

# Corporate Governance and Firm Value: International Evidence\*

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## **Abstract**

In this paper, we investigate the relation between firm-level corporate governance and firm value in a large and previously unused dataset from Governance Metrics International (GMI) comprising 6,663 firm-year observations from 22 developed countries over the period from 2003 to 2007. Based on a set of 64 individual governance attributes we construct two alternative additive corporate governance indices with equal weights attributed to the governance attributes and one index which is derived from a principal component analysis. For all three alternative index constructs we find a strong and positive relation between firm-level corporate governance and firm valuation. In addition, we investigate the value relevance of governance attributes that document the companies' social behavior. Regardless of whether these attributes are considered individually or aggregated into indices and even when controlling for "standard" corporate governance attributes, we demonstrate that they have a significantly positive effect on firm value. Our findings are robust to alternative calculation procedures for the corporate governance indices and to alternative estimation techniques.

**Keywords:** Corporate governance, Firm valuation, Minimum standards, Principal component analysis, Corporate behavior

**JEL Classification:** G32, G34, G38

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## **1. Introduction**

Our paper contributes to the empirical literature on firm-level corporate governance and the valuation effect of corporate governance in an international context. Based on a new and previously unexplored dataset from Governance Metrics International (GMI), we empirically investigate the valuation effect of alternative governance indices, which are based on a large set of 64 individual governance attributes, in an international sample covering 22 developed countries around the world over the time period from 2003 to 2007.

There is a large body of literature which documents that the existence of specific corporate governance attributes is associated with a higher firm value (e.g., Yermack, 1996, Gompers et al., 2003, Cremers and Nair, 2005, Core et al., 2006, Chhaochharia and Grinstein, 2007, Dittmar and Mahrt-Smith, 2007, or Bebchuck et al., 2008). While much of this literature deals with specific aspects of corporate governance, such as ownership or board structure, part of the literature aggregates individual corporate governance attributes to corporate governance indices. For the U.S., a number of studies (e.g., Gompers et al., 2003; Bebchuck and Cohen, 2005; Bebchuck et al., 2008) have demonstrated the value-relevance of such governance indices aggregating a number of firm-level governance attributes. However, relatively few studies investigate the valuation impact of firm-level corporate governance practices in an international context, notable exceptions being La Porta et al. (2002), Klapper and Love (2004), Dittmar et al. (2003), Durnev and Kim (2005), Francis et al. (2005), or Doidge et al. (2007). However, these studies use data compiled by La Porta et al. (1998) on minority shareholder rights protection, CLSA (Credit Lyonnais Securities Asia) scores, whose usefulness has been questioned by Khanna et al. (2006) for example, or governance attributes related to disclosure only as measured by Standard & Poor's rankings. To overcome the problem of data availability, some studies use hand-collected datasets on the firms' corporate governance structure within one specific country based on survey results. For example,

Drobetz et al. (2004) document a positive relationship between governance practices and firm valuation for German public firms and Beiner et al. (2006) for a sample of Swiss firms.

With the emergence of more detailed information on firm-level corporate governance for large samples of firms from multiple countries, a new stream of research has emerged. Aggarwal et al. (2008), for example, use data from RiskMetrics (formerly Institutional Shareholder Service (ISS)) and compare the governance of non-U.S. firms with a matched set of U.S. firms and find that the valuation of non-U.S. firms falls as their governance index value decreases as compared to the governance index of matching U.S. firms. Bruno and Claessens (2007) also use ISS data and find that firm value depends on both country-level shareholder protection laws and firm-level corporate governance attributes. In addition, these relations are more pronounced in companies that depend on external financing. Chhaochharia and Laeven (2009), also using the ISS database, distinguish between governance attributes that are legally required and attributes that are adopted voluntarily and show that firms that voluntarily adopt a more rigorous corporate governance structure are rewarded with a positive effect on their firm value.<sup>1</sup>

We contribute to this literature on the valuation effect of firm-level corporate governance in an international context in at least three important ways. First, we use an alternative data source, Governance Metrics International (GMI), which has not yet been used to investigate the valuation effect of corporate governance. Our database covers 64 different governance attributes which are classified by GMI in six categories, namely board accountability, financial disclosure and internal control, shareholder rights, remuneration, market for control, and corporate behavior. In contrast to Aggarwal et al. (2008) and Bruno and Claessens (2007), who use purely cross-sectional datasets, and Chhaochharia and Laeven (2009), who use a three-year panel dataset, we use a five-year panel covering the time period

