THE INFLUENCE OF INTERNAL AND EXTERNAL CORPORATE GOVERNANCE ON FIRM VALUE: EVIDENCE FROM STOXX® EUROPE 600 INDEX MEMBERS

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Abstract

The purpose of this paper is to analyze the influence of different dimensions of corporate governance quality on the valuation of non-financial firms listed in the STOXX® Europe 600 index over a period from 2012 to 2017. Instead of using a single governance measure that may cause biased estimates, we seek to capture a more holistic perspective on corporate governance. Therefore, we recreate a set of the most frequently cited governance scores in the literature on a common database and carry out a principal component analysis to identify similarities between the scores. Results reveal that our corporate governance scores load on two general factors that we identify to represent internal and external governance quality. After constructing composite governance measures for each of these factors, we find that external (internal) governance is positively (negatively) linked with firm valuation when applying both fixed effects and IV regressions to account for endogeneity. Our findings imply that subsequent studies on the governance-firm value relationship need to include proxies for both external and internal corporate governance quality.

Keywords: Internal and External Corporate Governance, Governance Scores, Firm Value, Principal Component Analysis, Panel Data, Endogeneity

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1. INTRODUCTION

In recent years, compliance with corporate governance has become an important factor to shareholders in identifying potential investment opportunities and aligning their investment strategies (Tseng et al., 2019). However, prior research on the effects of corporate governance on firm value provides inconsistent findings. Gompers, Ishii, and Metrick (2003), Aggarwal and Williamson (2006), and Ngoc Phi Anh (2016) among others, reveal a positive impact of corporate governance on financial performance indicators like sales growth, profit, and firm valuation. Gupta, Kennedy, and Weaver (2009) as well as Hassouna, Ouda, and Hussainey (2017) find no influence on valuation,

and Daines, Gow, and Larcker (2010) report mixed evidence for the influence on firm value depending on the specific governance rating they apply.

One reason for the contradicting findings may stem from the application of different corporate governance measures by the respective studies (Bhagat & Bolton, 2019). As Bebchuk, Cohen, and Ferrell (2009) demonstrate, the influence of governance on firm value depends on the respective set of governance provisions included in a governance score. Apparently, the diverse compositions of these scores measure different aspects of corporate governance quality, showing ambiguous influences on firm value (Daines et al., 2010). Even more importantly, using a single corporate governance index may cause biased estimations (Agrawal & Knoeber, 1996), especially if there are interactions between the scores (Donker & Zahir, 2008).

Early research on the impact of corporate governance on firm value is dominated by studies on the US market. These studies predominantly use scores that measure governance quality through the protection of shareholder rights, adopting an external approach to corporate governance. However, Aggarwal and Williamson (2006) and Schäuble (2019) underline the importance of internal governance mechanisms that go beyond a sole shareholder orientation. When examining the relation between corporate governance and firm value, stakeholder-oriented internal governance provisions should also be taken into consideration. Assuming convergence of external corporate governance across countries, for example, due to investor demand, best practice transfer, or international harmonization of disclosure requirements (Yoshikawa & Rasheed, 2009), internal corporate governance offers firms opportunities to differentiate themselves.

Thus, this paper seeks to contribute to the ongoing debate on the governance-firm value relationship in the following aspects. First, instead of using a single governance score, we apply a more holistic measurement approach. For this purpose, we reconstruct the most frequently cited corporate governance scores according to a Web of Science and Google Scholar review on a common database. To test whether the scores capture different aspects of corporate governance, we perform a principal component analysis (PCA). To our best knowledge and based on our literature review, such an approach to measure corporate governance quality has not yet been applied. The PCA reveals that the governance scores load on two general factors that represent internal and external governance quality. Second, most studies on the impact of corporate governance on firm value focus on the US market. Such findings may not be generalizable because corporate governance structures vary by nature across countries due to legal, cultural, and other factors. Instead, our sample is comprised of the largest non-financial European firms included in the STOXX® Europe 600. Particularly in continental Europe, corporate governance is more oriented toward stakeholder interests than in the US (Bottenberg, Tuschke, & Flickinger, 2017). Hence, capturing both internal and external corporate governance quality may provide additional insights. We do so by performing

a fixed-effects panel data regression and an instrumental variable (IV) regression to account for endogeneity concerns.

The remainder of this paper is organized as follows. Section 2 reviews related literature on different approaches to measure corporate governance and address endogeneity problems. Section 3 describes the dataset and discusses the results of the PCA to construct our composite governance measures. Section 4 provides and discusses the empirical analysis results, including the IV regression, to account for endogeneity. Section 5 concludes.

