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Do overlapping audit and compensation committee memberships contribute to better financial reporting quality? Empirical evidence for the German two-tier system

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Abstract: Strengthening audit committee effectiveness is a key challenge from a research, regulation and corporate practice perspective. Audit committees' monitoring role in financial reporting is of great importance for shareholders and other stakeholder groups. This empirical-quantitative study examines overlapping membership in the audit and compensation committees and its impact on financial reporting quality. The analysis covers a sample of German firms listed on the 'DAX', 'TecDAX' and 'MDAX' for the business years 2010–2016 (426 firm-year observations). Correlation and regression analyses were conducted to evaluate the link between two overlapping variables and financial reporting quality. While the first overlapping variable (proportion of audit committee members who also sit on the compensation committee) contributes positively to accrual quality (as financial reporting quality), no significant results were found for the second overlapping variable (the existence of an independent financial expert as an overlapping member). The main result holds for robustness checks and has major implications in the German two-tier system.

Keywords: corporate governance; audit committee; compensation committee; financial reporting quality; overlapping membership; restatements; accruals.

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Biographical notes: Patrick Velte is a Professor of Accounting and Auditing from the Leuphana University Lueneburg. His main teaching and research interests are financial accounting, auditing and sustainable corporate governance.

1 Introduction

This study focussed on the link between overlapping membership in the audit and compensation committees and financial reporting quality. We examined this relationship because of the great discussions regarding audit committee effectiveness from a research, regulatory and practice view. Since the 2008–2009 financial crisis, the monitoring quality

of boards of directors has been discussed controversially (Ferrero-Ferrero et al., 2012). One of the major criticisms was a lack of expertise by non-executive directors, especially in countries with a two-tier system (management board and supervisory board) (Ferrero-Ferrero et al., 2012). As a reaction to decreased stakeholder trust, private and legal standard setters all over the world implemented several reform initiatives to strengthen corporate governance quality. Audit committees represent one of the key corporate governance institutions that monitor the financial reporting process and cooperate with internal and external auditors (Sahnoun, 2011; Hamdan et al., 2013). According to principal agent theory, management acts opportunistically to influence accounting numbers by earnings management, which has a negative impact on financial reporting quality. Earnings management can be defined as the use of judgement in financial reporting to alter financial reports to mislead about the economic performance of the company and to influence outcomes that depend on reported accounting numbers. Earnings management is normally linked with increased information asymmetry, decreased stakeholder trust in the usefulness of financial reporting and higher cost of capital. The role of audit committees is to lower the extent of earnings management by strict monitoring (Hamdan et al., 2013). During the last 15 years, a variety of variables associated with audit committee effectiveness, such as independence and financial expertise, have been included in empirical-quantitative corporate governance research. One of the recent variables related to audit committee effectiveness that came into focus after the financial crisis 2008–2009 was the practice of overlapping membership of audit committee and compensation committee members (e.g., Kusnadi et al., 2016; Chandar et al., 2012; Liao and Hsu, 2013). As overlapping memberships have heterogeneous impacts on financial reporting quality from an international perspective (the US, Australia, India, Singapore, Spain), we consider analysing this link for the first time in the German two-tier system to be significant.

In comparison to the US board system, where the implementation of audit committees is considerably restricted, there is much more legal flexibility in the European member states. After the last European audit reform in 2014, every member state may include a mandatory or a voluntary regulation on the implementation of audit committees in stock corporations with a two-tier system (Velte, 2017). Furthermore, only one member in the audit committee must be a financial expert, and the audit committee in general has to guarantee the presence of an industry expert without stipulating a specific quota in the EU. While in principle, the majority of the audit committee must be independent from management after the European audit reform in 2014, the EU member states with a two-tier system have a voting right to neglect this regulation because the audit committee is a subcommittee of the supervisory board (Velte, 2017). Also, the implementation of compensation committees is not mandatory according to European law. Germany also recognises a voting right for the implementation of committees in German stock corporations. However, the German Corporate Governance Code (GCGC) as a 'soft-law' system has made a clear recommendation to implement an audit committee in these companies, in which the audit committee chair should be the financial expert. For most German companies listed at the 'prime standard', the implementation of audit committees represents a best practice. Empirical studies indicate a high compliance rate in the German prime standard (von Werder and Turkali, 2015; Velte and Stiglbauer, 2011). Therefore, there are major regulatory differences between most of the previous studies on overlapping memberships in the audit committee and this study.

Although there is a wide range of empirical-quantitative research on audit committee effectiveness, overlapping memberships on audit and compensation committees have not been the main focus recently. We identified eight studies with mixed results regarding the impact of overlapping memberships on financial reporting quality (Kalelkar, 2017; Shankaraiah and Amiri, 2017; Fernandez-Mendez et al., 2017; Habib and Bhuiyan, 2016; Kusnadi et al., 2016; Liao and Hsu, 2013; Chandar et al., 2012; Chang et al., 2011). On the one hand, overlapping memberships are connected with an increased expertise and knowledge spillovers that can lead to increased monitoring quality in the audit committee (Habib and Bhuiyan, 2016). On the other hand, their presence on more than one committee may cause audit committee members to become overcommitted, thereby decreasing their effectiveness as monitors of reported earnings (Kalelkar, 2017; Laux and Laux, 2009). According to the busyness hypothesis, audit committee monitoring is decreased when their members are busy (Tanyi and Smith, 2015). To the best of our knowledge, no study has been conducted for the German two-tier system and for an insider corporate governance model that is focussed on monitoring by the supervisory board. We chose Germany in view of its classical representation of code law and a two-tier system with a long tradition of supervisory boards. In contrast to one-tier systems, members of audit and compensation committees belong to supervisory boards in Germany. Furthermore, there is a legal requirement for employee 'codetermination' in German supervisory boards: one-third in firms with more than 500 employees or one-half in firms with a workforce of more than 2,000. Because representatives of employees on supervisory boards focus on employee interests as a major social goal, corporate social responsibility in the supervisory boards seems to be a major challenge in contrast to other regimes. Furthermore, Germany represents an insider model of corporate governance with a long code law tradition. However, supervisory boards are very flexible in establishing audit and compensation committees as there does not exist a legal obligation. We see a huge contribution to the existing literature because of the different corporate governance mechanisms in German stock corporations in contrast to other board systems (Gros, 2016; Kraft and Lopatta, 2016).

