

DO WOMEN ON MANAGEMENT BOARD INCREASE FAIR VALUE RELEVANCE?

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Abstract

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The purpose of this paper is the link between women on management board and the value relevance of fair value accounting according to IFRS 13. The empirical quantitative study covers a sample of German companies listed at the Prime Standard of the Frankfurt Stock Exchange for the business years 2013-2015 (411 firm-year observations). Value relevance is measured by the modified Ohlson (1995) model and we separate fair value accounting in level 1, level 2 and level 3 fair values. Multiple regressions state that female members in the management board do have a positive impact on the value relevance of fair value accounting according to IFRS 13. Surprisingly, gender diversity only has a significant impact on the value relevance of fair valued assets on level 1 and 2 ("mark to market") but not on level 3 ("mark to model").

Keywords: Fair Value Accounting, Earnings Management, Gender Diversity, Value Relevance, Corporate Governance, Management Board

1. INTRODUCTION

After the financial crisis 2008/09, the European Commission (EC) discussed several regulation measures to increase the reliance in the quality of corporate governance and stakeholder communication by public interest entities (PIEs). This strategy of "sustainable corporate governance" was mainly dominated by the discussion of implementing a fixed gender quota on the non-executive members of the board of directors resp. the supervisory board and of implementing a non-financial statement as part of the management report or a separate corporate social responsibility (CSR) report. As the EC has finalized the last mentioned project in the EU CSR directive (EC 2014), the EU directive on the fixed gender quota was not accepted by the European Council. But many European countries already implemented fixed gender quota for the non executive board members resp. supervisory boards. In Germany, since 2016, listed companies which are fully co-determined, must recognize a fixed gender quota of 30% in their supervisory boards. Furthermore, listed companies or determined companies must implement a strategy to increase gender diversity issues both in the management board and in the supervisory board and communicate these goals to their stakeholders (diversity reporting). The idea behind these regulations is that gender diversity in the board contributes to an increased awareness of (non) financial reporting quality and stakeholder relationship. The current relevance of possible links

between gender diversity and stakeholder communication is dominated by the reliance of fair value accounting after the financial crisis 2008/09. As some critics stated that fair value in IFRS or US-GAAP were "catalysts" of the crisis, the German financial reporting system ("German commercial law") is a main representative of the prudence principle in contrast to full fair value accounting. In view of the huge difference between IFRS and German accounting tradition, we chose Germany as a European member state with a two tier system (separation between management and supervisory board) and an insider model of corporate governance (dominance of internal monitoring activities). In addition to these regulatory initiatives, empirical research on women on boards has been increased rapidly after the financial crisis. Studies show a positive impact of women on boards on financial reporting quality (e.g. Byoun et al., 2016; Liu et al., 2016). No empirical studies have been conducted up to now what concentrate on the impact of women on management boards on fair value accounting on the one hand and on a European country with a two tier system on the other hand. We only could identify one study (Siekkinen, 2016), who investigates several board composition variables (e.g. gender diversity) and their impact of fair value relevance in 29 European countries and in the banking industry.

This paper decreases this research gap by analyzing the link between management board gender diversity and value relevance of fair value accounting according to IFRS 13 in Germany as the

main representative of the European two tier system and insider model of corporate governance. In total, we concentrate on 411 firm-years observations for the business years 2013-2015. We chose this starting period in view of the first year of mandatory implementation of the new IFRS 13 by the German listed companies. We provide information on management board composition by firms' CSR reporting, which we hand-collected from sustainability reports, integrated reports, status reports and annual reports. The firms in the sample represent the Prime standard of the Frankfurt Stock Exchange (DAX30, TecDAX, MDAX, SDAX). We control for other board and firm variables (e.g. financial expertise and independence on the audit committee, board size, appointment of a Big four audit firm). We rely on the famous Ohlson modified model (1995) for our value relevance measures and on the three levels of fair value hierarchy according to IFRS 13. Multiple regressions state that female management board members have a positive impact on fair value relevance. In more detail, our results indicate that gender diversity only has a significant impact on the value relevance of fair valued assets on level 1 and 2 ("mark to market") but not on level 3 ("mark to model"). As level 3 fair values are classified by a lack of objectivity, we argue that earnings management with regard to fair value estimates is extremely huge in level 3 and women on management boards will not lead to greater reliance on these fair value measures. Our results are most relevant for researchers, users and regulators to calculate the possible impacts of current regulations (e.g. implementation of a fixed gender diversity quota in Germany since 2016) and to examine the interactions of sustainable corporate governance and financial accounting.

The paper is structured as follows. First, we present the main theoretical explanatory approaches to the impact of gender diversity on financial accounting. In this context a state of the art analysis of empirical studies will be another main goal to deduct our hypothesis. Then, the data and methodology of the empirical analysis will follow, whereas the sample selection, the main variables and the regression model are presented. The research results of the correlation-, regression and sensitivity analysis are focused. The summary and the limitations of the study will complement the following analysis.