2. LITERATURE REVIEW

2.1. Measuring corporate governance quality

Approaches to measuring governance quality are typically based on a set of individual governance provisions to construct a firm-specific rating. While most ratings apply pass-fail scoring methodologies, they substantially differ on the number, weighting, and choice of provisions (Louizi & Kammoun, 2016). There are two general categories of provisions: those that measure external and those that measure internal governance quality (Al-Najjar & Clark, 2017). Scores that predominantly include provisions related to shareholder rights and anti-takeover provisions are considered ratings of external governance (Schäuble, 2019). It is assumed that shareholders will pay a premium for firms that protect their rights through governance regulations (Aggarwal, Erel, Ferreira, & Matos, 2011). In theory, this should increase the valuation of firms with good external governance (Durnev & Kim, 2005).

More holistic measurement approaches contain additional provisions of internal governance, thereby emphasizing the importance of internal control (Brown & Caylor, 2006). In this context, provisions of internal governance relate to the characteristics of the board of directors, internal audit, director's compensation, or a firm's ownership structure (Wintoki, Linck, & Netter, 2012). Ratings that consist of internal governance provisions go beyond a sole orientation toward the shareholder by including provisions that address all stakeholders (Acharya, Myers, & Rajan, 2011). Zagorchev and Gao (2015) show that governance scores which comprise provisions of internal governance such as board structure, audit, compensation, and ownership structure are associated with higher Tobin's Q, which is commonly used in literature to represent firm or market value of a company.

To analyze the composition of governance scores with regard to internal and external provisions, we conduct a Web of Science and Google Scholar ranking to identify prevailing academic ratings for governance quality.[1] Our ranking results include the Gompers et al. (2003) G-Index (2,636 citations) underlining the score's widespread recognition by media and academia (Khanchel, 2007), the Bebchuk et al. (2009) Entrenchment Index (1,008 citations) as well as the Brown and Caylor (2006) GOV-Score and Parsimonious Index

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[1] Ranking was conducted in September 2020 based on searches on Google Scholar and Web of Science with key words „corporate governance" and "score" or "rating" or "measure" or "index".

(1,311 citations each). For comparison purposes, we analyze similarities in the structure and provisions used in the scores. All four scores apply comparable scoring approaches based on different databases. The G-Index uses 24 provisions[2] from data provided by the Investor Responsibility Research Center (IRRC) and is computed on the principle that any reduction of shareholder rights negatively impacts firm value. Bebchuk et al. (2009) extend results from Gompers et al. (2003) to construct the Entrenchment Index that uses only those 6 out of the original 24 provisions from the same database that are specifically related to anti-takeover and protection provisions. Brown and Caylor (2006) use the Institutional Shareholder Services database to set up the GOV-Score and Parsimonious Index. Whereas the GOV-Score includes all 51 firm-specific provisions[3] from such a database, the Parsimonious Index only contains those 7 provisions that drive the positive impact between governance and firm value. To provide a complete picture of all scores discussed in this paper, we extend our analysis by the Eikon ESG Shareholder and Eikon ESG Management scores provided by Refinitiv Eikon[4] to represent established commercial ratings of corporate governance.

Following the shareholder- and stakeholder-centric approach by Shahzad, Rutherford, and Sharfman (2016) we set up three categories for provisions of similar content, which are shareholder rights, board of directors, and audit and disclosure. Our analysis of the different scores is summarized in Table 1. Provisions included in the G-Index, the entrenchment index, and the Eikon ESG Shareholder score predominantly fall in the shareholder rights category. Consequently, these scores can be considered as shareholder-oriented ratings of external corporate governance. Provisions used to compute the GOV-Score and Parsimonious Index contain internal and external provisions. In the GOV-Score, weighting of internal and external provisions is balanced, while external provisions prevail in the Parsimonious Index. The Eikon ESG Management score can be clearly identified as a stakeholder-oriented rating of internal corporate governance quality as it only comprises provisions from the board of directors and audit and disclosure categories. Our comparison between the selected governance scores indicates that approaches to measuring governance quality are based on different sets of underlying provisions among researchers. Consequently, it can be assumed that differences in computing scores to assess governance quality may contribute to the mixed research results (Bhagat & Bolton, 2019).