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<sup>1</sup> Aggarwal and Williamson (2006) and Brown and Caylor (2006) use the ISS database to construct governance indices for U.S. firms only and both find a positive relation between corporate governance and firm value.

from 2003 to 2007. The longer time period covered by our sample has two major advantages. First, our sample size is substantially larger than that of Aggarwal et al. (2008) and Bruno and Claessens (2007) and similar to that of Chhaochharia and Laeven (2009) even though our dataset does not include any U.S. firms which account for approximately 1,500 observations (20%) of Chhaochharia and Laeven's (2009) sample. Second, the longer time-series enables us to better investigate the dynamics of the relation between corporate governance and firm value. The second contribution is related to the construction of the governance index. Aggarwal et al. (2008) and Chhaochharia and Laeven (2009) first determine the number of governance attributes with data available for each firm-year observation, and then define the governance index as the percentage of attributes a particular company has in place. Besides using the procedure proposed by Aggarwal et al. (2008), we construct two additional and alternative indices. The first additional index employs a procedure similar to the one used by Aggarwal et al. (2008), but treats a governance attribute for which there is no information as if this attribute was not in place, instead of omitting such missing observations from the index construction. The second additional index is based on Larcker et al. (2007) and uses principal component analysis (PCA) to condense the information contained in the individual governance attributes into a smaller number of governance indices, whereas the weighting scheme is based on a statistical procedure instead of using arbitrarily chosen or equal weights. Our third contribution is to investigate whether there is also a valuation effect of specific governance attributes that document a company's social behavior. While a large number of different aspects of governance have already been studied in prior research, we are the first to explore whether a company's social behavior has an impact on firm value when standard corporate governance attributes are accounted for.

Our results indicate a strong and positive relation between firm-level corporate governance and firm valuation. These results are robust to alternative calculation procedures

for the corporate governance indices, a breakdown of the sample by calendar year, and alternative estimation techniques. To mitigate a potential omitted-variables bias and control for firm-specific unobservable heteroskedasticity, we estimate panel regressions including firm fixed effects. Alternatively, we control for the effect of unobserved variables that are constant over industries (instead of firms) as well as unobserved variables that are constant over time by including industry and year fixed effects. Moreover, we show that governance attributes documenting a company's behavior also have a significantly positive effect on firm value, regardless of whether these variables are studied individually or aggregated to governance indices. The value relevance of these attributes is also robust to controlling for the effect of standard corporate governance attributes, different approaches to index calculation and to different estimation techniques.

To release the assumption that all the unobserved heterogeneity that leads to the correlation between the corporate governance variables and the error term is constant over time, firms, or industries, we estimate a dynamic panel GMM estimator as proposed by Wintoki et al. (2008). This approach additionally alleviates the problem of slowly moving corporate governance indices over time which may render fixed effects techniques rather ineffective (e.g., Coles et al., 2006). The results turn out to be robust and indicate a causal link between our three alternative corporate governance indices and firm value.

The remainder of the paper is organized as follows. Section 2 describes the data, defines our variables, and explains the construction of our governance indices. Section 3 presents the main results. Section 4 contains robustness tests and extensions. Section 5 concludes.

## **2. Data and Variables**

In this section, we first describe the corporate governance data used in our study. We then show how we aggregate the individual governance attributes to construct different

corporate governance indices. Finally, we describe the financial data we use to construct the control variables used for the tests in the empirical section.

### *2.1 Firm-level data on corporate governance attributes*

We use firm-level data on corporate governance attributes provided by Governance Metrics International (GMI). GMI started providing data on firm-level governance in 2003. It collects data on both U.S. and non-U.S. firms fully covering the MSCI World and the MSCI EAFE Index. GMI produces a governance rating for the covered firms using a proprietary scoring algorithm. To construct these ratings (which are not used in this study), GMI gathers information on individual governance attributes. These individual governance attributes are used for the construction of our governance indices. The starting point of our sample are all 7,092 non-U.S. firm-year observations on over 2,300 firms over the full sample period from 2003 to 2007. The panel is unbalanced as the number of firms grows considerably over time (from 605 in 2003 to 2,215 in 2007). We drop countries with less than 10 firm-year observations in total (i.e., Argentina, Colombia, Czech Republic, Egypt, Hungary, Iceland, Israel, Jordan, Morocco, Pakistan, Peru, Philippines, Thailand, and Venezuela) as well as developing and emerging countries (i.e., Brazil, Chile, China, India, Indonesia, Malaysia, Mexico, Russia, South Africa, South Korea, Taiwan, and Turkey) as the valuation effect of firm-level corporate governance attributes may substantially differ between developed and developing countries. Klapper and Love (2004), for example, show that firm-level corporate governance matters more in countries with weak legal environments and argue that firms can partially compensate for ineffective laws and enforcement. These sample restrictions leave us with a sample of 6,663 firm-year observations. Table 1 shows the distribution of firm-year observations across the 22 countries included in our sample. We see that the countries with the largest number of firm-year observations are Japan (1,762), UK (1,407), and Canada (471) while Portugal and New Zealand (45) have the smallest number of firm-year observations.