2. BACKGROUND AND HYPOTHESIS DEVELOPMENT

2.1. Theoretical foundation

Empirical research on sustainable corporate governance (e.g. diversity, CSR reporting) has reached great dominance in the one-tier systems (board systems) mainly outside continental Europe in outsider corporate governance systems. In contrast to the one-tier system and the outsider corporate governance system, the German legislator stipulated a two tier system, the management board ("Vorstand") and the supervisory board ("Aufsichtsrat") with a great emphasis on internal monitoring activities. The function of the management board is the leading of the firm under its own responsibility, while the supervisory board

must appoint, monitor and advise the members of the management board. Theoretically, supervisory boards in a two-tier system are more independent compared to one-tier systems, but by tendency also less effective in supervising and advising the management board. Furthermore, many countries outside continental Europe (e.g. the USA) which are focused in current empirical board research rely on an outsider system with a strong focus on the supervision by the equity market. Insider systems imply a lower degree of investor protection, while internal corporate governance like the monitoring activities of supervisory boards play a key role in these corporate governance systems.

This differences lead to the research gap to gain new and relevant insights about the impact of women on the management board on fair value accounting which was not under research considerations. It can be expected that the impact of gender diversity on financial accounting is different in one- and two-tier systems on the one hand and in insider and outsider corporate governance systems on the other hand because the decision making process of board members could be different. Sustainable corporate governance variables as board diversity are central aspects of regulatory concerns in Germany during the last years and are addressed in our empirical study.

The economic impact of gender diversity on financial accounting can be explained by a variety of theories, while most papers concentrate on stakeholder theory. This view which can be traced back to coalition theory (Cyert and March, 1963) which aims at satisfying the interests of the different coalition partners with which the company is tied up through a network of various joint ventures and which ultimately determine the sale of products and services (Freeman, 1984). Isolated business practices which do not take into consideration societal values and requirements are non-conducive in a long-term perspective. A company is therefore considered a subset of society which means that generating value is in principle measured by the fulfilment of specific societal expectations. While primary stakeholders immediately exercise influence on the fate of the company - i.e. the production of products and services - the claims of secondary stakeholders affect the entrepreneurial activities more likely indirectly as the impact of the practices on people, society or the environment (Svendsen et al., 2001). Therefore it is not only imperative that management succeeds in reconciling a multitude of interests but beyond that the corporate goals of stakeholders with regard to their (partly) conflicting demands have to be prioritized. In order to constantly fulfill stakeholders' expectations, an adequate financial accounting quality is an essential goal. Listed companies on the German stock exchange that fulfil their communication requirements by IFRS financial statements must guarantee an adequate reliance on their financial accounting by the different stakeholder groups, especially by the investors. In contrast to the German accounting tradition of debt holder protection and prudence principle, financial accounting according to IFRS is closely linked to shareholder protection and the true and fair view principle. Fair value is one of the key accounting measures to increase the decision usefulness of IFRS

accounting as stated by the International Accounting Standards Board (IASB). The new IFRS 13 with the fair value hierarchy (level 1, level 2, level 3) has been mandatory since the business year 2013 and was implemented to increase the financial accounting quality and the stakeholder reliance on IFRS accounting. Level 1 refers to quoted prices in active markets and level 2 to inputs other than quoted prices that are observable either directly or indirectly. Fair value accounting according to level 1 and 2 belongs to the mark to market and this is normally linked with greater decision usefulness in comparison to level 3 fair values. Level 3 refers to unobservable inputs generated by entities and is classified as mark to model. According to the stakeholder theory, financial accounting in general and fair value accounting in special represent an effective tool of stakeholder communication (Roberts, 1992).

In order to realize an adequate reliance on fair value accounting, which could lead to positive market reactions, board composition is of key importance. As already stated, CSR and corporate governance activities have to be classified as interdependent strategies (“Sustainable corporate governance”) after the financial crisis 2008/09. Stakeholders expect a certain measure of specialist expertise in the management board, whereby the issue of gender diversity gains in importance during the last years. A great controversial discussion has been started also on a European level to introduce a fixed gender quota on boards. The new European directive which implies a fixed gender quota (40%) on the supervisory board or on non-executive directors was not accepted by the European Council by the end of 2015. In Germany, a fixed quota (30%) starting by 2016 has been regulated for the supervisory board and only for some capital market companies with full co-determination. Furthermore, all capital market oriented companies or with co-determination rules must publish their diversity aims and strategies. The German legislator has the opinion that gender diverse boards will have a positive impact on long-term strategies and increase stakeholder reputation. In 2014, the European Commission finalized the EC CSR directive for certain PEs by implementing a nonfinancial statement as part of the management report and an extended diversity reporting starting with the business year 2017. Stakeholder communication about gender diversity aspects should increase the reliance on financial accounting, too. This great interaction between financial and non financial reporting is currently represented by the integrated reporting concept by the International Integrated Reporting Council (IIRC). According to this reporting strategy, financial and non financial reporting are two complementary issues and should be analyzed in the “integrated thinking” process as interactive key value drivers of the firm.

