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RESEARCH PAPER

The Effect of Corporate Governance on Financial Performance: Evidence From a Shareholder-Oriented System

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Abstract

Despite the vast literature, the relationship between corporate governance and firm performance is hotly debated in the research field of corporate finance. This study examined the effect of Corporate Governance (GC) on the performance of firms in non-financial sectors listed on the Frankfort Stock Exchange in Germany over the period 2002-2018. To this end, we measured firm performance based on accounting data, using ROA and ROE. The results provided evidence that the characteristics of the audit committee and board of directors have significant and negative effects on firm financial performance, whereas the effect of CEO duality is not statistically significant. Large board size could bring about the issue of deferred decision making by the board members in the insider-controlled CG system of Germany. Furthermore, IFRS adoption in 2005 was found to have a positive effect on firm performance. These results can raise considerable interest in managers and shareholders, precisely when they prioritize the financial performance of their companies.

Keywords: corporate governance, audit committee, board of directors, financial performance, IFRS, shareholder-oriented system.

1. Introduction

Firm management generally aims to maximize firm performance and value in order to increase the shareholders' wealth. Shareholders are the owners of the firm principally, and their perspective is increasing their capital. Other groups of stakeholders such as managers, employees, and creditors also desire that their interest be retained and maximized. Here, it can be observed that the sustainability and growth of the firm will ensure the retention of all stakeholders' interests (Levinthal & Wu, 2010). Managers are agents in the firm, and their responsibility is to perform in the best interests of all the various stakeholders in the firm. This fundamental objective of the management faces several challenges since there might be several alternatives of decision-making in which they come to different results.

The governance system in the corporation can ensure that the interests of different stakeholders are met to serve the primary objective of enhancing firm performance and shareholders wealth (Saygili et al., 2021). Thus, the corporate governance (hereafter, CG) framework is likely to affect firm performance. CG is defined as the processes and structures by which firms are controlled and directed (Khongmalai and Distanont, 2017). Good CG encourages more transparency and accountability (Abdallah & Bahloul, 2021) towards the company investors and provides them with the aid to respond to the concerns of the stakeholders (International Finance Corporation, 2020). It also assists firms to expand access

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to fund, work more efficiently, reduce risk, and protect against mismanagement. As a result, CG could contribute to the enhancement of firm performance through the reduction of conflicts of interest among the stakeholders, i.e., it aims to reduce agency cost and thus increase performance.

The system of CG differs based on the structure, implementation of the codes, and level of compliance with the codes. Germany follows a shareholder–oriented system of CG, also known as two-tier system, in which the interests of the shareholders, the owners, and the firm are favored over the interests of all the other groups of stakeholders. This model of governance is commonly used in the Continental European countries. However, the Anglo-Saxon countries typically follow the stakeholders' model of CG, also called the one-tier system, in which it potentially supports the interests of the all stakeholders.

Despite the vast literature on the issue, the foregoing topic has not yet been explored. As it is argued, two companies can implement the two-tier system whereas significantly different CG frameworks might govern them regarding aspects like disclosure on the board's decision, percentage of employee's representatives in the non-executive directors, size of audit committee, and many more characteristics. It is unlikely to find one appropriate model of CG that similarly affects the performance of firms in different markets. Thus, each stock market or country needs to develop a strategy to overcome the agency issue on its first level between shareholders and managers, on its second level between majority shareholders and minority shareholders, and on its third level between stakeholders and corporation. As a result, firm performance could be enhanced.

The purpose of this study was to investigate the potential effect of the characteristics of CG structure on the financial performance of non-financial firms listed in Germany between 2002 and 2018. The starting point was selected based on the first adoption of the German Corporate Governance Code in 2002, as Werder et al. (2005) stated. This study could significantly contribute to the literature by providing valuable insight into the nature of the relation between CG and firm performance over a long time span in a shareholder-oriented system, following some previous theories. The financial system in Germany is classified as a bank-dominated model. This may imply the possibility of underdevelopment in the regulated German capital market (Abdullah, 2020). The sole German stock market is one of the most liquid markets and the largest one globally in terms of the number of listed firms and market capitalization. The non-financial sectors comprise a large proportion of the stock market size in Germany. It is expected that the results of this study be of interest to the German stock market regulatory authorities, the top management of non-financial listed firms, financial management, shareholders, investors, creditors, and financial analysts.

The remainder of the paper is prepared as follows. Section 2 reviews the most related literature. The research data, model specification, and methodology are described in Section 3. Section 4 is on analyzing the empirical findings and their interpretations, and Section 5 presents the conclusion and discussion of the results.