We use a sample of 64 governance attributes that have been compiled by GMI. For each of these attributes, GMI assesses whether a firm attains a minimum level of implementation. The 64 attributes we consider are sub-categorized by GMI into 1) board accountability, 2) financial disclosure and internal control, 3) shareholder rights, 4) remuneration, 5) market for control, and 6) corporate behavior. Table 2 provides an overview of the 64 governance attributes and shows the percentage of firms meeting these criteria according to GMI's thresholds. There are various standards that are met by the majority of firms. For example, seven of the 20 attributes pertaining to board accountability are fulfilled by over 80 percent of the firms in our sample. These attributes are: board performance is periodically evaluated, the board or a committee is responsible for CEO succession planning, the company has not failed to adopt the recommendations of a majority-approved shareholder proposal, the company has a separated chairman and CEO, all board members attended at least 75% of the board meetings, the number of shares held by officers and directors has not decreased by 10% or more over the last year, and the board has more than five but less than 16 directors. For the attributes on financial disclosure and internal control, five of the eight attributes are met by more than 80% of the firms in our sample: the company has not had a material earnings restatement in the past three years, the company has not received a qualified audit opinion within the last two fiscal years, the company is not currently under investigation for accounting irregularities, someone other than senior management has the sole authority to hire the outside auditor, and the company did not pay its auditor less for audit related services than for other services. In the category shareholder rights attributes, more than 90% of the firms allow shareholders to convene an EGM with 10% or less of the shares requesting one and do not cap voting rights at a certain percentage. More than 90% of the firms included in our sample meet five of the 12 governance criteria on remuneration: the CEO is without an employment agreement that provides for guaranteed bonus payments, the CEO/managing director does not sit on the remuneration committee, the company has neither repriced

outstanding executive stock options nor used an option exchange program, and the dilution resulting from stock options that have been granted does not exceed 20%. For the governance attributes on the market for corporate control, there is only one attribute that more than 90% of the companies in our sample fulfill which is the absence of a shareholder rights plan ("poison pill"). Finally, for the attributes on corporate behavior, only two requirements (disclosure of a company's workplace safety record and disclosure of the company's policy regarding political donations) are met by less than 50%. A comparison of Table 2 with commensurate results from studies using the ISS database such as, for example, Aggarwal et al. (2008) reveals that the level of implementation of governance attributes is similar for the governance attributes provided by both data providers.

## *2.2 Corporate governance index construction*

We use all 64 individual governance attributes to construct three alternative corporate governance indices. As a first step, we assign a value of one to each governance attribute that a firm has in place and zero otherwise. Our first index, CGI1, is then simply calculated as the percentage of attributes a company has adopted (i.e., attributes which have been assigned a value of one). If a company satisfies all 64 attributes, CGI1 for this company would be equal to 100%. If the company does not provide information on an attribute, we eliminate this attribute from the computation of the index. The value of CGI1 can thus be regarded as the percentage of attributes that are not missing and that a company satisfies. This approach is the same as the one used by Aggarwal et al. (2008).

Our second index, CGI2, is built in the same way as CGI1, with the exception that we do not exclude missing attributes from the computation but give each missing attribute a score of 0, effectively treating it as if the company had not adopted the respective governance attribute (as opposed to simply not disclosing the information whether the attribute is adopted). Both CGI1 and CGI2 are additive indices, a feature common in the literature (see,

e.g., Gompers et al., 2003; Drobetz et al., 2004; Bebchuk and Cohen, 2005; Beiner et al., 2006; Bebchuk et al., 2008). Panel A of Table 3 provides information on the first two governance indices, CGI1 and CGI2. The empirical distributions of CGI1 and CGI2 are displayed in Figure 1. The means (medians) of CGI1 and CGI2 are 61.47 (60.71) and 53.32 (50.77), respectively, indicating a reasonably symmetric distribution. Figure 1 also reveals that there are substantial differences in corporate governance between the firms in our sample, regardless of which index we use. We thus conclude that our corporate governance proxies are selected and constructed in a way that leads to sufficient variance in the cross-section.