As an interaction between the classic principal agent theory and stakeholder theory, the stakeholder agent theory (Hill and Jones, 1992) also plays a central role to our research topic. Both financial and non financial accounting is supposed to contribute to a reduction of information asymmetries and transaction costs from the agency relationships between stakeholders and companies (Shankmann, 1999). Management sees an increased

necessity here, given an undervaluation of the capital markets. At best an adequate gender diversity management can lead to a lower systematic business risk (Botosan, 1997). Ideally such strategy would always be beneficial so that in this case a higher degree of reliance on fair value accounting would be positively correlated to the use for stakeholder decision making and their abilities to evaluate companies positively. Aside from information asymmetries conflicts of interest between stakeholders and agents are to be reduced. Management is to consider such strategy as tools for bonding with the increased interests for information of the external addressees a tool that is expressed *inter alia* through the implementation of gender diversity issues. In order to keep conflicts of interest low, an appropriate gender diversity of the management board is essential to lower the “old boys’ network” and social ties.

2.2. Women on boards and financial accounting quality

Women on management board will be seen in the following as the essential factor related to sustainable corporate governance that influences the value relevance of financial accounting in general and of fair value accounting in special. Because the influence of gender diversity on fair value accounting is only included in one international study to our best knowledge (Siekkinen, 2016), this analysis includes common and objective variables which were found in a previous systematic literature review to analyze the impact of women on boards on financial reporting in general.

Over the last few years gender diversity has been empirically examined in more depth in regard to firm performance and earnings quality. A current meta-analysis by Post and Byron (2015) contains 140 studies and found that female board representation is positively related to accounting returns and this relationship is more positive in countries with stronger shareholder protections. The predominance of this research can be attributed to the comparative ease of categorization as well as to the political debate which has been going on for many years about whether a quota of women on boards should be established by law. The literature on board diversity and firms’ performance (e.g. Adams et al., 2009; Campbell and Mínguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003; Farrell and Hersch, 2005; Lückerath-Rovers, 2013) broadly supports the view that the presence of women representatives on the board enhances the firm’s financial performance. But also heterogeneous results occurred (e.g. Fauzi and Locke, 2012; Jhunjhunwala and Mishra, 2012).

In line with firm performance, current empirical research on gender diversity also focuses on earnings management as a key item of financial reporting quality. According to stakeholder agency theory, an opportunistic accounting policy promotes asymmetric information between the board of director and stakeholder, because exercising options and utilizing discretionary powers in financial reporting is in conflict with decision usefulness. Gender diversity should provide incentives to reduce earnings management and therefore increase earnings quality. Consequently, earnings quality becomes a better key decision-making tool for

stakeholder decisions. From an international perspective, the estimation of earnings management frequently focuses on *abnormal accruals* (Dechow et al., 2010, 353). Abnormal accruals are the difference between the annual result and the operational cash flow, i.e. it shows results of the financial year not affecting cash. The accruals models assume that the existence of accruals has no negative impact on quality if their amounts are not excessive. Only if they can be classed as abnormal or discretionary, opportunistic management behavior as an accounting policy will be associated with reduced earnings quality (Dechow et al., 2010, 353). The first popular accruals model (see also Gros and Worret, 2014) was developed by Jones (1991). In the following years, other accruals models have been introduced (Dechow et al., 1995; Dechow et al., 2003; McNichols, 2000; Kothari et al., 2005; Dechow and Dichev, 2002).

Different measures of financial reporting quality were used also in the gender diversity studies. The accruals models are the most dominant proxies in this context. According to Arun et al. (2015), Omoye and Eriki (2014), Buniamin et al. (2012), Gavius et al. (2012), Qi and Tian (2012), Gulzar and Wang (2011), Barua et al. (2010) and Labelle et al. (2010), women on boards are connected with lower discretionary accruals by the modified Jones model. In line with the board related results, Vähämaa (2014) find that a male to female CFO turnover decreases the accruals. In comparison to the afore mentioned studies that focus on the one tier system, Panzer and Müller (2015) analyses the supervisory board in the German two-tier system and state a negative link between the percentage of female members and the presence of a female chair or deputy chair and the accruals models by Kothari et al. (2005) and McNichols (2002). The present studies that recognize the accruals models do not include worldwide samples, but stick to developed (e.g. USA, Canada, Germany, France, UK) and developing countries (e.g. Nigeria, Malaysia, Iran, China). The authors decided to use only one accruals model as dependent variable, but have regularly included several measures of WOB as independent variables (e.g. Arun et al., 2015; Lakhal et al., 2015).

Apart from accruals models, *other models for estimating earnings quality* exist (see Dechow et al., 2010: e.g. earnings persistence; smoothness; timely loss recognition; earnings response coefficient). However, these have rarely been included in existing gender diversity studies (Byoun et al., 2016; Siekkinen, 2016; Boussaidi and Hamed, 2015; Francis et al., 2015; Ho et al., 2015; Gul et al., 2013). Byoun et al. (2016) use dividend payout policy (cash dividend and dividend-to asset ratio and dividend yield) as a proxy for earnings management and state that the appointment of at least one female director and the percentage of female directors is connected with increased dividend payout policy and therefore lower earnings management. Boussaidi and Hamed (2015) state that gender diversity is linked with lower tax aggressiveness. Francis et al. (2015) and Ho et al. (2015) find increased accounting conservatism by women on boards and signs for moderating effects (e.g. litigation and takeover risks). According to Gul et al. (2013), a positive link

between the presence of analysts' earnings forecast accuracy and the presence of female directors (audit committee members) is shown. In contrast to the accruals studies, also worldwide samples are included (Byoun et al., 2016; Siekkinen, 2016) in line with developed (e.g. USA) and developing (e.g. Tunisia, France, China) countries. In this context, more than one WOB measure is common (e.g. Byoun et al., 2016; Francis et al., 2015; Gul et al., 2013). To our best knowledge, the only existing study that combines gender diversity and fair value accounting as a proxy of earnings quality is conducted by Siekkinen (2016). His results indicate that value relevance of fair value accounting according to IFRS 13 (level 3), approximated by the Ohlson model, will be increased by the percentage of female board members, so that earnings management is also lower.