2. Literature Review

2.1. Theoretical Review

It is unlikely to find one appropriate model of CG that is in the best interest of all groups of stakeholders for all firms across all sectors of the stock markets in the world (Tricker & Tricker, 2015). Therefore, different stock markets or countries need to develop a specific strategy to overcome the potential agency issues (Kyere & Ausloos, 2021). Under the two-tier system of CG, shareholders traditionally enjoy a robust structure (Skare & Hasic, 2016). Two

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firms can implement the two-tier system and might be governed by highly different CG frameworks regarding aspects like disclosure on the board's decision, percentage of employee's representatives in the non-executive directors, size of audit committee, and many more characteristics (Velte, 2021). Consequently, each firm should apply to the system of CG, more likely to suit the goal of the firm to control the conflicts of interest that threaten the firm's best interest. The legislative framework, typically set by the Companies Act and Codes of Corporate Governance, limits founders when implementing the CG system. These restrictions prevent the implementation of a governance system that might serve the personal interests of the shareholders or founders only rather than those of the other stakeholders.

The initial purpose of the CG system is to overcome or decrease the conflict of interest among the possible stakeholders in the firm, i.e., to reduce the cost associated with the agency problem (Maurovic & Hasic, 2013). Shareholders are founders of the company, and they have the right to decide on the type of the CG system to be implemented by the firm. This selection of the system might be stated in the article of the company (Abdullah, 2020). However, a legal framework limits this decision of the shareholders.

The system of CG in Germany has traditionally been the typical sample of what Clarke (1998) has called the shareholder-oriented system and what Franks and Mayer (1994) have named the insider-controlled system. Although there is an argument that the characterization of the German CG system has been converging towards the stakeholder-oriented system, recent studies conclude that the core characteristic features of the CG system in Germany have continued generally unaltered (see Goergen et al., 2008; Kreijger, 2018). Some changes in the German legal framework happened over the last decade, as Goergen et al. (2008) states, in line with the common trend towards globalization and internationalization. Generally, the German CG system varies in terms of the corporate boards' structure and the impact of employees upon top decision-making. Figure 1 illustrates the structure of German CG.

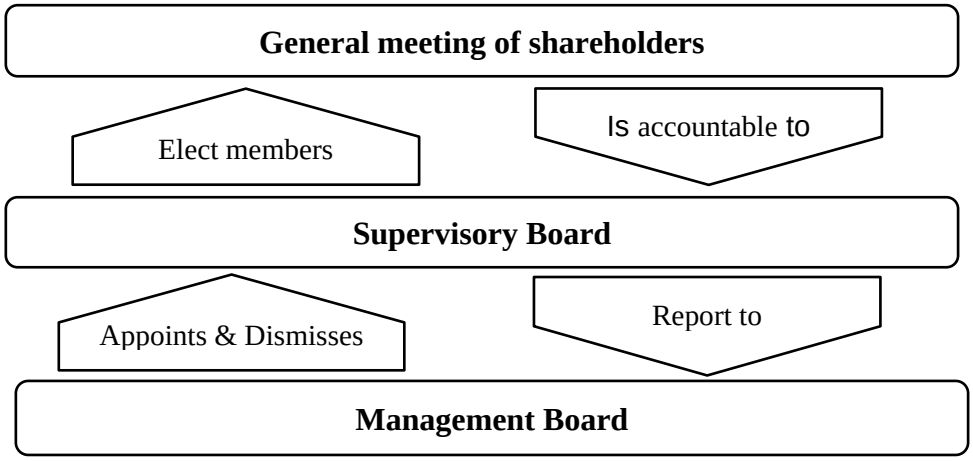


Figure 1. Structure of CG in Germany
Source: Kohlmann (2014)

Commonly, most shares for large firms in Germany are owned by at least one major shareholder, such as banks and insurance firms, other corporations, or wealthy individuals and families (Abdullah & Tursoy, 2019). The two-tier system of CG boards is introduced to listed corporations, mandating them to have one board of supervisors and another different board of executive officers. The independent non-executive board aims to protect shareholders' interest and hold directors accountable (Kreijger, 2018). Considerable power is given to the board of directors by the law. The board must control and monitor the acts of officers concerning the maximization of the interests of all stakeholders (Goergen et al., 2008) in addition to the

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interest of shareholders. This means that managers need to perform in the best interest of the corporation. Therefore, an overall two-tier system of CG, which cares about the shareholders' interests, aligns with German law (Kohlmann, 2014).

2.1.1. Agency Cost Theory

Theoretically, conflict of interest exists among the firm's stakeholders, in particular between shareholders and managers. The theory considers that this conflict of interest, as Jensen and Meckling (1976) assert, possibly generates agency cost to the firm. Consequently, firm performance is more likely to be decreased with the increase of agency cost (Afriyie et al., 2021) and vice versa.

