 2007       | 2012      | 6     | 0.02  | 0.06       | 0.02         | +          | +            |    |
| 69 | PSM   | PROSIEBENSAT 1 MEDIA SE  | Consumer Services | 2007       | 2015      | 9     | 0.67  | 0.00       | -0.02        | +          | -            |    |
| 70 | RHK   | RHOEN KLINIKUM AG        | Healthcare        | 2006       | 2015      | 10    | 0.03  | -0.02      | -0.06        | -          | -            |    |
| 71 | RHM   | RHEINMETALL AG           | Industrials       | 2006       | 2015      | 10    | -0.06 | 0.20       | 0.07         | -          | -            |    |
| 72 | RWE   | RWE AG                   | Utilities         | 2006       | 2015      | 10    | 0.01  | -0.00      | 0.12         | -          | +            |    |
| 73 | S92   | SMA SOLAR TECHNOLOGY AG  | Oil & Gas         | 2010       | 2015      | 6     | 0.42  | 0.22       | -0.61        | +          | -            |    |
| 74 | SAP   | SAP SE                   | Technology        | 2006       | 2015      | 10    | 0.24  | 0.65       | 0.69         | +          | +            |    |
| 75 | SAZ   | STADA ARZNEIMITTEL AG    | Healthcare        | 2006       | 2015      | 10    | -0.12 | 0.01       | 0.01         | -          | -            |    |
| 76 | SDF   | K&S AG                   | Basic Materials   | 2006       | 2015      | 10    | -0.08 | -0.01      | 0.01         | +          | -            |    |
| 77 | SGL   | SGL CARBON SE            | Industrials       | 2006       | 2015      | 10    | 0.01  | 0.01       | 0.01         | +          | +            |    |
| 78 | SIE   | SIEMENS AG               | Industrials       | 2006       | 2015      | 10    | -0.02 | 0.20       | 0.34         | -          | -            |    |
| 79 | SNG   | SINGULUS TECHNOLOGIES AG | Industrials       | 2006       | 2011      | 6     | 0.01  | 0.02       | 0.00         | +          | +            |    |
| 80 | SOW   | SOFTWARE AG              | Technology        | 2006       | 2015      | 10    | 0.62  | 0.34       | 0.56         | +          | +            |    |
| 81 | SWV   | SOLARWORLD AG            | Oil & Gas         | 2006       | 2012      | 7     | 0.30  | -0.08      | 0.08         | -          | +            |    |
| 82 | SY1   | SYMRISE AG               | Basic Materials   | 2008       | 2015      | 8     | 1.23  | 0.80       | 0.64         | +          | +            |    |
| 83 | SZG   | SALZGITTER AG            | Basic Materials   | 2006       | 2015      | 10    | -0.00 | -0.06      | -0.05        | +          | +            |    |
| 84 | TEG   | TAG IMMOBILIEN AG        | Financials        | 2006       | 2015      | 10    | -0.01 | 0.16       | 0.10         | -          | -            |    |
| 85 | TKA   | THYSSENKRUPP AG          | Industrials       | 2006       | 2015      | 10    | -0.02 | -0.01      | -0.05        | +          | +            |    |
| 86 | TUI1  | TUI AG                   | Consumer Services | 2006       | 2014      | 9     | -0.03 | -0.01      | -0.02        | +          | +            |    |
| 87 | UTDI  | UNITED INTERNET AG       | Technology        | 2006       | 2013      | 8     | 0.21  | -0.00      | 0.04         | -          | +            |    |
| 88 | VOS   | VOSSLOH AG               | Industrials       | 2006       | 2015      | 10    | 0.01  | -0.00      | -0.05        | -          | -            |    |
| 89 | VOW3  | VOLKSWAGEN AG            | Consumer Goods    | 2006       | 2015      | 10    | 0.12  | 0.11       | 0.05         | +          | +            |    |
| 90 | WAS   | H&R GMBH & CO KGAA       | Basic Materials   | 2006       | 2013      | 8     | 0.02  | 0.01       | -0.01        | +          | -            |    |
| 91 | WCH   | WACKER CHEMIE AG         | Basic Materials   | 2008       | 2015      | 8     | 0.01  | 0.01       | 0.00         | +          | +            |    |
| 92 | WDI   | WIRECARD AG              | Industrials       | 2010       | 2015      | 6     | -0.11 | 2.52       | 3.42         | -          | -            |    |
| 93 | WIN   | DIEBOLD NIXDORF AG       | Technology        | 2007       | 2015      | 9     | 0.47  | 1.08       | 0.91         | +          | +            |    |
| 94 | ZIL2  | ELRINGKLINGER AG         | Consumer Goods    | 2006       | 2015      | 10    | 0.79  | 0.24       | 0.24         | +          | +            |    |
|    |       |                          |                   |            |           |       |       |            |              | Sum (+)    | 60           | 53 |
|    |       |                          |                   |            |           |       |       |            |              | Sum (-)    | 34           | 41 |