2.2. Endogeneity and the governance-firm value relation

More recent publications raise concerns about the governance-firm value relation being affected by endogeneity (Hassouna et al., 2017). Specifically, the results on the governance-firm value relation may be biased due to self-selection whenever non-random samples are analyzed (Iyengar & Zampelli, 2009). Hence, it is challenging to determine whether the effect of proxies for corporate governance on firm value is causal, or whether issuers choose the level of corporate governance that meets their respective goals or preferences (Wintoki et al., 2012). For instance, firms trading at discounts might strive to improve their governance quality to increase valuation and send out positive signals to investors (Renders, Gaeremynck, & Sercu, 2010). Moreover, for firms that operate in highly competitive industries, compliance with corporate governance structures may be an effective way to differentiate themselves or improve reputation (Bear, Rahman, & Post, 2010). However, when managers are not able to add value through core business activities, but only by choosing certain governance practices, a sustainable effect on firm valuation is questionable (Schultz, Tan, & Walsh, 2010).

When managers purposely select a governance structure to optimize market value, it requires an appropriate methodology to reveal the actual influence of good governance on valuation (Iyengar & Zampelli, 2009). Results of studies that do not address endogeneity should consequently be interpreted with caution (Schultz et al., 2010). Among others, frequently used treatments to overcome endogeneity problems are fixed-effects panel regressions (Schultz et al., 2010) and IV regressions (Renders et al., 2010). In a fixed-effects panel regression, the "within" transformation wipes out any individual effects (Ebbes, Papies, & van Heerde, 2017). Fixed-effects panel models, therefore, produce consistent parameters in the case of unobserved heterogeneity but are not optimal to control for endogeneity when data is affected by a self-selection bias (Secchi, Tamagni, & Tomasi, 2016). An alternative to the fixed effects models is the use of external instrumental variables that are correlated with the endogenous regressor but uncorrelated with the error term (Renders et al., 2010). Such a technique has been employed by Drobetz, Schillhofer, and Zimmermann (2004) using stock index membership, Bhagat and Bolton (2008) using treasury stock as well as by including firm size (Black, Jang, & Kim, 2006; Coles, Meschke, & Lemmon, 2003), and firm size and industry (Larcker, Richardson, & Tuna, 2007). Identifying a strong instrumental variable that is uncorrelated with the dependent variable is often challenging (Renders et al., 2010). As an alternative, lagged values of the independent variables can be used as instruments, arguing that endogeneity does not persist over time (Christensen, Kent, Routledge, & Stewart, 2015).

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[2] Due to duplication between the initial 22 firm-level provisions and the 6 state law IRRC provisions Gompers et al. (2003) reduce the overall number of provisions to 24 unique characteristics.

[3] The Institutional Shareholder Services database originally includes 61 provision. However, Brown and Caylor (2006) omit 10 provisions as they only apply to a subset of the included firms.

[4] Refinitiv Eikon was formerly known as Thomson Reuters Eikon.

Table 1. Analysis of corporate governance scores

	G-Index	Entrenchment Index	Eikon ESG Shareholder	GOV-Score	Parsimonious Index	Eikon ESG Management
1. Shareholder rights (external CG)						
Protection and anti-takeover provisions	X	X	X	X	X	
Election and voting rights	X	X	X	X		
Proposal rights and engagement	X			X	X	
Equitable treatment of shareholders	X		X	X		
2. Board of directors (internal CG)						
Board characteristics (size, age, gender, education, etc.)				X		X
Board meetings				X	X	X
Board guidelines and policy				X	X	X
Board structure	X	X	X	X	X	X
Committees				X		X
Independence (board and committees)				X		X
Executive and director compensation	X			X		X
Director ownership				X	X	
3. Audit and disclosure (internal CG)						
Internal audit and consultants				X		X
Audit committee				X		X
Information disclosure and transparency				X		X

3. SAMPLE AND DATA

3.1. Sample selection

Our sample data are constructed from the 600 largest European firms by market capitalization listed in the STOXX® Europe 600 index and covers the most recent period from 2012 to 2017. To avoid survivorship bias[5], we refer to the index composition as of January 2012. All data are collected from Thomson Reuters Eikon Datastream and the Refinitiv Eikon ESG module.