Basically, the separation of management and ownership could create a conflict of interest between them (Salehi & Moghadam, 2019). In order to avoid or reduce this, the agency theory suggests CG strategy as a mean to overcome the conflict between the principal and the agent. Maurovic and Hasic (2013) state that the key objective of the CG system is to overcome or decrease the conflict of interest among the possible stakeholders in the firm, i.e., to decrease the cost associated with the agency problem. Sufficient monitoring or control mechanisms could create value for firms (Dang et al., 2018). The agency theory's custodian role is defined by the agency theory to be the daily control of the firm on behalf of the owners. Moreover, the theory describes the audit committee's role as controlling the process of management and auditors for the protection of shareholders' interest (Wasdani et al., 2021).

The shareholders' model of CG is dependent on the agency theory and in favor of maximizing shareholders wealth. This model supports the interests of the firm's shareholders over the interests of all other stakeholders due to their ownership rights (Chijoke-Mgbame et al., 2019; Lan & Heracleous, 2010). Thus, priority is given to shareholder wealth maximization in this model of corporate governance, which is applied in most of the Continental European countries, including Germany.

2.1.2. Stewardship Theory

The stewardship theory offers an alternative view of agency theory on management motivation or incentive. It argues that agents are predominantly trustworthy people and thus reliable custodians of their assets (Donaldson & Davis, 1991; Velte, 2021). From this perspective, CG is irrelevant to firm performance, i.e., firms do not need specific governance structures for management to protect the interests of stakeholders, including shareholders. Thus, monitoring the management actions and independence of the board of directors is irrelevant.

The stewardship theory assumes that there exists no conflict of interest between owners and managers in a firm (Kiptoo et al., 2021). The purpose of governance is to specify a mechanism and structure that could facilitate the most effective method to unify the interests of both principals and agents. This theory suggests that there is no original problem concerning the incentives and motivations of corporate executives (Donaldson, 2008). This possibly means that management tends to be trustworthy and protective towards the interests of shareholders. Therefore, the CEO is unlikely to be merely interested in the personal interests but attempts to show an adequate and balanced performance and thus be an appropriate agent for the firm's resources (Donaldson & Davis, 1991).

Moreover, this theory suggests that the firm executives should be given autonomy based on trust. This could contribute to lowering the costs of monitoring their behavior. This is also because the achievement of corporation success would satisfy the desire and needs of corporate executives. Consequently, this will help combine the interests of the agents for managing the

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resources of shareholders. The unity in the interests of managers brings about cooperation and teamwork, which would result in the maximization of shareholders' wealth and could enhance firm performance (Bathula, 2008). Thus, we set our research hypothesis based on the stewardship theory argument and state that CG has no significant effect on firm performance.

2.2. Empirical Review

The results from the previous empirical literature are diverse regarding the effect of CG on firm performance. This study reviews the most important previous studies by classifying them based on the country's financial system and its level of development.

Scholars have found a significant relationship between CG and firm performance in countries with a capital market-oriented system such as U.S., U.K., and Australia. Bhagat and Bolton (2008) selected a large sample of publicly traded companies in the U.S. during 1990-2002 to investigate the relation between CG and firm performance. The results concluded that better CG, as measured by CEO-Chair separation and stock ownership of board members, is positively associated with higher firm performance but not with the stock market future performance. Extending the sample period of their previous work to 1990-2016 in a sequel, Bhagat and Bolton (2019) emphasized that director stock ownership could positively affect future corporate performance. They also found similar results for a sub-sample of the top 100 largest U.S. banks. Additionally, Enache and Hussainey (2020) used a sample of U.S. biotech companies over 2005-2013 and found that board size and board independence have significant effects on Tobin's Q while the impacts of CEO duality were not found to be statistically significant. However, Giroud and Mueller (2010) found a negative relationship between CG and firm performance for a sample of 10,960 US firms listed on S&P. Bauer et al. (2004) also confirmed that firm performance is negatively affected by CG standards for a sample of 518 firm-year observations from the FTSE Euro Top 300 over the 2000-2001 period.

Rashid and Islam (2014) randomly selected a sample of 60 firms in Australia between 2000 and 2003. Their findings indicated that the CG framework significantly affects Tobin's Q ratio. Precisely, ownership concentration and CEO duality positively were found to impact firm value, whereas the impact of board size was negative. Furthermore, Aldamen et al. (2012) used a sample of 120 Australia's S&P300 listed companies during the financial crisis of 2008-2009. Their results revealed that audit committees characterized by small size, high experience of members, and financial expertise are significantly related to enhanced firm market performance. Furthermore, it was shown that an audit committee with block-holder representation, a board chair with high managerial experience, and external directorship positively influence financial performance, whereas an audit committee with long-serving chairs has a negative impact. Kyere and Ausloos (2021) also found a mixed result for 252 firms listed on London Stock Exchange in 2014.