Notes: As our analysis focuses on changes between year t and t-1, every firm loses one year observation for each variable. Therefore, the regression models for VECs and CECs coefficients are based on the years, provided in Table 2, minus one observation. See Table 1 for all variable definitions.

Table 3

List of valuation stewardship coefficients (VSCs) signs by industry.

|                    | No. of firms | VSC-CEO  |          | VSC-BOARD |          | VSC-CEO =VSC-BOARD |
|--------------------|--------------|----------|----------|-----------|----------|--------------------|
|                    |              | (+)      | (-)      | (+)       | (-)      |                    |
| All industries     | 94           | 64% (60) | 36% (34) | 56% (53)  | 44% (41) | 76% (71)           |
| Basic materials    | 10           | 90% (9)  | 10% (1)  | 80% (8)   | 20% (2)  | 70% (7)            |
| Consumer goods     | 12           | 83% (10) | 17% (2)  | 75% (9)   | 25% (3)  | 92% (11)           |
| Consumer services  | 9            | 78% (7)  | 22% (2)  | 56% (5)   | 44% (4)  | 78% (7)            |
| Financials         | 16           | 31% (5)  | 69% (11) | 44% (7)   | 56% (9)  | 88% (14)           |
| Healthcare         | 8            | 25% (2)  | 75% (6)  | 50% (4)   | 50% (4)  | 75% (6)            |
| Industrials        | 25           | 72% (18) | 28% (7)  | 44% (11)  | 56% (14) | 72% (18)           |
| Oil & gas          | 3            | 33% (1)  | 67% (2)  | 33% (1)   | 67% (2)  | 33% (1)            |
| Technology         | 6            | 83% (5)  | 17% (1)  | 83% (5)   | 17% (1)  | 67% (4)            |
| Telecommunications | 2            | 50% (1)  | 50% (1)  | 0% (0)    | 100% (2) | 50% (1)            |
| Utilities          | 3            | 67% (2)  | 33% (1)  | 100% (3)  | 0% (0)   | 67% (2)            |

Note: See Table 1 for all variable definitions. See Table 2 for further information on the firms included in the industries.

coefficients for the CEO. The same can be observed for the non-CEO management board members in the Financials, Industrials, Telecommunications, and Oil & Gas industries. These descriptive findings already indicate that the association is to some extent firm and industry specific and, thus, provide some support for [Kuhner and Pelger \(2015\)](#) analytical finding of a sensitive relationship between the two uses of accounting information.

#### 4.2. The association between valuation and stewardship usefulness

Table 4 presents the results for our hypotheses H1 and H2 (for the third regression stage) and summary statistics of the VECs and the CECs. The first two columns of Table 4 focus on CEO cash compensation in regression (2), while the last two columns focus on average cash compensation of the other management board members. Model 1 includes the full sample of VECs and CECs in regression (3), while Model 2 presents results on the basis of VECs and CECs winsorized at the 5% level.