Insofar, many studies found a stronger earnings quality after women on board. In line with the empirical studies and the theoretical foundation female members in the management board have a positive impact on decision making, can lower stakeholder-agent-conflicts and may lead to more precise financial accounting and lower earnings management that will be connected with an increased reliability with regard to the stakeholders. Insofar the following hypothesis was conducted:

H₁: Women on the management board increase the value relevance of fair value accounting according to IFRS 13.

3. DATA AND METHODOLOGY

3.1. Sample selection

The sample covers corporations being listed in the Prime Standard of the Frankfurt (DAX30, TecDAX, MDAX, SDAX) with regard to the business years 2013-2015. The intention was to analyse the reaction of the companies to the shrinking trust after the financial market crisis 2008/2009 and the implementation of IFRS 13, which leads to a more sustainable corporate governance with an active gender diversity management. We decide to focus on the time period 2013-15 because 2013 was the first business year when IFRS 13 became mandatory. Our sample companies underlie the highest standards of transparency & disclosure within the Stock Exchange in Germany. Researching sustainable corporate governance mechanisms as gender diversity of PIEs could have a signalling effect for other listed companies in Germany since these companies are covered most intensely by investors. Therefore, analysing these companies is very valuable from a researcher's as well as from a practitioner's perspective. In contrast to other related studies, we focus our research on non-financial firms because fair value accounting is also most relevant in other branches of industry. We exclude financial institutions due to specific accounting regulations for the industry in comparison with other industries and companies. *Table 1* gives an overview about the final sample of 411 firm years-observations.

Table 1. Survey sample

	2013	2014	2015
Listed companies	160	160	160
Financial institutions and missing data	-23	-23	-23
Final sample	137	137	137

3.2. Main Variables

Data on gender diversity and other sustainable corporate governance items was hand collected from sustainability reports, integrated reports, status reports and annual reports. The dependent variable is the value relevance of fair value accounting. Prior studies use the fundamental Ohlson (1995) model or a modified version in order to analyse the value relevance of accounting figures. The fundamental Ohlson model analyses how well the market value will be explained by the book value of equity and net income has been used in prior studies (Siekkinen 2016). The fundamental Ohlson model is as follows:

$$MVE_{it} = \alpha_0 + \alpha_1 BVE_{it} + \alpha_2 NI_{it} + \varepsilon_{it}$$

where MVE_{it} is the market value of equity of firm i at the time t , BVE_{it} is the book value of equity of firm i at the time t , NI_{it} is the net income of the firm i at the time t , and ε_{it} is the zero mean error term. In our empirical study, we focus on a modified Ohlson (1995) model following Song et al. (2010), Goh et al. (2015) and Siekkinen (2016). The book value of equity is divided into non-fair value assets and liabilities and into the three levels of fair values. In line with Siekkinen (2016), level 1 and level 2 fair value liabilities are pooled together. As proposed by Barth and Clinch (2009), the variables are share-scaled in order to reduce scale effects. Observations with an absolute value of studentized residuals above two are excluded from our sample in order to mitigate the effects of outliers (Siekkinen 2016). The modified Ohlson (1995) model used to test our hypothesis is as follows:

$$PRICE_i = \beta_0 + \beta_1 NFVA_i + \beta_2 FVA1_i + \beta_3 FVA2_i + \beta_4 FVA3_i + \beta_5 FVA1_i * GEND_i + \beta_6 FVA2_i * GEND_i + \beta_7 FVA3_i * GEND_i + \beta_8 NFVL_i + \beta_9 FVL12_i + \beta_{10} FVL3_i + \beta_{11} EPS_i + \beta_{12} GEND_i + \beta_{13} FIN_i + \beta_{14} IND_i + \beta_{15} SIZE_i + \beta_{16} BIG_i + \beta_{17} LEV_i + \beta_{18} ROA_i + \varepsilon_{it}$$

$PRICE_i$ is our dependent variable and represents the price of a stock of firm i four months after the end of the fiscal year t (i.e. April 30). Following Barth et al. (2014), the price of four months after the fiscal year-end is useful to assure that the financial accounting data in year-end annual statements has been analysed by the investors. $NFVA_i$ ($NFVL_i$) represent the non-fair value of assets (liabilities) per share of firm i . FVA_i (FVL_i) is the fair value of assets (liabilities) per share of firm i related to level 1, 2 or 3 of the fair value hierarchy according to IFRS 13. The fair values are collected from annual reports

and divided by the number of outstanding shares. EPS_i is the earnings per share excluding extraordinary items of firm i . Our observations from 2013-2015 are pooled into a sample consisting of 411 firm-year observations. The levels of fair value assets are (liabilities) value relevant if their coefficients are positive (negative) and significantly different from the value of zero (Siekkinen 2016).