Furthermore, studies have shown the significant effect of CG on firm performance in countries with the bank-based financial system, such as Germany and Switzerland. In the case of 100 largest non-financial firms publicly traded in Germany over 2003-2012, Gerum et al. (2018) attempted to compare the results with the results from a market-oriented funding policy. Their results confirmed that the applied CG framework in Germany tends to affect firm performance significantly. The authors argued that the market-oriented corporation cannot be a valid point of reference to identify the actual performance of large firms in Germany. Moreover, Drobetz et al. (2004) used primary data through a questionnaire collected from 91 public firms in DAX 30, MDAX, NEMAX 50, and SMAX, i.e., the four main market segments of the German stock exchange. The study classified 30 governance proxies into five groups: auditing, transparency, shareholder rights, corporate governance

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commitment, and management and supervisory board matters. This study showed that CG practice is positively related to firm value but is negatively associated with expected stock return. Similarly, using data of 120 public firms listed in the Swiss Stock Exchange in 2002, Beiner et al. (2006) found that corporate governance practice positively influences firm value.

The CG system of developing countries is characterized in a way different from the CG system in developed countries (Shao, 2019). Using a sample of 2,545 firms listed in China between 2001 and 2015, Shao (2019) found that ownership structure, managerial ownership, and supervisory board are positively and significantly associated with firm performance, and CEO duality tends to influence performance whereas board size shows no significant impact. In addition, Ko et al. (2019) confirmed that good CG quality – as measured by foreign ownership, board independence, CEO duality, and board member attendance ratio – positively affects firm performance in the electronics sector listed on Taiwan Stock Exchange.

In the case of India and for a sample of 100 companies, Wasdani et al. (2021) found a link between CG practices and organizational performance. Saygili et al. (2021) demonstrated a positive association between stakeholder-oriented governance practices and firm-level financial performance for firms listed on Borsa Istanbul during 2007–2019. Moreover, the study by Afriyie et al. (2021) showed that board size had no significant impact on the profitability of commercial banks in Ghana during 2011-2017. Kiptoo et al. (2021) indicated that board independence positively affected financial performance when studying 51 insurance firms in Kenya over the period 2013–2018. The study by Dalwai et al. (2021) revealed that CG mechanisms such as dispersed ownership and audit committee size result in easy-to-read annual reports that support agency theory. The study used a sample of 150 firm-year observations of listed financial sector companies in Oman, from 2014 to 2018. Moreover, Brahmana et al. (2018) conducted a study across several countries, including Brazil, China, India, Indonesia, Russia, and the U.S., over the period 2007-2013. Their findings indicated that CG structure positively affects firm performance through training and development policy.

3. Methodology

3.1. Sample and Data

The population of this study was comprised of the non-financial firms listed in Germany. Firms in the financial sector were excluded based on the argument that financial firms follow specific regulations, making their business operation different in several aspects, including financing and investment decisions (Abdullah & Tursoy, 2019; Le & Phan, 2017; Vo & Ellis, 2017). Moreover, firms whose year-end accounting data were missing during that period were also excluded from the sample. Based on the implementation of the German CG codes, we collected data from 2002 onward. Our final sample was consisted of 4,197 firm-year observations of non-financial firms listed on the Frankfurt Stock Exchange in Germany from 2002 to 2018. This provided a sample of unbalanced panel data for 364 corporations over 17 years. Secondary data were collected from the DataStream of Thomson Reuters EIKON.

3.2. The Variables

3.2.1. Firm Performance

Firm performance was the dependent variable of this study. There are different measures of performance used in the literature (for example, see Ahmed & Muhammed, 2018; Budur & Poturak, 2021; Zaim et al., 2021). Generally, scholars use accounting measures such as

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profitability indicators to measure firm performance (Abdullah et al., 2021; Ibhagui & Olokoyo, 2018; Jouida, 2018; Lins et al., 2017). In this study, the two measures of return on assets and return on equity were used. The return on assets is earnings before interest and tax to total assets, whereas the return on equity is earnings before interest and tax to total equity of shareholders.

3.2.2. Corporate Governance

CG was the explanatory variable of this study. The CG was defined as the processes and structures by which firms are controlled and directed (International Finance Corporation, 2020). CG is measured in the literature using different means such as the characteristics of the board of directors, ownership structure, the characteristics of the audit committee, transparency, and shareholders right (for instance, see Bhagat & Bolton, 2019; Chijoke-Mgbame et al., 2019; Drobetz et al., 2004; Enache & Hussainey, 2020; Faysal et al., 2021; Ko et al., 2019). This study used the characteristics of the board of directors and the characteristics of the audit committee to this end. The characteristics of the audit committee noted in this study were the existence of audit committee and audit committee independence. The characteristics of the board of directors taken into account in this study were board size and number of board meetings. Moreover, the CEO board member was used to measure if the CEO took the position of board chair, i.e., CEO duality.