Our main analysis focuses on the link between overlapping memberships in the audit committee and compensation committee in German firms listed on the 'DAX', 'TecDAX' and 'MDAX' (426 firm-year observations) on financial reporting quality for the business years 2010–2016. As there are many different definitions of financial reporting quality, we referred to the commonly accepted definition used by Jonas and Blanchet (2000): Financial reporting quality represents full and transparent financial information that is not designed to obfuscate or mislead users. We hand-collected two variables related to overlapping membership (i.e., the proportion of overlapping members and the existence of an independent financial expert as an overlapping member) and referred to the famous model by Kothari et al. (2005) to measure discretionary accruals (DA) as a proxy for financial reporting quality (Aguir et al., 2013).

We used two independent variables for our regression models and found that overlapping membership in the audit and compensation committees was linked with an increased financial reporting quality. While our first variable (percentage of overlapping membership) showed a positive significance, we did not find any significant links with regard to our second variable (the existence of an independent financial expert in the audit committee who also sits in the compensation committee). We referred to critical mass theory, which could be an explanation for our results. Our findings are robust to two

alternative measures of financial reporting quality (i.e., earnings restatements and non-audit fees (NAF)) and are in line with the theoretical model by Laux and Laux (2009), who assume that overlapping memberships can be connected with an increased knowledge of pay-for-performance compensation and with a better position to analyse management's incentives for earnings management. Furthermore, our results are in line with Fernandez-Mendez et al. (2017), Kalelkar (2017), Habib and Bhuiyan (2016) and Chandar et al. (2012).

In total, our results have great implications for regulatory, practical and research issues. First, the German standard setters should be aware of increased audit committee effectiveness by overlapping memberships on audit and compensation committees. As the implementation of audit committees is only recommended by the GCGC and only one financial expert is required by the German stock law, it could be useful to extend the recommendation of the GCGC or extend the regulations on supervisory board composition. Second, on a practical level, the information process within the supervisory board seems to be a key challenge with potential for improvement. The positive impact of overlapping members' knowledge spillovers depends to a great extent on their influence in the committees and the supervisory board. With regard to the individual circumstances in the communication processes of supervisory boards and their committees, the positive link between overlapping memberships depends on many firm-specific circumstances. Third, from a research perspective, we encourage future researchers to use other empirical methods (e.g., interviews or experiments) to analyse the motives and reactions of overlapping memberships in the audit committee and compensation committee from an internal and external view. Because Chandar et al. (2012) found a *u*-shaped relationship, we have shed light on the future analysis of an optimal proportion of overlapping members and on other overlapping attributes, e.g., overlapping memberships between audit committees and risk committees, nomination committees or sustainability committees.

The remainder of this study is organised as follows. First, we provide the theoretical foundation, the literature review on overlapping memberships and our hypotheses. Then, we present our research design, our sample collection and the descriptive statistics. In the next section, the empirical results of our correlation and regression analyses will be examined, followed by our robustness checks, our limitation description and the recommendation for further research.

2 Theoretical foundation, literature review and hypothesis

Empirical research on audit committee effectiveness has been a major focus for more than two decades, where most of the empirical-quantitative research is linked to the US board system (Velte, 2017; Malik, 2014; Ghafran and O'Sullivan, 2013; DeZoort et al., 2002). This research focus can be explained by the huge regulatory impact of the Sarbanes Oxley Act after the collapse of Enron in 2002. Audit committee effectiveness became one of the key corporate governance measures (Malik, 2014). Most of the research concentrates on the impact of audit committees on financial reporting quality because the main function of audit committees lies in the monitoring of the financial reporting process (Velte, 2017). We referred to principal agent theory (Ross, 1973;

Jensen and Meckling, 1976; Tirole, 1986) and identified the audit committee as a key mechanism to lower information asymmetry and conflict of interest between management and the capital market by PIEs (Velte, 2018). In a situation of increased agency conflicts by high earnings management, an effective audit committee should lead to a reduced amount of earnings management and thus an increased quality of financial reporting. Early empirical studies concentrate on the formation of audit committees, while the composition of the audit committee and the individual profile of the members have become more relevant after the financial market crisis in 2008–2009 (Malik, 2014; Ghafran and O'Sullivan, 2013). Afterwards, various studies have examined the impact of the presence of financial expertise and the independence of the audit committee in different regimes and corporate governance systems (Malik, 2014; Ghafran and O'Sullivan, 2013; Velte and Stiglbauer, 2011).