Our initial sample consists of 3,600 annual observations from 600 firms. First, we exclude 134 firms with 804 annual observations, which are considered financials according to the ICB sector classification. As we control for debt to total assets, regression results are likely to be distorted when financials remain in the sample. Furthermore, financials are strictly regulated, which potentially affects both their performance and corporate governance regulations. In the second step, we remove 247 annual observations because of missing data. Among these, 166 observations lack data on corporate governance, while data on the controlling variables are incomplete for 81 observations. Finally, 109 outliers are dropped. An observation is defined as an outlier if the Cook's distance exceeds a value of $4/n$, where n denotes the number of observations. This leaves us with an unbalanced panel dataset comprising 2,440 annual firm observations for 437 firms over a six-year period.

3.2. Corporate governance variables

3.2.1. Recreation of common corporate governance scores

We recreate the corporate governance scores outlined in Sub-section 2.1 on a common data basis. Our source of governance data is the Refinitiv Eikon ESG database, which is easily accessible and provides a broad set of provisions covering internal and external governance characteristics. A set of 65 provisions relevant to reflect governance quality

of a firm is identified, 41 of which relate to internal governance, that is the Eikon Management category, while 24 cover external governance, i.e., the Eikon Shareholder category. As Eikon provides this separation of provisions, we subdivide the GOV-Score into two separate scores, one based on the Eikon management and one based on the shareholder category. This leaves us with a total of seven governance scores.

Following the approach of Brown and Caylor (2006), we use the most recent version of the Institutional Shareholder Services governance methodology guide to determine whether a provision contributes positively or negatively to corporate governance quality (Institutional Shareholder Service, 2020). When a firm fulfills a provision that positively affects governance quality, it is coded as one, and zero otherwise. If a provision is stated as a number or percentage, it is deemed to be fulfilled if the threshold as proposed by the Institutional Shareholder Service (2020) methodology guide can be achieved without making any further gradations (Gompers et al., 2003). For instance, a board meeting attendance of 75% or more is proposed as a threshold for good governance. The recreation of the scores then follows a straightforward scoring model that sums the binary value of each provision contained in the score. Each score is scaled as a percentage showing the ratio of the sum of total provisions fulfilled to the sum of provisions included in the respective score. Compared to the composition of the scores in the original papers, the following modifications are necessary due to the use of the Eikon database:

• GINDEX refers to the recreated G-Index and is based on a total number of 12 Eikon provisions that are identified as similar or overlapping with 17 out of the 24 original IRRC provisions used by Gompers et al. (2003).

• ENTRM denotes the recreated Entrenchment Index by Bebchuk et al. (2009), which we base on all provisions in the Eikon dataset related to anti-takeover or protection mechanisms.[6] Our Entrenchment Index includes a total set of

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[6] The Entrenchment Index is predominantly used in countries which apply the shareholder concept of corporate governance. However, we do not see an issue to consider this score as the originally included provisions can apply to shareholder- and stakeholder-oriented countries (original provisions are staggered boards, golden parachutes, limits to amend bylaws, limits to amend charter, supermajority, poison pill).

14 entrenching Eikon provisions related to limitations of shareholder voting rights, anti-takeover provisions, and classified or staggered board structure.

• GOV-SH represents the Brown and Caylor (2006) shareholder GOV-Score and comprises all 24 provisions from the Eikon shareholder category.

• GOV-MNG represents the management GOV-Score and is based on the 41 management provisions provided by the Eikon database.

• PARS refers to the Parsimonious Index for which we use a set of similar governance provisions

as identified by Brown and Caylor (2006). The reconstructed score includes six of the original seven Institutional Shareholder Services provisions, as the relevant provision for "Option Burn Rate" is not available in the Refinitiv Eikon dataset.

The Eikon ESG Shareholder score (EIKON-SH), including provisions capturing external governance quality, and the Eikon ESG Management score (EIKON-MNG), including provisions capturing internal governance quality, are based on the original Eikon score without further modifications. Table 2 summarizes the descriptive statistics.

Table 2. Summary statistics of corporate governance variables

Governance score	Mean	Median	Std. dev.	Max	Min
GINDEX	0.5192	0.5000	0.1567	1.0000	0.0667
ENTRM	0.6331	0.6429	0.1580	1.0000	0.1111
EIKON-SH	0.5050	0.5071	0.2873	0.9987	0.0000
GOV-SH	0.7098	0.7273	0.1173	1.0000	0.3000
GOV-MNG	0.6812	0.6829	0.1170	0.9512	0.3030
PARS	0.7384	0.8000	0.1581	1.0000	0.2000
EIKON-MNG	0.5642	0.5929	0.2832	0.9988	0.0000

In line with previous findings (Daines et al., 2010), correlation coefficients between our seven corporate governance scores reported in Table 3, however, indicate that different aspects of corporate governance quality are measured. While coefficients

between scores mainly capturing either external or internal corporate governance tend to be rather high, correlations between external and internal governance scores are low and occasionally even negative.