Gender diversity is our key variable of interest. The proxy $GEND$ represents the percentage of female members in the management board. $GEND$ is included in our model as an interaction variable and as a separate independent variable in line with prior studies (Siekkinen 2016). Furthermore, following Song et al. (2010), the effect of gender diversity is only tested for the three levels of fair value assets ($FVA1$, $FVA2$, $FVA3$), because the frequency and amount of fair value assets is higher in comparison to fair value liabilities. We include several control variables which are frequently used in empirical corporate governance and CSR research. FIN is measured as the percentage of financial experts in the supervisory board as these members have special financial accounting expertise that might be relevant for monitoring activities with regard to fair value measures. In line with former studies, we expect a positive link on value relevance. We also include the variable IND as the percentage of independent supervisory board members. Again we assume that the degree of independent members in the supervisory board will have a positive impact on reliance on fair value accounting. Empirical corporate governance research also takes into account the size of the management board ($SIZE$) as a control variable. $SIZE$ is considered in relation to the index related average. I hypothesize a positive impact of gender diversity in the management board on fair value relevance. The prevailing opinion also assumes that the cooperation between supervisory board and external auditor might have a positive influence on financial accounting. Within this context, the research of DeAngelo (1981) is of particular interest since it provides evidence for a positive relation between the size of the audit company and their independency and expertise. Therefore, the appointment of one of the four top-selling audit companies in Germany and Austria ("Big Four") has been added as another control variable (BIG) to expect a positive impact on audit quality. Furthermore, I use two financial variables as a proxy for additional control. The ratio of total debt divided by total assets (LEV) and the return on assets (ROA) are taken into account. The control variables were set into relation according to the respective industry branch. A summary is presented in Table 2. The assumptions of regression (linearity, homoscedasticity of residue, normal distribution of error term, multicollinearity) in accordance with the approach of Hair et al. (2009) were tested here as well.

Table 2. Variables of the study

<i>Dependent Variable</i>	<i>Explanation</i>
PRICE	Closing share price of April 30.
<i>Independent Variable/ Interaction Variable</i>	<i>Explanation</i>
NFVA	Non-fair value assets per share
FVA1	Fair value of assets for level 1 of the fair value hierarchy according to IFRS 13
<i>Independent Variable/ Interaction Variable</i>	<i>Explanation</i>
FVA2	Fair value of assets for level 2 of the fair value hierarchy according to IFRS 13
FVA3	Fair value of assets for level 3 of the fair value hierarchy according to IFRS 13
NFVL	Non-fair value liabilities per share
FVL12	Total of level 1 and 2 fair value liabilities per share according to IFRS 13
FVL3	Fair value of liabilities for level 3 of the fair value hierarchy according to IFRS 13
GEND	percentage of female members in the management board (as reported)
<i>Control Variables</i>	<i>Explanation</i>
EPS	Earnings per share excluding extraordinary items
FIN	percentage of financial expert members in the supervisory board (as reported)
IND	percentage of independent members in the supervisory board (as reported)
SIZE	size of the management board (as reported)
BIG	appointment of one of the four top-selling companies in Germany („Big Four“; Deloitte Touche Tohmatsu; EY; PricewaterhouseCoopers; KPMG) [dummy variable; yes = 1, no = 0] (as reported)
LEV	ratio of total debt divided by total assets
ROA	net income before extraordinary items/preferred dividends divided by total assets

4. RESEARCH RESULTS

4.1. Descriptive statistics

The tables 3 and 4 give an overview of the descriptive statistics. The mean share price is 15.54 euro, the mean of level 1, 2 and 3 fair value assets are 47.98, 33.90 and 8.92 euro, respectively. The mean of level 1/2 and 3 fair value liabilities are 31.09 and 10.39 respectively. All variables are presented as per share values. The non-zero column in table 3 presents the percentage of observations that disclose the above zero value of the specific variable. In total, 88.54 % disclose level 1 fair value assets, 79.11 % disclosure level 2 assets and 77.12 % disclosure level 3 assets in their balance sheet. The relative amount of fair values to total assets is 43.5 %, meaning that the value of 43.5 % of the total assets is measured at fair value in the 2015 balance sheets. On average, 4.59 % of the total assets or 13.5 % of the fair value assets are classified as level 3 (not listed in the tables).

In our sample, firms tend to disclose more fair value assets than fair value liabilities. The percentage of firm-year observations with above zero level 1 and 2 liabilities is 69.23 %, while level 3 fair value liabilities is 31.32 %. 13.9 % of the total liabilities are disclosed as fair values and 2.49 % of the total liabilities are disclosed as level 3 (not listed in the tables). Compared with fair value assets, the use of fair value liabilities is less common.

