# “Transparency & disclosure on corporate governance as a key factor of companies’ success: a simultaneous equations analysis for Germany”


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# SECTION 3. General issues in management

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# Transparency & disclosure on corporate governance as a key factor of companies' success: a simultaneous equations analysis for Germany

## Abstract

This paper develops and tests a simultaneous equations model on the relationship between corporate governance disclosure and firm performance on a sample of over 100 German firms listed in the Prime Standard segment of the Frankfurt Stock Exchange. Integrating leading indicators for corporate governance − such as firm size, risk, ownership structure, leverage, takeover activities or board size − and capturing endogeneity and reverse causation, we provide evidence that there's a significantly positive relationship between transparency & disclosure on corporate governance and firm performance as measured by market-to-book value of equity and total shareholder return. Surprisingly, and contrary to theoretical assumptions we couldn't find evidence on a significantly positive relationship between declared compliance with the German Corporate Governance Code and firm performance. We arrive at the conclusion that our state of the art approach to measuring the impact of good corporate governance on firm performance may handle both problems endogeneity and reverse causation better than existing approaches do. Based on our findings we propose a change of mind on good corporate governance in Germany on its way to a more market-oriented system and a paradigm shift towards more openness and transparency and thus increasing trust in German corporations.

**Keywords:** corporate governance, transparency & disclosure, firm performance.
**JEL Classification:** M10.

## Introduction

"Timely and accurate disclosure of information regarding the … governance of the company is an important part of corporate governance. This improves common understanding of the structure, activities and policies of the organization. Consequently, the organization is able to attract investors" (Junarso, 2006, p. 4). Not only the well-known case of Enron has shown the importance of transparency & disclosure on corporate governance drastically. Also, Germany has faced spectacular cases of mismanagement such as golden handshakes to the management board of Mannesmann when facing its hostile takeover by Vodafone Airtouch or the political bailout of Hypo Real Estate in the current financial crisis. Therefore, politics and academics in many countries are still in search of the holy grail of good corporate governance to avoid and solve such problems. Nevertheless, not least in light of the current financial crises "even in advanced market economics, there is [still] a great deal of disagreement on how good or bad the existing governance mechanisms are" (Shleifer and Vishny, 1997, p. 737). Germany established the German Corporate Governance Code (GCGC) in 2002, which is evaluated and if necessary modulated yearly and which companies have to report on, whether they hold its rules or not.

There's also an increasing demand on good governance since institutional investors gather bigger and more concentrated share proportions. Since investors' decisions more and more depend on governance metrics, managers of listed companies face pressure to adopt international best practices of good governance. Accordingly, companies should keep an eye on reporting on corporate governance because good corporate governance has to be recognizable at first to be an effective value driver. Otherwise capital markets cannot work efficiently. Unsurprising, missing transparency was also been identified as a core reason for the current financial crisis (Hellwig, 2009). Despite theoretical assumptions on corporate governance reporting as a factor of companies' success which have recently been confirmed in several international studies (e.g., Haat et al., 2008), there has only been little effort in Germany to research on this topic empirically. Our study focuses on this gap. We try to find out, if transparency & disclosure on corporate governance is as important within the German stock market as in Anglo American stock markets (Netter et al., 2009). Increasing global convergence of governance systems (Yoshikawa and Rasheed, 2009) could be a hint to expect transparency & disclosure being a key factor of success also in German corporations. Consequently, this may induce a paradigm shift towards transparency & disclosure in the center of corporate governance systems and concentration on external information expectation.

## 1. Current state of knowledge on governance reporting

Whereas corporate transparency is generally defined as "the widespread availability of relevant, reliable information about the … governance, value, and risk of publicly traded firms" (Bushman and Smith 2003, p. 66), companies may also use (governance) reporting as an active instrument to manage analysts' assessment due to two facts:

Firstly, lacking information on management and control of listed companies lowers accuracy of investors' risk-return ratio because "it is in the accounting for intangibles that the present system fails most seriously to reflect enterprise value and performance" (Lev and Zarowin, 1999, p. 354). Accordingly, corporate governance reporting may be a valuable instrument to close a gap between internal and external information: this may lower investors' uncertainty towards investment decisions. Surprisingly, in comparison to financial disclosure companies' reporting on corporate governance issues mainly is on a voluntary basis in Germany. There are just a few legal rules companies have to follow, e.g., a compliance statement with the GCGC rules following the German Corporation Act (§161), which we discuss in the further section of this paper. Secondly, reducing information asymmetry and trust-building on capital markets is an important task for companies, because it is intended to lower cost of capital and to secure access to financial assets.

Summing up, transparency & disclosure on corporate governance may enable companies to signal quality in management and control. These signals may have a potential to lower agency costs by reducing conflicts of interest and costs of monitoring management and searching for information. Thus, corporate governance reporting may support value-based management with its primary target to increase shareholder value. International research supports this assumption: capital markets equal non-private, relevant governance information with bad information if they are able to evaluate the information on correctness and completeness (Milgrom, 1981). In case of missing governance information investors aren't able to allocate capital perfectly. Consequently, some companies may have to pay too much cost of capital whereas others have to pay too little. Empirically, Beeks and Brown (2006) found out that companies with better governance also disclose more information. Also, Bhat et al. (2006) identified corporate governance as being valuable when there are lacking financial disclosure and weak legal enforcement. They even think that transparency on corporate governance may substitute financial disclosure and increase analysts' accuracy. Corporate governance in Germany is also considered to have weak enforcement mechanisms. The GCGC rules aren't part of listing rules at the German stock market and they aren't controlled by auditors or any independent third party, yet. Danger for managers in case of wrong or misleading information on compliance with the GCGC is also regarded as being low (Kühne and Fuss, 2003). Thus, (voluntary) transparency & disclosure on corporate governance on additional aspects of corporate governance may be valuable for German companies.

