BEHIND BROAD CORPORATE GOVERNANCE AGGREGATES: A FIRST LOOK AT SINGLE PROVISIONS OF THE GERMAN CORPORATE GOVERNANCE CODE

Alexander Bassen*, Stefan Prigge**, Christine Zöllner***

Abstract

This study contributes to the emerging research that analyzes the relation between performance and *single* components of broad corporate governance aggregates, such as governance codes and ratings. Available research is confined to the U.S., Japan, and emerging markets. We enlarge the geographical scope to the German Corporate Governance Code (GCGC). For a sample of 100 large listed German stock corporations, compliance with the GCGC at large is significantly associated only with one of our performance measures (Tobin's q); this connection is *negative*. Individual analysis of eleven GCGC recommendations reveals that for three of them, association with all performance measures is insignificant. Four (four) components are significantly positively (*negatively*) connected with at least one performance measure.

Keywords: corporate governance, German Corporate Governance Code, corporate performance

* University of Hamburg, School of Economics and Social Sciences, Von-Melle-Park 9, 20146 Hamburg, Germany. Email: alexander.bassen@wiso.uni-hamburg.de.
** Hamburg, Germany. Email: prigge@web.de. Part of the paper was written while this author was holding an interim professorship at the Private Hanseatic University Rostock.
*** University of Hamburg, School of Economics and Social Sciences, Von-Melle-Park 9, 20146 Hamburg, Germany. Email: christine.zoellner@wiso.uni-hamburg.de.

Introduction

Research about the relation between overall corporate governance aggregates, e.g., governance ratings, and performance is rapidly increasing worldwide. The results of these studies are inconsistent. Only very recently, national and regional analyses on the association of *single* components of broad corporate governance aggregates with measures of corporate performance have been published. However, so far, the scope of these studies is confined to the U.S., Japan, and emerging markets. Our study is the first empirical single-provision analysis of the association between a corporate governance aggregate and performance for an established European economy.

It is the goal of this study to connect two areas of the research that studies the association between governance aggregates and performance: Firstly, we contribute to the literature on the relation between compliance with the German Corporate Governance Code (GCGC) at large and performance. Secondly, we look behind the result for the overall score and analyze the contribution made by single provisions of the GCGC to the general result. Since compliance with the GCGC is rather strong among our sample corporations consisting of the largest quoted German stock corporations, we have to confine our analysis on those eleven of the 68 recommendations with the lowest compliance rates. In addition, we compare our

results with those in related studies for U.S. and Japanese corporations. Unfortunately, such comparison is impeded by the fact that some of the provisions in our analysis relate to the two-tier structure of German stock corporations.

Review of Related Research
The German Corporate Governance Code

One strand of the literature, our study is connected with, considers the relation between GCGC compliance and performance. The development of the GCGC started in 2001. Its first version was published in 2002 (for development, background, and basics of and compliance with the GCGC, see v. Werder et al. 2005; for recent changes in German corporate governance including the GCGC, cf. Cromme 2005). The declared aim of the GCGC is to improve the transparency of German corporate governance especially for international investors so that their trust in the quality of management and control of German corporations is enhanced. The GCGC, therefore, cites elements of different German laws. These repetitions are amended with 68 recommendations and with 16 suggestions mostly concerning internal corporate governance mechanisms. The GCGC is divided into six areas: (1) Shareholders and the General Meeting, (2) Cooperation between Management Board and Supervisory Board, (3) Management Board, (4)

Supervisory Board, (5) Transparency, and (6) Reporting and Audit of the Annual Financial Statements (for more details, see the homepage of the Government Commission on the German Corporate Governance Code, www.corporate-governance-code.de/index-e.html; visited 3.3.2008).

Although compliance with the GCGC is voluntary, it roughly follows the "comply or explain" approach. Listed German corporations are not compelled to comply, but they have to disclose annually with which of the recommendations they did not comply with. An explanation for non-compliance is not mandatory. The statement of conformity has a legal basis in Art. 161 of the German Stock Corporation Act. This legal obligation does not include the suggestions.

There are only a few empirical studies on the association between the GCGC at large and several performance measures. Nowak et al. (2005; 2006) cannot find a connection between GCGC compliance and stock returns. Bassen et al. (2006) come to the same conclusion with respect to Tobin's q, ROA and stock returns. In contrast to that, Goncharov et al. (2006) discover a significantly positive association between GCGC compliance and market valuation and stock returns, resp. In summary, the debate of the relation between GCGC compliance and performance is still open.

Single-Provision Analyses of Broad Corporate Governance Aggregates

The second strand of the literature our study is connected with, is a field in governance literature, which has been emerging in recent years and which focuses on *aggregations* of firm-specific corporate governance characteristics. Thus, research activity seems to reflect the recent occurrence of governance aggregates such as codices and ratings (for an overview on codices, see Wymeersch 2005; for an overview on ratings, cf. Rose 2007). Accordingly, this research area investigates the connection of corporate performance with governance codices, governance ratings, or self-defined governance indices. The theoretical literature on the relationship between corporate governance in general and corporate performance is surprisingly underdeveloped. Despite differences in detail, the general argument boils down to the point that better governance is expected to reduce agency problems between management and internal shareholders on the one hand and external shareholders on the other hand (see, e.g., La Porta et al. 2002; Lombardo / Pagano 2002; Shleifer / Wolfenzon 2002, pp. 8, 13 et seq.; Ashbaugh et al. 2004, pp. 1, 5 et seq.; Drobetz et al. 2004, pp. 268 et seq.; Black et al. 2005, p. 25; Durnev / Kim 2005, pp. 1463-1468; Black et al. 2006a, pp. 399 et seq.).

The analyses of the relationship between governance aggregates and corporate performance currently focus on three issues: Firstly, does causality run from governance to performance, or vice versa

(cf. Ashbaugh et al. 2004; Bhagat / Bolton 2006; Lehn et al. 2007; Chidambaran et al. 2008). Secondly, do other governance mechanisms affect the relationship between the governance aggregate and performance (see Cremers / Nair 2005; Bhagat / Bolton 2006). Thirdly, provided a significant association between a governance aggregate and performance has been detected, do all or only a few components of the aggregate contribute to the significance? This article investigates the latter question for the GCGC. We review this subarea of the literature in greater detail.

We restrict our literature review to research dealing with corporations in established market economies for the following reason: According to the World Bank (1999), national corporate governance systems cannot be evaluated without considering national characteristics, such as the development of capital markets or law systems. The specific circumstances in emerging economies raise serious doubts on their comparability to German corporations. Still, the task is quite demanding for comparisons with U.S. and Japanese evidence.

The literature review begins with studies of U.S. firms. The highly influential study by **Gompers et al. (2003)** can be considered the starting point of the research concerning the relationship between governance aggregates and performance. They find a significant association between their 24-provision-governance index and firm performance in their sample period 1990-1999.

This evidence prompts Bebchuk et al. (2004) to analyze if all of these 24 provisions have a comparably equal association with performance. Their paper is the starting point of this particular subarea in the literature. Their theory-driven analysis yields six provisions that they expect to have a significant connection with performance. These six provisions are aggregated in an "entrenchment index". Details of these provisions can be found in Table 1. The empirical analysis replicates the one of Gompers et al. (2003). Bebchuk et al. find that all of the six provisions — individually and aggregated in the entrenchment index — are significantly negatively correlated with performance as measured by Tobin's q. No significant evidence could be found for the remaining 18 provisions. In contrast, positive, albeit very small, correlations were found for these provisions. The replication of the portfolio approach of Gompers et al. (2003) confirms their result that worse governance is associated with negative abnormal stock returns, but again this result is caused by these six provisions.

According to Bebchuk et al., these six provisions are the main drivers of the significant correlation between the governance index and the performance measures shown by Gompers et al. (2003). Bebchuk et al. point out that the current methodological approach which measures corporate governance with an ever growing number of criteria might be misleading and could be improved by concentrating

on smaller sets of criteria which consist of governance factors, which have the strongest impact.

Brown / Caylor (2006a) refer to Gompers et al. (2003) and Bebchuk et al. (2004). The basis of the study is their governance index as of February 2003, which includes in total 51 governance factors provided by the Institutional Shareholders Service (ISS). Linking this index with firm valuation as measured by Tobin's q, they find a significantly positive relation. In a more detailed analysis, they do not use a theoretical approach, but rather choose an econometric approach. They consider the 51 ISS provisions on a single basis to identify the drivers of the significant correlations. They regress Tobin's q on all 51 provisions, and on a single provision and an aggregate of the remaining 50 provisions. Moreover, they let a stepwise approach of their econometric software select the relevant provisions among the 51 items. As a result they are able to specify five provisions (details in Table 1), two of them are identical with those highlighted in Bebchuk et al. (2004).

In a supplementary paper, Brown / Caylor (2006b) more or less replicate the companion study, but in this paper they concentrate on the correlation between governance and the firms' operating performance as measured by Return on Assets (ROA) and Return on Equity (ROE). They show that corporations with low scores in their corporate governance index have significantly lower ROA and ROE. Among the 51 provisions, they identify 10 factors which show significantly positive correlations with at least one of the two performance measures (details in Table 1). Five provisions can be linked with both ROA and ROE. Only one of these provisions – average options granted in the past three years as a percentage of basic shares outstanding did not exceed 3%. – is also significant with respect to Tobin's q in their companion study.

Brown and Caylor support the recommendation of Bebchuk et al. (2004) to focus on smaller indices of corporate governance, however, the significant provisions in their study are only partially identical with those found by Bebchuk et al. (2004). In addition to that, Brown and Caylor clearly demonstrate, that the significant governance provisions differ between performance measures.

As supplement, Aggarwal / Williamson (2006) can be mentioned which do not investigate single provisions, but which nevertheless provide some information relevant for our context. They aggregate 64 governance provisions of ISS to a governance index and find a significantly positive relationship with Tobin's q. In a second step, the 64 provisions are divided into eight subcategories. Six of the subcategories (board structure, audit, state of incorporation, compensation, progressive practices, and ownership) are significantly and positively related to firm value, two (company charter and by-laws, and director education) are found to have an insignificant relation with Tobin' q. The results support the view

that the significant relationship of the 64-provision index with Tobin's q is not caused by all provisions.

Table 1 about here

Bauer et al. (2005; 2008) conduct an analysis similar to that of Aggarwal / Williamson (2006) for Japanese corporations. We refer to the working-paper version of 2005 which investigates four performance measures: Tobin's q, stock price performance, ROE, and the net profit margin, whereas the published version of 2008 only contains the results for stock price performance. The corporate governance system in Japan is often considered to be similar to the German one (cf., e.g., Prowse 1995). For this reason, the results of Bauer et al. may possibly supply more useful information with regard to German corporate governance than U.S. studies. However, due to recent developments, e.g., the retreat of banks from equity holdings and supervisory board positions in Germany, German and Japanese corporate governance might have lost in the recent past some of their former similarity (for the recent developments in Germany, see, for instance, Hackethal et al. 2005 and Vitols 2005, for Japan in comparison to Germany, cf. Jackson / Moerke 2005). Moreover, there is one board in Japanese stock corporations, whereas management board and supervisory board are separated in German stock corporations. The GCGC concerns very much the two boards.