For our third alternative index construction, we follow Larcker et al. (2007) and apply principal component analysis (PCA) to condense the information contained in the governance attributes. PCA allows us to explore the unknown nature of the factor structure that is hidden behind our set of individual governance attributes. To enhance the interpretability of the PCA results, we use an oblique rotation that allows the principal components to be correlated. Larcker et al. (2007) argue that such a PCA-based governance index has considerably less measurement error than any individual corporate governance variable.

As PCA requires the availability of all governance attributes for one specific firm-year observation, we first reduce the number of governance attributes to a number which assures a sufficiently large sample size while including the presumably most important governance attributes. We choose the 17 governance attributes reported in Panel A of Table 4, resulting in 5,627 firm-year observations (4,630 in multivariate analyses). Applying PCA to the 17 governance attributes, we set CGI3 equal to the first principal component (which explains 16.4% of total variance in the governance attributes). Panel A of Table 3 provides summary statistics for CGI3.

In the robustness tests of Section 4, we will use alternative approaches to construct our PCA-based governance indices. In the first approach, we use the same 17 governance attributes as above but retain the first five components which jointly explain 51.3% of total variance in the original governance attributes. That is, we have five governance indices in the specific regression equation. In the second approach, used to enhance the interpretability of the results and to check for their robustness, we use a similar approach as Larcker et al. (2007) and associate with each component those governance attributes that have a factor loading in excess of 0.40 in absolute value. Instead of directly using the principal components as governance indices, we then follow Larcker et al. (2007) and construct governance indices (“construct scores”) by calculating equally weighted averages of standardized versions of the governance attributes with factor loadings in excess of 0.40 in absolute value. Since these alternative governance indices are weighted averages of standardized variables, their mean is equal to zero and the variance equal to one. Panel B of Table 4 reports the expected sign of the correlation between the principal components and firm value and the percentage of variance explained by each component and cumulatively. The expected sign is deviated from the signs and magnitudes of the factor loadings of the individual governance attributes in each component. For the governance indices directly based on the first five principal components, we sum all factor loadings over the 17 governance attributes and attribute a positive expectation for the principal components with a value larger than one (the sums of factor loadings for the five components are 0.24, 2.06, 1.96, 0.30, and 1.09, respectively). For the governance indices based on the equally weighted averages of the standardized attributes, we deviate the sign of the expected correlation from whether the sum of factor loadings in excess of 0.40 in absolute terms is larger than zero (larger than 0.5), smaller than zero (smaller than -0.5), or close to zero (between -0.5 and 0.5). However, as the importance of the individual attributes may differ substantially, lower sums of the factor loadings might nevertheless be associated with higher positive coefficients than higher sums with relatively less weights

attributed to the most important governance attributes. The factor loadings for the first five principal components are reported in Panel A of Table 4.

The third and fourth alternative approaches are identical to the first two approaches but are based on a larger set of 21 governance attributes. This set additionally includes dummy variables whether the company has not adopted a shareholder rights plan ("poison pill"), whether the CEO/managing director does not sit on the remuneration committee, whether the remuneration committee is wholly composed of independent board members, and whether the company has separated the chairman and CEO positions. The addition of these four governance attributes reduces the sample size in the multivariate analyses by 802 observations (17.3%) when directly using the principal components as governance indices. In contrast, when using the equally weighted average of the standardized versions of the governance attributes, which exhibit factor loadings in excess of 0.40 in absolute value in the first five principal components, as governance indices, the sample size remains unchanged.

### *2.3 Financial data*

We obtain the financial data for the companies included in our sample from Worldscope. We use Tobin's Q as our main performance measure. Following La Porta et al. (2000) and Doidge et al. (2004), we compute Tobin's Q as the sum of total assets less the book value of equity plus the market value of equity, divided by total assets. In the multivariate analysis, we use several control variables. We control for firm size by using the logarithm of total assets (LNTA). Further, and in accordance to prior work investigating the relation between corporate governance and firm value (e.g., see Aggarwal et al., 2008), we control for the past growth in sales over the last two years (PGSALES), the ratio of research and development expenditures to sales (RD/SALES), the ratio of cash to total assets (CASH/ASSETS), the ratio of capital expenditures to assets (CAPEX/ASSETS), the ratio of property-plants-equipment to sales (PPE/SALES), the ratio of earnings before interest and taxes to sales