Summing up, theoretically governance reporting might reduce information asymmetry and uncertainty between managers and shareholders and thus lower cost of capital. Though, realistic perceptions of companies might be related positively with firm performance. Apart from these theoretical assumptions there are also empirical findings that make us confident on the correctness of these assumptions.

## 2. Impact of governance reporting on firm performance: empirical findings

There's only one German study focusing directly on the interrelation between transparency & disclosure on corporate governance and firm performance (Toksal, 2004), finding a cost of capital reducing impact of transparent corporate governance reporting. Without testing applied instruments on quality criteria of social sciences, this study focuses on data of companies' annual reports, which obviously didn't cover enough space for single companies to differentiate from others. Thus, we present international empirical findings helping us to develop our hypotheses: Collett and Hrasky (2005) report that companies providing more governance information voluntarily also have lower cost of equity capital. Following Habib (2008), disclosure policy is a definite predictor for the interrelation between corporate governance and firm performance. However, Haat et al. (2008) don't find causality between timely disclosure on governance and economic profit. As mentioned in the introduction, German corporations have to report whether they hold the GCGC or not, yearly. They do not have to explain why they do not hold single GCGC rules. Thus, the compliance statement represents the mandatory disclosure on corporate governance. Some studies focus on declared compliance with the GCGC on firm performance. High levels of compliance with the GCGC are taken as a proxy for good corporate governance. Taking a look at the findings of these studies, we identify heterogeneity, either reporting no impact (e.g., Bassen et al., 2006), a positive (e.g., Goncharov et al. 2006) or a negative one (e.g., Bassen et al. 2009) on firm performance, as a consequence of different methodology, sample or time frame. Interestingly, there's no single study covering a data set newer than 2004/2005 and no one controlling for endogeneity or reverse causation. We pick up this gap and test our data set from 2007 also on the impact of declared compliance with the GCGC on firm performance controlling for endogeneity and reverse causation.

Summing up, empirically there aren't consistent findings on corporate governance reporting as a key

factor for companies' success, yet, neither internationally nor in Germany. Our paper focuses on a fundamental and systematic evaluation of the interrelation between governance reporting and firm performance in German corporations testing the following hypotheses.

## 3. Hypotheses

Following agency theory, information asymmetry between the capital market and companies may cause inefficient investment decisions. Information asymmetry may raise costs companies should minimize not to lower firm performance excessively. We think the main reason for these costs is uncertainty on companies' governance quality which may constrain adequate corporate assessment. That's a problem especially in Germany since corporate governance is hardly observable and only a few standards on governance reporting exist which companies have to follow. Companies may capitalize on this gap by lowering uncertainty through disclosing on governance actively and voluntarily. Theory holds two explanations for the positive impact of transparency & disclosure on corporate governance on firm performance: capital market transactions hypothesis and corporate control contest hypothesis (Bushman and Smith, 2003). Whereas capital market transactions hypothesis assumes that companies may have incentives to lower information asymmetries to achieve lower cost of capital, corporate control contest hypothesis assumes companies to distract investors from bad firm performance. Thus, investors shouldn't consider low firm performance as a consequence of bad governance but as a consequence of effects from outside that can only hardly be managed by the company. Showing potential in governance despite bad performance should bring investors to expect higher future performance due to good corporate governance. Also, empirically lower cost of equity was reported for companies with higher transparency & disclosure on corporate governance (Cheng et al., 2008). Nevertheless, there are studies that don't report an impact of corporate governance reporting on economic profit (Haat et al., 2008). By contrast, disclosure of sensitive data on corporate governance could be a benchmark for competitors to copy governance structures and induce a loss of competitive advantage. Another point is reporting costs. Empirical studies for Germany show, that reporting counts about two per cent of sales in smaller companies, whereas these costs are about two-tenth of a per cent in big blue chip companies within the DAX (Königs and Schiereck, 2006). Consequently, bigger companies are reported as being more transparent in corporate governance (Graf and Stiglbauer, 2008a). Based on these insights we assume that (voluntary) transparency & disclosure on corporate governance has an impact on firm performance but the algebraic sign of the possible impact on firm performance could be positive or negative. Therefore:

*H1: Transparency & disclosure on corporate governance has an impact on firm performance.*

Contrary to hypothesis H1, there are researchers that assume reverse causality between transparency & disclosure on corporate governance and firm performance (Lang and Lundholm, 1993). Thus, companies which have already solved their agency conflicts and perform better accordingly may also be more transparent on corporate governance. Due to sound performance this could be a credible signal for investors and a credible commitment to solve future agency conflicts. Given the costs of reporting on corporate governance high performing companies are assumed as being rather willing to invest more into high governance standards than low performing ones. Accordingly, companies with sound liquidity were identified to be more transparent on corporate governance in their annual reports and on their website with a generally higher degree of disclosure on non-financial information (Eng and Mak, 2003). Recent studies, e.g., by Li and Qi (2008) generally show higher degrees of transparency & disclosure for highly liquid companies. Thus, these companies may easier finance high costs for corporate governance reporting. Beside positive effects of firm performance on transparency & disclosure on corporate governance there may also occur a negative effect: lower success could induce companies to increase transparency & disclosure on corporate governance and simply use it as an impression management tool to distract investors from low performance (Westphal and Zajac, 1998). Summing up, there are indications, that performance could also have an impact on transparency & disclosure on corporate governance. Since the algebraic sign of that impact could be positive or negative, therefore:

*H2: Firm performance has an impact on transparency & disclosure on corporate governance.*

## 4. Method

**4.1. Sample and data collection.** Our sample covers 113 companies being listed in the indices DAX, TecDAX, MDAX and SDAX of Deutsche Börse Group the whole year 2007 to avoid index effects and we only analyze companies accounting via IFRS to avoid a regulatory bias. These companies underlie the highest standards of transparency & disclosure within the Prime Standard of the Frankfurt Stock Exchange. Researching corporate governance reporting of these companies could have a signalling effect for other listed companies in

Germany since these companies are covered most intensely by investors. Therefore, analyzing these companies is very valuable from a researcher's perspective.

We compute a bisection of corporate governance reporting, consisting of the mandatory corporate governance disclosure (compliance statement) incorporated in a compliance scorecard and additional criteria of transparency & disclosure on corporate governance, incorporated in a transparency & disclosure scorecard as published by Graf and Stiglbauer (2008b). Using content analysis we analyze all data available from an informed investor's perspective, e.g. compliance statement, annual report, corporate governance report, compensation report, agenda of shareholders' meeting, codes of conduct, bylaws and companies' website. The compliance scorecard represents the rules of the GCGC and was coded binary (fulfilling a rule: score 1; non-fulfilling a rule: score 0) and independently by two raters. It covers 94 rules. All rules have been weighted equal. Accordingly, a maximum score of 94 can be achieved. The transparency & disclosure scorecard covers 38 additional criteria within 6 main categories: I. Compliance statement (7 criteria, e.g., "Does the company explain deviations from recommendations of the GCGC?"), II. Corporate governance report (5 criteria, e.g., "Do management board and supervisory board provide information on planned actions and developments on corporate governance in the reporting year?"), III. Corporate governance internet reporting (8 criteria, e.g., "Does the company publish its articles of incorporation on the internet?"), IV. Compensation system (8 criteria, e.g., "Does the company give any information on success-based incentives to managers below top management?"), information on the V. Quality, independence and integrity of the boards (6 criteria, e.g., "Does the company publish information on how often every member of the supervisory board takes part on meetings of the supervisory board?), and VI. Corporate governance commitment and firm-specific corporate governance code (4 criteria, e.g., "Does the company publish a firm-specific corporate governance code based on the GCGC?). Also, the criteria of the transparency & disclosure scorecard have been weighted equal (fulfilling a rule: score 1; non-fulfilling a rule: score 0). Accordingly, a maximum score of 38 can be achieved. After two rounds of coding and discussion based validation we reached very good inter-coder agreement levels among both instruments as a measure for reliability ($\kappa = 0.923$ and $\alpha = 0.913$ for the compliance scorecard, respectively $\kappa = 0.892$ and $\alpha = 0.898$ for the transparency & disclosure scorecard). Subsequently, binary data have been summed up into overall scores. For a better computation we calculated these scores as relative scores. We also collected data for further corporate governance mechanisms which we describe in the upcoming section. Sources for collecting these data were Thomson Financial Datastream, Worldscope, companies' annual reports, balance sheets and income statements and data given by Deutsche Börse Group and the German Federal Financial Supervisory Authority (BaFin).

**4.2. Model and estimation method.** So far there doesn't exist a unitary model integrating corporate governance mechanisms and performance variables. Instead, models have to be specified separately out of theoretical and empirical findings, which also have to conform with statistical requirements (Amemiya, 1981). Though, the specification of single equations is hindered and faces uncertainty. Therefore, each equation should, ceteris paribus, have a causal interpretation (Wooldridge, 2009). First of all, at the beginning of the specification of simultaneous equations models one should define, which variables shall be explained by the model and which variables the model should contain altogether (Hackl, 2005).

According to our hypotheses and in order to control for endogeneity and reverse causation, we firstly consider compliance with the GCGC (C) and transparency & disclosure on corporate governance (TD) as endogenous variables. Furthermore, we calculate a set of five variables on firm performance (Table 1), including two accounting-based measures (ROA and ROE), two hybrid performance measures (accounting- and capital market-based) (MTB and Q) and one market-based measure (TSR) which are also endogenous within our list of variables (former studies mostly calculate one single measure on performance. This approach induces problems in generalizing findings for other performance measures). As already mentioned, we additionally calculated control variables within the equations as a set of governance mechanisms. Those mechanisms are considered regularly in comparable corporate governance performance studies (e.g., Bress, 2008; Bassen et al., 2006).