**Table 4**  
Univariate OLS analysis with dependent variable VEC (valuation earnings coefficients).

| $VEC_i = \gamma_0 + VSC \times CEC_i + \epsilon_i$ |                            |                                 |                            |                                 |
|--|----------------------------|---------------------------------|----------------------------|---------------------------------|
| Variable   | Model 1<br>VEC<br>(N = 94) | Model 2<br>VEC (w5)<br>(N = 94) | Model 1<br>VEC<br>(N = 94) | Model 2<br>VEC (w5)<br>(N = 94) |
| CEC [CEO cash]                                     | <b>0.376 (5.45)***</b>     | <b>0.278 (3.66)***</b>          |                            |                                 |
| CEC [Board cash]                                   |                            |                                 | -0.084 (-0.86)             | 0.131 (1.41)                    |
| R <sup>2</sup>                                     | 0.244                      | 0.127                           | 0.008                      | 0.021                           |
| Adj. R <sup>2</sup>                                | 0.236                      | 0.118                           | -0.003                     | 0.011                           |
| VEC reg. (1)                                       |                            |                                 |                            |                                 |
| Min  | -0.50                      | -0.10                           | -0.50                      | -0.10                           |
| Max  | 3.06                       | 0.82                            | 3.06                       | 0.82                            |
| Mean   | 0.21                       | 0.18                            | 0.21                       | 0.18                            |
| VEC reg. (2)                                       |                            |                                 |                            |                                 |
| Min  | -0.92                      | -0.28                           | -1.26                      | -0.41                           |
| Max  | 3.95                       | 1.08                            | 3.42                       | 0.91                            |
| Mean   | 0.20                       | 0.15                            | 0.09                       | 0.08                            |

Notes: The t-statistics are in parentheses and the significance levels are at the 1% (\*\*\*), 5% (\*\*), and 10% (\*) levels. CEC<sub>i</sub> stands for compensation earnings coefficients and uses cash compensation in reg. (2). Model 2 winsorizes VECs and CECs on 5% and 95% levels before running reg. (3), which is indicated by (w5). VECs calculated in reg. (1) and CECs calculated in reg. (2) with robust standard errors are reported with their minimum, maximum, and mean values below the results of reg. (3). See Table 1 for all variable definitions.

**Table 5**  
Multivariate OLS analysis with dependent variable VEC (valuation earnings coefficients).

| $VEC_i = \gamma_0 + VSC \times CEC_i + \gamma_1 DFFLOAT_i + \gamma_2 (DFFLOAT \times CEC)_i + \epsilon_i$ |                                  |                            |                                    |                            |                            |                                   |                            |                            |
|---|----------------------------------|----------------------------|------------------------------------|----------------------------|----------------------------|-----------------------------------|----------------------------|----------------------------|
| $VEC_i = \gamma_0 + VSC \times CEC_i + \gamma_1 DSIZE_i + \gamma_2 (DSIZE \times CEC)_i + \epsilon_i$     |                                  |                            |                                    |                            |                            |                                   |                            |                            |
| Variable  | Model 1<br>VEC<br>(N = 94)       | Model 2<br>VEC<br>(N = 94) | Model 3<br>VEC<br>(N = 94)         | Model 4<br>VEC<br>(N = 94) | Model 1<br>VEC<br>(N = 94) | Model 2<br>VEC<br>(N = 94)        | Model 3<br>VEC<br>(N = 94) | Model 4<br>VEC<br>(N = 94) |
| CEC   | 0.112                            | <b>0.376</b>               | <b>0.496</b>                       | <b>0.395</b>               |                            |                                   |                            |                            |
| [CEO cash]  | (0.78)                           | <b>(5.16)***</b>           | <b>(6.59)***</b>                   | <b>(5.33)***</b>           |                            |                                   |                            |                            |
| CEC   |                                  |                            |                                    |                            | -0.061 (-0.32)             | -0.122 (-1.20)                    | -0.112 (-0.66)             | -0.142 (-1.36)             |
| [Board cash]  |                                  |                            |                                    |                            |                            |                                   |                            |                            |
| DFFLOAT   | <b>-0.160</b><br><b>(-1.87)*</b> |                            |                                    |                            | -0.078 (-0.81)             |                                   |                            |                            |
| DSIZE   |                                  | -0.090 (-1.05)             | -0.044 (-0.54)                     | -0.032 (-0.34)             |                            | <b>-0.224</b><br><b>(-2.40)**</b> | -0.157 (-1.63)             | -0.118 (-1.19)             |
| DFFLOATxCEC   | <b>0.341</b><br><b>(2.09)**</b>  |                            |                                    |                            | -0.023 (-0.10)             |                                   |                            |                            |
| DSIZExCEC   |                                  | -0.344 (-1.16)             | <b>-0.501</b><br><b>(-3.35)***</b> | -0.181 (-0.85)             |                            | 0.031 (0.09)                      | 0.068 (0.33)               | 0.393 (1.39)               |
| R <sup>2</sup>  | 0.290                            | 0.269                      | 0.346                              | 0.254                      | 0.016                      | 0.068                             | 0.037                      | 0.038                      |
| Adj. R <sup>2</sup>   | 0.266                            | 0.244                      | 0.324                              | 0.229                      | -0.017                     | 0.037                             | 0.004                      | 0.006                      |
| DUMMY = 1 if  | Free float                       | Total assets               | MCAP                               | Board size                 | Free float                 | Total assets                      | MCAP                       | Board size                 |
|   | >0.73                            | >15.26                     | >14.81                             | >4.33                      | >0.73                      | >15.26                            | >14.81                     | >4.33                      |
|   | (N = 53)                         | (N = 40)                   | (N = 40)                           | (N = 33)                   | (N = 53)                   | (N = 40)                          | (N = 40)                   | (N = 33)                   |