Table 3. Correlation coefficient summary of corporate governance variables

	GINDEX	ENTRM	EIKON-SH	GOV-SH	GOV-MNG	PARS	EIKON-MNG
Pearson correlation coefficients:							
GINDEX	1.0000						
ENTRM	0.5536*	1.0000					
EIKON-SH	0.3335*	0.3388*	1.0000				
GOV-SH	0.6228*	0.8172*	0.5104*	1.0000			
GOV-MNG	-0.0241	0.2236*	0.1277*	0.2940*	1.0000		
PARS	0.3721*	0.6249*	0.2401*	0.5799*	0.3345*	1.0000	
EIKON-MNG	-0.0117	0.0840*	0.1220*	0.1089*	0.6060*	0.1648*	1.0000
Spearman's rank correlation coefficients:							
GINDEX	1.0000						
ENTRM	0.5844*	1.0000					
EIKON-SH	0.3353*	0.3192*	1.0000				
GOV-SH	0.6497*	0.8156*	0.4935*	1.0000			
GOV-MNG	-0.0205	0.2326*	0.1114*	0.2947*	1.0000		
PARS	0.3703*	0.6198*	0.2327*	0.5879*	0.3308*	1.0000	
EIKON-MNG	-0.0116	0.0763*	0.1217*	0.0887*	0.5892*	0.1498*	1.0000

*Note: Variables with * are significant at the 5% level.*

3.2.2. Principal component analysis (PCA)

To identify common factors on which our governance measures load, we perform a PCA similar to Larcker et al. (2007), Dey (2008), and Louizi and Kammoun (2016) who analyze corporate governance on the provision level. Whereas Larcker et al. (2007) identify 14 factors based on 39 single governance provisions, Dey (2008) distil seven principal components out of 22 governance variables. Louizi and Kammoun (2016) find only two main factors that represent their underlying set of 50 governance variables. They identify these factors as "shareholders rights and board of directors" and "interests of different parties".

Prior to the PCA, we test pre-conditions through the Kaiser-Mayer-Olkin criterion with a value of 0.7097 being well above the critical value of 0.5, and the Bartlett test being statistically significant at the 95% confidence interval level (Maddala, 2008). We extract the number of relevant factors for our PCA using the Very Simple Structure (VSS) criterion. Based on a varimax rotation, the VSS

criterion indicates a two-factor model that accounts for 67.89% of the total variance.

Table 4 reveals that scores which mainly include external provisions related to shareholder rights show high loadings on factor 1, while ratings that predominantly consist of provisions related to internal governance load on factor 2. These results correspond to prior findings by Louizi and Kammoun (2016) and suggest that approaches to measuring governance quality need to differentiate between the aspects of internal and external governance. In addition to the reconstruction of the seven corporate governance indicators on a common data basis and the choice of the corporate governance measures, high loadings on the external governance factor may be driven by the influence of institutional investors. Especially institutional investors from countries with strong shareholder rights export corporate governance practices (Aggarwal et al., 2011), which may cause a convergence of global corporate governance and adoption of best practice examples (Krafft, Qu, Quatraro, & Ravix, 2014).

Table 4. Results of the principal component analysis

Governance score	Factor 1	Factor 2	Uniqueness
GOV-SH	0.916		0.141
ENTRM	0.876		0.221
GINDEX	0.776		0.366
PARS	0.694		0.434
EIKON-SH	0.572		0.665
GOV-MNG		0.889	0.184
EIKON-MNG		0.874	0.237
Proportional variance	0.435	0.244	
Cumulative variance	0.435	0.679	

Based on the PCA results, we construct two composite measures of corporate governance quality, one for external (EXT) and one for internal governance quality (INT). To compute EXT and INT, all governance scores are z-standardized. These normalized values are summed up and divided by the number of scores comprised, that is five for factor 1 (EXT) and two for factor 2 (INT). Summary statistics on EXT and INT are presented in Table 5.