Table 1. List of variables

| Abbr. | Definition |
|---|---|
| Endogenous variables | |
| ROE | Return on equity |
| ROA | Return on assets |
| Q | Tobin's q |
| MTB | Market to book ratio of equity |
| TSR | Total shareholder return |
| C | Declared compliance with GCGC |
| TD | Transparency & disclosure on corporate governance |
| Exogenous variables | |
| SIZE | Firm size measured by market capitalization (mio. €) |
| VOLA | Volatility (252 trading days) |
| BETA | Beta (252 trading days) |
| BLOCK | Largest voting rights block |
| FREEFLOAT | Free float |
| CLOSEHELD | Closely-held shares |
| GROWTH | Growth in sales (2007/2006) |
| LEV | Leverage |
| RD | R&D intensity |
| BDSIZE | Board size (management board as part of the German two-tier system) |
| INDUSTRY | 18 sectors of Prime All Share-Index from Deutsche Börse Group as dummies |
| TAKEOVER | Takeover activity: 1; 0 otherwise |
| TECDAX, MDAX, SDAX | Company in index: 1; 0 otherwise |

To test H1 and H2 we specified a simultaneous equations system based on theoretically causal relations and representing the hypotheses stated above. In the first two equations C respectively TD are endogenous and all performance measures are exogenous. To control for reverse causation we specified the further equations the other way round: performance measures are endogenous and C and TD are exogenous. Aksu and Kosedag (2006) report that companies which already solved their agency problems better than others are also more transparent, because they can credibly report more on good corporate governance. So we think C has an impact on TD and not the other way round (Figure 1). Increasing risk of a specific stock by trend causes higher costs to hold an undiversified portfolio (Adrian and Rosenberg, 2008) consisting of companies with worse corporate governance (Dyck and Zingales, 2004). Thus, VOLA and BETA are integrated as exogenous variables in equation (1). We also integrate our three types of ownership structure of a company as exogenous variables. A major shareholder is expected to have enough power to force management to improve corporate governance structures. On the other hand, FREEFLOAT in connection with the problem of collective action of atomistic shareholders are supposed to be much weaker in improving those structures by pressuring or monitoring managers (McConnell and Servaes, 1990). Again, CLOSEHELD could stimulate managers to implement good governance to benefit from potential improvements in governance structures personally. Higher proportions of LEVERAGE are assumed with better governance, since those companies are more often evaluated and monitored by capital markets (Shleifer and Vishny, 1997). There's also the assumption that industry and selection index could influence compliance with the GCGC (Werder and Talaulicar, 2006; Graf and Stiglbauer, 2008). We didn't find definite theoretical/empirical evidence to include further variables in equation (1).

Apart from the performance variables equation (2) covers BLOCK possibly with a negative impact (Kelton and Yang, 2008) assuming that big shareholders could have more internal information and therefore substitute the controlling activity of financial analysts (Sabherval and Smith, 2008). Accordingly, FREEFLOAT is expected to have a contrary impact on transparency and disclosure. Recently, CLOSEHELD has been reported with a positive impact on transparency and disclosure, explained through the convergence of interests hypothesis, which means that managers being invested in a company could accommodate their personal goals with those of the company and thus report more private information to enhance corporate value (Li and Qi, 2008). Also positive board size effects on transparency and disclosure have been reported, e.g., concerning renumeration issues (Laksmana, 2008). We also assume an impact of industry and selection index on transparency and disclosure (Graf and Stiglbauer, 2010).

Equations (3) to (7) cover SIZE. Brailsford and O'Brien (2008) show that smaller capitalized companies within a portfolio have higher margins on

average, than predicted by CAPM. Diaz und Sanchez (2008) also report smaller companies as being more efficient and less bureaucratic in adopting resources. Thus, size could also have an impact on operating performance (Papadagonas, 2007). Contrary, bigger companies are quite often connected with the existence of economies of scale and market power and therefore higher financial performance (Grant et al., 1988; Robins and Wiersema, 1995). Ownership structure has an undefined impact both on fundamental and capital market performance. BLOCK is connected with better firm performance (Hill and Snell, 1989), due to greater continuity of interests which is assumed to have a stabilizing function through hindering investors to exit companies fastly, since this may decrease firm value enormously and cause substantial financial losses (Baysinger and Butler, 1985). Contrary, ownership concentration also represents power, which may either be used supporting or opposing towards management. Thus, BLOCK could also lower firm performance in case of ongoing conflicts between large shareholders and management (Salancik and Pfeffer, 1980). This argument is often being brought into discussion in case of institutional investors, which are assumed to operate rather on a short-term basis and opportunistically and thus coming into conflict with companies' long-term targets (Ingley and Walt, 2004). GROWTH is integrated in equations (3) and (4) since it influences the calculation of ROE and ROA indirectly. Also, LEV, RD and BDSIZE are integrated in equations (3) and (4). General statements on an optimal degree of leverage with a conclusion on financial stability of a company cannot be predicted definitely. Moreover, influencing factors on the degree of leverage are aspired profitability and induced risk out of that. LEV generally increases profitability, but also increases the risk, that either profitability of investments decreases or the interest level increases extraordinary. Following this assumption, ROE is lower than ROA and these losses could induce a loss of equity value (Coenenberg, 2001). RD is generally reported to increase firm performance (Reenen, 1997; O'Mahony and Vecchi, 2009). Companies spend on RD to increase competitiveness and their ability to increase return on investment (Heshmati and Lööf, 2008). However, also decisions on RD expenditure may be affected by opportunistic behavior, called the horizon problem in management literature. Managers, in fact being employed in companies less time in comparison to the optimum horizon of an investment may favor projects, which increase short-term outcome to increase their personal income, often being measured partly through companies' performance (Kalyta, 2009). Concerning BDSIZE, small boards may lack precision in decision making, due to single board members' limited managerial capacity. Maybe smaller boards don't cover enough critical mass for efficient decision-making, too (Thomsen, 2008; Chiang, 2005). Contrary, large boards may suffer lacking consensus among lots of different opinions or lacking coordination of decision-making (Eisenberg et al., 1998). Also monitoring may be hindered due to difficulties in observing processes and actions of single board members and thus increase agency costs (Jensen, 1993).