Bauer et al. use the Governance Metrics International (GMI) rating of 2004. GMI observes close to 500 different corporate governance criteria which are firstly combined into six subindices and then aggregated to an overall score. Bauer et al. show that – using the overall score – corporations with good corporate governance exhibit significantly higher stock price performances and firm values, but lower ROE and net profit margin, which are only partially significant. In their next step, Bauer et al. look at the six subindices which refer to board accountability, financial disclosure and internal controls, shareholder rights, remuneration, market for control, and corporate behavior. They identify remuneration, and financial disclosure and internal controls as being the most important sub indices for stock price performance and firm value. A small effect can be shown for shareholder rights. Whereas takeover defense measures were seen to have a significantly negative association with firm value, corporate behavior was discovered to be significantly connected with firm value in a positive manner. All subindices were found to be negatively related to ROE and profit margin. Thus, as in Brown / Caylor (2006a; 2006b), the results differ for the various performance measures.

The common thread of the presented studies – particularly of those that analyze individual provisions – is the fact that they empirically support the conjecture that for governance ratings and indices, which are based on a vast set of provisions, only a

few provisions are actually significantly associated with firm performance. The research of Black et al. (2005; 2006b) for the emerging markets of Korea and Russia, resp., yields similar results.

Moreover, we find inconsistencies among the governance measures which are supposed to possess a significant relationship with corporate performance. Differences between Bauer et al. (2005) and the U.S. studies could plausibly be ascribed to the distinctions between the corporate governance systems in the U.S. and Japan, but there are also major differences between the U.S. studies as well, even within a single study and for an identical sample between the various performance measures (Brown / Caylor 2006a; 2006b). The causes of these various findings are still unclear as this branch of the literature is still in its infancy.

Goal of this Study

Our study adds to the small stock of research on the correlation of broad corporate governance measures and firm performance. We transfer the approach of international research inquiries, particularly that of Brown / Caylor (2006a; 2006b) on German corporations, thus providing the first study of this type for an established European economy. Our first research question covers the general association between the declared compliance with the GCGC and firm performance, which we assume to be positive. Our main interest, however, is to discover the most relevant recommendations of the GCGC, i.e., those recommendations which are significantly related with performance. Do the relevant recommendations differ for various performance measures? How do the relevant recommendations of the GCGC relate to the relevant provisions identified in studies for other countries?

Research Design
Sample

The starting point of our sample composition is the HDax stock index as of 31st of July 2005. The HDax consists of the 110 largest companies listed on the German stock exchange. Measures of size are free float market capitalization and exchange turnover. The HDax joins the Dax index of the 30 largest companies, the MDax index of the 50 largest companies from classic sectors ranking immediately below the Dax, and the TecDax of the 30 largest companies from the technology sector following immediately behind the Dax. We remove all foreign companies and also German companies with less than 1% free float. Our final sample comprises 100 large German stock corporations.

Data

The focal point of our research is compliance with the GCGC. Taking the position of an informed external investor we investigate all publicly available information the company provides: annual report, declaration of conformity with the GCGC, agenda of the general meeting, charter of the corporation, and company website. Our GCGC data represent the status as of 31st of July 2005.

The descriptive statistics in Table 1.

Table 2 reveal the extraordinarily high conformity with the recommendations of the GCGC: On average, each corporation complies with 95.59% of the recommendations, with the company at the bottom of this ranking having a compliance rate of still 77.94%. Compliance with the recommendations stands in marked contrast to conformity with the suggestions, which is much lower. Compliance with GCGC recommendations displays little variation, reducing the probability of finding significant relations with performance measures.

Performance measures constitute a second set of variables. We use three kinds of measures: valuation measures (Tobin's q, market-to-book ratio of equity; both as of 30.6.2005), book performance measures (ROA, ROE; both for the time period from 1.7.2004 to 30.6.2005), and stock returns (for the time period from 1.7.2004 to 30.6.2005). All performance measures enter the analysis in an industry-adjusted form.

Finally, we collected data for a variety of additional variables which are commonly used as control variables in corporate governance studies: They relate to company size (balance sheet total, number of employees, market capitalization), growth (sales from January to June 2005 as percentage of sales from January to June 2004), risk (volatility, beta), and ownership structure (voting rights block of the largest ultimate owner according to the German Federal Financial Supervisory Authority). Book data were collected on the occasion of our company inquiry, stock market data were provided by the Deutsche Börse AG. Table 3 summarizes the variables definitions.

Table 2 and Table 3 about here

Selection of Control Variables

We collected data from seven potential control variables. To discover the significant (10% level) control variables for each of our five performance measures, we analyze regressions of the following type:
(1) performance measure = lnSIZE + GROWTH + BLOCK + VOL + BETA + MDAX + TECDAX
We use four optimization tools of SPSS: (1) The regression includes all regressors at once and the researcher selects the significant ones ("inclusion"). (2) SPSS analyzes the regressors stepwise and adds a variable to the set of independent variables provided it enhances the explanatory power of that set of independent variables by a pre-determined amount. Moreover, SPSS checks in each round whether the

incumbent regressors should remain in the set of independent variables ("stepwise"). (3) SPSS starts with all regressors and excludes one after another all independent variables that do not contribute to the explanatory power in a pre-determined amount ("backward"). (4) The same as procedure (2) with the exception that SPSS does not test whether incumbent regressors should remain in the set of independent variables ("forward").

Calculations not shown here yield the following

sets of control variables (see

Table 4). If one of the stock index indicator variables qualified for the control variable set, it was interpreted as evidence that stock index membership matters for this performance measure. In this case, as a rule, the other index indicator variable was included as well.

Table 4 about here

ANALYSIS OF GCGC AGGREGATES

This article focuses on single GCGC items. Nevertheless, it seems interesting to start the examination with a short look at aggregates of the GCGC. Three aggregates will be considered: the complete Code (GCGC), all recommendations (GCGC_REC), and all suggestions (GCGC_SUG). The regression equations are built according to this pattern:
(2) performance measure = GCGC aggregate + performance-measure-specific control variables
The results of the ROA regressions should be interpreted with some caution because the distributions of the residuals oscillate around the minimum requirements of normality.

Table 5 about here

ANALYSIS OF SINGLE GCGC RECOMMENDATIONS
GCGC Recommendations with the Lowest Compliance Rate

A significant relationship with performance measures is most probable for those GCGC recommendations with the lowest compliance rates. In these cases, performance measures which possess some variation are regressed on GCGC variables which also show some variance. For eleven of the 68 recommendations the compliance rate does not exceed 90%, which is why we confine our analysis to these recommendations. For example, Caylor / Brown (2006a), as shown in the working paper version 2005, benefit from the fact that in their sample only nine out of 51 provisions exhibit a compliance rate above 90%. Thus, they are able to investigate all provisions individually.

Table 6 about here

Procedure of Analysis

We apply two different approaches to determine the significant GCGC recommendations for each of our five performance measures. The first approach examines regression equations of the following types:
(3) performance measure = a single GCGC recommendation + performance-measure-specific control variables
(4) performance measure = a single GCGC recommendation + all GCGC recommendations except that single recommendation (GCGC_REC w/o1) + performance-measure-specific control variables
Due to space limitation, only significant results of the regressions of equations (3) and (4) can be shown in Table 7.

Table 7 about here

The second approach analyzes equations of the following pattern:
(5) performance measure = all 11 GCGC recommendations + all control variables
This kind of equation is analyzed with the four optimization tools of SPPS (inclusion, stepwise, backward, forward), which have been already described. The regression analyses of the GCGC aggregates and the single GCGC recommendations revealed for each performance measure a standard set of observations that has to be excluded because they either interfere with the symmetry of the distribution of the standardized residuals or because they are too influential according to Cook's Distance. These cases have been eliminated from the optimization analysis as well. Table 8 depicts the results.

Table 8 and Table 9 about here

Optimized Aggregates of GCGC Recommendations

For eight out of eleven recommendations, we detect a significant relation with at least one performance measure. At this stage, the status of our analysis offers the opportunity to construct a new class of aggregate governance measures with better precision. The increase in precision comes from three sources: (1) Inclusion only of those recommendations that have proved their significance. (2) Consideration of the significant relation's direction, i.e., recommendations with a negative relation with performance should enter the aggregate with a minus sign. (3) Customizing a specific aggregate for each performance measure.

These considerations lead to the following five performance-measure-specific aggregates of recommendations:

REC_OPT(lnQ_ia): REC3.14 – REC3.16 – REC4.35 + REC4.42

REC_OPT(lnMBT_ia): – REC2.7 + REC3.14 – REC3.16 + REC4.42

REC_OPT(ROA_ia): REC4.27 – REC4.39

REC_OPT(ROE_ia): – REC2.7 – REC4.39 + REC4.42

REC_OPT(SR_ia): REC3.14 + REC3.21

Moreover, in order to analyze the effect of significant recommendations with a negative algebraic sign, we also calculate "absolute" versions of the performance-measure-specific aggregates of recommendations (REC_OPTABS(X)). Here, we simply sum the relevant recommendations complied with, without considering whether the recommendation is positively or negatively associated with performance. I.e., we apply the usual method of aggregating broad governance measures, Since the two recommendations in REC_OPT(SR_ia) are both positively related with stock returns, REC_OPTABS(SR_ia) is identical with REC_OPT(SR_ia) and needs, therefore, not be calculated.

These optimized sets of recommendations are tested in six different specifications for every performance measure with the exception of stock returns for which four specifications suffice. The aim is to compare the relation between the performance measures on the one hand and the optimized set, the recommendations not being part of the optimized set, and the complete set of recommendations, resp., on the other hand. The six specifications have the following structure. Of course, specification (6) has already been calculated above:

(6) performance measure = GCGC_REC + performance-measure-specific control variables

(7) performance measure = REC_OPT(performance measure) + performance-measure-specific control variables

(8) performance measure = GCGC_REC w/o REC_OPT(performance measure) + performance-measure-specific control variables

(9) performance measure = REC_OPT(performance measure) + GCGC_REC w/o REC_OPT(performance measure) + performance-measure-specific control variables

(10) performance measure = REC_OPTABS(performance measure) + performance-measure-specific control variables

(11) performance measure = REC_OPTABS(performance measure) + GCGC_REC w/o REC_OPT(performance measure) + performance-measure-specific control variables

Table 10 about here

DISCUSSION
The Relation between the German Corporate Governance Code at Large and Performance

For four of our five performance measures, the relation is insignificant (Table 5). This finding stands in line with the previous results of Nowak et al. (2005; 2006) and Bassen et al. (2006) but is in conflict with Goncharov et al. (2006). For Tobin's q, we discover a significantly negative association with compliance with GCGC recommendations. This result stands out, not only in the GCGC context but also in view of the other studies on governance aggregates presented above. Among them, only Bauer et al. (2005) report significantly negative associations for two of their four performance measures, ROE and net profit margin. In search for explanations, they refer to arguments collected by Core et al. (2006), p. 658. According to them, weaker governance might give managers enough job security that they are willing to follow a potentially superior long-term strategy at the expense of short-term performance; that they are prepared to bear the risk of lower-tail outcomes of good projects: and that they are willing to restrain themselves from overinvesting in projects for which they dispose of specific expertise, only to impede their replacement. Irrespective whether the significantly negative association is caused by one of the reasons mentioned above, further studies of other samples and sample periods should be conducted to find out whether there really is a negative relation between GCGC compliance and Tobin's q.