Table 5. Descriptive statistics for composite governance variables

Composite governance score	Mean	Median	Std. dev.	Max	Min
EXT	-0.0001	0.0037	0.7720	2.0941	-2.2240
INT	0.0051	0.1251	1.3620	3.0793	-4.0107

3.3. Dependent variable and controlling variables

As in previous studies on the impact of corporate governance on firm value, we use Tobin's Q, denoted by Q, as our dependent variable reflecting firm valuation (Demsetz & Lehn, 1985; Morck, Shleifer, & Vishny, 1988; Aggarwal & Williamson, 2006). Q is defined as the market value of equity and total assets less common equity and deferred taxes divided by total assets. Panel A of Table 6 provides descriptive information on Q.

Our set of controlling variables is based on the insights of prior research on the impact of corporate governance on firm valuation. We use *SIZE* as total assets to represent firm size (Drobetz et al., 2004). To account for risk, we consider *DEBT*, i.e., the ratio of total debt to total assets, (Chhaochharia & Laeven, 2009) whereas the return on assets *ROA*, captured by gross income to total assets, is added as a measure of a firm's profitability (Bebchuk et al., 2009). To control for growth potential, we follow Aggarwal, Erel, Stulz, and Williamson (2010) and add *CAPEX*, i.e., the capital expenditures to total assets, as an indicator for investment intensity. Consistent with Flammer (2015), we include *CASH*, i.e., cash holdings as the ratio of cash and short-term investments to total assets and further account for corporate risk by including *RESVOL*, i.e., the residual volatility (Krishnaswami & Subramaniam, 1999) and information asymmetries denoted by *INTANGIBLES*, i.e., the ratio of intangible assets (Khanchel, 2007). For the regression analysis, we use the natural logarithm to transform the controlling variables *SIZE* and *RESVOL*.

Table 6. Descriptive statistics on the dependent variable and controlling variables

Variables	Mean	Median	Std. dev.	Max	Min
Panel A:					
Q	1.6684	1.4572	0.7315	4.9445	0.4298
Panel B:					
ln(SIZE)	16.0046	15.8081	1.3106	19.8375	12.7759
DEBT	0.3942	0.3873	0.2144	1.8676	-1.7329
ROA	0.0546	0.0540	0.0617	0.3993	-0.7008
CAPEX	0.0423	0.0338	0.0346	0.3381	-0.0701
CASH	0.0787	0.0606	0.0667	0.5017	0.0001
INTANGIBLES	0.2808	0.2431	0.2079	0.8974	0.0000
ln(RESVOL)	2.4497	2.3921	0.4759	6.4661	0.8446

4. EMPIRICAL RESULTS

4.1. Basic results

We test for the impact of EXT and INT on Q while controlling for the variables outlined in Sub-section 3.3. To account for unobservable time and individual effects, we use the "within" estimator with year and firm fixed effects, as indicated by the Hausman test. All variance inflation factors fall below the critical threshold of five so that results reported in Table 7 are not affected by multicollinearity between the independent variables. Significance tests of the regression coefficients rely on robust Huber-White standard errors to account for heteroscedasticity (Huber, 1967; White, 1980).

Table 7. Results of the fixed effects panel regression model

Variables	Estimate/(robust std. error)	t-value
ln(SIZE)	-0.268 (0.065)***	-4.110
DEBT	0.069 (0.075)	0.920
ROA	1.871 (0.224)***	8.360
CAPEX	0.535 (0.436)	1.230
CASH	0.931 (0.225)***	4.140
ln(RESVOL)	-0.125 (0.021)***	-5.950
INTANGIBLES	-0.302 (0.315)	-0.960
EXT	0.096 (0.031)***	3.130
INT	-0.017 (0.015)	-1.140
Firm fixed effects	Yes	
Year fixed effects	Yes	
Observations	2,440	
R-squared within	0.1814	
R-squared between	0.3092	
R-squared overall	0.2787	

Note: This table reports the results of the fixed effects panel regression model. We regress governance measures EXT and INT on firm value (Q). The controlling variables include ln(SIZE), DEBT, ROA, CAPEX, CASH, ln(RESVOL), and INTANGIBLES. Significance tests of the regression coefficients rely on robust Huber-White standard errors which are reported in parentheses. Variables with ***, **, or * are significant at 1%, 5%, and 10% level, respectively.