During the financial market crisis, Laux and Laux (2009) assume in their theoretical model that the presence of a compensation committee would increase the use of pay-for-performance CEO compensation, e.g., stock-based payments for better management incentives in line with shareholders. These increased monitoring costs would be borne by the audit committee. Overlapping memberships in the audit committee and compensation committee may curb the increase of pay-for-performance compensation. Following this line, monitoring costs will be decreased and financial reporting quality increased (Kusnadi et al. 2016). Overlapping membership contributes to a better understanding of pay-for-performance compensation and therefore contributes to higher financial quality. According to Chang et al. (2011), Hoitash and Hoitash (2009) and Zheng and Cullian (2010), companies with fewer overlapping memberships in the audit and compensation committee (OMAC) are more likely to employ incentivised CEO compensation, such as stock options.

With regard to financial reporting quality and auditing, the empirical results are mixed (e.g., Kusnadi et al., 2016; Chandar et al., 2012; Liao and Hsu, 2013). This can be explained by the different theoretical implications of OMAC, namely, the increased expertise due to knowledge spillovers versus the lack of time due to busyness. Fernandez-Mendez et al. (2017) found a positive impact from OMAC on qualified audit opinion, indicating an increased financial reporting quality. Habib and Bhuiyan (2016) and Chang et al. (2011) referred to the famous DA model by Kothari et al. (2005). While Habib and Bhuiyan (2016) found a positive relationship between OMAC and financial reporting quality, Chang et al. (2011) state a negative relationship. Liao and Hsu (2013) referred to the Dechow and Dichev (2002) model to measure DA and also found a positive impact of OMAC, assuming a negative impact on financial reporting quality. In contrast to this, a positive relationship between OMAC and financial reporting quality is stressed by Chandar et al. (2012). The authors also indicate a *u*-shaped relationship (i.e., the existence of an optimum number of overlapping members). According to Kalelkar (2017), OMAC lowers audit fees and thus is negatively related to audit risk. From a supply perspective of external auditing, the external auditor assumes an increased audit committee effectiveness under OMAC, which leads to reduced audit fees. Kusnadi et al. (2016), Shankaraiah and Amiri (2017) and Fernandez-Mendez et al. (2017) failed to find any relationship between OMAC and financial reporting quality in different countries (i.e., Singapore, India and Spain). Up to now, no empirical analysis was conducted for German listed firms. In view of these diverse results, it seems unclear whether OMAC

contributes to an increased financial reporting quality in our setting. An overview of the recent empirical studies on OMAC can be found in Table 1.

Table 1 Literature review on the link between OMAC and financial reporting quality

Author(s) and year of publication	*State year sample*	*Independent variable(s)*	*Dependent variable(s)*
Positive link between OMAC and financial reporting quality			
Fernandez-Mendez et al. (2017)	Spain 2004–2011 122 firms	Number of independent directors serving on both audit and compensation committees divided by the total independent directors on the board	Issuance of a qualified audit opinion
Kalelkar (2017)	USA 2007–2012 5,595 firm-year observations	At least one audit committee member sits on the compensation committee	Logarithm of audit fees (audit risk)
Habib and Bhuiyan (2016)	Australia 2001–2013 3,837 firm-year observations	At least one audit committee member is on the compensation committee	DA model by Kothari et al. (2005)
Chandar et al. (2012)	USA 2003–05 1,032 firm-year observations	Proportion of audit committee members who also sit on the compensation committee (and square)	DA model by Kothari et al. (2005) Also indications for an u-shape relationship (optimum)
Negative link between OMAC and financial reporting quality			
Liao and Hsu (2013)	USA 2004–08 1,319 firms	At least one audit committee member on the compensation committee	DA model by Dechow and Dichev (2002)
Chang et al. (2011)	USA 1999–2004 4,355 firm-year observations	Proportion of independent overlapping directors sitting on audit and compensation committee related to total audit committee members or compensation committee members	DA model by Kothari et al. (2005)
Insignificant link			
Kusnadi et al. (2016)	Singapore 2010 423 firms	At least one audit committee member in the compensation committee At least one independent accounting expert in both committees	DA model by Dechow and Dichev (2002)
Shankaraiah and Amiri (2017)	India 2002–2012 133 firms	Proportion of audit committee members who also sit on the compensation committee	DA model by Kothari et al. (2005)
Fernandez-Mendez et al. (2017)	Spain 2004–2011 122 firms	Number of independent directors serving on both audit and compensation committees divided by the total independent directors on the board	DA model by Dechow et al. (1995)

We follow the arguments from principal agent theory (Ross, 1973; Jensen and Meckling, 1976; Tirole, 1986) and the parts of the empirical literature (Liao and Hsu, 2013) that assume that OMAC leads to increased audit committee effectiveness. Higher audit committee effectiveness is linked with better monitoring of financial reporting and with management incentives to lower the number of DA. We developed the following hypothesis (H1).

H1 Overlapping membership in the audit and compensation committees leads to decreased DA and thus to an increased financial reporting quality.

3 Research design

3.1 Sample selection

We chose the German setting for the following reasons. The social, cultural, regulatory and political settings of Germany are unique. First, German stock corporations have to implement a two-tier system (i.e., a management board and supervisory board). Therefore, members of the audit and compensation committee automatically belong to the supervisory board. On average, supervisory boards in two-tier systems are more independent but have less experience with the respective business. This can be related to the impact of overlapping membership on financial reporting quality. Second, German stock corporations with between 500 and 2,000 employees are legally obligated to fulfil a one-third codetermination in the supervisory board, and those corporations with over 2,000 employees must fulfil a one-half codetermination. As a result, social issues play a major role in supervisory boards. Supervisory boards in Germany do not only care for the shareholders but also represent other stakeholders' interests. This is also related to the German tradition of code law. Third, Germany represents an insider model of corporate governance, with relatively little impact from external monitoring by the equity market and a major focus on creditor protection. Fourth, supervisory boards in Germany are very heterogeneous in their members' backgrounds and experience and can reach a large size (up to 21 members). Finally, as the implementation of committees is not mandatory in German stock corporations, supervisory boards are more flexible in their organisation. These qualities stress the exclusiveness of the German setting, which is highly relevant for our research question and our main hypothesis. Although we assume OMAC's positive impact on financial reporting quality, the mentioned aspects are not always complementary in their contribution to audit committee effectiveness.