Single Provision Analysis as a Field of Governance Research

Concerning the results for the aggregate measure of GCGC recommendations, our results completely conflict with the literature on components of governance aggregates. As reported above, all of these studies measure a significant relation between the governance aggregate and performance, and all of these studies, except for Bauer et al. (2005) for ROE and net profit margin, find an association between better governance and better performance. Thus, our results for the governance aggregate come closest to those of Bauer et al. (2005) for Japan, but there are still pronounced differences. The investigations share the characteristic, that they both find a significantly negative association between the governance aggregate and some of their performance measures (ROE and net profit margin in Bauer et al. (2005), Tobin's q in our case). However, the details are entirely in conflict with each other: Bauer et al. (2005) report a significantly positive association for Tobin's q and stock returns (negatively significant and insignificant, resp., in our case) and a significantly negative association for ROE (insignificant in our case).

Turning to the results for single provisions (Table 7,Table 8, and Table 9), we find that three of the eleven recommendations have no significant relationship with any performance measure at all: REC4.40, REC4.41, and REC6.59. For eight recommendations we detect a significant relation with

at least one performance measure. Only four of them are positively connected with performance, the remaining four provisions dispose of a negative association with performance.

Our results share the pattern found in the literature that the association with performance found for the governance aggregate does not hold for all components of the aggregate in single analysis. Moreover, our findings approve the results of Bauer et al. (2005) and Brown / Caylor (2006a; 2006b) that significant aggregate subareas and provisions, resp., may differ between various performance measures. But despite the variety in this regard, our results dispose of uniformity with respect to another aspect: The algebraic sign of significant regression coefficients for a recommendation is consistent across performance measures: The significant relations of a certain recommendation with performance are either all positive or all negative.

The replication of the approach applied in Brown / Caylor (2006a; 2006b) in Table 10 mainly supports the findings of Brown and Caylor. Except for Tobin's q all performance measures share the same pattern: The optimized set of recommendations is positively significant in every specification it is a part of, whereas the remaining aggregates clearly miss the level of significance. Only with the exception of ROA, the optimized sets of recommendations are quite strong in their significance. Concerning Tobin's q, the results in this part stand in line with those in Table 5: GCGC and GCGC_REC proved significant strength in their relationship with Tobin's q. Hence, the strength of the remaining aggregates, besides the optimized set, comes as no big surprise. It is, however, puzzling that our analysis of single recommendations did not filter out more significant recommendations. It seems that there is at least one recommendation with a strong negative relation with Tobin's q. We have only examined those eleven recommendations with the lowest compliance rate. Possibly, even recommendations with compliance rates above 90% might be significantly related with Tobin's q despite the little variation they necessarily possess.

However, despite this overall similarity with previous results, there are some differences when we look at the details: For instance, we could regard the number of eight significant provisions as similar small as in the related studies. But, taking a different view, one could say that eight out of eleven, i.e., about three quarters, of the analyzed provisions dispose of a significant association with performance. Seen this way, the result differs very much from the related studies.

As a major contribution to the literature we regard the detection of the large weight of provisions which have a significantly negative association with performance: four out of eight. In analyses of U.S. samples, significantly negative relationships between single governance provisions and performance do not seem to be noticeable. Only Bebchuk et al. (2004), p.

2, report, though insignificant, evidence of this type for some of the 18 provisions not being part of their entrenchment index. For Japanese corporations, Bauer at al. (2005) find significantly negative associations of some of their governance subindices with ROE and net profit margin. Such negative associations are not only interesting per se, they may also hide significant associations between measures of performance and those governance aggregates which are simple additions of their components. This effect is nicely demonstrated in that part of Table 10 that goes beyond Brown / Caylor (2006a; 2006b). Comparing the corresponding results for REC_OPT(X) and REC_OPTABS(X) supports the view that it is highly important how those recommendations which are negatively related with performance are incorporated in the aggregate measures. For the market-to-book ratio and ROE, the coefficient turns from significantly positive (OPT) to clearly insignificant (OPTABS). For Tobin's q and ROA the swing is even stronger from significantly positive to marginally (Tobin's q) or almost marginally significantly *negative* (ROA). Possibly, this is one explanation why the majority of empirical studies mainly failed to find a significant connection between GCGC and performance.

Unfortunately, the lack of overlapping provisions severely impedes detailed comparisons of our results for single provisions with those of international studies. This is partially caused by the fact that some of the provisions in our analysis relate to the two-tier structure of the German stock corporation. The only overlap can be found in the two studies of Brown / Caylor (2006a; 2006b). They include a criterion which refers to the existence of a mandatory retirement age for directors. This criterion does not provide significant results. Contrary to that, we find a significantly negative relation between Tobin's q and recommendation 4.35. This recommendation advises the consideration of international activities, possible conflicts of interests, and age limits when selecting suitable supervisory board members. As these three characteristics are combined in one recommendation, it is almost impossible to distinguish between them. We additionally analyze the explanations given in the statements of conformity. All corporations that explain their non-compliance refer to the age limit. This leaves room for interpretation: Either full compliance is expressed for the other two characteristics, or the age limit is used to cover lacking compliance. Nevertheless, the capital market seems to appreciate age of members of supervisory board. If age can be seen as a proxy for experience and knowledge, these personal qualifications seem to be highly relevant — possibly even more than independence. In opposition to that, the existence of an age limit for members of the management (recommendation 4.27) is significantly positively associated with ROA. In the case of management board members, the gain in experience and

knowledge might be outweighed by a loss in dynamics at older ages.

Results of Single Provisions

The picture for the management board is quite consistent. All recommendations related to the management board dispose of a significant association with at least one performance measure. For three of the recommendations, association is positive: Compensation should be transparent (recommendation 3.21) and provide incentives to act in the shareholders' interest (recommendation 3.14). The age limit (recommendation 4.27) has already been discussed above. Two recommendations are significantly negatively associated with performance. The intention to act against excessive managerial risk aversion might be the common thread for both. One of which is the existence of a cap which limits compensation in case of unforeseen or extraordinary developments (recommendation 3.16). As this recommendation has a significantly negative association, it might indicate that a lack of limitation in compensation also reduces the degree of risk aversion of management. The background of this reasoning is twofold: It is the interpretation of equity as an option, which implies a value increasing effect if c.p. volatility of the company's assets rises, in combination with the fear that increasing performance dependence of their total wealth makes top managers more risk averse and thus more prone to forgo risky investments which would favor the shareholders. Encouragement of a riskier behavior might also be an explanation for the significance of recommendation 2.7: If there is a directors and officers (D&O) policy for the board members, the GCGC recommends a suitable deductible. A deductible might increase the degree of risk aversion of the management as well. Taken together, non-compliance with these two recommendations changes the outcome distribution for management board members in a way that decreases the lower end and increases the upper end. According to all four incentive related recommendations, there seems no worry about the absolute amounts of managerial compensation, instead it should be transparent — possibly discouraging excessive compensation — and structured in a manner to align management's and shareholders' interests, including risk attitude.

In contrast to the management board, the picture for the supervisory board is rather inconclusive. Three recommendations are significantly negatively, one is significantly positively and two are insignificantly related with a performance measure. In one case (recommendation 4.42), transparency of compensation is significantly positively connected with as much as three performance measures, but a second transparency recommendation (recommendation 4.41) is totally insignificant. Similar inconclusiveness can be found for the structure of compensation: The recommendation of performance-

related compensation is insignificant (recommendation 4.40). The corresponding recommendation (3.14) for the management board is positive. No explanation suggests itself for this difference. Possibly it is influenced by the fact that stock-options-related incentive programs for members of the supervisory board are against German law. As a consequence, the legal basis for performance-oriented compensation schemes of the supervisory board remains unclear. The picture for supervisory board compensation becomes even more puzzling when the significantly negative relation for recommendation 4.39 is taken into account. This provision recommends to consider the work load of supervisory board members (exercising chair, committee membership, etc.) for compensation. Put together, performance-related compensation is insignificant and workload- and responsibility-related compensation significantly negative. The two remaining supervisory board recommendations (2.7: D&O recommendation relates to both management and supervisory board; 4.35: age and other characteristics) have already been discussed above. The final criterion in our list refers to publication terms of financial statements (recommendation 6.59). It does not possess a significant relation with performance. As the German HDax includes the biggest corporations this result is not surprising. It seems reasonable to expect that other channels of communication between management and shareholders are more relevant.

Consequences and Implications for the German Corporate Governance Code

The GCGC recommendations are intended to represent good governance practice. From this perspective, insignificant relations with performance are disappointing, but at least they are not significantly negative, as it is for Tobin's q. This result is truly unexpected and alarming. It is unclear why just Tobin's q disposes of the negative connection whereas, in the aggregate analysis, the closely related market-to-book ratio of equity does not. This is even more puzzling in view of the strength of the negative association: It is significant for all 68 recommendations and for the 64-recommendations set (GCGC_REC w/o REC_OPT), which excludes those recommendations with a significant result in the single-provision analysis. And among the recommendations of the optimized set, the negative association of some recommendations is only for Tobin's q so strong that the optimized set without consideration of the algebraic sign (GCGC_OPTABS) is significantly *negatively* associated with performance. In summary, the negative relation is very robust for recommendations 2.7 (deductible for D&O) and 3.16 (cap), but not confined to these recommendations. This result should be challenged in further research.

But insignificant — and even significantly positive — associations between the GCGC at large

and performance measures might as well cover a variety of associations for the single components of the GCGC with performance. The significantly negative connection with Tobin's q for the GCGC in general and for some single recommendations with other performance measures should motivate the Code Commission and all other parties concerned with the GCGC to elevate the single recommendations — and thereby the GCGC at large — to a more solid, preferably empirically based foundation. So far, the main rationale of the recommendations and suggestions are plausibility considerations. An encompassing single-provision analysis would yield a much better founded code. Encompassing means that ideally all recommendations and suggestions should be analyzed this way, which would require a much larger sample. The empirical assessment of new GCGC components before their introduction is desirable, though difficult to realize. But established components can be empirically analyzed and, if need be, changed afterwards. Although the GCGC is soft law, it is nevertheless a kind of regulation, which comes at a cost. In view of this regulatory burden, accurate quality inspections of the GCGC should be a matter of course. Regular quality inspections are a natural activity of commercial providers of governance scores such as ISS or GMI. To be sure, the ultimate goal of commercial providers and the Code Commission are not identical. But this difference should be considered in the way the inspection is conducted and interpreted, but it should not lead to a different answer to the question whether such tests are performed at all. The insignificant results of Nowak et al. (2005; 2006), Bassen et al. (2006) and in our study and particularly the significantly negative associations presented in this study should be reason enough to submit the GCGC a serious quality inspection.

ROBUSTNESS TEST FOR REVERSE CAUSALITY

This study is part of the research area which investigates the relation between broad measures of corporate governance and corporate performance. More precisely, it belongs to the subarea which analyzes whether all components of such broad measures are significantly related with performance. Above, reverse causality has been mentioned as a further subarea. That subarea explores whether corporate governance affects performance or vice versa. We have ignored this issue so far. Instead, we have reported about *associations* between broad governance measures and performance without speaking out on the direction of causality.