3.2.3. Control Variables

In order to accurately capture the effects of CG on firm performance, this study controlled for some variables. This is consistent with the literature and could assist in controlling for some firm-specific and market-specific characteristics (Bandyopadhyay & Barua, 2016; Enache & Hussainey, 2020; Gerum et al., 2018; Jaisinghani & Kanjilal, 2017; Jouida, 2018; Vo & Ellis, 2017). The control variables that this study used were leverage and International Financial Reporting Standards (IFRS) adoption. Leverage shows the total assets financed through debt in a firm (Abdullah & Tursoy, 2021; Ross et al., 2008). Financial leverage is the measure of capital structure used to affect financial performance in some previous studies (for instance, see Fosu, 2013; Ibhagui & Olokoyo, 2018; Li et al., 2019; Margaritis & Psillaki, 2010). This study used long-term debt ratio of leverage to this end. Long-term debt ratio is long-term debts to total equity at book value. High leverage is associated with high performance due to the tax shield of debt (Abdullah & Tursoy, 2019; Akalpler & Abdullah, 2020; Jouida, 2018; Ozcan, 2019). Moreover, IFRS mandatory adoption in 2005 has been the crucial shift towards higher transparency and quality of accounting information, and hence it presumes to affect firm performance (Abdullah et al., 2020; Sampaio et al., 2020). The mandatory adoption of IFRS by the German stock market in 2005 was measured through a dummy variable and it is included to control for the accounting and financial regulatory modifications in the German stock market. Table 1 provides the definition and description of the variables employed in this study.

Table 1. Variables and Their Definitions

Variable	Measure	Abbr.	Type	Definition
Financial performance	Return on assets	ROA	Dependent	EBIT / total assets
	Return on equity	ROE	Dependent	EBIT/ total equity
Corporate governance	Audit committee	A.C.	Independent	Presence and independence of audit committee
	Board of directors	B.D.	Independent	Size of the board of directors and number of board meetings
	CEO duality	CEOBM	Independent	Chief executive officer holds board chair
Capital structure	Financial leverage	LDR	Control	Long-term debt / total equity
Financial regulatory change	IFRS adoption in 2005	IFRS	Dummy	Pre-IFRS and post-IFRS adoption in 2005

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3.3. Research Design and Model

As recommended in the literature (Bryman & Bell, 2015), the explanatory research approach is appropriate for investigating the relations involving several variables. Mohammed et al. (2019) and Saunders (2011), moreover, add that this approach could be helpful for problems that have not been clearly defined. Concerning data, the longitudinal research design is used. Regarding the method, panel data estimation is analyzed in the literature using several joint estimation approaches such as the pooled OLS, FE, and RE (Chadha & Sharma, 2015; Faysal et al., 2020; Vo & Ellis, 2017).

Regarding the research model, this study followed the study model of Bhagat and Bolton (2019) and Detthamrong et al. (2017), which suggested a linear association between CG mechanisms and firm performance. Equation 1 indicates that firm performance is the function of the CG framework with some other control variables. This equation is formed to test the hypothesis that the CG affects firm performance.

$$FP_{(t)j} = CG_{(t)j}\beta + X_{(t)j}\gamma + \mu \quad (1)$$

Where $FP_{(t)j}$ is firm financial performance for firm j at time t, $CG_{(t)j}$ is corporate governance measure for firm j at time t, β is the coefficient of CG measures, X is the vector of some control variables such as financial leverage and IFRS transition, and μ is the stochastic error term.

The expanded research models are shown in equations 2 and 3.

$$ROA_{(t)j} = \beta_0 + \beta_1 AC_{(t)j} + \beta_2 ACI_{(t)j} + \beta_3 BS_{(t)j} + \beta_4 NBM_{(t)j} + \beta_5 CEOBM_{(t)j} + \beta_6 LDR_{(t)j} + \beta_7 IFRS + \varepsilon_{(t)j} \quad (2)$$

$$ROE_{(t)j} = \beta_0 + \beta_1 AC_{(t)j} + \beta_2 ACI_{(t)j} + \beta_3 BS_{(t)j} + \beta_4 NBM_{(t)j} + \beta_5 CEOBM_{(t)j} + \beta_6 LDR_{(t)j} + \beta_7 IFRS + \varepsilon_{(t)j} \quad (3)$$

Where;

$ROA_{(t)j}$ is return on assets ratio to measure the financial performance;

$ROE_{(t)j}$ is return on equity ratio to measure the financial performance;

$AC_{(t)j}$ is audit committee (1 when a firm has audit committee and 0 otherwise);

$ACI_{(t)j}$ is audit committee independence based on the rate of non-executive audit committee member;

$BS_{(t)j}$ is the size of board of directors based on the number of board members;

$NBM_{(t)j}$ is the number of board meetings per annum;

$CEOBM_{(t)j}$ is chief executive officer board member to measure CEO duality;

$LDR_{(t)j}$ is the long-term debt to total assets at their book value;

$IFRS$ is a dummy variable for IFRS adoption in 2005 (0 for pre-IFRS implementation period and 1 for post-IFRS implementation period);

j denotes firms while t is for time; and

ε is the stochastic error term.