Our sample selection process began with an initial sample of 110 German companies listed on the 'DAX', 'TecDAX', 'MDAX' for the business years 2010–2016. We excluded financial institutions with major differences in their earnings management in line with recent studies and firms without available financial data in the Thomson and Reuters economics database 'datastream'. Then, we excluded firms without fully available financial data for measuring DA in this timeframe and firms without with missing values on control variables. Our final sample consisted of 426 firm-year observations with OMAC data from 2010–2016. Table 2 gives a summary of the sample selection process. We hand-collected data on OMAC and other governance variables from annual, corporate governance and sustainability reports.

Table 2 Sample selection

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
Listed companies on the German prime standard (DAX30, TecDAX, MDAX).	110	110	110	110	110	110	110
Number of financial institutions and firms without financial data available.	31	31	31	32	32	31	31
Companies without seven years of consecutive financial data for estimating DA.	12	12	13	12	12	13	13
Companies with missing values on control variables.	5	5	6	6	5	5	6
Final sample	62	62	60	60	61	61	60

In our regression model, we analysed whether OMAC has a positive impact on financial reporting quality. The assumptions of regression analysis (i.e., linear relationship, homoscedasticity, multivariate normality and little or no multi-collinearity) were tested based on Hair et al.'s (2009) guidelines.

We conducted a multiple regression analysis to test the impact of OMAC on accruals quality (ACQ) for our sample of German listed companies. The basic model is presented in equation (1) as follows:

$$ACQ_i = \beta_0 + Sum\beta_1 x\ independent\ variables + Sum\beta_2 x\ control\ variables_i + \varepsilon_i \quad (1)$$

Larger ACQ values indicate an increased financial reporting quality, and therefore significant positive coefficient estimates of the independent variables represent a positive impact on financial reporting quality. We then proceeded to conduct panel data regression analyses. In most empirical corporate governance research, endogeneity concerns can limit the validity of quantitative studies (Wintoki et al., 2012). The quality of financial reporting could lead to better audit committee effectiveness and not the other way around as assumed in the current study. The Durbin-Wu-Hausman test is the model most commonly used to check for endogeneity. We thus conducted this test to choose either the random-effects or fixed-effects model for the various regression analyses. In most cases, however, the results were largely similar regardless of the test used, and we did not find any hint of endogeneity in our regression model. If this had not been the case, the use of instrumental variables and the generalised method of moments (GMM) would have been useful (Wintoki et al., 2012). We relied on the fixed-effects model.

3.2 Dependent variable

In line with former empirical research (e.g., Kusnadi et al., 2016), DA represented our proxy for financial reporting quality. The key goals of an audit committee are to monitor the company's financial reporting process and supervise internal and external audits, which should lead to increased financial reporting quality (Malik, 2014). According to principal agent theory, managers influence financial reporting via earnings management in an opportunistic way. In this context, real earnings management (before the balance sheet date) and accruals management (after the balance sheet date) are dominant. Through manipulation of accounting numbers, e.g., of accruals, we measure accruals

quality in our study as a primary variable of financial reporting quality. There are a great variety of different accrual models in empirical research that are based on the famous model by Jones (1991). We referred to the performance-adjusted modification of the Jones (1991) model by Kothari et al. (2005) because it was frequently used in recent earnings management studies (Velte, 2017). Kothari et al. (2005) modified the basic Jones model in order to alleviate the misspecification problem when applied to samples experiencing non-random performance. For all companies in the same industry with at least eight observations in each year, we estimated the following equation to get industry-specific parameters for measuring the non-discretionary part of total accruals (NDA):

$$TAt = \beta_0 \left(1 / ASSETES_{t-1}\right) + \beta_1 delta\ SALES_t - delta\ RECEIVABLE_t + \beta_2 PPE + \beta_3 ROA_{t-1} + \varepsilon_t \quad (2)$$

We measured total accruals (TA) as the difference between net income after tax (NPAT) and operating cash flows (CFO) in line with Hribar and Collins (2002). Delta SALES represents the change in sales from year $t - 1$ to year t. Delta RECEIVABLE represents the change in accounts receivable from year $t - 1$ to year t. PPE is gross property, plant and equipment, and ROA is return on assets. Following Kothari et al. (2005), ROA is lagged in order to control for abnormal performance. We deflated all variables by the lagged TA to control for heteroscedasticity. DA is the residual from equation (2) (TA – NDA). In line with recent empirical studies, we used the absolute value of DA (Habib and Bhuiyan, 2016). Our measure of ACQ remains as our dependent variable. We multiplied the standard deviation by –1 to calculate ACQ. Therefore, an increased amount of ACQ leads to higher financial reporting quality. To check the robustness of our results, we also integrated other accruals models later in this paper.

3.3 Independent variable

We used OMAC as our independent variable with the following alternatives:

1 the proportion of audit committee members who also sit on the compensation committee (OMAC_BASIC)

2 the existence of an independent financial expert as overlapping member (OMAC_IFE).