Notes: The t-statistics are in parentheses and the significance levels are at the 1% (\*\*\*), 5% (\*\*), and 10% (\*) levels. CEC<sub>i</sub> stands for compensation earnings coefficients and uses cash compensation in reg. (2). See Table 1 for all variable definitions.

For the CEOs' cash compensation, we find no support for H1. Instead, our analysis reveals a positive association between valuation and compensation earnings coefficients which is in line with the US evidence by [Bushman et al. \(2006\)](#) and [Banker et al. \(2009\)](#). In contrast, we find support for H2 of no association for average non-CEO board members' compensation. These different results for the CEOs vs. the non-CEO management board members might reflect the sensitivity of the valuation/stewardship relationship to managerial characteristics.

Table 5 reports further tests on the sensitivity of the association for the CEO (H1) and other management board members (H2). In a multivariate setting, we explore whether the association is sensitive when considering firm characteristics. Therefore, as outlined in (4) and (5) we introduce an interaction term between the compensation earnings coefficient (CEC) and a dummy of the firm's (mean of) free float (Model 1) or firm size (Models 2–4). Model 1 of Table 5 provides the results when using the interaction term, where the dummy variable is one for free float values greater than (the mean in our sample of) 73%. For CEOs, the pure relationship is no longer significantly positive, while the interaction term is significantly positive. This indicates that the positive significant association holds only for firms with a high degree of free float. For other management board members, we support our prior results of no association.

**Table 6**

Robustness: Univariate OLS analysis with dependent variable VEC (valuation earnings coefficients).

| $VEC_i = \gamma_0 + VSC \times CEC_i + \epsilon_i$ |                            |                                |                            |                                 |
|--|----------------------------|--------------------------------|----------------------------|---------------------------------|
| Variable   | Model 1<br>VEC<br>(N = 94) | Model 2<br>VEC(w5)<br>(N = 94) | Model 1<br>VEC<br>(N = 94) | Model 2<br>VEC (w5)<br>(N = 94) |
| CEC [CEO total]                                    | <b>0.361 (4.95)***</b>     | <b>0.153 (1.99)*</b>           |                            |                                 |
| CEC [Board total]                                  |                            |                                | <b>-0.224 (-2.00)**</b>    | -0.0499 (-0.47)                 |
| R <sup>2</sup>                                     | 0.210                      | 0.041                          | 0.042                      | 0.002                           |
| Adj. R <sup>2</sup>                                | 0.202                      | 0.031                          | 0.031                      | -0.008                          |
| VEC reg. (1)                                       |                            |                                |                            |                                 |
| Min  | -0.50                      | -0.10                          | -0.50                      | -0.10                           |
| Max  | 3.06                       | 0.82                           | 3.06                       | 0.82                            |
| Mean   | 0.21                       | 0.18                           | 0.21                       | 0.18                            |
| VEC reg. (2)                                       |                            |                                |                            |                                 |
| Min  | -1.35                      | -0.40                          | -1.27                      | -0.45                           |
| Max  | 3.94                       | 1.20                           | 2.19                       | 0.61                            |
| Mean   | 0.17                       | 0.15                           | 0.05                       | 0.04                            |