(EBIT/SALES), leverage (LEVERAGE) defined as the ratio of total debt to total assets, a dummy variable whether the firm has American Depository Receipts (ADR) and the percentage of shares that are closely held (CLOSELY HELD). All variables are denoted in U.S. dollars. To address the problem of outliers and influential observations, we winsorize the variables PGSALES, PPE/SALES, and EBIT/SALES at the 1% and the 99% percentiles and restrict our sample to firm-years with a Tobin's Q of less than or equal to 6 and a LEVERAGE less than or equal to 1.<sup>2</sup> The summary statistics for Tobin's Q and all control variables are reported in Panel B of Table 3.

### **3. Valuation effect of main corporate governance indices**

In this section, we investigate the valuation effect of our alternative corporate governance indices in a multivariate framework. Specifically, we estimate panel regressions of Tobin's Q on our three alternative governance indices (CGI1, CGI2, and CGI3) and a set of control variables. The choice of control variables is based on Aggarwal et al. (2008). To control for firm size, we include the natural logarithm of total assets (LNTA). The ratio of property-plants-equipment to sales (PPE/SALES) is included as companies operating with higher (lower) proportions of fixed (intangible) assets may consider it less optimal to adopt a strict corporate governance practice due to less scope to misuse assets. We also control for the variables which are usually found to be associated with firm performance: the two-year growth of sales (PGSALES), the ratio of capital expenditures to assets (CAPEX/ASSETS), the ratio of R&D expenditures to sales (RD/SALES), the ratio of cash to total assets (CASH/ASSETS), the ratio of EBIT to sales (EBIT/SALES), leverage (LEVERAGE), and the percentage of shares that are closely held (CLOSELY HELD). Finally, empirical evidence suggests that companies which are cross-listed on a U.S. exchange are valued higher (Doidge

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<sup>2</sup> In unreported robustness tests, we find all our results to remain qualitatively unchanged when we omit the winsorization and sample restriction based on the Q- and LEVERAGE-values.

et al., 2004). Hence, we also include a dummy variable whether the firm has American Depository Receipts outstanding (ADR).

To eliminate a potential omitted-variables bias and control for the effect of unobserved variables that are constant over firms, we include firm fixed effects. We use Driscoll and Kraay (1998) standard errors, which are heteroskedasticity-consistent and robust to general forms of cross-sectional and temporal dependence.<sup>3</sup>

Columns 1 to 3 in Table 5 report the results for the three governance indices, CGI1, CGI2, and CGI3, respectively. Most importantly, the coefficients on all three governance indices are estimated positive and significant. Moreover, the coefficient estimates on the governance indices suggest that for the median company a one standard deviation increase in the corporate governance index is associated with an increase of the market capitalization by at least 4.2% (Column 1) of a company's book asset value. Hence, the valuation effect of corporate governance in our sample is comparable to that reported in Chhaochharia and Laeven (2009). Regarding the control variables, our findings largely correspond to those of Aggarwal et al. (2008) with four exceptions. First, the coefficient of RD/SALES is not significant in all three specifications. However, if we follow Aggarwal et al. (2008) and include industry fixed effects (as we do in Columns 4 to 6), the coefficient of RD/SALES turns positive and significant as well. Second, consistent with Aggarwal et al. (2008), the coefficients of PPE/SALES are negative. However, in Table 5 they are all significant at the 1% while being insignificant in Aggarwal et al. (2008). Third, the coefficient on LEVERAGE is in some specifications significantly negative whereas the estimations of Aggarwal et al. (2008) never show significant coefficients for LEVERAGE. Fourth, the coefficient on CLOSELY HELD is negative and significant in all three specifications. This finding contrasts

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<sup>3</sup> Driscoll and Kraay (1998) show that erroneously ignoring cross-sectional dependence in the estimation of linear panel models can lead to severely biased statistical inference. Moreover, Hoechle et al. (2008) show that the calendar time portfolio approach frequently employed in long-term event studies replicates the Driscoll and Kraay covariance matrix estimator for pooled OLS regressions by aid of a two-step procedure.

with Aggarwal et al. (2008) and earlier literature (e.g., La Porta et al., 1999; Stulz, 2005) and might be due to the relatively high mean (24%) and median (28%) values of closely held shares in our sample.<sup>4</sup> In their seminal paper, Morck et al. (1988) report a negative relationship between share ownership of the board of directors and firm value in the 5% to 25% ownership range and attribute these findings to a domination of the incentive alignment effect by the entrenchment effect. A similar effect might be at work for block ownership more generally in our sample.