This variation seems to be most important as there is strong empirical evidence that an independent financial expert in the audit committee positively contributes to financial reporting quality. Independent financial experts are more experienced in performance measurements, so that the quality of the monitoring process of CEO compensation contracts and financial reporting will be increased (Kusnadi et al. 2016). We defined a dichotomous variable (OMAC_IFE), which takes a value of one if there is at least one independent financial expert who sits on both committees.

3.4 Control variables

First, in line with the existing literature (Habib and Bhuiyan 2016), we controlled for other audit and compensation committee variables, such as the size of the audit and

compensation committees (AC_SIZE and CC_SIZE), the number of meetings of audit and compensation committees during a fiscal year (AC_MEET and CC_MEET) and the mean tenure of audit and compensation committee members (AC_TENURE and CC_TENURE). Second, we controlled for the following board attributes: the number of supervisory board members (B_SIZE), the meetings of the supervisory board during the fiscal year (B_MEET) and the mean tenure of supervisory board members (B_TENURE). We also integrated a measure of audit quality based on whether the firm was audited by one of the big four audit firms (i.e., Deloitte, Ernst and Young (EY), KPMG and PricewaterhouseCoopers (PwC) [BIG4]). Third, we integrated other firm characteristics, such as accounting-based performance (return on assets [ROA]), market-based performance (Tobin's q), firm size (total assets [SIZE]) and firm risk (BETA for systematic firm risk and DEBT for unsystematic firm risk). Table 3 gives an overview of our variables in this study.

3.5 Descriptive statistics

The descriptive statistics for ACQ, OMAC_BASIC and OMAC_IFE and the control variables are presented in Table 4. The German firms on the DAX, TecDAX and MDAX have a mean ACQ value of –0.0398 (median = –0.0439), indicating an income-increasing accruals policy. On average, 34.5% of the audit committee members also sit on the compensation committee (with a median of 42.5%). However, the existence of an independent financial expert with OMAC is very low in the sample (mean and median of zero). The mean number of audit committee members (AC_SIZE) is 4.545 (median = 4.787), with a minimum value of three and a maximum value of eight. Slightly different results occurred for CC_SIZE with a mean of 5.657 and a median of 4.938. The number of audit committee meetings (AC_MEET) is 4.987 on average (median of 4.553) and the number of compensation committee meetings (CC_MEET) is 4.234 on average (median of 4.879). Furthermore, the average values for AC_TENURE and CC_TENURE are approximately 3.5 years and 4.659 years, respectively (median of 3.798 and 4.894). B_SIZE is approximately 13 members (median of 14 members), B_MEET is approximately 5 (median of 5) and B_TURE is about 6 years on average (median of 6.598). Most of the firms are audited by the big four audit companies. In terms of the firm-specific final data, the mean values for ROA, Tobin's Q, SIZE, BETA and DEBT are 0.0698, 2.546, 13.224, 0.650 and 0.402 (with mean values of 0.021, 1.898, 15.232, 0.687 and 0.539), respectively.

4 Empirical results

4.1 Correlation analysis

Table 5 represents the Pearson's correlation coefficients. We found that OMAC_BASIC and OMAC_IFE are positively but not significantly correlated with ACQ. It is not surprising that OMAC_BASIC and OMAC_IFE are highly correlated. We did not include these variables in one model but conducted separate regressions. We also found that AC_MEET is correlated with AC_SIZE and CC_MEET with CC_SIZE. Furthermore, we identified a negative correlation between ACQ and each of the

following variables: B_SIZE, ROA, and Tobin's q'. Finally, a positive correlation exists between B_MEET and ACQ and between BIG4 and ACQ. In addition, we examined the variance inflation factor (VIF) of OMAC and found that the VIFs are small (< 5), and the mean VIF is only 3.5, which is much lower than the common rule of 10 as a sign of severe or serious multi-collinearity. One of the correlations is large enough to raise concern related to multi-collinearity.

Table 3 Variables of the empirical study

Dependent variable	*Explanation*
ACQ	Accruals quality, measured by the discretionary accruals according to Kothari et al. (2005), multiplying by (–1). A higher ACQ indicates higher accruals quality and higher financial reporting quality.
Independent variables	*Explanation*
OMAC_BASIC	Proportion of audit committee members who also sit on the compensation committee (OMAC_BASIC)
OMAC_IFE	Dummy variable, if at least one independent financial expert in the audit committee also sits in the compensation committee (1), otherwise 0.
Control variables	*Explanation*
AC_SIZE	Number of members on the audit committee.
CC_SIZE	Number of members in the compensation committee.
AC_MEET	Number of annual meetings of the audit committee.
CC_MEET	Number of annual meetings of the compensation committee.
AC_TENURE	Average number of years the audit committee members spend in the audit committee of the company.
CC_TENURE	Average number of years the compensation committee members spend in the compensation committee of the company.
B_SIZE	Number of members on the supervisory board.
B_MEET	Number of annual meetings of the supervisory board.
B_TENURE	Average number of years the supervisory board members spend in the supervisory board of the company.
BIG4	Dummy variable if one the big four audit firms are elected for financial audit (EY, Deloitte, KPMG, PwC), otherwise 0.
ROA	Return on assets = net income before preferred dividends + ((interest expense on debt – interest capitalised) * (1 – tax rate)) / average of last year's and current year's total assets.
Tobin's Q	Market value of equity and liabilities book value of equity and liabilities.
SIZE	Natural logarithm of total assets (firm size).
BETA	Beta factor (systematic firm risk).
DEBT	Total debt/total assets (unsystematic firm risk).
Variables used in the robustness tests	*Explanation*
RE	Dummy variable, if the firm has earnings restatements in the respective fiscal year (1), otherwise 0.
NAF	Relation between non-audit fees and total fees as reported in the notes.