But since this issue is of interest in our context as well, some hints concerning the direction of causality will be collected in this robustness test. The OLS regression assumes exogenous regressors. If corporate performance affects the governance measure, this governance measure would be

endogenous in the regression. Unfortunately, empirical corporate governance research is divided how potential endogeneity should be dealt with within the framework of a cross section analysis. By the application of more complex regression approaches researchers intend to give consideration to the potential endogeneity of governance variables. The approaches applied comprise two- or three-stage least squares regressions (for applications, cf., e.g., Demsetz / Lehn 1985; Agrawal / Knoeber 1996; Barnhart / Rosenstein 1998; Demsetz / Villalonga 2001; Beiner et al. 2006), other instrument variable approaches (for applications, see, for instance, Barnhart / Rosenstein 1998; Himmelberg et al. 1999; Bøhren / Ødegaard 2006), and the generalized method of moments (it is applied by Köke 2002). But it is highly controversial whether the more complex approaches are indeed superior to the OLS regression. As antipodes Agrawal / Knoeber (1996) and Demsetz / Villalonga (2001) could be mentioned on the affirmative side and Barnhart / Rosenstein (1998), Bhagat / Jefferis (2002) pp. 36-39, Larcker / Rusticus (2005), and Bøhren / Ødegaard (2006) on the skeptical side. Barnhart / Rosenstein (1998) p. 2 conclude their comparison of OLS regression, three-stage least squares regression, and various instrumental variable regressions with the following statement: "In situations as this, where the structure of empirical models is uncertain, systems estimation results should be interpreted cautiously, sensitivity analysis should be conducted, and OLS should not be casually dismissed."

Given such an inconclusive econometric situation we follow the approach of Brown / Caylor (2006a) pp. 424-426, who refer to Klein (1998) pp. 292 et seq.: The procedure bases on the observation that many measures of corporate performance are positively autocorrelated. Provided a preceding realization of the performance variable is added to the regression as a further regressor, all factors that contribute to the autocorrelation enter the regression. As a consequence, the hurdle becomes higher for a governance variable to have a significant regression coefficient, particularly if it has been a significant influence of performance in the preceding period in question. If the regression coefficient of the governance variable is significant in such a regression, causation seems to run at least partially from governance to performance.

Brown / Caylor (2006a) do not reveal how many periods their value of Tobin's q is lagged, Klein (1998) includes a 1-year-lagged performance variable in the regression. We replicate the computations shown in Table 10, which explore the performance from 1.7.2004 to 30.6.2005, with an additional lagged value of the performance measure under investigation. We analyze several lags with yearly performance values from 2000 to 2003. Table 11 displays the results for the lagged performance value from 2003. The results for the other lags do not differ much; they are not shown to preserve space.

Table 11 about here

By and large, as to the significance of the regression coefficients of the governance variables, the results in Table 11 and the results for the other lags resemble very much the results in Table 10 although most of the performance measures are characterized by strong autocorrelation. The permanence of those significances supports the view that significant relations between the governance measures and performance are at least partially due to an effect exerted by governance on performance.

Concluding remarks

This article contributes empirical evidence to the recently emerging literature that analyzes the association of single components of broad corporate governance aggregates with measures of corporate performance. We investigate the German Corporate Governance Code (GCGC) and five performance measures. For the GCGC at large, all performance measures but Tobin's q are insignificantly associated with code compliance. Even more interesting, the significant connection Tobin's q is *negative* and rather strong. We then look at those eleven recommendations with a compliance rate of 90% or less individually. For three of them, association with all performance measures is insignificant, four are significantly positively and four are significantly *negatively* connected with at least one performance measure. This is not only interesting per se, it may also hide significant associations between measures of corporate performance and those governance aggregates which are simple additions of their components. Possibly, this is one explanation why empirical studies mainly failed to find a significant connection between the GCGC at large and performance (see Nowak et al. 2005; 2006, and Bassen et al. 2006 with mainly insignificant results, but cf. also Goncharov et al. 2006 with significant findings). In the literature, only Bauer et al. (2005) also report some significantly negative associations for their overall governance measure and subindices thereof for a sample of Japanese corporations.

We confirm previous findings of Bauer et al. (2005) and Brown / Caylor (2006a; 2006b) that significant provisions might differ between performance measures. The related studies of U.S. corporations state that the number and percentage share of significant provisions in comparison with the overall aggregate is quite small. At least for the percentage share, our result is different since eight of the eleven analyzed provisions are significant. Unfortunately, detailed comparisons of our results with those of international studies are impeded by the fact that some of the provisions in our analysis relate to the two-tier structure of the German stock corporation.

According to our robustness check, it seems that causality runs at least partially from governance to performance. In view of the several significantly negative, but also in view of the many insignificant, associations we found for GCGC aggregates and single components with performance, the result on direction of causality reinforces our plea for an encompassing empirically based quality inspection of the GCGC. Encompassing means a much larger sample and a longer sample period. The former allows the analysis of many more than eleven recommendations. We had to confine our analysis on eleven recommendations due to the very high rate of compliance among HDAX corporations.

Our final remark considers this newly emerging strand of research in general. The stock of studies so far is very small. Besides the general findings, that only some of the components of a governance aggregate are significantly related with performance, the studies do exhibit substantial differences yet ask important questions. To enumerate just some of the questions: Do the relevant governance provisions differ between performance measures? Can the results from one country be transferred to other countries with a markedly different corporate governance environment? Is there, at least within one country, a set of relevant governance provisions which is stable across performance measures and through time? Answers to these questions are highly welcomed because they would help to improve corporate governance regulation and to avoid unnecessary regulatory burden. Empirical quality inspections of the GCGC might both advance, and profit from, this research area.

References

1. Aggarwal, R. and Williamson, R. (2006) Did New Regulations Target the Relevant Corporate Governance Attributes? Paper, Georgetown University, Washington, D.C.
2. Agrawal, A. and Knoeber, C.R. (1996) Firm Performance and Mechanisms to Control Agency Problems between Managers and Shareholders, *Journal of Financial and Quantitative Analysis*, 31.
3. Ashbaugh, H., Collins, D.W. and LaFond, R. (2004) Corporate Governance and the Cost of Equity Capital. Paper, December.
4. Barnhart, S.W. and Rosenstein, S. (1998) Board Composition, Managerial Ownership, and Firm Performance: An Empirical Analysis, *Financial Review*, 33(4), 1 – 16.
5. Bassen, A., Kleinschmidt, M., Prigge, S. and Zöllner, C. (2006) Deutscher Corporate Governance Kodex und Unternehmenserfolg — Empirische Befunde, *Die Betriebswirtschaft*, 66, 375 – 401.
6. Bauer, R., Frijns, B., Otten, R. and Tourani-Rad, A. (2005) The Impact of Corporate Governance on Corporate Performance: Evidence from Japan. Paper, Maastricht University and Auckland University of Technology.
7. Bauer, R., Frijns, B., Otten, R. and Tourani-Rad, A. (2008) The Impact of Corporate Governance on Corporate Performance: Evidence from Japan, *Pacific-Basin Finance Journal*, 16, 236 – 251.

8. Bebchuk, L., Cohen, A. and Ferrell, A. (2004) What Matters in Corporate Governance? Discussion Paper No. 491. Harvard Law School, Cambridge, MA.

9. Beiner, S., Drobetz, W., Schmid, M.M. and Zimmermann, H. (2006): An Integrated Framework of Corporate Governance and Firm Valuation, *European Financial Management*, 12, 249 – 283.

10. Bhagat, S. and Bolton, B. (2006) Board Ownership and Corporate Governance Indices. Paper, September.

11. Bhagat, S. and Jefferis, R.H. (2002) *The Econometrics of Corporate Governance Studies*. Cambridge, Mass., London: MIT Press.

12. Black, B.S., Kim, W., Jang, H. and Park, K. (2005) Does Corporate Governance Predict Firms´ Market Values? Time Series Evidence from Korea. ECGI Finance Working Paper No. 103/2005.

13. Black, B.S., Jang, H. and Kim, W. (2006a) Does Corporate Governance Predict Firms' Market Values? Evidence from Korea, *Journal of Law, Economics, & Organization*, 22, 366 – 413 (2006).

14. Black, B.S., Love, I. and Rachinsky, A. (2006b) Corporate Governance Indices and Firms´ Market Values: Time Series Evidence from Russia. *Emerging Markets Review*, 7, 361 – 379.

15. Bøhren, Ø. and Ødegaard, A. (2006) Governance and Performance Revisited. In: Ali, P. and Gregoriou, G.N. (Eds.*), International Corporate Governance After Sarbanes-Oxley*, Hoboken: Wiley, pp. 27 – 64.

16. Brown, L.D. and Caylor, M.L. (2006a) Corporate Governance and Firm Valuation. *Journal of Accounting and Public Policy*, 25, 409 – 434.

17. Brown, L.D. and Caylor, M.L. (2006b) Corporate Governance and Firm Operating Performance, Paper, Georgia State University. Forthcoming in: *Review of Quantitative Finance and Accounting*.

18. Chidambaran, N.K., Palia, D. and Zheng, Y. (2008) Corporate Governance and Firm Performance: Evidence from Large Governance Changes. Paper, January.

19. Core, J.E., Guay, W.R. and Rusticus, T.O. (2006) Does Weak Governance Cause Weak Stock Returns? An Examination of Firm Operating Performance and Investors' Expectations, *The Journal of Finance*, 61, 655-687.

20. Cremers, K.J.M. and Nair, V.B. (2005) Governance Mechanisms and Equity Prices, *The Journal of Finance*, 60, 2859 – 2894.

21. Cromme, G. (2005) Corporate Governance in Germany and the German Corporate Governance Code, *Corporate Governance: An International Review*, 13, 362 – 367.

22. Demsetz, H. and Lehn, K. (1985) The Structure of Corporate Ownership: Causes and Consequences, *Journal of Political Economy*, 93, 1155 – 1177.

23. Demsetz, H. and Villalonga, B. (2001) Ownership Structure and Corporate Performance, *Journal of Corporate Finance*, 7, 209 – 233.

24. Drobetz, W., Schillhofer, A. and Zimmermann, H. (2004) Corporate Governance and Expected Stock Returns: Evidence from Germany, *European Financial Management*, 10, 267 – 293.

25. Durnev, A. and Kim, E.H. (2005) To Steal or not to Steal: Firm Attributes, Legal Environment, and Valuation, *The Journal of Finance*, 60, 1461 – 1493.

26. Gompers, P., Ishii, J. and Metric, A. (2003) Corporate Governance and Equity Prices, *Quarterly Journal of Economics*, 118, 107 – 155.

27. Goncharov, I., Werner, J.-R. and Zimmermann, J. (2006) Does Compliance with the German Corporate Governance Code Have an Impact on Stock Valuation? An Empirical Analysis, *Corporate Governance: An International Review*, 14, 432 – 445.

28. Hackethal, A., Schmidt, R.H. and Tyrell, M. (2005): Banks and German Corporate Governance: On the Way to a Capital Market-Based System? *Corporate Governance: An International Review*, 13, 397 – 407.

29. Himmelberg, C.P., Hubbard, R.G. and Palia, D. (1999) Understanding the Determinants of Managerial Ownership and the Link between Ownership and Performance, *Journal of Financial Economics*, 53, 353 – 384.

30. Jackson, G. and Moerke, A. (2005): Continuity and Change in Corporate Governance: Comparing Germany and Japan, *Corporate Governance: An International Review*, 13, 351 – 361.

31. Klein, A. (1998) Firm Performance and Board Committee Structure, *Journal of Law and Economics*, 41, 275 – 303.

32. Köke, F.J. (2002) *Corporate Governance in Germany. An Empirical Investigation*. Heidelberg, New York: Physica.

33. Larcker, D.F. and Rusticus, T.O. (2007) On the Use of Instrumental Variables in Accounting Research. Paper.

34. La Porta, R., Lopez-de-Silanes, F., Shleifer, A. and Vishny, R.W. (2002) Investor Protection and Corporate Valuation, *The Journal of Finance*, 57, 1147 – 1170.