Variations across countries have been shown to matter a lot for corporate governance (see e.g. Doidge et al., 2007). We aim to account for this fact in two ways. First, in Columns 4 to 6 of Table 5, we control for country-specific instead of firm-specific unobservable heteroskedasticity. In addition, we include industry and year fixed effects. Second, in Columns 7 and 8, we follow Chhaochharia and Laeven (2009) and adjust the CGI scores by subtracting the number of governance attributes that every firm of a country fulfills in a given year from the number of attributes a firm has in place. Doing so enables us to focus on changes in the governance scores which are truly firm-specific and not influenced by country-specific differences in legal regimes. For the PCA-based CGI3, such an adjustment is not possible. The results in Columns 4 to 8 show that these alternative specifications leave the results of Columns 1 to 3 qualitatively unchanged. Most importantly, the coefficients on the governance indices all remain positive and significant. The only notable change in the control variables is that the coefficient on RD/SALES turns positive and significant when country dummy variables are included (Columns 4 to 6).

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<sup>4</sup> Unfortunately, Aggarwal et al. (2008) do not report descriptive statistics for closely held shares and therefore we cannot compare the distribution of the variable between the two samples.

## **4. Robustness Tests and Extensions**

### *4.1 Robustness of main results*

In our first set of robustness tests, we analyze our sample on a year-by-year basis and for the five countries with the most firm-year observations. The results are reported in Table 6 and show that the positive effect of corporate governance on firm value in general remains significant both over time and if we restrict our sample to specific countries. The two exceptions are the analysis for 2003 (Column 1) and Japan (Column 6). The insignificant coefficient on CGI1 in Column 1 might be related to the relatively small sample size as compared to the four subsequent years. As for Japan, Japanese corporate governance is well-known to differ from that in other countries (e.g., La Porta et al., 2000). Hence, it is not surprising that our results show no relation between our governance indices and firm value in Japan. To save space, we only report the results for regressions including CGI1. However, all results reported in Table 6 remain qualitatively unchanged when CGI1 is replaced by CGI2 or CGI3. For Canada, we excluded the control variable CASH/ASSETS since Worldscope's coverage of this variable for Canadian firms is very poor, leading to a reduction in the sample size by about 60%.

Table 7 reports the results on different variants of our PCA-based corporate governance indices. In Column 1, we apply exactly the same procedure as we did to obtain CGI3 but include the first five principal components as governance indices. In Columns 2 and 3 we follow an approach similar to Larcker et al. (2007) by associating with each component the governance attributes with a factor loading in excess of 0.40 in absolute value and building equally weighted averages of the standardized versions of the respective governance variables. In Columns 4 and 5, we report the results from regressions including governance indices which correspond to the first (Column 4) and the first five (Column 5) principal components based on the larger set of 21 governance attributes. Finally, Columns 6 and 7 report the results

from estimating regressions including the same PCA-based governance indices as in Columns 2 and 3, but again based on the set of 21 instead of 17 governance attributes. Most importantly, the results in Table 7 show that the significantly positive effect of corporate governance on firm value is robust to the alternative specifications of the PCA-based governance indices – at least for the governance indices which are based on the first, second and fourth principal components.

#### *4.2 Endogeneity*

Endogeneity has become a crucial issue in investigating the effects of corporate governance on firm value. Recent papers additionally argue that such endogenous relations may be dynamic (e.g., Wintoki et al., 2008). Hermalin and Weisbach (2004) and Wintoki et al. (2008) argue that current actions of a firm affect future corporate governance as well as performance, which will in turn affect the firms' future actions.

To control for such a dynamic endogeneity, unobservable heterogeneity, and simultaneity, we follow Wintoki et al. (2008) and use the dynamic panel GMM estimator as proposed by Arellano and Bover (1995) and Blundell and Bond (1998). The estimation consists of the following three steps: First, we rewrite the regression equation as a dynamic model that includes lagged performance as an explanatory variable. Second, we first difference all variables. This controls for unobserved heterogeneity and eliminates a potential omitted variables bias. Third, we estimate the model by GMM and use lagged values of the governance indices and performance as instruments. Using lagged variables as instruments for the present values of these variables controls for potential simultaneity and reverse causality. In addition, this estimation procedure allows all the explanatory variables (i.e., the governance indices and all control variables) to be treated as endogenous.<sup>5</sup>

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<sup>5</sup> Many papers in the literature use either instrumental variables approaches or panel regression techniques such as firm and year fixed effects regressions. However, instrumental variables approaches are problematic because of a lack of suitable instruments for corporate governance (e.g., Larcker et al., 2007). Fixed effects regressions

The results are reported in Table 8 and indicate that the coefficients on all three alternative governance indices remain positive and statistically significant at the 5% level or better. These results alleviate endogeneity concerns and provide evidence of a causal link between our corporate governance indices and firm value.