4. Empirical Results

4.1. Descriptive Statistics

Table 2 shows the summary of the descriptive statistics. The mean values of ROA and ROE are 5.18 and 10.8, respectively, for the sample non-financial firms listed in Germany. The range and standard deviation illustrate that there are firms with extremely high and low performance in the sample during the sample period. The mean value of the audit committee is considerably high (0.952), showing that most of the sample firms have this committee as one of the pillars of the corporate governance mechanism. However, the level of independence (36.8%) of the committee is even below 50%. The arithmetic average of board

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size is around 15 members for the firm sample, with a mean of 5.98 meetings per annum. Moreover, the mean value shows that a shallow rate of CEO holds the chair position of the board, 0.057.

Table 2. Descriptive Statistics

	ROA	ROE	AC	ACI	BS	NBM	CEOBM	LDR
Mean	5.184	10.84	0.952	36.836	15.366	5.984	0.057	32.049
Median	4.74	12.47	1.00	22.22	16.00	5.00	0.00	32.98
Maximum	78.81	265.92	1.00	100.00	29.00	23.00	1.00	92.05
Minimum	-52.25	-297.63	0.00	0.00	0.00	0.00	0.00	0.00
Std. Dev.	7.584	25.613	0.215	38.084	5.109	2.375	0.232	18.903
Observations	4169	4169	4169	4169	4169	4169	4169	4169

4.2. Multicollinearity Check

Table 3 presents the correlation matrix between the pairs of the variables. The results show that the characteristics of the audit committee and board of directors are negatively correlated with the measures of firm performance. However, CEOBM is positively correlated with ROA and ROE and only statistically significant at the 5% level of significance between CEOBM and ROE. The leverage ratio of long-term debt to equity is negatively correlated with the financial performance measures at 1% level of significance.

Table 3. Correlation Matrix and VIF

	1	2	3	4	5	6	7	8	VIF
1. ROA	**1.00**								
2. ROE	0.717[a]	**1.00**							
3. AC	-0.139[a]	-0.107[a]	**1.00**						**1.10**
4. ACI	-0.052[a]	-0.016	0.218[a]	**1.00**					**1.12**
5. BS	-0.153[a]	-0.024	0.203[a]	0.040[b]	**1.00**				**1.04**
6. NBM	-0.102[a]	-0.108[a]	0.093[a]	0.050[a]	-0.096[a]	**1.00**			**1.04**
7. CEOBM	0.028[c]	0.032[b]	-0.122[a]	0.035[b]	-0.021	-0.050[a]	**1.00**		**1.02**
8. LDR	-0.342[a]	-0.206[a]	0.031[b]	0.009	0.360[a]	0.085[a]	-0.063[a]	**1.00**	**1.02**
9. IFRS	0.046[a]	0.041[a]	0.032[b]	0.070[a]	-0.115[a]	0.143[a]	0.011	-0.062[a]	**1.05**

Note: (a) significant at 1%, (b) significant at 5%, (c) significant at 10% levels

Enders (2008) states that predictor variables in a multiple regression model cannot be linearly estimated from the others with a substantial degree of accuracy. The results illustrate that none of the correlations between the pairs of the explanatory variables seems to be at a problematic level. The most substantial level of correlation observed is 36%, which is between B.S. and LDR. This means that all the correlation matrices are expected, and the explanatory variables are far from being perfectly correlated. This issue is further investigated through the usage of variance inflation factor (VIF) (see Table 3), which is recommended in the literature (Abdullah et al., 2016; Gujarati, 2009; Thompson et al., 2017). The results show that the individual values of VIF are all less than 10, thus showing no sign of a multicollinearity problem. As a result, our data did not suffer from multicollinearity issue, and the explanatory variables could be combined in a single regression model.

4.3. Unit Root Test

In order to define the nature of the data and to ascertain the presence of a possible association between the variables, in the long run, we primarily subjected the variables and data of this study to some panel unit root tests. Augmented Dicky-Fuller suggests an individual unit root test for panel data that allows for testing heterogeneous lag length, A.R. (p), across cross-

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sections (Dickey & Fuller, 1979). Nevertheless, a standard unit root test for panel data presumes the existence of an identical autoregressive A.R. (p) across cross-sections (Levin et al., 2002). This study performed both unit root tests to increase the robustness of the results. Identically, LLC and ADF tests use a null hypothesis of having a unit root in the panel. Table 4 presents the results of panel unit root tests. The results confirm that all the series are integrated or stationary at level I(0), since the p-values of both ADF-Fisher Chi-square and Levin, Lin and Chu t* are relatively small (i.e., below 0.01). Consequently, we can reject all null hypotheses of non-stationarity.