Notes: The t-statistics are in parentheses and the significance levels are at the 1% (\*\*\*) , 5% (\*\*), and 10% (\*) levels.  $CEC_i$  stands for compensation earnings coefficients and uses total compensation in reg. (2). Model 2 winsorizes VECs and CECs on 5% and 95% levels before running reg. (3), which is indicated by (w5). VECs calculated in reg. (1) and CECs calculated in reg. (2) with robust standard errors are reported with their minimum, maximum, and mean values below the results of reg. (3). See Table 1 for all variable definitions.

Table 5 also presents our results for the interaction with one of three different variables for firm size: logarithm of total assets (Model 2), logarithm of market capitalization (Model 3), and board size (Model 4). For CEOs, we find no support for H1. Instead, in general we find support for prior univariate results of a positive association. However, when we estimate firm size with market capitalization, the regression result indicates that larger firms do not have an overall positive association between valuation and stewardship uses of accounting information for the CEO (Model 3,  $MCAP > 14.81$ ). Thus, the findings regarding firm size are somewhat inconclusive. For other management board members, we can support H2 in line with the univariate results of no association between valuation and stewardship uses when comparing larger firms to smaller firms.

Summarizing our results, in line with the extant evidence from the US we find a positive association between valuation and stewardship uses of accounting information for CEO compensation data in univariate analysis. However, we find that this association is sensitive to firm characteristics in multivariate analyses. This pertains particularly to the degree of free float: Firms with higher free float tend to have a positive relationship. Moreover, our test of H2 reveals that the association of valuation and stewardship uses also depends on the scope of managers considered as we find no significant (univariate and multivariate) association for non-CEO management board members.

#### 4.3. Robustness tests

Tables 6 and 7 present robustness tests for our hypotheses. Table 6 presents our univariate results for H1 and H2 with the use of total compensation instead of cash compensation in regression (2). In general, the results support our prior findings. However, we find a significant negative association for the average management board members' compensation (excluding the CEO) in the univariate analyses.

In Table 7, we present robustness tests using total compensation and interaction terms with dummies for firms with higher than average free float values and larger than average firm size. Except for Model 2, we support our prior findings of a sensitive/firm specific association for the CEO. Larger firms seem to have a less strong positive association between stewardship and valuation uses of accounting information (Models 3 and 4 with CEO total compensation). Model 1 for the CEO indicates that there might be no significant association for firms with a low degree of free float, while there is a positive significant association for firms with a high degree of free float, which supports our prior results in Table 5. For the other management board members, we can only support prior results of no association in Model 4. Model 1 to Model 3 indicate a significant negative association when using total compensation. This might be explained by total compensation having less linkage to (value-relevant) accounting earnings.

## 5. Discussion and conclusion

Motivated by the scarcity of empirical research on the relationship between the valuation and stewardship uses of accounting information (e.g., Murphy et al., 2013; O'Connell, 2007) and recent analytical findings suggesting a context-specific relationship (Kuhner & Pelger, 2015), this paper provides empirical evidence from a non-US setting. For this purpose, we focus on listed German firms. Moreover, we consider whether the consideration of managerial characteristics, for which we use the distinction between the CEO and non-CEO management board members as a proxy, and firm-specific characteristics, firm size and free float, affect the relationship of the two uses in the German setting.