Table 4 Descriptive statistics of variables for the period between 2010 and 2016

Variables	*Mean*	*SD*	*Median*	*Min*	*Max*
ACQ	–0.0398	0.423	–0.0439	–0.823	3.298
OMAC_BASIC	0.345	0.243	0.425	0.000	0.500
OMAC_IFE	0.000	0.000	0.000	0.000	1.000
AC_SIZE	4.545	1.323	4.787	3.000	8.000
CC_SIZE	5.657	1.767	4.938	3.000	9.000
AC_MEET	4.987	2.232	4.553	2.000	8.000
CC_MEET	4.234	2.545	4.879	2.000	9.000
AC_TENURE	3.540	1.879	3.798	1.000	7.000
CC_TENURE	4.659	2.649	4.894	1.000	9.000
B_SIZE	13.434	5.232	14.209	3.000	21.000
B_MEET	5.039	3.879	4.976	4.000	10.000
B_TENURE	6.333	4.212	6.598	1.000	12.000
BIG4	1	1	0.5	0	1
ROA	0.0698	0.054	0.021	–0.076	0.268
TOBIN's Q	2.546	2.198	1.898	0.432	8.324
SIZE	13.224	2.434	15.232	9.439	18.429
BETA	0.650	0.289	0.687	–0.241	2.549
DEBT	0.402	0.296	0.539	0.211	0.821

Notes: This table represents the descriptive statistics for financial reporting quality, audit committee, compensation committee and supervisory board characteristics and other variables used in this study.
The sample consists of 426 firm-year observation for the fiscal year 2010–2016.
Variable definitions can be found in Table 3.

4.2 Regression analysis

We included two variables, OMAC_BASIC and OMAC_IFE, which represent the overlapping membership of audit committees and compensation committees and estimated equation (2) using ordinary least squares (OLS). The results are presented in models (1) and (2) of Table 6. The estimated coefficients of OMAC_BASIC and OMAC_IFE are both positive, but only OMAC_BASIC is statistically significant. This result can be explained by critical mass theory (Kanter, 1977; Childs and Krook, 2008), where one audit committee member with specific expertise does not have enough influence to change the decision process of the whole committee. A critical mass of more than one audit committee member is needed to influence financial reporting quality. Our findings partly support our hypothesis (H1) that overlapping membership in the audit and compensation committees increases the quality of financial reporting in Germany. Our result is in line with Chandar et al. (2012) and in contrast to Liao and Hsu (2013) and Kusnadi et al. (2016), who found a negative or a non-significant impact of OMAC on ACQ. In line with Laux and Laux's (2009) theoretical model, OMAC is linked to knowledge spillover, which is useful for the audit committee's financial reporting monitoring. With regard to our corporate governance variables, we identified a positive and significant link between ACQ and the following variables: AC_SIZE, CC_SIZE, AC_MEET, B_SIZE and BIG4. Furthermore, DEBT is positively related to ACQ.

Table 5 Correlation matrix

Variables	*ACQ*	*OMAC_BASIC*	*OMAC_IFE*	*AC_SIZE*	*CC_SIZE*	*AC_MEET*	*CC_MEET*	*AC_TENURE*	*CC_TENURE*	*B_SIZE*	*B_MEET*	*B_TENURE*	*BIG 4*	*ROA*	*Tobin's Q*	*SIZE*	*BETA*	*DEBT*
ACQ	1																	
OMAC_BASIC	0.201	1																
OMAC_IFE	0.198	0.598*	1															
AC_SIZE	0.123	0.154	0.204	1														
CC_SIZE	0.198	0.212	0.190	0.212	1													
AC_MEET	0.212	0.298	0.098	0.553*	0.231	1												
CC_MEET	0.287	0.290	0.198	0.211	0.489*	0.209	1											
AC_TENURE	0.109	0.263	0.274	0.459*	0.212	0.320*	0.212	1										
CC_TENURE	0.212	0.187	0.198	0.121	0.320*	0.132	0.290*	0.298	1									
B_SIZE	–0.320*	0.321*	0.540**	0.323*	0.121*	0.152	0.219	0.212	0.310	1								
B_MEET	0.289*	0.212	0.190	0.034	0.032	0.321*	0.222*	0.121	0.221	0.112	1							
B_TENURE	0.210	0.198	0.212	0.219	0.198	0.221	0.321	0.129	0.321	0.298	0.277	1						
BIG4	0.421**	0.121	0.219	0.343*	0.312	0.310*	0.298	0.298	0.300	0.202	0.322	0.287	1					
ROA	–0.231*	0.298	0.198	0.287	0.249	0.189	0.138	0.121	0.032	0.029	0.087	0.198	0.178	1				
Tobin's Q	–0.289*	0.219	0.224	0.287	0.178	0.218	0.264	0.258	0.044	0.178	0.156	0.155	0.123	0.032	1			
SIZE	–0.212	–0.198	-0.198	0.212	0.111	0.266	0.212	0.234	0.109	0.143	0.188	0.212	0.024	0.054	0.042	1		
BETA	0.189	0.154	0.275	0.089	0.189	0.022	0.175	0.021	0.219	0.189	0.232	0.265	0.028	0.219*	0.321*	0.212	1	
DEBT	0.212	0.188	0.298*	0.009	0.098	0.187	0.134	0.212	0.298	0.088	0.099	0.121	0.211	0.123	0.222	0.312		1

Notes: This table presents the Pearson's correlation analysis between financial reporting quality (ACQ), audit committee and compensation variables and other firm characteristics.
The sample consists of 426 firm-year observation for the fiscal year 2010–2016.
Variable definitions can be found in Table 3.
***, **, and * represent statistical significance at the 1%, 5% and 10% levels respectively (two-tailed test).