Table 4. Panel Unit Root Tests

Variables	ADF-Fisher Chi-square	Levin, Lin and Chu t*	Results
ROA	1800.3[a]	-94.34[a]	I(0)
ROE	1924.2[a]	-42.91[a]	I(0)
ACI	580.79[a]	-19.98[a]	I(0)
BS	1097.6[a]	-31.42[a]	I(0)
NBM	1284.8[a]	-20.97[a]	I(0)
LDR	970.27[a]	-464.5[a]	I(0)

Note: (a) significant at 1% level, (b) significant at 5%, (c) significant at 10% levels

4.4. Regression Analysis

It is assumed that the pooled OLS estimator does not distinguish between the observations in each cross section. In other words, the heterogeneity and individuality that commonly exists among firms are denied by combining all cross-sections through pooling (Abdullah et al., 2020). Therefore, we performed panel affect models of F.E. and RE.

Table 5. Appropriate model selection tests

Test	Null hypothesis	Model	χ^2Stat.	*P*-value	Test result
Breusch-Pagan	No panel effects	1	982.58	0.0000	Panel effect
		2	592.94	0.0000	Panel effect
Hausman	RE model is appropriate	1	10.099	0.0115	F.E. model
		2	54.049	0.0000	F.E. model
Redundant F.E.	Cross-section effects are redundant	1	1513.1	0.0000	Reject Null
		2	979.11	0.0000	Reject Null

Table 5 shows the results of the proper model selection tests. First, we performed the Breusch-Pagan LM test to select the proper case between pooled OLS and random effect models (Breusch & Pagan, 1980). The results confirmed that we could vehemently reject the null hypotheses of no effects for the two models due to the small perceived *p*-values. Second, we performed the Hausman test to select the appropriate model between F.E. and RE estimators (Hausman, 1978). The results provided evidence against the null hypotheses, stating that the random effect model is appropriate, in both models 1 and 2 because the *p*-values of the Chi-square values (10.10 and 54.05) are smaller than 0.05. Furthermore, we ran the redundant F.E. test. Using the likelihood function, the cross-section Chi-square assessed the joint significance of the cross-section effects.

The null hypothesis of this test was set as the cross-section effects were found to be redundant. The two statistic values (1531 and 979) and the associated small *p*-values strongly rejected the null hypotheses for both models 1 and 2. Thus, we concluded that the F.E. model was appropriate.

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Table 6. Results of F.E. Models of Regression Analysis

	Model 1 ROA is the dependent				**Model 2 ROE is the dependent**			
	β	***S.E.***	***t****	***Prob.***	***β***	***S.E.***	***t****	***Prob.***
AC	-2.424	0.717	-3.38	0.000	-13.765	2.690	-5.117	0.000
ACI	-0.014	0.005	-3.02	0.003	0.016	0.017	0.920	0.358
BS	-0.165	0.055	-2.977	0.003	-0.246	0.208	-1.184	0.237
NBM	-0.161	0.051	-3.148	0.002	-0.977	0.192	-5.082	0.000
CEOBM	-0.839	0.545	-1.540	0.124	0.777	2.043	0.380	0.704
LDR	-0.141	0.009	-16.41	0.000	-0.461	0.032	-14.350	0.000
IFRS	1.152	0.347	3.322	0.001	3.865	1.301	2.971	0.003
C	15.021	1.138	13.20	0.000	44.22	4.269	10.358	0.000
No. of Obs.	4169				4169			
No. of groups	364				364			
Adj. R^2	34.333				0.190			
F-stat.	6.890				3.636			
Prob. (F)	0.000				٠,٠٠0			
D.W. stat.	1.828				2.002			
Obs.	4169				4169			

The table shows the results of two F.E. models to examine the effect of CG on firm performance. Firm financial performance is measured using different measures of ROA and ROE in model 1 and model 2, respectively. CG is measured using the characteristics of the audit committee, characteristics of the board of directors, and CEO duality. The results are based on annual data for non-financial companies listed in Germany during 2002-2018. IFRS is a dummy variable to control for the market-specific effect of IFRS transition as a financial and accounting regulatory transition point on January 1st, 2005, which might affect firm performance.

Table 6 presents the results of F.E. regression model estimators. The ROA and ROE are dependent variables to measure firm financial performance in models 1 and 2. We regressed several measures of corporate governance on firm performance. Although the *F*-statistics show that both models have the goodness of fit of the explanatory variables, the results of adjusted *R*-squared show that the explanatory variables could only explain the variation in ROA and ROE by 34.3% and 19.0%, respectively. The regression analysis results in model 1 show that the characteristics of corporate governance mechanisms tend to be harmful to all the measurement. These effects tend to be statistically significant from the audit committee and board of directors' measures but not significant from CEOBM. Moreover, the results in model 2 show that the effect of ACI, BS, and CEOBM are not statistically significant.

The existence of A.C. has a negative and significant impact on ROA and ROE. Precisely, firms with audit committee are subject to perform lower by ROA 2.4 and ROE 13.8 compared to firms with no audit committee. Audit committee independence has a negative and significant effect on ROA only, where ROA tends to decline by 0.014 by every 1% increase in ACI. The impact of board size is also negative but only significant for ROA. ROA decreases by an average of 0.165% with every 1% increase in B.S.