35. Lehn, K., Patro, S. and Zhao, M. (2007) Governance Indexes and Valuation: Which Causes Which? *Journal of Corporate Finance*, 13, 907 – 928..

36. Lombardo, D. and Pagano, M. (2002) Law and Equity Markets: A Simple Model. In: McCahery, J.A., Moerland, P., Raaijmakers, T. and Renneboog, L. (Eds.), *Corporate Governance Regimes. Convergence and Diversity*, Oxford and New York: Oxford University Press, pp. 343 – 362.

37. Nowak, E., Rott, R. and Mahr, T.G. (2005) Wer den Kodex nicht einhält, den bestraft der Kapitalmarkt? *Zeitschrift für Unternehmens- und Gesellschaftsrecht*, 34, 252 – 279.

38. Nowak, E., Rott, R. and Mahr, T.G. (2006) The (Ir)relevance of Disclosure of Compliance with Corporate Governance Codes — Evidence from the German Stock Market. Swiss Finance Institute Research Paper Series No. 06-11.

39. Prowse, S. (1995) Corporate Governance in an International Perspective: A Survey of Corporate Control Mechanisms Among Large Firms in the U.S., U.K., Japan and Germany, *Financial Markets, Institutions & Instruments*, 4.

40. Rose, P. (2007): The Corporate Governance Industry, *The Journal of Corporation Law*, 32, 887 – 926.

41. Shleifer, A. and Vishny, R.W. (1997) A Survey of Corporate Governance, *The Journal of Finance*, 52, 737 – 783.

42. Vitols, S. (2005) German Corporate Governance in Transition: Implications of Bank Exit from Monitoring and Control, *International Journal of Disclosure and Governance*, 2, 357 – 367.

43. Von Werder, A., Talaulicar, T. and Kolat, G.L. (2005) Compliance with the German Corporate Governance Code: An Empirical Analysis of the Compliance Statements by German Listed Companies, *Corporate Governance: An International Review*, 13, 178 – 187.

44. World Bank: Corporate Governance (1999) A Framework for Implementation – Overview. Paper.
45. Wymeersch, E. (2005) Implementation of the Corporate Governance Codes. In: Hopt, K.J., Wymeersch, E., Kanda and H., Baum, H. (Eds), *Corporate Governance in Context– Corporations, States, and Markets in Europe, Japan, and the US*, Oxford and New York: Oxford University Press 2005, pp. 403 – 419.

Table 1. Survey of Significant Single Governance Provisions in Analyses of U.S. Corporations

Single Governance Provisions with Significant Connection to Corporate Performance in U.S. Corporations					
	Bebchuk et al. (2004)		Brown / Caylor (2006a)	Brown / Caylor (2006b)	
Governance Provision	Tobin's q	Stock Return	Tobin's q	ROE	ROA
Preferred blank check, poison pill	**X**	**X**	**X**	**X**	**X**
Staggered boards	**X**	**X**	**X**		
Average options granted in the past three years as a percentage of basic shares outstanding did not exceed 3%			**X**	**X**	**X**
Limits to shareholder amendments of the bylaws	**X**	**X**			
Supermajority requirements for mergers	**X**	**X**			
Supermajority requirements for charter amendments	**X**	**X**			
Golden parachute arrangements	**X**	**X**			
Nominating committee which consists only of independent outside directors				**X**	**X**
Non-employees do not participate in company pension plans				**X**	**X**
At least one member of the board participated in an ISS accredited director education program				**X**	**X**
Board guidelines published in the proxy statements			**X**		
No option re-pricing within the last three years			**X**		
Compensation committee which consists only of independent outside directors				**X**	
Auditors ratified at the most recent annual meeting				**X**	
Directors required to submit their resignation upon a change in job status					**X**
Company expenses stock options					**X**
No former CEO serves on board					**x**

Notes: The provisions are ordered according to the frequency of their occurrence. A provision is displayed in this table if it disposes of a significant relationship with the respective performance measure.

Table 2. Descriptive Statistics

Variable	n	Mean	S.D.	Minimum	Median	Maximum
Compliance GCGC	100	86.62%	6.52%	67.86%	85.71%	98.81%
Compliance GCGC recommendations	100	95.25%	4.28%	77.94%	95.59%	100.00%
Compliance GCGC suggestions	100	49.94%	23.24%	12.50%	43.75%	93.75%
Tobin's q	100	1.63	0.95	0.92	1.27	6.13
Market-to-book ratio of equity	100	2.38	1.89	0.55	1.82	12.53
ROA	100	1.89%	4.28%	-21.10%	1.73%	14.42%
ROE	100	4.70%	11.10%	-82.17%	5.08%	23.83%
Stock return	99	22.26%	48.67%	-64.35%	16.92%	390.35%
Balance sheet total in m. €	100	48,940	154,629	63	3,270	1,006,024
Number of employees	100	41,812	79,013	4	10,956	440,000
Market capitalization in m. €	100	7,248	12,584	118	1,899	64,226
Change in sales	100	7.45%	15.82%	-44.03%	5.73%	71.89%
Volatility	99	27.72%	11.74%	14.59%	23.88%	69.33%
Beta	99	0.80	0.38	0.02	0.80	1.78
Largest voting rights block	100	29.67%	25.70%	0.00%	18.40%	100.00%

Notes: The variables are defined in Table 3.

Table 3. Variables

Short Cut	Definition
German Corporate Governance Code	
GCGC	compliance with GCGC in %
GCGC_REC	compliance with GCGC recommendations in %
GCGC_SUG	compliance with GCGC suggestions in %
GCGC_REC w/o1	compliance with all GCGC recommendations except for the specific single recommendation that is analyzed in that context in %
REC_OPT(X)	compliance with a set of GCGC recommendations that is optimized for a specific performance measure X with consideration of the algebraic sign of the recommendations' regression coefficients
REC_OPTABS(X)	compliance with a set of GCGC recommendations that is optimized for a specific performance measure X without consideration of the algebraic sign of the recommendations' regression coefficients, i.e., simple addition of recommendations complied with
GCGC_REC w/o REC_OPT(X)	compliance with all GCGC recommendations except for the recommendations that are part of the optimized set of recommendations of performance measure X in %

Short Cut	Variable	Definition
Performance Measures		
ROA	return on assets	profit / balance sheet total
ROE	return on equity	profit / book value equity
Q	Tobin's q	(balance sheet total + market value equity - book value equity) / balance sheet total
MTB	market-to-book ratio of equity	market value equity / book value equity
SR	stock return	(share price 30.6.2005 + dividend 1.7.2004-30.6.2005) / share price 30.6.2004
Control Variables		
SIZE	company size	number of employees
—	company size	balance sheet total in m. €
—	company size	market capitalization in m. €
VOL	volatility	12-months-volatility (1.7.2004-30.6.2005)
BETA	beta	12-months-beta to HDax (1.7.2004-30.6.2005)
GROWTH	growth in sales	sales from January to June 2005 as percentage of sales from January to June 2004
BLOCK	largest voting rights block	voting rights block of the largest ultimate owner according to the German Federal Financial Supervisory Authority
MDAX	corporation in MDax	binary indicator variable; 1: corporation in MDax, otherwise 0
TECDAX	corporation in TecDax	binary indicator variable; 1: corporation in TecDax, otherwise 0
Additions to Variable Names		
addition ia	industry adjustment of performance measures	realization of that performance measure by a specific company - industry median of that performance measure [To ensure a population of each industry that is adequate and satisfactory to the use of its median value in the calculation of the industry-adjusted performance measures, we merged the 18 industries of Deutsche Börse's classification into 4 industries: Financial (banks, financial services, insurance), Traditional (automobile, basic resources, chemicals, construction, consumer, food + beverages, industrial, utilities, part of pharma + healthcare), New Technologies (part of pharma + healthcare, software, telecommunication), Services (media, retail, transportation + logistics).]
addition ln	natural logarithm	

Table 4. Performance-Measure-Specific Control Variables

Performance Measure	Control Variables
lnQ_ia	lnSIZE, BLOCK, MDAX, TECDAX
lnMTB_ia	lnSIZE, BLOCK, MDAX, TECDAX
ROA_ia	GROWTH, BLOCK, MDAX, TECDAX
ROE_ia	GROWTH, VOL
SR_ia	GROWTH, BETA, MDAX, TECDAX

Notes: The variables are defined in Table 3.

Table 5. Regression Results of GCGC Aggregates

Variable	Performance Measure														
	lnQ_ia			lnMTB_ia			ROA_ia			ROE_ia			SR_ia		
Constant	2.86*	3.34*	1.40*	2.51*	1.86	1.91*	0.02	0.06	-0.01	-0.05	-0.04	0.00	-0.40	-0.61	-0.04
	(0.00)	(0.00)	(0.00)	(0.03)	(0.20)	(0.00)	(0.71)	(0.21)	(0.19)	(0.46)	(0.70)	(0.97)	(0.35)	(0.31)	(0.74)
GCGC	-0.02*			-0.01			0.00			0.00			0.01		
	(0.02)			(0.39)			(0.32)			(0.38)			(0.34)		
GCGC_REC		-0.03*			0.00			0.00			0.00			0.01	
		(0.01)			(0.86)			(0.20)			(0.62)			(0.31)	
GCGC_SUG			-0.01			-0.02			0.00			0.00			0.00
			(0.25)			(0.28)			(0.17)			(0.57)			(0.64)
lnSIZE	-0.15*	-0.15*	-0.12*	-0.16*	-0.16*	-0.16*									
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)									
GROWTH							0.05*	0.03*	0.05*	0.14*	0.12*	0.14*	0.51*	0.51*	0.49*
							(0.00)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
BLOCK	0.19	0.20†	0.28*	0.44†	0.47*	0.44*	0.01	0.01	0.01						
	(0.11)	(0.09)	(0.03)	(0.05)	(0.04)	(0.05)	(0.49)	(0.46)	(0.44)						
VOL										-0.03	-0.03	-0.03			
										(0.53)	(0.47)	(0.48)			
BETA													-0.08	-0.09	-0.08
													(0.35)	(0.34)	(0.39)
MDAX	-0.32*	-0.27*	-0.20†	-0.32†	-0.26	-0.35†	0.00	0.00	0.01				0.12	0.11	0.11
	(0.00)	(0.00)	(0.06)	(0.08)	(0.13)	(0.06)	(0.72)	(0.55)	(0.38)				(0.10)	(0.12)	(0.15)
TECDAX	-0.69*	-0.63*	-0.50*	-0.70*	-0.61*	-0.73*	0.00	0.00	0.01				0.04	0.02	0.02
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.82)	(0.92)	(0.20)				(0.66)	(0.80)	(0.84)
Adj. R²	0.32	0.33	0.24	0.14	0.13	0.14	0.06	0.05	0.05	0.17	0.10	0.17	0.11	0.11	0.11
p-value of F	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.07†	0.09†	0.08†	0.00*	0.01*	0.00*	0.01*	0.01*	0.01*
n	94	94	96	98	98	98	91	92	92	92	91	92	94	94	94
Exclusions	6	6	4	2	2	2	9	8	8	8	9	8	5	5	5

Notes: This table displays the results of a regression analysis of the following type of equation:
performance measure = GCGC aggregate + performance-measure-specific control variables.
The table reports the regression coefficient in the first row and in parentheses the p-value in the second row. Coefficients with a p-value better than 10% are marked with the cross symbol (†), coefficients with a p-value better than 5% with the asterisk symbol (*). The variables are defined in Table 3.
The results of the ROA_ia regressions should be interpreted with some caution because the distributions of the residuals oscillate around the minimum requirements of normality.
Observations with absolute values of the standardized residual above 3 or Cook's Distance values above .2 are usually excluded from that particular analysis, provided the high value is not due to a data error, which can be corrected.