Table 6 Regression analysis

Variables	*Model (1): OMAC_BASIC*		*Model (2): OMAC_IFE*	
	Coefficient estimate	*p-value*	*Coefficient estimate*	*p-value*
OMAC_BASIC	3.098***	0.010	-	-
OMAC_IFE	-	-	0.056	0.589
AC_SIZE	1.989**	0.036	2.129**	0.033
CC_SIZE	1.768**	0.039	2.090**	0.034
AC_MEET	3.121*	0.072	2.989*	0.089
CC_MEET	0.098	0.431	0.123	0.398
AC_TENURE	1.542	0.321	1.431	0.328
CC_TENURE	1.798	0.389	1.656	0.356
B_SIZE	2.112**	0.042	1.898**	0.030
B_MEET	0.098	0.312	0.132	0.421
B_TENURE	0.032	0.529	0.054	0.511
BIG4	0.081**	0.049	0.092**	0.054
ROA	0.065	0.409	0.076	0.495
Tobin's Q	0.032	0.298	0.0309	0.309
SIZE	0.042	0.498	0.0398	0.378
BETA	0.075	0.329	0.0698	0.319
DEBT	0.091**	0.039	0.081**	0.041
R^2	0.249		0.282	
Observations	426		426	

Notes: This table represents the regression analysis of the impact of OMAC_BASIC (model (1)), OMAC_IFE (model (2)) and the control variables on accruals quality (ACQ) as proxy for financial reporting quality.
The sample consists of 426 firm-year observation for the fiscal year 2010–2016.
Variable definitions can be found in Table 3.
***, **, and * represent statistical significance at the 1%, 5% and 10% levels respectively (two-tailed test).

4.3 Robustness tests: effect of OMAC on earnings restatements and on non-audit fees

Our research focus was on the relationship between OMAC and audit committee effectiveness and higher quality financial reporting. Another well-known proxy for financial reporting quality instead of DA is the degree of earnings restatements (Desai et al., 2006). Major errors in the financial statements should be detected by the audit committee. Careful monitoring of the financial reporting process should provide an incentive for audit committees to prevent accounting failures (Malik, 2014; Velte, 2017). The occurrence of earnings restatements should be negatively linked to financial reporting quality. We conducted our first robustness test to examine the implication of OMAC on financial restatements (RE). RE is a dichotomous variable set to 1 if the firm had earnings restatements in the respective fiscal year and 0 otherwise. The basic regression model is shown in equation (3):

$$RE_i = \beta_0 + Sum\beta_1 x\ independent\ variables + Sum\beta_2 x\ control\ variables_i + \varepsilon_i \quad (3)$$

Audit committee effectiveness should not only positively contribute to financial reporting quality, but it will also result in increased external audit quality. Several researchers stress the link between financial reporting and external audit quality and also use financial reporting measures for audit quality (Gaynor et al., 2016). The relation between NAF and total fees represents one of the most dominant measures for external audit quality in current empirical audit research (DeFond and Zhang, 2014). As parallel audits and non-audit duties may impair auditor independence, especially in a low-ball setting, we conducted our second robustness test to analyse the link between OMAC and NAF. NAF represents the relation between NAF and total fees as reported in the (consolidated) notes of the firm. The basic regression model is shown in equation (4):

$$NAF_i = \beta_0 + Sum\beta_1 x\ independent\ variables + Sum\beta_2 x\ control\ variables_i + \varepsilon_i \quad (4)$$

The results of our robustness tests are shown in Table 7. We multiplied the dependent variables RE and NAF with –1 to stress their impact on financial reporting quality. There is strong evidence that OMAC_BASIC and OMAC_IFE are connected with both lower RE and NAF in both models. Thus, the robustness tests results reported in Table 7 suggest that higher OMAC will contribute to greater financial reporting quality by using RE and NAF. Therefore, hypothesis H1 is supported.

5 Conclusions

After the financial crisis of 2008–2009, audit committee effectiveness has been a major topic of discussion from a research, regulatory and practical view. Former empirical studies have been concentrated on several variables of audit committee composition, e.g., the independence or financial expertise of the members. As a more recent measure of audit committee effectiveness, we focussed on overlapping membership in audit and compensation committees (OMAC) and their influence on financial reporting quality. We analysed German firms listed on the 'DAX', 'TecDAX' and 'MDAX' (426 firm-year observations) for the business years 2010–2016. We hand-collected two variables of OMAC (i.e., the proportion of overlapping members and the existence of an independent financial expert as an overlapping member) and used the Kothari et al. (2005) DA model as a proxy for financial reporting quality. Our results indicate that the proportion of overlapping members is linked with an increased financial reporting quality. We explain this result as the effect of knowledge spillovers from overlapping membership, which are useful to the audit committee's monitoring duties with regard to the financial reporting process. We did not find our second variable of interest to be significant (the existence of an independent financial expert as an overlapping member). We explain this result with critical mass theory. Our findings are partly robust to two alternative measures of financial reporting quality (earnings restatements and NAF) as we found positive significance for both of the OMAC variables under study. We relied on the theoretical model by Laux and Laux (2009), who assume that OMAC can be connected with an increased knowledge about pay-for-performance compensation and with a better position to analyse management's incentives for earnings management.