Our regression model accounts for 27.9% of the total variance reported by the overall R-squared value. Regression results for the controlling variables mostly correspond to expectations and prior findings in the literature. The positive impact of the controlling variables on *Q* is reported for *ROA* and *CASH*, while *DEBT*, *CAPEX*, and *INTANGIBLES* are not significant. For the remaining controlling variables, we report a significant negative impact of *ln(SIZE)* and *ln(RESVOL)*. The negative effect of *ln(SIZE)* on *Q* is surprising as prior studies by Rizqia and Sumiati (2013) reveal a positive relationship between firm size and *Q* due to eased access to external funding, lower transaction cost, and more spotlight from investors compared to smaller firms. However, our results are in line with prior studies by Brown and Caylor (2006), Chen, Chung, Hsu, and Wu (2010) or Jayachandran, Kalaignanam, and Eilert (2013) who also find a negative impact of firm size on *Q*. Our findings on a negative *ln(SIZE)-Q* relationship are probably driven by the sample characteristics. Among the largest companies measured by total assets, industry sectors such as industrials, basic materials, or energy account for a large fraction, while the technology sector, where higher valuation levels can frequently be observed, is underrepresented. The negative influence of *ln(RESVOL)* on valuation is as expected, as the residual volatility can be used to represent information asymmetries (Krishnaswami, Spindt, & Subramaniam, 1999).

Regarding our independent variables, we reveal a positive influence of EXT on *Q*, while *Q* non-significantly decreases with increasing INT. The market value of public companies is determined by investors' demand for equity. Hence, we assume that external governance plays a more important role for shareholders than internal governance due to its direct impact on shareholder rights. Moreover, several studies disclose a negative influence of certain internal governance provisions on valuation.

With regard to board size, Yermack (1996) argues that smaller boards of directors can work more effectively and at a lower cost. Governance regulations prescribing a mandatory number of board members may lead to an inverse relationship between internal governance and valuation. Durden and Pech (2006) claim that internal governance regulations have negative consequences on management performance as they potentially hinder managers creating value for the business. Excessive internal governance obligations might distract and pre-occupy management resources. When managers cannot effectively operate the business due to internal governance obligations, firm value may be negatively influenced (Durden & Pech, 2006).

4.2. IV regression

To mitigate endogeneity concerns caused by a self-selection bias, we use an IV regression model (Chung & Zhang, 2011). We follow Durnev and Kim (2005) and use lagged values of the endogenous independent variables EXT and INT as instruments, since the natural instruments are either already considered as control variables, such as firm size (Black et al., 2006), or by the sample selection process, such as index membership (Drobetz et al., 2004). The instruments are denoted as EXT_{t-1} and INT_{t-1}.

We apply an IV regression including year and firm fixed effects. To verify the consistency of the model, we first test the relations between the instrumental variables and the endogenous regressors. Table 8 reports the first-stage of the IV regression results showing that EXT is correlated with EXT_{t-1}, and INT is correlated with INT_{t-1}, which fulfills the relevance criterion (Ebbes et al., 2017). First-stage F-statistics of excluded instruments are well above the threshold of ten according to Stock and Yogo (2005).

Table 8. First-stage IV regression results

Variables	EXT	INT
	Estimate/(robust std. error)	Estimate/(robust std. error)
EXT$_{t-1}$	0.273 (0.034)***	0.024 (0.042)
INT$_{t-1}$	0.012 (0.012)	0.400 (0.028)***
ln(SIZE)	0.080 (0.037)**	0.166 (0.071)**
DEBT	-0.102 (0.078)	-0.163 (0.099)*
ROA	0.031 (0.141)	0.459 (0.259)*
CAPEX	-0.635 (0.389)	-0.068 (0.754)
CASH	0.182 (0.176)	0.162 (0.338)
ln(RESVOL)	-0.013 (0.024)	-0.050 (0.041)
INTANGIBLES	0.041 (0.175)	0.399 (0.302)
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	1,991	1,991
F-test of excluded instruments	32.82	100.42

*Note: This table reports the results of the first-stage IV regression including fixed effects. We regress the controlling variables ln(SIZE), DEBT, ROA, CAPEX, CASH, ln(RESVOL), and INTANGIBLES as well as the instrumental variables EXT$_{t-1}$ and INT$_{t-1}$ on the governance measures EXT and INT. Significance tests of the regression coefficients rely on robust Huber-White standard errors which are reported in parentheses. Variables with ***, **, or * are significant at 1%, 5%, and 10% level, respectively.*

The results of the second stage of the IV regression are revealed in Table 9. Applying the Cragg-Donald and Kleibergen-Paap Wald F-statistics, our set of instruments is identified as valid and strong instruments for EXT and INT with F-statistics well above the critical value according to the Stock-Yogo weak ID test (Bhagat & Bolton, 2019). As the endogeneity test shows that the EXT and INT cannot be treated as exogenous, endogeneity is of concern, so the IV regression results from Table 9 are more consistent than the regression results from our fixed effects regression in Sub-section 4.1.