Table 6. GCGC Recommendations with the Lowest Compliance Rate

Short Cut	Recomendation Number	Recommendation	Compliance Rate
REC3.21	4.2.4.2	With respect to the reporting of the compensation of the members of the Management Board in the Notes of the Consolidated Financial Statements: The figures shall be individualized.	50%
REC2.7	3.8.0.3	If the company takes out a D&O (directors and officers' liability insurance) policy for the Management Board and Supervisory Board, a suitable deductible shall be agreed.	62%
REC4.42	5.4.5 (3) S.1	The compensation of the members of the Supervisory Board shall be reported in the Notes of the Consolidated Financial Statements, subdivided according to components.	69%
REC6.59	7.1.2 S.2	The Consolidated Financial Statements shall be publicly accessible within 90 days of the end of the financial year; interim reports shall be publicly accessible within 45 days of the end of the reporting period.	77%
REC4.40	5.4.5.2.1	Members of the Supervisory Board shall receive fixed as well as performance-related compensation.	78%
REC4.41	5.4.5 (3) S.2	Also payments made by the enterprise to the members of the Supervisory Board or advantages extended for services provided individually, in particular, advisory or agency services shall be listed separately in the Notes of the Consolidated Financial Statements.	82%
REC4.35	5.4.1.1.2	For nominations for the election of members of the Supervisory Board, the international activities of the enterprise, potential conflicts of interest and an age limit to be specified for the members of the Supervisory Board shall be taken into account.	86%
REC3.16	4.2.3.2.4	Compensation of the members of the Management Board: For extraordinary, unforeseen developments a possibility of limitation (Cap) shall be agreed for by the Supervisory Board.	87%
REC4.39	5.4.5.1.3	Compensation of the members of the Supervisory Board: Also to be considered here shall be the exercising of the Chair and Deputy Chair positions in the Supervisory Board as well as the chair and membership in committees.	87%
REC3.14	4.2.3.2.2	Compensation of the members of the Management Board: Stock options and comparable instruments shall be related to demanding, relevant comparison parameters.	88%
REC4.27	5.1.2.2.3	An age limit for members of the Management Board shall be specified.	90%

Notes: The short cut contains the following information, e.g., REC3.21: It is a recommendation ("REC") from the third area of the GCGC ("3": management board), and it is the 21st recommendation in our counting of a total of 68 recommendations. The recommendation number indicates where to find the recommendation in the GCGC.

Table 7. Regression Results for Single GCGC Recommendations (1)

Variable	Performance Measure																			
	lnQ_ia				lnMTB_ia				ROA_ia				ROE_ia				SR_ia			
Constant	1.67*(0.00)	2.67*(0.00)	1.63*(0.00)	3.06*(0.00)	1.86*(0.00)	1.30(0.37)	1.39*(0.01)	2.65†(0.08)	-0.02†(0.08)	0.04(0.37)	0.01†(0.10)	0.05(0.28)	0.02(0.11)	-0.08(0.43)	0.00(0.84)	0.04(0.73)	-0.17(0.16)	-0.31(0.61)	-0.17(0.10)	0.30(0.67)
REC2.7					-0.21†(0.07)	-0.22†(0.07)							-0.01(0.11)	-0.02†(0.09)						
REC3.14																	0.18*(0.03)	0.17*(0.04)		
REC3.16	-0.32*(0.00)	-0.30*(0.00)																		
REC3.21																			0.13*(0.02)	0.14*(0.01)
REC4.27									0.01(0.10)	0.01†(0.09)										
REC4.35			-0.17†(0.05)	-0.08(0.39)																
REC4.39											-0.01*(0.04)	-0.01*(0.05)								
REC4.40																				
REC4.41																				
REC4.42							0.19(0.11)	0.22†(0.08)							0.02†(0.06)	0.02†(0.06)				
REC6.59																				
GCGC_REC w/o1		-0.01(0.16)		-0.02(0.11)		0.01(0.68)		-0.02(0.37)		0.00(0.21)		0.00(0.39)		0.00(0.31)		0.00(0.71)		0.00(0.82)		-0.01(0.50)
lnSIZE	-0.13*(0.00)	-0.13*(0.00)	-0.14*(0.00)	-0.14*(0.00)	-0.17*(0.00)	-0.17*(0.00)	-0.15*(0.00)	-0.15*(0.00)												
GROWTH									0.05*(0.00)	0.05*(0.00)	0.03*(0.03)	0.03*(0.04)	0.11*(0.00)	0.12*(0.00)	0.12*(0.00)	0.11*(0.00)	0.51*(0.00)	0.51*(0.00)	0.65*(0.00)	0.63*(0.00)
BLOCK	0.21†(0.07)	0.19†(0.10)	0.21†(0.09)	0.19(0.11)	0.55*(0.01)	0.57*(0.01)	0.48*(0.03)	0.45*(0.04)	0.01(0.29)	0.01(0.36)	0.01(0.23)	0.01(0.29)								
VOL													-0.05(0.26)	-0.04(0.31)	-0.03(0.45)	-0.03(0.43)				
BETA																	-0.09(0.32)	-0.09(0.32)	0.01(0.95)	0.01(0.93)
MDAX	-0.19*(0.02)	-0.23*(0.01)	-0.21*(0.01)	-0.26*(0.01)	-0.30†(0.06)	-0.29†(0.08)	-0.18(0.27)	-0.21(0.22)	0.00(0.89)	0.00(0.79)	0.00(0.54)	0.00(0.41)					0.11†(0.09)	0.12†(0.09)	0.16*(0.03)	0.14†(0.05)
TECDAX	-0.64*(0.00)	-0.68*(0.00)	-0.55*(0.00)	-0.62*(0.00)	-0.72*(0.00)	-0.71*(0.00)	-0.56*(0.01)	-0.60*(0.01)	0.01(0.21)	0.01(0.38)	0.00(0.65)	0.00(0.86)					0.03(0.64)	0.04(0.61)	-0.01(0.85)	-0.03(0.71)
Adj. R^2	0.40	0.40	0.31	0.32	0.16	0.16	0.16	0.16	0.09	0.10	0.08	0.08	0.12	0.12	0.13	0.12	0.15	0.14	0.18	0.17
p-value of F	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.02*	0.02*	0.03*	0.04*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
n	93	93	94	94	98	98	98	98	90	90	92	92	91	91	91	91	94	94	96	96
Exclusions	7	7	6	6	2	2	2	2	10	10	8	8	8	8	8	8	5	5	3	3

Notes: This table displays the results of a regression analysis of the following types of equation:

performance measure = a single GCGC recommendation + performance-measure-specific control variables

performance measure = a single GCGC recommendation + all GCGC recommendations except that single recommendation (GCGC_REC w/o1) + performance-measure-specific control variables.

The table reports the regression coefficient in the first row and in parentheses the p-value in the second row. Coefficients with a p-value better than 10% are marked with the cross symbol (†), coefficients with a p-value better than 5% with the asterisk symbol (*).The table only reports regressions in which the single GCGC recommendation possesses in at least one of the two specifications an at least marginally marginal significant (10% level) regression coefficient.

Observations with absolute values of the standardized residual above 3 or Cook's Distance values above .2 are usually excluded from that particular analysis, provided the high value is not due to a data error, which can be corrected. The variables are defined in Table 3 and Table 6.

Table 8. Regression Results for Single GCGC Recommendations (2)

Variable	Performance Measure																			
	lnQ_ia				lnMTB_ia				ROA_ia				ROE_ia				SR_ia			
	Inclu	Step	Back	For	Inclu	Step	Back	For	Inclu	Step	Back	For	Inclu	Step	Back	For	Inclu	Step	Back	For
Constant	1.74* (0.00)	1.45* (0.00)	1.45* (0.00)	1.45* (0.00)	2.24* (0.00)	1.47* (0.00)	1.03* (0.01)	1.47* (0.00)	0.05* (0.05)	0.01† (0.06)	0.00 (0.48)	0.01† (0.06)	-0.01 (0.96)	-0.01 (0.18)	-0.01 (0.18)	-0.01 (0.18)	0.00 (0.99)	-0.28* (0.00)	-0.28* (0.00)	-0.28* (0.00)
REC2.7	-0.08 (0.23)				-0.23† (0.08)				-0.01 (0.23)				-0.01 (0.34)				-0.01 (0.85)			
REC3.14	0.24* (0.03)	0.24* (0.02)	0.24* (0.02)	0.24* (0.02)	0.30 (0.13)		0.31† (0.10)		0.00 (0.61)				0.01 (0.70)				0.19* (0.04)	0.15* (0.05)	0.15* (0.05)	0.15* (0.05)
REC3.16	-0.31* (0.00)	-0.35* (0.00)	-0.35* (0.00)	-0.35* (0.00)	-0.26 (0.16)	-0.32† (0.07)	-0.34† (0.05)	-0.32† (0.07)	-0.01 (0.35)				-0.03 (0.12)				-0.10 (0.28)			
REC3.21	-0.08 (0.25)				-0.09 (0.47)				0.00 (0.43)				0.01 (0.61)				0.11† (0.06)	0.09† (0.08)	0.09† (0.08)	0.09† (0.08)
REC4.27	0.04 (0.75)				-0.17 (0.42)				0.00 (0.80)				0.02 (0.26)				0.04 (0.73)			
REC4.35	-0.14 (0.18)	-0.19* (0.03)	-0.19* (0.03)	-0.19* (0.03)	0.05 (0.80)				0.00 (0.76)				0.00 (0.79)				-0.06 (0.52)			
REC4.39	0.05 (0.60)				-0.11 (0.55)				-0.01† (0.09)	-0.01† (0.07)		-0.01† (0.07)	-0.03† (0.09)				-0.06 (0.49)			
REC4.40	-0.02 (0.81)				0.13 (0.41)				0.00 (0.51)				0.01 (0.44)				-0.05 (0.47)			
REC4.41	0.00 (0.98)				-0.06 (0.76)				-0.01 (0.30)				-0.01 (0.41)				0.05 (0.56)			
REC4.42	0.13 (0.16)	0.12† (0.06)	0.12† (0.06)	0.12† (0.06)	0.31† (0.06)	0.24* (0.04)	0.23* (0.05)	0.24* (0.04)	0.00 (0.57)				0.03† (0.08)	0.02† (0.05)	0.02† (0.05)	0.02† (0.05)	-0.04 (0.58)			
REC6.59	-0.08 (0.31)				-0.21 (0.15)				0.00 (0.62)				-0.01 (0.62)				-0.04 (0.58)			
lnSIZE	-0.10* (0.00)	-0.07* (0.00)	-0.07* (0.00)	-0.07* (0.00)	-0.16* (0.00)	-0.13* (0.00)	-0.12* (0.00)	-0.13* (0.00)	0.00 (0.43)				0.00 (0.55)				0.00 (0.91)			
GROWTH	0.04 (0.84)				0.22 (0.53)				0.02 (0.23)	0.03* (0.02)	0.04* (0.01)	0.03* (0.02)	0.09* (0.02)	0.12* (0.00)	0.12* (0.00)	0.12* (0.00)	0.41* (0.03)	0.51* (0.00)	0.51* (0.00)	0.51* (0.00)
BLOCK	0.17 (0.22)				0.46† (0.07)		0.43* (0.05)		0.01 (0.37)				0.02 (0.28)				-0.03 (0.83)			
VOL	-0.59† (0.09)	-0.83* (0.01)	-0.83* (0.01)	-0.83* (0.01)	-0.56 (0.39)				-0.04 (0.16)				-0.04 (0.44)				-0.01 (0.99)			
BETA	-0.34* (0.00)	-0.37* (0.00)	-0.37* (0.00)	-0.37* (0.00)	-0.22 (0.25)				-0.01 (0.37)				0.00 (0.82)				-0.10 (0.35)			
MDAX	-0.18† (0.08)				-0.26 (0.17)				-0.01 (0.33)				0.00 (0.84)				0.11 (0.24)	0.16* (0.00)	0.16* (0.00)	0.16* (0.00)
TECDAX	-0.28† (0.05)				-0.56* (0.03)	-0.50* (0.00)	-0.43* (0.01)	-0.50* (0.00)	0.00 (0.89)				0.01 (0.74)				0.02 (0.86)			
Adj. R²	0.37	0.39	0.39	0.39	0.18	0.16	0.20	0.16	0.03	0.09	0.06	0.09	0.09	0.13	0.13	0.13	0.10	0.18	0.18	0.18
p-value of F	0.00*	0.00*	0.00*	0.00*	0.01*	0.00*	0.00*	0.00*	0.34	0.01*	0.01*	0.01*	0.11	0.00*	0.00*	0.00*	0.10†	0.00*	0.00*	0.00*
n	95	95	95	95	97	97	97	97	91	91	91	91	91	91	91	91	94	94	94	94
Exclusions	4	4	4	4	2	2	2	2	8	8	8	8	8	8	8	8	5	5	5	5