Only about a quarter of the whole management board members (GEND) are female (20.0 %). Also, the percentage of financial experts in the supervisory board (FIN) is rather low (22.0 %), indicating that the supervision of the financial accounting may be weaker. The percentage of independent members in the supervisory board (IND) is slightly higher (27.0%). On average, approximately 8 members serve on the management board (SIZE). The appointment of a Big four audit firm (BIG) is relatively high (69.0%), suggesting a higher audit market concentration at the German prime standard. The average leverage (LEV) accounts for 26.0 % and the return on assets (ROA) accounts for 12.0 % on average.

Table 3. Descriptive statistics

<i>Variables</i>	<i>Mean</i>	<i>Median</i>	<i>Max</i>	<i>Min</i>	<i>SD</i>	<i>P25</i>	<i>P75</i>	<i>Non-zero (%)</i>
PRICE	15.54	7.78	218.32	0.05	26.54	1.43	20.32	100.0
NFVA	101.12	19.43	2434.21	0.00	312.32	2.98	98.43	100.0
FVA1	47.98	7.98	2642.32	0.00	192.32	0.21	28.12	88.54
FVA2	33.90	1.32	1082.34	0.00	110.74	0.01	17.211	79.11
FVA3	8.92	0.29	389.213	0.00	47.21	0.00	1.78	77.12
NFVL	145.98	24.32	5121.12	0.00	412.98	2.43	112.32	98.34
FVL12	31.09	0.30	1132.34	0.00	454.87	0.00	8.21	69.23
FVL3	10.39	0.31	500.12	0.00	20.32	0.00	0.02	31.32
GEND	0.20	0.19	0.51	0.00	0.14	0.10	0.29	-
EPS	1.20	0.49	30.98	-10.32	2.32	0.04	1.42	100.0
FIN	0.22	0.21	0.49	0.00	0.19	0.15	0.31	-
IND	0.27	0.20	0.52	0.00	0.28	0.10	0.32	-
SIZE	7.98	6.89	8.00	2.00	5.09	4.0	10.0	-
BIG	0.69	0.20	0.48	0.00	1.0	0.00	1.00	-
LEV	0.26	0.25	0.45	0.00	0.53	0.00	0.37	-
ROA	0.12	0.11	0.54	0.01	0.13	0.01	0.21	-

4.2. Correlation results

Table 4 presents the Pearson correlation matrix for the dependent, independent, as well as control variables. Most of the board composition variables (GEND, FN, IND) correlate positively but non-

significantly with PRICE with the exception of SIZE. Thus, we did not find a correlation between the GEND and PRICE that could support our hypothesis. Consistent with prior research, PRICE correlates positively with the appointment of a Big four audit company (BIG) and with EPS.

Table 4. Pearson correlation matrix

Variables	PRICE	NFVA	FVA1	FVA2	FVA3	NFVL	FVL12	FVL3	GEND	EPS	FN	IND	SIZE	BIG	LEV	ROA
PRICE	1															
NFVA	0.012	1														
FVA1	0.025	0.032	1													
FVA2	0.0230	0.265	0.332*	1												
FVA3	0.026	0.032	0.354*	0.312*	1											
NFVL	-0.078	-0.073	-0.089	-0.056	-0.078	1										
FVL12	-0.032	-0.109	-0.102	-0.098	-0.101	0.139	1									
FVL3	-0.023	-0.098	-0.119	-0.112	-0.131	0.108	0.323*	1								
GEND	0.309	0.121	0.212	0.198	0.201	0.197	0.189	0.132	1							
EPS	0.410*	0.212	0.312*	0.278	0.223	0.298	0.098	0.982	0.321*	1						
FN	0.198	0.209	0.167	0.178	0.119	0.146	0.178	0.201	0.258*	0.178	1					
IND	0.093	0.137	0.200	0.121	0.081	0.049	0.027	0.087	0.039	0.201	0.219	1				
SIZE	0.312*	0.121	0.287*	0.279*	0.312*	0.098	0.121	0.183	0.109	0.089	0.098	0.099	1			
BIG	0.219*	0.058	0.232*	0.232*	0.298*	0.089	0.067	0.121	0.114	0.186	0.178	0.165	0.112	1		
LEV	-0.121	-0.098	0.121	0.232*	0.281*	-0.121	0.121	0.189	0.167	0.089	0.091	0.121	0.176	0.192	1	
ROA	0.198	0.201	0.221	0.198	0.112	0.179	0.158	0.112	0.079	0.090	0.081	0.119	0.196	0.121	0.132	1

Notes: PRICE is the dependent variable measuring the closing price of April 30, NFVA: non-fair value assets per share, FVA1: fair value of assets for level 1 of the fair value hierarchy according to IFRS 13, FVA2: fair value of assets for level 2 of the fair value hierarchy according to IFRS 13, FVA3: fair value of assets for level 3 of the fair value hierarchy according to IFRS 13, NFVL: non-fair value liabilities per share, FVL12: total of level 1 and 2 fair value liabilities per share according to IFRS 13, FVL3: fair value of liabilities for level 3 of the fair value hierarchy according to IFRS 13, GEND: percentage of women on the management board, EPS: earnings per share excluding extraordinary items, FN: percentage of financial experts members in the supervisory board, IND: percentage of independent members in the supervisory board, SIZE: total number of members on the management board at the end of the fiscal year, BIG: dummy variable equal to 1 if the company engaged one of the "Big Four" audit firms, LEV: leverage measured by ratio of book value of total debt and total assets, ROA: profitability measured by natural log of Return on Assets, * correlation is significant at the 0.05 level (2-tailed); ** correlation is significant at the 0.01 level (2-tailed).