#### *4.3 Corporate behavior*

Using GMI's dataset on governance variables enables us to investigate the value of corporate behavior attributes such as for example whether the company discloses its policy regarding corporate level political donations or whether the company has been charged with workplace safety violations. Such "soft" factors have not yet been included in the previous literature on corporate governance and firm value. Even though some research exists on some specific aspects of corporate behavior (e.g., Desai and Dharmapala, 2008), to the best of our knowledge, no previous work has considered multiple attributes in a way we do in this study. To investigate the value impact of corporate behavior, we first aggregate the nine variables pertaining to GMI's corporate behavior category to an index. Similar as for the corporate governance index, we construct three different indices. The first index, entitled CGI\_CB, is constructed in the same way as CGI2, namely by dividing the number of attributes a company has adopted by the total number of corporate behavior attributes. This index construction treats missing attributes as if these attributes were not adopted. The second index, CGI\_CB\_PCA, is constructed in the same way as CGI3 by employing principal component analysis and using the first principal component as the governance index. The third index, CGI\_CB\_ADJ is equal to CGI\_CB but adjusted according to Chhaochharia and Laeven (2009) by subtracting the number of governance attributes that every company in a given country fulfills in a given year. To investigate the possible relation between corporate behavior and firm value, we re-estimate the main regression specification of Table 5 and

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are rather ineffective as corporate governance moves slowly over time and the time series dimension of the datasets is usually short (Coles et al., 2006).

replace the original governance indices by the corporate behavior indices. To eliminate potentially spurious regression results by simply picking up the effect of corporate governance, we control for the “standard” corporate governance attributes by including the additional control variable CGI\_CB\_CONTR, which is an auxiliary governance index constructed in the same way as CGI2 but excluding the nine corporate behavior attributes. The results are reported in Columns 1 to 3 of Table 9 and show a significant and robust positive effect of good corporate behavior on firm value for all three alternative corporate behavior indices. Moreover, the relation between the governance control index, CGI\_CB\_CONTR, and firm value remains positive and highly significant. Again, these findings are robust to alternative estimation techniques. For example, when we re-estimate Columns 1 to 3 but include country, industry, and year fixed effects, the relationship between the corporate behavior index and Tobin’s Q remains positive and significant (see Columns 4 and 5).

#### *4.4 Individual governance attributes*

So far, we have focused on governance indices and their value impact. However, academic studies, the regulatory bodies, and the press at large generally pay more attention to individual governance attributes than to an aggregate of attributes. In addition, it is potentially interesting and revealing to learn which specific attributes are significantly related to firm value and thereby contribute to the positive valuation effect of the governance indices. Hence, in this section, we investigate the relation between two different subsets of individual governance attributes and firm value. First, we include the 17 variables contained in our main PCA-based governance index, CGI3. The second subset consists of our nine corporate behavior attributes. Panel A of Table 10 lists the 17 individual governance attributes, Panel B of Table 10 the nine corporate behavior attributes. We investigate the valuation effect of the individual corporate governance and corporate behavior attributes based on similar fixed

effects regressions as reported in Column 1 of Table 5. In Column 1 of Table 10, we include each governance / corporate behavior attribute separately – along with the set of control variables. In Column 2, we additionally include the remaining 16 / 9 individual governance attributes as control variables. In Panel B, we also include CGI\_CB\_CONTR to control for the effect of corporate governance on firm value.

The results in Panel A show that some of the included attributes have a significantly positive effect on firm value, regardless of whether they are included individually in the regression or whether they are included jointly with the other 16 attributes. Most importantly, board size, a dummy variable whether a company has received a qualified audit opinion, a dummy variable whether a company has a one-share-one-vote policy, a dummy variable whether shareholders have the right to convene an EGM, and a dummy variable whether the audit committee is wholly composed of independent members are all positive and significant at the 5% level or better. In contrast, not requiring a supermajority to approve a merger has a negative effect on firm value. Many of these results confirm earlier findings in the literature, for example on board size (e.g., Yermack, 1996) and audit committee composition (Chan and Li, 2008).