Equations (5) to (7) also cover GROWTH, which may influence future expectations of investors positively and thus probably being priced in (Yermack, 1996). INDUSTRY has also been integrated in equation (3) to (7). Economic literature often discusses if firm performance can be explained via a unitary, cross-industrial benchmark (Fama and French, 2000; Ohlson and Juettner-Nauroth, 2005). So, investors operating on a long-term basis wouldn't take INDUSTRY into account. Nevertheless, structural differences between industries and their impact on firm performance cannot be neglected either theoretically (Porter, 1979; Rumelt, 1991) or empirically (Pedersen and Thomsen, 1998). Though, again it has recently been discussed, if industry-specific performance analysis is better than a cross-industrial one (Fairfield et al., 2009).

Additionally, LEV is integrated into equations (5) to (7) following the assumption that the proportion between equity and debt (and its shift) is an important information on capital markets and may influence stock evaluation (Hull, 1999). On the other hand, debt may put pressure on management to increase performance, since serving creditors primarily reduces free cash flow, which management cannot use for future projects (so-called control hypothesis) (Jensen, 1986). Higher degrees of LEV can also induce higher agency costs, since the interests of shareholders and creditors drift away from each other in a stronger manner (Myers, 1977). One can explain that fact, since serving creditors primarily lowers the proportion that can be used for paying dividends on shareholders. Additionally, lower present cash flows decrease possibilities for future projects that may guarantee higher future cash flows (Weill, 2008). RD is integrated in equations (5) to (7) due to the steadily high investment-cash flow sensitivity towards R&D investments (Bushman et al., 2004; Brown and Petersen, 2009). Equations (5) to (7) cover ROA and ROE as exogenous variables, since operating performance was demonstrated to be an influencing factor on firm value (Daines, 2001). Fundamental performance has also been reflected as being important to capital markets (Reschreiter, 2009). Capital markets are asking for a compensation for risk factors, too (Bae et al., 2006). The

higher the variation of a stock, the more risky it is. Following volatility-feedback hypothesis (Pindyck, 1984), both good and bad news signal an increase of volatility, inducing a higher risk premium. Thus, VOLA and BETA were integrated in equations (5) to (7). As recently demonstrated by Hackbarth and Morellec (2008), takeover activities and their announcement may have an influence on capital market performance.

We also impose a log transformations on size and leverage, since the range of variation is rather wide. Table 2 reports the descriptive statistics for variables in the study. We estimated our model via Three Stage Least Squares regression (3SLS), the most common full information estimation method in empirical business research which has been reported to be more efficient than 2SLS, since single equations also cover information from other equations of an equations system (Wooldridge, 2009). As far as a model is complete and identifiable 3SLS delivers consistent and asymptotically normally distributed estimators. Estimation methods like 3SLS are very valuable to find causal relations between corporate governance and firm performance (especially when data derive from cross-sectional analysis) (Beiner et al., 2005). Generally, cross-sectional data are preferred, when (as in the present case) differences in the behavior of various economic subjects or groups and systematic relations on the level of economic subjects shall be analyzed (Hübler, 2005). We didn't use panel data, due to the fact of aiming at a comparison of our findings with former studies in Germany in the field of compliance and transparency & disclosure, which have also used data from one year (e.g., Toksal, 2004, Nowak et al., 2005; Goncharov et al., 2006; Bress, 2008). Corporate governance practices of firms have been reported as being very "sticky" and don't change much over time (Werder and Talaulicar, 2006; Black et al., 2006) so we don't think we would find better results using panel data.

All equations are identifiable (we tested each single equation on the fulfilment of the order condition (Studenmund, 2001)). The order condition for a single equation is fulfilled, when, based on the total number of exogenous variables of the system, the number of exogenous variables not being in a single equation is equal or higher than the number of endogenous variables on the right hand of a single equation. Considering that, all equations are identified. Using Intercooled Stata 9.2 we also couldn't find a variable being exactly linearly dependent (fulfilling the rank condition (Stewart, 1991)). Intercooled Stata 9.2 didn't eliminate any variable automatically, concerning this condition. Thus, our simultaneous equations system can be estimated. We're discussing the completeness of our model within the limitations of our study. We also perform a Wu-Hausman exogeneity test. Hypothesis H0, that the correlation between the error term and the endogenous variables is zero, can be rejected on the 1% level. Accordingly, Ordinary Least Squares (OLS) estimates would be biased and inconsistent.