**Table 7**

Robustness: Multivariate OLS analysis with dependent variable VEC (valuation earnings coefficients).

| $VEC_i = \gamma_0 + VSC \times CEC_i + \gamma_1 DFFLOAT_i + \gamma_2 (DFFLOAT \times CEC)_i + \epsilon_i$ $VEC_i = \gamma_0 + VSC \times CEC_i + \gamma_1 DSIZE_i + \gamma_2 (DSIZE \times CEC)_i + \epsilon_i$ |                               |                                  |                            |                            |                               |                               |                            |                               |  |
|---|-------------------------------|----------------------------------|----------------------------|----------------------------|-------------------------------|-------------------------------|----------------------------|-------------------------------|--|
| Variable  | Model 1<br>VEC<br>(N = 94)    | Model 2<br>VEC<br>(N = 94)       | Model 3<br>VEC<br>(N = 94) | Model 4<br>VEC<br>(N = 94) | Model 1<br>VEC<br>(N = 94)    | Model 2<br>VEC<br>(N = 94)    | Model 3<br>VEC<br>(N = 94) | Model 4<br>VEC<br>(N = 94)    |  |
| CEC [CEO total]   | -0.0332<br>(-0.29)            | <b>0.353 (4.71)***</b>           | <b>0.409 (5.36)***</b>     | <b>0.433 (5.59)***</b>     |                               |                               |                            |                               |  |
| CEC [Board total]   |                               |                                  |                            |                            | <b>-0.360 (-2.09)**</b>       | <b>-0.272 (-2.34)**</b>       | <b>-0.352 (-2.25)**</b>    | -0.168<br>(-1.34)             |  |
| DFFLOAT   | <b>-0.212 (-2.67)***</b>      |                                  |                            |                            | -0.058<br>(-0.61)             |                               |                            |                               |  |
| DSIZE   |                               | -0.142 (-1.59)                   | -0.092<br>(-1.03)          | 0.003 (0.03)               |                               | <b>-0.226 (-2.47)**</b>       | -0.149<br>(-1.58)          | -0.106<br>(-1.10)             |  |
| DFFLOATxVEC   | <b>0.606 (4.28)***</b>        |                                  |                            |                            | 0.266 (1.15)                  |                               |                            |                               |  |
| DSIZExVEC   |                               | -0.152 (-0.48)                   | <b>-0.374 (-1.78)*</b>     | <b>-0.482 (-2.45)**</b>    |                               | 0.350 (1.01)                  | 0.329 (1.46)               | -0.349<br>(-1.24)             |  |
| R <sup>2</sup>  | 0.359                         | 0.242                            | 0.265                      | 0.265                      | 0.058                         | 0.107                         | 0.082                      | 0.071                         |  |
| Adj. R <sup>2</sup>   | 0.337                         | 0.217                            | 0.241                      | 0.240                      | 0.027                         | 0.077                         | 0.052                      | 0.040                         |  |
| DUMMY = 1 if  | Free Float > 0.73<br>(N = 53) | Total Assets > 15.26<br>(N = 40) | MCAPE > 14.81<br>(N = 40)  | Board Size > 4.33 (N = 33) | Free Float > 0.73<br>(N = 53) | Total Assets > 15.26 (N = 40) | MCAPE > 14.81<br>(N = 40)  | Board Size > 4.33<br>(N = 33) |  |

Notes: The t-statistics are in parentheses and the significance levels are at the 1% (\*\*\*), 5% (\*\*), and 10% (\*) levels.  $CEC_i$  stands for compensation earnings coefficients and uses total compensation in reg. (2). See Table 1 for all variable definitions.

Our univariate findings with respect to CEO compensation are in line with prior literature documenting a positive association of valuation and stewardship on the basis of US data (Banker et al., 2009; Bushman et al., 2006). This finding reflects that the interplay of the two uses of accounting information seems to be similar in both the US setting and the German setting. Reasons for this finding might include the more Anglo-American style of governance adopted in Germany during recent decades (Engelen, 2015), including substantial increases in (and more variable incentive-based) top management compensation (Beck, Friedl, & Schäfer, 2020).

In multivariate tests, we then show that this positive association for CEO compensation does not always remain stable when considering firm-specific characteristics, in particular free float. Free float captures the ownership not held by larger shareholder and reflects an important governance variable (e.g., Engelen, 2015). Our findings show that for firms with higher levels of free float the valuation/stewardship relationship remains positive, while this is not the case for those firms with lower levels of free float. In other words, the valuation use of accounting information seems to be more in line with accounting incentives being provided to management (stewardship use) when the level of free float is higher.