Notes: This table displays the results of a regression analysis of the following type of equation:

performance measure = all 11 GCGC recommendations + all control variables

The table reports the regression coefficient in the first row and in parentheses the p-value in the second row. Coefficients with a p-value better than 10% are marked with the cross symbol (†), coefficients with a p-value better than 5% with the asterisk symbol (*).The table only reports regressions in which the single GCGC recommendation possesses in at least one of the specifications a marginal significant (10% level) regression coefficient.

For each performance measure, four optimization tools of SPSS are employed: (1) The regression includes all regressors at once and the researcher selects the significant ones ("**Inclu**"). (2) SPSS analyzes the regressors stepwise and adds a variable to the set of independent variables provided it enhances the explanatory power of that set of independent variables by a pre-determined amount. Moreover, SPSS checks in each round whether the incumbent regressors should remain in the set of independent variables ("**Step**"). (3) SPSS begins with all regressors and excludes one after another all of the independent variables that do not contribute to the explanatory power in a pre-determined amount ("**Back**"). (4) The same as procedure (2) with the exception that SPSS does not test whether incumbent regressors should remain in the set of independent variables ("**For**").

Observations with absolute values of the standardized residual above 3 or Cook's Distance values above .2 are usually excluded from that particular analysis, provided the high value is not due to a data error, which can be corrected. The variables are defined in Table 3 and Table 6.

Table 9. Survey of Regression Results for Single GCGC Recommendations

Short Cut	Recomendation Number	Recommendation	Compliance Rate	lnQ_ia	lnMTB_ia	ROA_ia	ROE_ia	SR_ia
REC2.7	3.8.0.3	If the company takes out a D&O (directors and officers' liability insurance) policy for the Management Board and Supervisory Board, a suitable deductible shall be agreed.	62%		-		-	
REC3.14	4.2.3.2.2	Compensation of the members of the Management Board: Stock options and comparable instruments shall be related to demanding, relevant comparison parameters.	88%	+	+			+
REC3.16	4.2.3.2.4	Compensation of the members of the Management Board: For extraordinary, unforeseen developments a possibility of limitation (Cap) shall be agreed for by the Supervisory Board.	87%	-	-			
REC3.21	4.2.4.2	With respect to the reporting of the compensation of the members of the Management Board in the Notes of the Consolidated Financial Statements: The figures shall be individualized.	50%					+
REC4.27	5.1.2.2.3	An age limit for members of the Management Board shall be specified.	90%			+		
REC4.35	5.4.1.1.2	For nominations for the election of members of the Supervisory Board, the international activities of the enterprise, potential conflicts of interest and an age limit to be specified for the members of the Supervisory Board shall be taken into account.	86%	-				
REC4.39	5.4.5.1.3	Compensation of the members of the Supervisory Board: Also to be considered here shall be the exercising of the Chair and Deputy Chair positions in the Supervisory Board as well as the chair and membership in committees.	87%			-	-	
REC4.40	5.4.5.2.1	Members of the Supervisory Board shall receive fixed as well as performance-related compensation.	78%					
REC4.41	5.4.5 (3) S.2	Also payments made by the enterprise to the members of the Supervisory Board or advantages extended for services provided individually, in particular, advisory or agency services shall be listed separately in the Notes of the Consolidated Financial Statements.	82%					
REC4.42	5.4.5 (3) S.1	The compensation of the members of the Supervisory Board shall be reported in the Notes of the Consolidated Financial Statements, subdivided according to components.	69%	+	+		+	
REC6.59	7.1.2 S.2	The Consolidated Financial Statements shall be publicly accessible within 90 days of the end of the financial year; interim reports shall be publicly accessible within 45 days of the end of the reporting period.	77%					

Notes: See notes for Table 6; the performance measures are defined in Table 3. The performance measure columns display the results of the regressions described in Table 7 and Table 8. + (-) indicates an at least marginally significantly (10% level) positive (negative) regression coefficient, a vacancy an insignificant regression coefficient.

Table 10. Regression Results for the Optimized Recommendation Sets

Variable	lnQ_ia						lnMTB_ia						ROA_ia						ROE_ia						SR_ia			
Constant	3.20* (0.00)	1.28* (0.00)	3.36* (0.00)	2.92* (0.00)	1.74* (0.00)	3.04* (0.00)	1.86 (0.20)	1.51* (0.00)	1.86 (0.25)	2.06 (0.19)	1.66* (0.00)	1.81 (0.29)	0.05 (0.25)	0.06 (0.67)	0.04 (0.35)	0.04 (0.37)	0.01 (0.20)	0.05 (0.32)	-0.04 (0.70)	0.02† (0.07)	-0.06 (0.59)	-0.03 (0.80)	0.01 (0.45)	-0.07 (0.54)	-0.68 (0.25)	-0.14 (0.19)	-0.35 (0.58)	0.26 (0.68)
GCGC_REC	-0.03* (0.02)						0.00 (0.86)						0.00 (0.24)						0.00 (0.62)						0.01 (0.23)			
GCGC_OPT		0.14* (0.00)		0.13* (0.00)				0.21* (0.00)		0.21* (0.00)				0.01† (0.07)		0.01† (0.07)				0.01* (0.01)		0.01* (0.01)				0.12* (0.00)		0.13* (0.00)
GCGC_REC w/o REC_OPT			-0.03* (0.02)	-0.03* (0.04)		-0.02 (0.15)			0.00 (0.87)	-0.01 (0.71)		0.00 (0.93)			0.00 (0.34)	0.00 (0.35)		0.00 (0.44)			0.00 (0.53)	0.00 (0.64)		0.00 (0.46)			0.01 (0.55)	-0.01 (0.52)
GCGC_OPTABS					-0.07† (0.05)	-0.04 (0.37)					-0.01 (0.87)	-0.01 (0.92)					-0.01 (0.12)	-0.01 (0.16)					0.00 (0.80)	0.00 (0.64)				
lnSIZE	-0.14* (0.00)	-0.12* (0.00)	-0.14* (0.00)	-0.12* (0.00)	-0.14* (0.00)	-0.14* (0.00)	-0.16* (0.00)	-0.15* (0.00)	-0.16* (0.00)	-0.15* (0.00)	-0.16* (0.00)	-0.16* (0.00)																
GROWTH													0.04* (0.01)	0.04* (0.01)	0.04* (0.01)	0.04* (0.01)	0.03* (0.01)	0.03* (0.02)	0.12* (0.00)	0.11* (0.00)	0.12* (0.00)	0.11* (0.00)	0.11* (0.00)	0.12* (0.00)	0.39* (0.03)	0.36* (0.04)	0.38* (0.04)	0.34* (0.05)
BLOCK	0.23* (0.05)	0.27* (0.02)	0.25* (0.03)	0.24* (0.03)	0.21† (0.07)	0.22† (0.06)	0.47* (0.04)	0.58* (0.01)	0.47* (0.04)	0.56* (0.01)	0.48* (0.03)	0.47* (0.04)	0.01 (0.28)	0.01 (0.11)	0.01 (0.27)	0.01 (0.16)	0.01 (0.19)	0.01 (0.24)										
VOL																			-0.03 (0.47)	-0.03 (0.37)	-0.03 (0.48)	-0.03 (0.42)	-0.03 (0.41)	-0.03 (0.48)				
BETA																									-0.11 (0.22)	-0.13 (0.14)	-0.10 (0.26)	-0.12 (0.15)
MDAX	-0.27* (0.00)	-0.13 (0.12)	-0.26* (0.00)	-0.19* (0.04)	-0.24* (0.01)	-0.26* (0.00)	-0.26 (0.13)	-0.21 (0.18)	-0.25 (0.13)	-0.22 (0.17)	-0.26 (0.13)	-0.26 (0.13)	0.00 (0.51)	0.00 (0.52)	0.00 (0.56)	0.00 (0.37)	0.00 (0.64)	0.00 (0.50)							0.10 (0.14)	0.12† (0.07)	0.09 (0.18)	0.11† (0.09)
TECDAX	-0.65* (0.00)	-0.52* (0.00)	-0.64* (0.00)	-0.58* (0.00)	-0.64* (0.00)	-0.66* (0.00)	-0.61* (0.01)	-0.66* (0.00)	-0.61* (0.01)	-0.67* (0.00)	-0.62* (0.01)	-0.62* (0.01)	0.00 (0.24)	0.00 (0.98)	0.00 (0.55)	0.00 (0.79)	0.00 (0.65)	0.00 (0.52)							0.05 (0.49)	0.06 (0.36)	0.04 (0.62)	0.05 (0.47)
Adj. R²	0.34	0.38	0.34	0.40	0.33	0.34	0.13	0.22	0.13	0.21	0.13	0.12	0.07	0.09	0.06	0.09	0.08	0.07	0.10	0.16	0.10	0.15	0.09	0.09	0.08	0.16	0.07	0.16
p-value of F	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.01*	0.05†	0.02*	0.06†	0.03*	0.04*	0.05†	0.01*	0.00*	0.01*	0.00*	0.01*	0.02*	0.03*	0.00*	0.05†	0.00*
n	93	93	93	93	93	93	98	98	98	98	98	98	91	91	91	91	91	91	91	91	91	91	91	91	93	93	93	93
Exclusions	7	7	7	7	7	7	2	2	2	2	2	2	9	9	9	9	9	9	8	8	8	8	8	8	6	6	6	6

Notes: This table displays the results of six regressions for each performance measure (the latter two not for SR_ia): performance measure = GCGC_REC + performance-measure-specific control variables

performance measure = REC_OPT(performance measure) + performance-measure-specific control variables

performance measure = GCGC_REC w/o REC_OPT(performance measure) + performance-measure-specific control variables

performance measure = REC_OPT(performance measure) + GCGC_REC w/o REC_OPT(performance measure) + performance-measure-specific control variables

performance measure = REC_OPTABS(performance measure) + performance-measure-specific control variables

performance measure = REC_OPTABS(performance measure) + GCGC_REC w/o REC_OPT(performance measure) + performance-measure-specific control variables

The table reports the regression coefficient in the first row and in parentheses the p-value in the second row. Coefficients with a p-value better than 10% are marked with the cross symbol (†), coefficients with a p-value better than 5% with the asterisk symbol (*).