Table 2. Sample characteristics

| | Min. | Max. | Mean | Q (0,25) | Median | Q (0,75) | Std.dev. | Extremes |
|---|---|---|---|---|---|---|---|---|
| ROE | -1.613 | 0.672 | 0.155 | 0.098 | 0.157 | 0.244 | 0.223 | 4 ≤ -0.230; 4 ≥ 0.490 |
| ROA | -0.258 | 0.373 | 0.068 | 0.028 | 0.064 | 0.102 | 0.075 | 4 ≤ -0.090; 4 ≥ 0.220 |
| Q | 0.813 | 8.832 | 1.799 | 1.096 | 1.513 | 2.003 | 1.106 | 10 ≥ 3.400 |
| MTB | 0.586 | 12.838 | 2.949 | 1.422 | 2.420 | 3.336 | 2.277 | 10 ≥ 6.700 |
| TSR | -0.610 | 2.021 | 0.140 | -0.120 | 0.017 | 0.342 | 0.478 | 6 ≥ 1.020 |
| TD | 0.395 | 0.868 | 0.652 | 0.579 | 0.658 | 0.737 | 0.102 | |
| C | 0.585 | 1.000 | 0.815 | 0.755 | 0.797 | 0.881 | 0.092 | |
| lnSIZE | 5.060 | 11.480 | 7.706 | 6.495 | 7.370 | 8.860 | 1.631 | |
| VOLA | 0.095 | 0.563 | 0.323 | 0.251 | 0.316 | 0.374 | 0.096 | 2 ≥ 0.560 |
| BETA | 0.264 | 2.257 | 1.086 | 0.780 | 1.069 | 1.341 | 0.396 | 1 ≥ 2.260 |
| BLOCK | 0.030 | 0.979 | 0.285 | 0.099 | 0.167 | 0.487 | 0.246 | |
| FREEFLOAT | 0.142 | 1.005 | 0.707 | 0.499 | 0.711 | 0.949 | 0.243 | |
| CLOSEHELD | 0.000 | 0.884 | 0.299 | 0.105 | 0.258 | 0.497 | 0.236 | |
| GROWTH | -0.189 | 1.130 | 0.166 | 0.039 | 0.123 | 0.242 | 0.201 | 7 ≥ 0.560 |
| lnLEV | -1.177 | 3.940 | 0.668 | 0.070 | 0.530 | 1.060 | 1.107 | 3 ≤ -1.700; 10 ≥ 2.700 |
| RD | 0.000 | 0.359 | 0.022 | 0.000 | 0.005 | 0.026 | 0.044 | 10 ≥ 0.070 |
| BDSIZE | 2.000 | 11.000 | 4.430 | 3.000 | 4.000 | 5.000 | 1.837 | 5 ≥ 9.000 |
| n | 113 | 113 | 113 | 113 | 113 | 113 | 113 | |

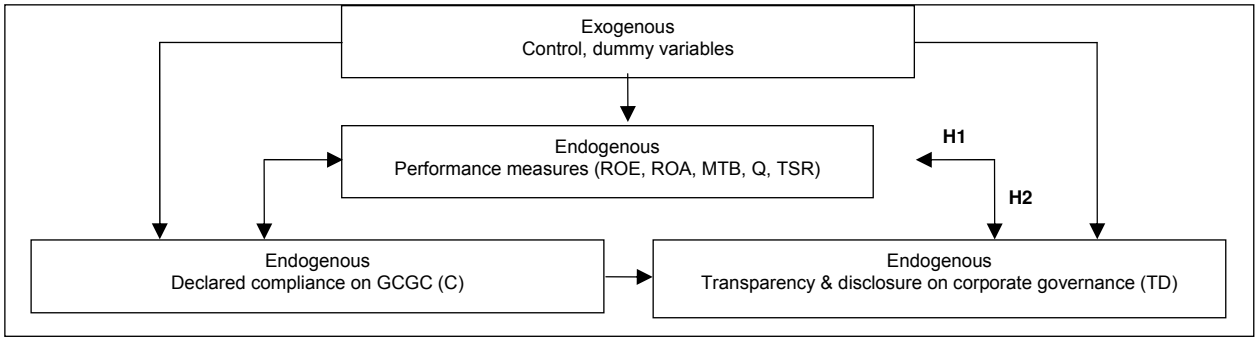


**Fig. 1. Architecture of the simultaneous equations system**

To examine the issue of multicollinearity, we calculated variance inflation factors (VIFs) for all variables. All of the VIFs were below the rule of thumb cut-off of 10 (Hair et al., 1995), excluding the relationship between SIZE and index dummies. We didn't estimate SIZE and index dummies within single equations.

**4.3. Analysis and results.** The hypotheses and the simultaneous equations system proposed were tested using Intercooled Stata 9.2 to generate least squares parameter estimates. A 3SLS estimation was conducted, which yielded a model that fitted the data well, despite not having as many variables as expected to be significant at a minimum of 10%, we take this as a hint for further research in corporate governance models, to explain more variance of firm performance through corporate governance mechanisms and thus handle better the complexity of the corporate governance issue (Table 3). Nevertheless, our model shows higher degrees of model fit than sparse, but comparable corporate governance research from Germany also using 3SLS (e.g., the ones of Bress, 2008) but also just few variables being highly significant.