Table 9. Second stage IV regression results and post estimations

Variables	Estimate/(robust std. error)	t-value
ln(SIZE)	-0.356 (0.058)***	-6.120
DEBT	0.060 (0.058)	1.030
ROA	1.626 (0.181)***	8.960
CAPEX	0.470 (0.418)	1.120
CASH	0.560 (0.221)**	2.540
ln(RESVOL)	-0.136 (0.024)***	-5.710
INTANGIBLES	-0.424 (0.259)	-1.640
EXT	0.198 (0.086)**	2.290
INT	-0.099 (0.033)***	-3.020
Firm fixed effects	Yes	
Year fixed effects	Yes	
Observations	1,991	
R-squared centred	0.1537	
Cragg-Donald Wald F-statistic	78.928	
Kleibergen-Paap Wald F-statistic	32.370	
Stock-Yogo critical value (10% rejection)	7.03	
Endogeneity test of endogenous regressors	Chi-sq (2) p-value = 0.0115	
Kleibergen-Paap underidentification test	Chi-sq (1) p-value = 0.0000	

*Note: This table reports the results of the second stage IV regression including fixed effects. We regress governance measures EXT and INT on firm value (Q) by including lagged values of EXT and INT as instrumental variables. The controlling variables include ln(SIZE), DEBT, ROA, CAPEX, CASH, ln(RESVOL), and INTANGIBLES. Significance tests of the regression coefficients rely on robust Huber-White standard errors which are reported in parentheses. Variables with ***, **, or * are significant at 1%, 5%, and 10% level, respectively.*

Signs of the estimates and significance of the controlling variables from our second stage IV regression are comparable to those of the fixed effects regression. However, by including the instrumental variables, the influence of EXT on Q remains significant and positive, whereas the relation between INT and Q is significantly negative. As outlined in the previous section, the negative influence of INT on Q can be explained by costs related to good internal governance structures such as board committees, board size, or frequency of board meetings as well as by distractions of the management from core business activities (Durden & Pech, 2006). The overall cost to implement good internal governance might negatively affect the market value of a company, while shareholder-oriented external governance creates value for shareholders and thereby has a positive effect on firm value. These results correspond with Stiglbauer and Velte (2012).

5. CONCLUSION

Using a sample of non-financial firms included in the STOXX® Europe 600 index over a period from 2012 through 2017, this study investigates the influence of internal and external corporate governance on firm valuation. The level of corporate governance quality is measured by recreating the most frequently cited corporate governance scores from the literature on a common database while following the originally applied methodologies. Using a PCA, we find that our set of seven governance scores loads on two different factors. We identify such factors to represent internal and external governance quality and construct two composite governance measures for each of the factors.

We apply fixed effects panel regression techniques to gain insights into the governance-firm

value relation. Accounting for endogeneity, we further use a two-stage IV regression model including lagged values of the independent variables as instruments. Controlling for generally accepted variables derived from literature, we find that external governance quality is positively linked to firm valuation, whereas internal governance shows a significant negative impact when endogeneity is addressed. The positive influence of external governance quality can be explained by its direct impact on shareholder rights. As firm valuation reflects the investor's demand in the firm, the protection of shareholder rights through good external governance may be perceived as a positive signal to investors. While it is plausible that internal governance plays an important role in good corporate management, potential costs from the creation of board committees, large boards of directors, frequent board meetings, and the use of management resources may negatively affect valuation. Our findings allow concluding that one possible reason for mixed evidence on the governance-firm value relation in the literature might stem from the inverse influence of internal and external governance.

Overall, the study suggests that both internal and external corporate governance play an essential role in the responsible management of a firm. Compliance with governance principles nowadays is a mandatory requirement for firms as governance criteria are increasingly included in capital investment decisions and became an important input to define investment strategies. Our findings indicate that differences in the influence of internal and external factors of corporate governance on the governance-firm value relation should be considered. Moreover, the findings emphasize the requisite of addressing endogeneity concerns when analyzing the influence of corporate governance on firm value.

The limitations of this paper mainly relate to the data sample used. Due to the availability of governance data at company level, our study focusses on large companies with high market capitalization, while data for small and medium-sized companies could not be obtained. Broader studies in different countries and markets could therefore produce more generalizable results. It could also be of interest for the academic community to gain more insights on why internal governance negatively influences on firm value and if there are differences between industry sectors.

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