4.3. Regression results

Table 5 shows the results of the multivariate regression analysis. The coefficients of *GEND* are positive and significant at the 5% and 1%-level, suggesting that the presence of women in the management board has a positive impact on the value relevance of fair value accounting with regard to the sample of German listed companies. In more detail, gender diversity only has a significant impact on the value relevance of fair valued assets on level 1 and 2 (“mark to market”) but not on level 3 (“mark to model”). Hence, the results only support our hypothesis partly. Recall that the average number of members on management board is about eight and female members account for about 20%, so the management boards are highly skewed male in this study. Hence, this raises the question whether the female members of the management board in Germany only play a “token” role. The previous

studies argue that gender diversity appears to have minimal impact unless a critical mass of at least three women is present on the board (Post et al., 2011; Liao et al., 2015). However, the results suggest that the small number of female members in the management board makes a difference in fair value relevance.

Interestingly, the existence of financial experts in the supervisory board (*FIN*) and independent members (*IND*) do not have a positive significant impact on value relevance. Furthermore, we find positive significant results for the variables *BIG* and *SIZE*. Insofar, the appointment of a Big four audit firm and management board size contribute to the value relevance of fair value accounting in a positive way. *LEV* and *ROA* do not contribute to the value relevance in our model. The coefficients of determination appear to be satisfactory (0.310). The F-statistics show significance at the 1%-level.

Table 5. Regression analysis

Variable	Expected Sign	Coefficient	t-stat
Intercept		-1.562	-0.421
NFVA	+	0.315	4.243**
FVA1	+	0.285	3.842**
FVA2	+	0.296	3.945**
FVA3	+	0.284	3.842**
FVA1 * GEND	+	0.076	2.012*
FVA2 * GEND	+	0.086	2.139*
FVA3 * GEND	+	0.002	0.326
NFVL	-	-0.312	-4.325**
FVL12	-	-0.309	-4.214**
FVL3	-	-0.314	-4.302**
GEND	+	0.077	2.017*
EPS	+	0.006	0.332
FIN	+	0.009	0.343
IND	+	0.008	0.332
SIZE	+	0.086	2.121*
BIG	+	0.092	2.271*
LEV	-	0.004	0.212
ROA	+	0.003	0.199
R ² (adj.)		0.310	
F stat.		2.16**	

Notes: *PRICE* is the dependent variable measuring the closing price of April 30, *NFVA*: non-fair value assets per share, *FVA1*: fair value of assets for level 1 of the fair value hierarchy according to IFRS 13, *FVA2*: fair value of assets for level 2 of the fair value hierarchy according to IFRS 13, *FVA3*: fair value of assets for level 3 of the fair value hierarchy according to IFRS 13, *NFVL*: non-fair value liabilities per share, *FVL12*: total of level 1 and 2 fair value liabilities per share according to IFRS 13, *FVL3*: fair value of liabilities for level 3 of the fair value hierarchy according to IFRS 13, *GEND*: percentage of women on the management board, *EPS*: earnings per share excluding extraordinary items, *FIN*: percentage of financial experts members in the supervisory board, *IND*: percentage of independent members in the supervisory board, *SIZE*: total number of members on the management board at the end of the fiscal year, *BIG*: dummy variable equal to 1 if the company engaged one of the “Big Four” audit firms, *LEV*: leverage measured by ratio of book value of total debt and total assets, *ROA*: profitability measured by natural log of Return on Assets, * correlation is significant at the 0.05 level (2-tailed); ** correlation is significant at the 0.01 level (2-tailed).

4.4. Sensitivity analysis

To assess whether results of my main analysis are robust, we conduct sensitivity analysis on the measurement of the impact of management board composition on the value relevance. We modified

GEND by a dummy variable that equal 1 if at least one woman joins the management board. The regression results are shown in table 6. Again, *GEND* and the interaction variables *FVA1 * GEND* and *FVA2 * GEND* have a positive significance on *PRICE*.

Table 6. Sensitivity analysis

Variable	Expected Sign	Coefficient	t-stat
Intercept		-1.143	-0.318
NFVA	+	0.309	4.199**
FVA1	+	0.271	3.803**
FVA2	+	0.281	3.902**
FVA3	+	0.275	3.815**
FVA1 * GEND	+	0.066	1,982*
FVA2 * GEND	+	0.091	2.188*
FVA3 * GEND	+	0.003	0.331
NFVL	-	-0.300	-4.215**
FVL12	-	-0.278	-4.189**
FVL3	-	-0.314	-4.302**
GEND	+	0.077	2.017*
EPS	+	0.006	0.332
FIN	+	0.009	0.343
IND	+	0.008	0.332
SIZE	+	0.086	2.121*
BIG	+	0.092	2.271*
LEV	-	0.004	0.212
ROA	+	0.003	0.199
R ² (adj.)		0.298	
F stat.		2.07**	