Table 3. Three Stage Least Squares estimation results and model fit

| | Endogenous variable | | | | | | |
|---|---|---|---|---|---|---|---|
| | C (1) | TD (2) | ROE (3) | ROA (4) | Q (5) | MTB (6) | TSR (7) |
| C | | 0.462*** (0.000) | -0.295 (0.318) | -0.059 (0.501) | 0.597 (0.539) | 2.267 (0.360) | -1.293** (0.015) |
| TD | | | 0.136 (0.589) | -9.69e-08 (1.000) | 1.126 (0.179) | 3.230* (0.067) | 1.055** (0.021) |
| ROE | 0.043 (0.498) | 0.511 (0.429) | | | -2.017*** (0.001) | -3.480** (0.019) | 0.113 (0.723) |
| ROA | -0.343 (0.152) | -0.181 (0.446) | | | 13.743*** (0.000) | 24.047*** (0.000) | -0.418 (0.687) |
| Q | -0.001 (0.957) | 0.011 (0.489) | | | | | |
| MTB | 0.011* (0.091) | 0.000 (0.998) | | | | | |
| TSR | -0.032 (0.198) | 0.032 (0.259) | | | | | |
| SIZE | | | 0.045*** (0.008) | 0.015*** (0.004) | 0.110* (0.053) | 0.236 (0.102) | 0.150*** (0.000) |
| VOLA | 0.081 (0.548) | | | | 4.274*** (0.001) | 10.615*** (0.001) | 1.234* (0.068) |
| BETA | 0.011 (0.709) | | | | -0.291 (0.259) | -0.138 (0.834) | 0.426*** (0.002) |
| BLOCK | 0.071 (0.154) | -0.012 (0.820) | 0.182 (0.206) | 0.039 (0.360) | -0.142 (0.769) | -0.005 (0.997) | -0.030 (0.909) |
| FREEFLOAT | 0.046 (0.369) | -0.015 (0.778) | 0.181 (0.221) | 0.031 (0.471) | -1.110** (0.024) | -2.101* (0.093) | 0.025 (0.926) |
| CLOSEHELD | -0.008 (0.910) | -0.053 (0.970) | 0.096 (0.635) | 0.052 (0.382) | -0.384 (0.567) | -1.036 (0.545) | 0.473 (0.198) |
| GROWTH | | | -0.052 (0.623) | -0.022 (0.476) | -0.054 (0.879) | -0.367 (0.687) | -0.037 (0.849) |
| LEV | -0.002 (0.840) | | -0.015 (0.497) | -0.029*** (0.000) | 0.006 (0.942) | 0.553** (0.015) | -0.064 (0.187) |
| RD | | | 0.125 (0.804) | 0.007 (0.961) | 1.682 (0.325) | 3.168 (0.466) | 0.489 (0.600) |

Table 3 (cont.). Three Stage Least Squares estimation results and model fit

| | Endogenous variable | | | | | | |
|---|---|---|---|---|---|---|---|
| | C (1) | TD (2) | ROE (3) | ROA (4) | Q (5) | MTB (6) | TSR (7) |
| BDSIZE | | -0.000 (0.970) | -0.028* (0.067) | -0.010** (0.019) | | | |
| INDUSTRY | ± | ± | ± | −** | + | +** | ± |
| TAKEOVER | | | | | -0.451 (0.138) | -0.538 (0.488) | -0.188 (0.257) |
| TECDAX | -0.124*** (0.000) | -0.063** (0.047) | | | | | |
| MDAX | -0.118*** (0.000) | -0.033 (0.190) | | | | | |
| SDAX | -0.145*** (0.000) | -0.057** (0.045) | | | | | |
| Adj. R-Sq | 0.361 | 0.412 | 0.324 | 0.303 | 0.600 | 0.386 | 0.359 |
| Chi2/df | 0.751 | 0.842 | 0.640 | 0.502 | 1.818 | 0.812 | 0.713 |
| RMSEA | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 |
| AIC | 0.751 | 0.679 | 0.981 | 0.763 | 0.470 | 0.721 | 0.753 |
| P(F-Value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Note: *, **, *** denote significance at the 10%, 5% and 1% levels, respectively.

*Equation (1)* confirms a weakly significant impact of MTB on C. TECDAX, MDAX and SDAX have a highly significant negative impact on C. Furthermore, *Equation (2)* confirms a highly significant, positive impact of C on TD. TECDAX and SDAX have a significantly negative impact on TD. As can be seen from the above table, none of the performance measures has a significant impact on TD. Analyzing *equations (3)* and *(4)*, SIZE has a highly significant, positive impact on ROE and ROA, whereas BDSIZE has a significantly negative impact both on ROE (10% level) and on ROA (5%). Larger executive boards induce so-called negative board size effects in our sample. *Equation (4)* also shows a highly significant, negative impact of LEV on ROA. We didn't find a significant impact of TD on ROE and ROA. Analyzing the results of *equation (5)*, ROE and ROA have a highly significant impact on Q. SIZE (10%) and VOLA (1%) have a significantly positive impact on Q. Furthermore, FREEFLOAT has a significantly negative impact on Q and *equation (6)* finds a significantly negative impact of ROE and a highly significant, positive impact of ROA on the endogenous variable MTB. TD has a weakly significant, positive impact on MTB and a weakly significant, negative impact of FREEFLOAT on MTB. Results also show a (highly) significant, positive impact of VOLA and LEV on MTB. Analyzing *equation (7)*, SIZE, BETA (each 1%) and VOLA (10%) have a significantly positive impact on TSR. C has a significantly negative impact and TD has a significantly positive one on TSR.

Summarizing, we have to differentiate on single performance measures, when answering hypotheses H1 and H2: H1 has to be rejected for operative measures of performance (ROE, ROA) but is accepted for MTB and TSR, that's to say hybrid or market-based performance measures. We also reject H1 analyzing the impact on Tobin's Q. Despite theoretical plausibility H2 has to be rejected. We couldn't find evidence on reverse causation between one of our performance measures and transparency & disclosure on corporate governance through 3SLS estimation of our equations system.