Table 7 Robustness tests

Variables	*Model (3): OMAC_BASIC and (−1) * RE*		*Model (4): OMAC_IFE and (−1) * RE*		*Model (5): OMAC_BASIC and (−1) * NAF*		*Model (6): OMAC_IFE and (−1) * NAF*	
	Coefficient estimate	*p-value*	*Coefficient estimate*	*p-value*	*Coefficient value*	*p-value*	*Coefficient value*	*p-value*
OMAC_BASIC	3.187***	0.010	-	-	3.329***	0.011	-	-
OMAC_IFE	-	-	3.398***	0.012	-	-	3.429***	0.012
AC_SIZE	1.549**	0.041	1.329**	0.045	1.179**	0.046	1.243**	0.045
CC_SIZE	1.365**	0.048	1.154**	0.049	1.640**	0.037	1.759**	0.033
AC_MEET	3.025*	0.065	2.978*	0.071	3.132	0.121	3.878	0.132
CC_MEET	0.043	0.329	0.054	0.318	0.097	0.321	0.087	0.099
AC_TENURE	1.431	0.398	1.898	0.412	1.497	0.399	1.329	0.391
CC_TENURE	1.539	0.382	1.772	0.391	1.644	0.401	1.311	0.342
B_SIZE	2.032**	0.039	1.998**	0.036	2.121*	0.085	2.011*	0.068
B_MEET	0.143	0.328	0.187	0.387	0.121	0.311	0.134	0.354
B_TENURE	0.048	0.498	0.043	0.432	0.053	0.411	0.066	0.409
BIG4	0.091**	0.034	0.110**	0.037	0.121**	0.040	0.101**	0.038
ROA	0.087	0.412	0.090	0.421	0.101	0.398	0.092	0.412
Tobin's Q	0.023	0.302	0.032	0.328	0.028	0.306	0.056	0.354
SIZE	0.054	0.418	0.049	0.397	0.048	0.402	0.039	0.398
BETA	0.069	0.401	0.070	0.390	0.089	0.388	0.101	0.399
DEBT	0.089**	0.041	0.081**	0.039	0.091**	0.041	0.089**	0.038
R^2	0.208		0.228		0.254		0.275	
Observations	319				407			

Notes: This table represents the regression analysis of the impact of OMAC_BASIC (models (3) and (5)), OMAC_IFE (model (4) and (6)) and the control variables on earnings restatements (RE) (models (3) and (4)) and non audit fees (NAF) (models (5) and (6)) as proxy for financial reporting quality.
The sample consists of 319 (407) firm-year observation for the fiscal year 2010–2016.
Variable definitions can be found in Table 3.
***, **, and * represent statistical significance at the 1%, 5% and 10% levels respectively (two-tailed test).

We have contributed to previous empirical studies by Fernandez-Mendez et al. (2017), Kalelkar (2017), Habib and Bhuiyan (2016) and Chandar et al. (2012) for the US, Spanish and Australian capital market, who also found a positive impact of OMAC on financial reporting quality. However, our results contrast the US findings by Liao and Hsu (2013) and Chang et al. (2011), who found a negative impact of OMAC on financial reporting quality. Moreover, our results are not in line with Kusnadi et al. (2016), Shankaraiah and Amiri (2017) and Fernandez-Mendez et al. (2017), who failed to find any relationship between OMAC and financial reporting quality in different regimes (Singapore, India and Spain).

Our results have great implications for regulatory, practical and research issues. First, German standard setters should be aware of increased audit committee effectiveness by OMAC. The current legal requirements and recommendations of the German corporate governance code only rely on independence, financial and industry expertise of the committee members. According to our results, it would be at least useful to recommend the existence of OMAC in stock corporations in the code. Second, on a practical level, with regard to the individual circumstances in the communication processes of supervisory boards and their committees, the positive link between OMAC and financial reporting quality depends on many firm-specific circumstances and should be analysed more deeply. This could be related to industry, firm size, firm risk or other factors outside the topic of corporate governance. Third, from a research perspective, we encourage future researchers to use additional empirical methods (e.g., interviews or experiments) to analyse the motives and reactions of OMAC from an internal and external view, e.g., overlapping memberships between audit committees and risk committees, nomination committees or sustainability committees. This is especially true for the combined analysis of sustainability and board composition (e.g., diversity), and its connection to financial reporting quality, which has become more and more important in current empirical-quantitative research.

Finally, we stress the limitations of our study. As we only cover a specific time period (2010–2016), this study offers limited insights since the regulatory changes of increased stakeholder management incentives after the financial crisis 2008–2009 are only likely to be apparent in the case of long-term studies. In addition, the study was limited to the analysis of audit committee effectiveness. We are aware of the fact that other board composition variables may also have an impact on financial reporting quality. Furthermore, we hypothesised a linear relationship between OMAC and financial reporting quality, whereas there are indications in recent literature that there could be a *u*-shaped relationship. Furthermore, we concentrated on the German setting, which has a two-tier system with a long code law tradition. Therefore, our results are not representative for the well-known international one-tier system and regimes with case law and an outsider model of corporate governance. We encourage researchers to conduct international studies with a comparison of case law and code law systems as case law systems are more dominated by shareholder value management compared to code law (which is dominated by stakeholder value management). Last but not least, empirical research methods other than archival research (e.g., experiments, interviews) might be useful to analyse the link between OMAC and financial reporting quality.

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