Furthermore, the number of the board meeting is also negatively associated with the two measures of firm financial performance. Precisely, every 1% increase in NBM would have a marginal impact on ROA and ROE to decline by 0.16 and 0.98, respectively, and these coefficients are significant at the 1% level of significance. However, CEOBM, which is supposed to measure CEO duality, has a different impact on firm performance but statistically not significant. As a result, we can conclude that the audit committee and board of directors harm firm performance, but CEO duality does not affect it.

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Regarding the effects of the control variables, financial leverage and IFRS adoption tend to influence the two used measures of firm performance significantly. However, their directions of effects are diverse; LDR has a negative impact, whereas IFRS transition tends to affect positively. Precisely, every 1% increase in long-term debt ratio has a marginal negative impact on ROA and ROE by 0.14% and 0.46%, respectively. Moreover, the average values of ROA and ROE are more excellent by 1.15 and 3.87, respectively, over the post-IFRS adoption period compared to their average value over the pre-IFRS adoption period. Thus, higher financial leverage can decrease performance further, while IFRS adoption in 2005 enhanced firm performance.

5. Discussion and Conclusion

This research examined whether CG attributes in a shareholder-oriented and insider-controlled system made a difference to firm financial performance. The specific governance characteristics of interest were the attributes of the audit committee, board of directors, and CEO duality. We examined different measures of these CG characteristics in order to investigate the effect of CG on the financial performance of non-financial firms listed in Germany, which are characterized to have a continental system of CG and are mainly controlled by a significant group of shareholders. However, most of the previous literature on the relationship between CG and performance concentrates on the Anglo-Saxon system of CG and recently on the developing countries.

The sample of this study consisted of a large number of observations (4169 firm-year) and over a long time span of 17 years (2002 – 2018). Publicly available annual data of the firms are collected and used. The results of F.E. regression estimator showed that there existed significant effects of CG on firm performance of non-financial firms listed in Germany during the selected period. Subsequently, we could reject the null hypothesis stating that there is no significant effect of corporate governance structure upon firm financial performance. Precisely, the results showed that CG characteristics had a negative marginal effect on firm performance. However, the impact of CEO duality was not statistically significant. These results are consistent with the results of Aldamen et al. (2012), Enache and Hussainey (2020), Faysal et al. (2021), and Rashid and Islam (2014). However, our results are not in line with the results of Beiner et al. (2006), Bhagat and Bolton (2019), Ko et al. (2019), and Shao (2019).

We found that the large size of the board and the significant number of board meetings are associated with poor performance. The prediction of Jensen (1986) for a negative correlation between board size and firm performance was later verified by Yermack (1996). The initial reasons here are the reduced board ability to monitor and control manager due to the ‘free-riding’ issue, the increased issues with coordination and communication as group size increases, and deferred decision-making by the board members (Mak & Kusnadi, 2005). Mainly, German firms are characterized to own by a particular major shareholder, and thus large board size might increase the problems as mentioned earlier and then decrease firm performance.

Unexpectedly, the existence and independence of the audit committee negatively affected financial performance. An explanation is that the audit committee oversees the financial reporting and disclosure practice, choice of accounting principles and policies, and regulatory compliance and ethics to serve all potential stakeholders’ interests. However, the German CG system has traditionally been a typical shareholder-oriented and insider-controlled system (Clarke, 1998; Franks & Mayer, 1994).

Moreover, high leverage is associated with low financial performance because more debt can increase the agency cost of debt (Becker & Stromberg, 2012) and increase the bankruptcy

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cost (Abdullah & Tursoy, 2019). Nonetheless, the impact of IFRS adoption is positive on the average financial performance of the sample firms. IFRS is considered as a critical shift towards higher transparency, better quality of accounting information (Abdullah, 2013), and more consistency to accounting language, which could deliver more investment and produce more rational decisions, hence increasing firm performance and value (Abdullah et al., 2020; Sampaio et al., 2020).

These results should be of considerable interest to managers and shareholders, precisely when concerned about its financial performance. Corporate governance attributes are crucial factors affecting the financial performance. This implies that even in a shareholder-oriented system, CG could significantly impact financial performance. The effect of financial leverage shows that the company management can use financing from equity to grow the business. Moreover, the analysis in this research contributes to the literature by investigating CG characteristics in a shareholder-oriented system and its effect on financial performance. We also added the impact of IFRS adoption to the model, which could be of considerable interest to the financial regulatory authority in Germany since it has a significant effect on performance.

With regard to the limitations of the study, it should be noted that the obtained results are restricted to the non-financial sectors, whereas one could draw a different conclusion for the relationship between CG and the financial sector's performance, since financial firms follow specific regulations. Moreover, future research could build on this work by examining data from other similar markets and different periods to better understand the relationship.

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