## Discussion, contributions and implications

Summing up, our study generally confirms the value relevance of transparency & disclosure on corporate governance for companies listed on the German capital market, with a positive impact on MTB and TSR. We could neither find an impact of transparency & disclosure on corporate governance on operating performance nor reverse causation between performance and transparency & disclosure in our sample. The results suggest that although transparency & disclosure on corporate governance may not improve a firm's operating performance, it does improve investors' perception of the governance of companies, with the resultant impact on firm value. Accordingly, companies may increase performance through signalling corporate governance. Companies should invest in transparency & disclosure on corporate governance to increase value and realize lower cost of capital for future growth. Empirical findings support this assumption, showing that medium transparency & disclosure is not efficient on capital markets (Hirth and Callsen-Bracker, 2008). Concentrating our study on aspects, one may fulfil with little financial effort, high costs of governance reporting don't seem to count as much as theory predicts, especially for smaller companies. All companies in our sample should have enough financial

resources to finance these aspects. This is important, since smaller corporations' problems (e.g., in TecDAX and SDAX) increase to reach the same budgets for investor relations as bigger companies in DAX have. Thus, expectations on smaller companies to disclose more intensely may concentrate on the aspects analyzed, showing potential to differentiate from other companies and having great impact on investors' decision-making (Martin/Schulz, 2005). According to our findings, companies with good corporate governance may use corporate governance reporting actively to separate from worse corporate governance. Surprisingly, our study shows that predominantly smaller companies (watch out for the estimated sign of the index dummies) lack transparency & disclosure on corporate governance. We hope our study will induce a change in mind of those companies to improve consciousness of transparency & disclosure on corporate governance and its value-driving function. Generally, we don't consider our findings as a hint for lacking willingness of companies to be transparent.

Contrary to former studies, five years after establishing the GCGC, we don't consider declared compliance with the GCGC as a value-driver. This result contrasts sharply with previous research. There are, however, a number of reasons why the earlier research may not have been able to detect such a relationship. One possibility could be the choice of performance measures used or the choice of governance mechanisms including the specification of our model and the estimation proceeded. Without having an effect of newness, and after corporate scandals, despite high levels of compliance with the GCGC (e.g., Siemens) investors seem to more and more distrust high levels of compliance with the GCGC. Consequently, this gap between declared good governance and real action in companies (symbolic management) may be a negative signal for the capital market (Wade et al., 1997). Even really good governed companies may suffer from this, because analysts do monitor and search for information more intensely, than they would do instead. Notwithstanding, we don't advice companies to reject GCGC rules, generally. Especially, companies with higher market to book values seem to invest heavily in better corporate governance, incorporated in national and international standards like the GCGC or the Sarbanes Oxley Act. Nevertheless, we advise companies to behave more critically towards GCGC rules and a more firm-specific adoption of single rules. This has already been reported as a factor of success for British companies (MacNeil and Li, 2006). Moreover, especially low-rated companies should enhance their governance mechanisms to be able to signal good governance. Based on our findings we come to the conclusion that the GCGC isn't a broadly-adopted instrument of regulation, yet. Missing potential to differentiate from other companies through mandatory disclosure on the GCGC rules has also encouraged German administration to change the rules of the game. A first change in corporate governance reporting is the establishment of the "comply or explain"-principle on rules of the GCGC. Formerly, companies only had to declare whether they reject a single rule without explaining why. A new paragraph (§289a) in German trade law also forces corporations to increase reporting on corporate governance-specific issues. Thus, corporate governance more and more becomes an important task for auditors. It'll be interesting to see auditors' and companies' reaction towards this new framework. We think auditors and companies will have to work together more intensely and more process-based to fulfil these new rules. Summing up, based on our sample we implicate internationally that it is worth reporting on corporate governance on a voluntary basis to raise company's value and cheaper money. By concentrating on aspects that can be reached with little financial effort, high costs on governance reporting are rejected as an argument in case of insufficient reporting through smaller corporations. Taking a look at the relevance of our transparency & disclosure index, German lawmakers and the Code Commission should think on more specific rules with enough potential for single companies to differentiate from other companies obviously, because "it is in the accounting for intangibles that the present system fails most seriously to reflect enterprise value and performance" (Lev and Zarowin, 1999, p. 354). Our findings suggest, that for investors transparency & disclosure on corporate governance matters not only with respect to the latter but also the spirit of transparency, who want to see it not just as a box ticking exercise but as a real change in the governance of listed companies in Germany.

## Limitations of the study

Several limitations must be reported in this study, starting with our sample. Increasing our sample on further corporations within the German stock market would make our study even more representative. Maybe a bigger variety in compliance and transparency & disclosure could induce different causality. Furthermore, the data derive from one year. Maybe panel analysis over several years could change our findings. Supporting our approach, Black et al. (2006) promote one-year studies in governance research, since governance doesn't change heavily over time ("sticky governance"). This study also suffers from the fact, that declared compliance can't be considered as being equal with real compliance.

There's only little possibility and pressure, in contrast to the US, to proof whether companies' reporting on compliance with the GCGC is correct and also little danger for managers of punishment may occur in the German legal system or concerning listing at the German stock exchange. Another limitation derives from the aspects analyzed in our transparency & disclosure scorecard. Maybe different researchers use other or further aspects on governance reporting − this is also with single analysts and investors. Finally, we report a risk return trade-off on our estimation method 3SLS and on completeness of our model. We decided to prefer using all the information in our model to get more efficient estimators with the risk that misspecifications within the model would count stronger than in 2SLS. As already said, even in advanced economies there's great disagreement on how good the existing governance mechanisms are. As a consequence, we also computed a limited-information estimation method (2SLS). The results differ little from 3SLS estimation. Some variables had lower levels of significance but with the same direction of impact and considerable fit indices. As already said, missing exogenous variables (omitted variables) is a general problem in empirical corporate governance research (Börsch-Supan and Köke, 2002). Future research may assess this question of completeness of governance models.

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