This implies that for firms with dominant blockholders, where free float is rather limited, the two uses of accounting information are less likely to overlap. While the traditional dominance of blockholders in many German firms has decreased over time (Engelen, 2015), we can expect that in countries where blockholdings continue to be important there is no overall positive (univariate) relationship between the two uses of accounting information. This finding calls for future cross-country studies to further explore how and to what extent ownership (and other governance variables) influence the relationship between the valuation and stewardship uses of accounting information.

The finding of the sensitivity of the valuation/stewardship relationship to the governance variable of free float also suggests that there is no general positive empirical relationship between the two uses. This finding resonates with the analytical literature that repeatedly emphasized possible differences between the valuation and stewardship uses of accounting information (e.g. Gjesdal, 1981; Heinle & Hofmann, 2011; Paul, 1992), and is also in line with findings on the context-sensitivity of the relationship in the model by Kuhner and Pelger (2015).

We also find no association between valuation and stewardship usefulness in univariate and multivariate analyses for non-CEO members of the management board. Thus, for the same set of firms different associations between valuation and stewardship are found for CEOs vs. non-CEO management board members. In other words, while more value-relevant accounting information leads to higher CEO compensation, it has no significant impact on the compensation of other management board members. This finding might reflect differences in managerial characteristics, such as regarding risk aversion (Kaplan & Sorensen, 2017; Kuhner & Pelger, 2015). Consistent with agency theory, Graham et al. (2013) provide empirical evidence that higher risk aversion leads to incentive-based compensation becoming more costly. Therefore, more risk averse managers are paid less variable (and relatively more fixed) compensation. As Kaplan and Sorensen (2017) report that CEOs are less risk-averse than other management board members, this provides a possible explanation for our findings of a positive relationship between valuation and stewardship information for CEOs but of no significant relationship for non-CEO board members.

While prior research suggests differences in characteristics between CEOs and other top managers, in our study we cannot capture such differences directly. Instead, we rely on the distinction between CEOs and non-CEO board members as a proxy. Therefore, we cannot rule out alternative explanations for our finding. For instance, the different relationship that we find might also be due to the specific tasks of the respective management board members. For example, [Caglio, Dossi, and Van der Stede \(2018\)](#) show that CFOs' pay becomes more similar to the pay of CEOs if they have similar tasks and decision rights. Thus, future research might analyze in more detail how the different functions and tasks of management board members affect the relationship of valuation and stewardship uses of accounting information. It might also be interesting to use compensation data for lower hierarchy levels than top management to further explore the link between valuation and stewardship uses.

The finding on different relationships for CEOs vs. non-CEO management board members is also noteworthy on the background of analytical agency models. All models dealing with the valuation/stewardship relationship assume a single agent being responsible for managing the firm on behalf of the principal. However, this perspective is not descriptive of real-world settings where multiple top managers have significant decision rights. For example, the CEO-CFO interplay and their respective incentives are recently considered more thoroughly in the analytical literature in accounting (e.g., [Friedman, 2016](#)). Introducing such a (broader) analytical perspective to the study of the relationship of valuation and stewardship uses might provide more nuanced insights that could then also be subjected to empirical testing.

Our findings can also be related to recent debates on the role of stewardship in the objective(s) of financial reporting specified in the IASB's conceptual framework. In the basis for conclusion of its 2018 conceptual framework the IASB outlines that – during the consultations – “some stakeholders” would have liked to see “the provision of information to help to assess management's stewardship [...] as an additional and equally prominent objective” to valuation usefulness ([IASB, 2018, BC1.35](#)). The IASB rejects this idea as “stewardship is not an end in itself; it is an input needed in making resource allocation decisions” ([IASB, 2018, BC1.35\(a\)](#)). While the latter is a normative statement by the IASB presented without any empirical support, our paper suggests that it is not, in general, descriptive of empirical settings of the use of accounting information to assume that stewardship usefulness can automatically be encompassed in valuation usefulness. Instead, the relationship of the uses of accounting information is affected by the firms' governance, such as by the extent of free float, and the set of managers considered regarding accounting-based incentive compensation. Thus, the complexity of the relationship becomes apparent even if we adopt an arguably narrow perspective on stewardship that only focuses on managerial compensation.