Notes: PRICE is the dependent variable measuring the closing price of April 30, NFVA: non-fair value assets per share, FVA1: fair value of assets for level 1 of the fair value hierarchy according to IFRS 13, FVA2: fair value of assets for level 2 of the fair value hierarchy according to IFRS 13, FVA3: fair value of assets for level 3 of the fair value hierarchy according to IFRS 13, NFVL: non-fair value liabilities per share, FVL12: total of level 1 and 2 fair value liabilities per share according to IFRS 13, FVL3: fair value of liabilities for level 3 of the fair value hierarchy according to IFRS 13, GEND: GEND is the independent variable as a dummy variable equal to 1 if at least one woman joins the management board, EPS: earnings per share excluding extraordinary items, FIN: percentage of financial experts members in the supervisory board, IND: percentage of independent members in the supervisory board, SIZE: total number of members on the management board at the end of the fiscal year, BIG: dummy variable equal to 1 if the company engaged one of the "Big Four" audit firms, LEV: leverage measured by ratio of book value of total debt and total assets, ROA: profitability measured by natural log of Return on Assets, * correlation is significant at the 0.05 level (2-tailed); ** correlation is significant at the 0.01 level (2-tailed).

In addition to the use of other variables, we examined collinearity problems through the correlation matrix. The correlation coefficient is thought to be problematic if it exceeds 0.8. The correlation coefficients found in our study are below the stated value. A more indicative and accurate technique that is commonly used is the variance inflation factor (VIF) for each of the independent variables. If the VIF exceeds 10, collinearity is considered to be a problem. The VIF (not tabulated) for this study for the model is 4.59. Thus, according to the correlation matrix and VIF of the variables of the study, it is unlikely that multicollinearity manipulates the regression results, since the maximum VIF is less than the threshold of 10.

5. SUMMARY AND LIMITATIONS

This paper represents the first empirical study on the impact of gender diversity in the management board on the value relevance of fair value accounting according to IFRS 13 for the German Prime Standard (DAX30, TecDAX, MDAX, SDAX). Our intention was to analyse one main representative of the two tier system and the insider corporate governance system. Furthermore, the German tradition of debt holder principle and prudence, that dominates the German accounting system, was a relevant background. Our study covers 411 firm-years observations during the business years 2013-2015 and states that gender diversity in the management board has a positive impact on the value relevance of fair value accounting, which was measured by the

modified Ohlson (1995) model. In more detail, gender diversity only has a significant impact on the value relevance of fair valued assets on level 1 and 2 ("mark to market") but not on level 3 ("mark to model"). Insofar, our hypothesis was supported partly. Surprisingly, the percentage of financial experts and independent members in the supervisory board shows a positive but insignificant impact on the fair value relevance. These effects are robust to a modified variable for gender diversity. Our empirical results indicate that the implementation of IFRS 13 and the fair value hierarchy will be still linked with earnings management. The decision usefulness of fair value accounting will be lower from level 1/2 to level 3 and this is also connected with a decreased value relevance of the fair valued assets without active markets. Financial accounting and sustainable corporate governance are interdependent disciplines in our analysis because women on management boards only strengthen stakeholder trust on fair value accounting if the respective assets are valued by level 1/2 and represent an adequate reliability. The lack of objectivity on level 3 fair valued assets may be too low so that women on boards do not contribute in a positive way to stakeholder trust with regard to these financial accounting figures. Insofar, other corporate governance variables may have a stronger impact on level 3 fair values, e.g. financial expertise on the supervisory board or big four audits.

In the coming years, further increases in research activity from a continental European

perspective can be expected because the research gap of empirical sustainable corporate governance studies concerning the two-tier system in Europe is not suitable in view of current regulations in terms of gender diversity. In this context, limitations of the study must be mentioned. The analysis only covers a restricted reporting period and therefore offer only limited insights that changes in the manner of reporting because of legislative reforms tend to become visible only in longitudinal studies. The comparability of other studies is compromised in addition by the heterogeneity of the samples, because although they are all concerned with the board system, there are different forms of corporate governance specific to the individual countries. Moreover, sample size is not that high, presumably on account of the time investment required for data analysis. These reduce the significance of the research results and indicate a considerable potential for improvement in the development of future empirical study designs.

Finally, with a view to the usefulness of future decisions on financial accounting and sustainable corporate governance, recent regulatory reform initiatives must be mentioned. The EU and other bodies have published a range of statements in response to the last financial crisis which will have a material impact on sustainable corporate governance in the future. Certain PIEs are forced to prepare a nonfinancial declaration and an extended diversity reporting as part of their management report or as a separate reporting instrument. Insofar, financial and non financial reporting have to be classified as complements for a suitable stakeholder relations strategy. Furthermore, the new specifications of the IIRC for an integrated reporting framework show a new impetus for the further development of business reporting, although in company practice, this will require several years of adjustment. Future research activities should also focus on fair value disclosures according to IFRS 13 in the European member states, especially in Germany, because the accounting tradition in Continental Europe was mainly dominated by the prudence principle and debt holder protection. Insofar, the value relevance of fair value accounting can be positively influenced by board characteristics, but not generally. Regulators and practice should be aware of the great interdependencies between financial accounting, corporate governance and corporate social responsibility.

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