Observations with absolute values of the standardized residual above 3 or Cook's Distance values above .2 are usually excluded from that particular analysis, provided the high value is not due to a data error, which can be corrected. The variables are defined in Table 3 and Table 6. The composition of the performance-measure-specific optimized sets of recommendations is as follows: **REC_OPT(lnQ_ia)**: REC3.14 – REC3.16 – REC4.35 + REC4.42; **REC_OPTABS(lnQ_ia)**: REC3.14 + REC3.16 + REC4.35 + REC4.42; **REC_OPT(lnMTB_ia)**: – REC2.7 + REC3.14 – REC3.16 + REC4.42; **REC_OPTABS(lnMTB_ia)**: REC2.7 + REC3.14 + REC3.16 + REC4.42; **REC_OPT(ROA_ia)**: REC4.27 – REC4.39; **REC_OPTABS(ROA_ia)**: REC4.27 + REC4.39; **REC_OPT(ROE_ia)**: – REC2.7 – REC4.39 + REC4.42; **REC_OPTABS(ROE_ia)**: REC2.7 + REC4.39 + REC4.42; **REC_OPT(SR_ia)**: REC3.14 + REC3.21; **REC_OPTABS(SR_ia)**: is not calculated because the recommendation sets with the appendix ABS are characterized by the fact that all relevant recommendations enter with a plus sign. Since the two relevant recommendations for REC_OPT(SR_ia) already enter the variable with a plus sign, REC_OPT(SR_ia) and REC_OPTABS(SR_ia) would be identical.

Table 11. Regression Results for the Optimized Recommendation Sets with Lagged Performance (Performance of 2003)

Variable	lnQ 1	lnQ 2	lnQ 3	lnQ 4	lnQ 5	lnQ 6	lnMTB 1	lnMTB 2	lnMTB 3	lnMTB 4	lnMTB 5	lnMTB 6	ROA 1	ROA 2	ROA 3	ROA 4	ROA 5	ROA 6	ROE 1	ROE 2	ROE 3	ROE 4	ROE 5	ROE 6	SR 1	SR 2	SR 3	SR 4
Constant	1.11† (0.08)	0.21 (0.37)	1.17* (0.09)	1.05 (0.12)	0.44 (0.13)	1.06 (0.15)	0.06 (0.96)	0.21 (0.65)	0.00 (1.00)	0.10 (0.94)	0.20* (0.72)	-0.03 (0.98)	0.03 (0.59)	0.00 (0.72)	0.02 (0.62)	0.02 (0.69)	0.00 (0.78)	0.03 (0.60)	-0.06 (0.53)	0.03* (0.03)	-0.09 (0.41)	-0.06 (0.59)	0.02 (0.42)	-0.10 (0.35)	-0.44 (0.45)	-0.09 (0.44)	-0.18 (0.78)	0.27 (0.67)
GCGC_REC	-0.01 (0.13)						0.00 (0.91)						0.00 (0.59)						0.00 (0.46)						0.01 (0.40)			
GCGC_OPT		0.08* (0.02)		0.08* (0.02)				0.09 (0.11)		0.09 (0.11)				0.01* (0.00)		0.01* (0.00)				0.02* (0.00)		0.02* (0.00)				0.10* (0.02)		0.10* (0.02)
GCGC_REC w/o REC_OPT			-0.01 (0.15)	-0.01 (0.18)		-0.01 (0.36)			0.00 (0.88)	0.00 (0.92)		0.00 (0.85)			0.00 (0.61)	0.00 (0.67)		0.00 (0.63)			0.00 (0.35)	0.00 (0.39)		0.00 (0.28)			0.00 (0.73)	-0.01 (0.57)
GCGC_OPTABS					-0.04 (0.23)	-0.02 (0.66)					0.00 (0.97)	-0.01 (0.90)					0.00 (0.76)	0.00 (0.79)					0.00 (0.74)	0.00 (0.50)				
Performance 2003	0.70* (0.00)	0.67* (0.00)	0.70* (0.00)	0.66* (0.00)	0.71* (0.00)	0.70* (0.00)	0.74* (0.00)	0.70* (0.00)	0.74* (0.00)	0.70* (0.00)	0.74* (0.00)	0.74* (0.00)	0.16* (0.00)	0.17* (0.00)	0.16* (0.00)	0.17* (0.00)	0.16* (0.00)	0.16* (0.00)	0.09* (0.00)	0.09* (0.00)	0.09* (0.00)	0.09* (0.00)	0.09* (0.00)	0.09* (0.00)	0.00 (0.93)	0.00 (0.88)	0.00 (0.95)	0.00 (0.89)
lnSIZE	-0.03 (0.12)	-0.02 (0.27)	-0.03 (0.13)	-0.03 (0.15)	-0.03 (0.15)	-0.03 (0.13)	-0.03 (0.53)	-0.03 (0.45)	-0.03 (0.52)	-0.03 (0.46)	-0.03 (0.52)	-0.03 (0.52)																
GROWTH													0.05* (0.01)	0.05* (0.00)	0.05* (0.01)	0.05* (0.00)	0.05* (0.01)	0.05* (0.01)	0.11* (0.00)	0.09* (0.01)	0.11* (0.00)	0.09* (0.01)	0.11* (0.00)	0.11* (0.00)	0.44* (0.04)	0.43* (0.04)	0.42† (0.05)	0.41† (0.05)
BLOCK	0.07 (0.45)	0.09 (0.29)	0.08 (0.38)	0.06 (0.46)	0.05 (0.56)	0.06 (0.50)	0.15 (0.40)	0.19 (0.27)	0.15 (0.40)	0.19 (0.27)	0.14 (0.41)	0.15 (0.40)	0.00 (0.72)	0.00 (0.81)	0.00 (0.71)	0.00 (0.87)	0.00 (0.80)	0.00 (0.74)										
VOL																			-0.02 (0.69)	-0.04 (0.32)	-0.02 (0.70)	-0.04 (0.38)	-0.02 (0.59)	-0.02 (0.67)				
BETA																									-0.13 (0.16)	-0.14 (0.12)	-0.13 (0.19)	-0.14 (0.14)
MDAX	-0.02 (0.77)	0.05 (0.47)	-0.02 (0.80)	0.02 (0.81)	-0.01 (0.91)	-0.02 (0.76)	0.11 (0.40)	0.12 (0.36)	0.11 (0.39)	0.12 (0.36)	0.11 (0.43)	0.11 (0.42)	0.00 (0.85)	0.00 (0.90)	0.00 (0.84)	0.00 (0.80)	0.00 (0.73)	0.00 (0.85)							0.09 (0.17)	0.10 (0.12)	0.08 (0.21)	0.10 (0.15)
TECDAX	-0.23* (0.03)	-0.17† (0.09)	-0.22* (0.04)	-0.21* (0.04)	-0.22* (0.04)	-0.23* (0.03)	-0.20 (0.32)	-0.24 (0.21)	-0.20 (0.31)	-0.23 (0.23)	-0.21 (0.32)	-0.21 (0.32)	0.00 (0.56)	0.00 (0.82)	0.00 (0.57)	0.00 (0.92)	0.00 (0.63)	0.00 (0.56)							-0.02 (0.83)	0.00 (0.99)	-0.03 (0.68)	-0.01 (0.85)
Adj. R²	0.64	0.65	0.63	0.63	0.63	0.63	0.57	0.58	0.57	0.57	0.57	0.56	0.25	0.33	0.25	0.32	0.25	0.24	0.23	0.31	0.24	0.31	0.23	0.23	0.18	0.12	0.18	0.17
p-value of F	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*	0.02*	0.00*	0.02*	0.00*
n	81	81	81	81	81	81	84	84	84	84	84	84	78	78	78	78	78	78	80	80	80	80	80	80	80	80	80	80

Notes: This table displays the results of six regressions for each performance measure (the latter two not for SR_ia):performance measure = GCGC_REC + performance measure 2003 + performance-measure-specific control variables

performance measure = REC_OPT(performance measure) + performance measure 2003 + performance-measure-specific control variables

performance measure = GCGC_REC w/o REC_OPT(performance measure) + performance measure 2003 + performance-measure-specific control variables

performance measure = REC_OPT(performance measure) + GCGC_REC w/o REC_OPT(performance measure) + performance measure 2003 + performance-measure-specific control variables

performance measure = REC_OPTABS(performance measure) + performance measure 2003 + performance-measure-specific control variables

performance measure = REC_OPTABS(performance measure) + GCGC_REC w/o REC_OPT(performance measure) + performance measure 2003 + performance-measure-specific control variables

The table reports the regression coefficient in the first row and in parentheses the p-value in the second row. Coefficients with a p-value better than 10% are marked with the cross symbol (†), coefficients with a p-value better than 5% with the asterisk symbol (*).

The variables are defined in Table 3 and Table 6. The composition of the performance-measure-specific optimized sets of recommendations is as follows: **REC_OPT(lnQ_ia)**: REC3.14 – REC3.16 – REC4.35 + REC4.42; **REC_OPTABS(lnQ_ia)**: REC3.14 + REC3.16 + REC4.35 + REC4.42; **REC_OPT(lnMTB_ia)**: – REC2.7 + REC3.14 – REC3.16 + REC4.42; **REC_OPTABS(lnMTB_ia)**: REC2.7 + REC3.14 + REC3.16 + REC4.42; **REC_OPT(ROA_ia)**: REC4.27 – REC4.39; **REC_OPTABS(ROA_ia)**: REC4.27 + REC4.39; **REC_OPT(ROE_ia)**: – REC2.7 – REC4.39 + REC4.42; **REC_OPTABS(ROE_ia)**: REC2.7 + REC4.39 + REC4.42; **REC_OPT(SR_ia)**: REC3.14 + REC3.21; **REC_OPTABS(SR_ia)**: is not calculated because the recommendation sets with the appendix ABS are characterized by the fact that all relevant recommendations enter with a plus sign. Since the two relevant recommendations for REC_OPT(SR_ia) already enter the variable with a plus sign, REC_OPT(SR_ia) and REC_OPTABS(SR_ia) would be identical.

Data sources for the performance data 2003: Capital market data come from Deutsche Börse AG, accounting data were collected from the corporations.

Sample: For each performance measure those cases are analyzed which enter the regression in Table 10. Missing data decrease the number of cases. To analyze a sample as close as possible to the sample examined without a lagged performance measure in Table 10, the thresholds for Cook's distance (.2) and the absolute value of the standardized residual (3.0) are relaxed to some extent while the requirements of regression analysis are still being met.