More empirical evidence on how accounting information is actually used and how different uses relate to each other might help standard-setters to base their future debates on a better (empirical) basis. Research, using interviews, surveys, or quantitative archival approaches, could shed further light on the complex nature of the relationship between different uses of accounting information. This might lead the IASB to reflect more critically in the future on the normative stance currently adopted.<sup>10</sup>

Our findings are subject to several limitations. First, we focus on the German setting which has some specificities which might not be representative of the empirical situation in other jurisdictions. This relates to laws affecting corporate governance, in particular regarding management compensation, as well as specifics of the capital market. Therefore, the association between valuation and stewardship and the effect of firm factors might differ in countries with different regulatory and capital market settings. Broader cross-country studies could explore how differences between countries or regions affect the nature of the relationship. Such research could also systematically scrutinise the influence of country-specific elements on the relationship, which we are unable to do in a single country setting.

Second, the use of the three-stage model is based on the approach introduced by [Bushman et al. \(2006\)](#). This approach might be valid to explore the relationship between different uses of accounting information but due to the aggregation that is used in the first two regressions also leads to a rather indirect measurement of the relationship. This somewhat limits the opportunities to capture the extent of the influence of firm characteristics on the relationship of the two uses. Therefore, developing further approaches to empirically assess the relationship might be a fruitful endeavour for future accounting research. Such approaches, in the spirit of and going beyond [Gassen \(2008\)](#), might also try to capture the relationship between valuation and broader notions of stewardship than our narrow focus on management compensation.

Third, our study analyzes the statistical association between the uses and their sensitivity to certain factors. This does not allow us to directly detect causality in the sense of what causes the relationship to be positive, non-existent, or negative. While we offer some explanations for our findings, further research, using multiple methods, could try to analyze more deeply the reasons responsible for the type of the relationship. For example, research could more clearly reveal the extent of the influence of managerial, firm, or country factors on the relationship. Such research might also try to link characteristics of accounting standards or systems to the type of the relationship. In particular, studies might contrast the relationship for the times before and after (mandatory) adoption of IFRS. Existing literature suggests a decreasing usefulness of IFRS accounting numbers for compensation contracts on the basis of UK data ([Voulgaris et al., 2014](#)), while in several settings effects of IFRS adoption on value relevance seem to be positive (summarized e.g. in Institute of Chartered Accountants in England and Wales ([ICAEW](#)), 2015). However, research so far has not explored how IFRS adoption affected the relationship between valuation and stewardship uses of accounting information. In this regard, it might also be interesting to explore how changes in

<sup>10</sup> In a related case, [Young \(2006\)](#) shows that the user (investor) orientation of the FASB is not based on empirical evidence of user preferences but that the user is constructed as an ideal-type rational economic decision-maker.

key standards in IFRS over time, such as introducing more fair value accounting, influence the relationship. Watts (2003) suggested that more fair value accounting makes accounting standards less useful for contracting purposes, which might affect the valuation/stewardship relationship.

Fourth, Christodoulou and McLeay (2014) highlight the problem of endogeneity in regression modelling with respect to the variation in accounting variables based on double entry bookkeeping. While we are aware that we cannot observe the individual causal effects between endogenous periodic accounting variables, it is not possible to apply an alternative approach to the ordinary least squares (OLS) regression because we have no valid instrument for EARN. Furthermore, our model is only focusing on the data available and as we use changes between year  $t$  and  $t-1$ , we cannot observe the changes before 2006 for the German setting. Together with the lack of management board compensation data in several cases due to opt-outs by firms regarding individual disclosure of board compensation, this might lead to selection bias. With regard to the firms included in our empirical analysis, we try to mitigate these concerns by providing descriptive evidence on CECs and VECs in Table 2.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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