In Panel B of Table 10, we find that four corporate behavior attributes have a positive effect on firm value, regardless of whether they are included individually in the regression or whether they are regressed jointly along with the other eight attributes. These attributes include dummy variables whether the company discloses its workplace safety record, if regulatory investigation for a material issue other than accounting irregularities are is under way, if the company discloses its policy regarding corporate level political donations, and if the company has not been charged with workplace safety violations. These results provide further validation of our finding that governance attributes describing certain behavioral aspects of a company have a strong positive effect on firm value even when standard

governance attributes are accounted for, a relationship that has not been investigated or documented in the literature to date.

## **5. Conclusions**

In this paper, we investigate the effect of firm-level corporate governance on firm value using a previously unused dataset by Governance Metrics International (GMI) which covers 64 individual corporate governance attributes on over 2,300 firms from 22 developed countries over a five-year time period from 2003 to 2007. We aggregate the 64 governance attributes to governance indices using different techniques. First, based on related previous work (e.g., Aggarwal et al., 2008), we construct additive indices. Second, we use principal component analysis (PCA) to extract governance indices from the 64 attributes. Moreover, we specifically investigate whether governance attributes that reflect a company's social behavior also affect firm value.

We find a strong and positive relation between firm-level corporate governance and firm valuation and between a company's social behavior and firm value. These results are robust to the different techniques used to construct the corporate governance indices, a breakdown of the sample by both calendar year and country, and alternative estimation techniques, including various fixed effects specifications and a dynamic panel GMM estimator.

Our results indicate that better corporate governance practices are reflected in statistically and economically significantly higher market values. Hence, at least for the average firm in our sample, the costs of the implementation of the corporate governance mechanisms seem to be smaller than the monitoring benefits resulting in higher cash flows accruing to investors and lower costs of capital for the firms. Consequently, from the companies' perspective, corporate governance should be understood as an opportunity rather than an obligation and pure cost factor.

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**Table 1: Overview of countries included in the sample**

Country	Observations	% of sample
Australia	419	6.29%
Austria	56	0.84%
Belgium	90	1.35%
Canada	471	7.07%
Denmark	80	1.20%
Finland	92	1.38%
France	344	5.16%
Germany	337	5.06%
Greece	88	1.32%
Hong Kong	203	3.05%
Ireland	61	0.92%
Italy	201	3.02%
Japan	1,762	26.44%
Netherlands	147	2.21%
New Zealand	45	0.68%
Norway	57	0.86%
Portugal	45	0.68%
Singapore	208	3.12%
Spain	173	2.60%
Sweden	194	2.91%
Switzerland	183	2.75%
UK	1,407	21.12%
Total	6,663	100%

The table reports the number of observations (Observations) and the percentage each country accounts for in the full sample (% of sample) for each country covered in the study. The total sample consists of 6,663 firm years. We drop countries for which we have less than 10 firm-year observations (i.e., Argentina, Colombia, Czech Republic, Egypt, Hungary, Iceland, Israel, Jordan, Morocco, Pakistan, Peru, Philippines, Thailand, and Venezuela) and emerging and developing countries (i.e., Brazil, Chile, China, India, Indonesia, Malaysia, Mexico, Russia, South Africa, South Korea, Taiwan, and Turkey).

**Table 2: Firms meeting requirements for governance attributes**

Individual governance attribute	% of firms meeting attributes
<b>Board Accountability</b>	
1. Board members are subject to annual election by all shareholders	22.2%
2. Non-executive board members have a formal session without executives once a year	55.3%
3. Board performance is periodically evaluated	86.2%
4. Company discloses a code of ethics for senior executives	45.3%
5. Company discloses its corporate governance policies or guidelines	64.2%
6. Board or a committee is responsible for CEO succession planning	82.8%
7. Company has not failed to adopt the recommendations of a shareholder proposal	99.8%
8. All executive board members own shares after excluding options held	73.1%
9. All non-executive board members own shares after excluding options held	37.5%
10. Company has a separated chairman and CEO	86.0%
11. All members attended at least 75% of the board meetings	80.5%
12. Company has a designated "lead" or senior non-executive board member	28.5%
13. There have been no related-party transactions in the past three years	50.0%
14. The governance/nomination committee is composed of independent board members	20.9%
15. No former CEO of the company serves on the board	72.2%
16. Nr. of shares held by officers and directors has not decreased by 10% or more	84.2%
17. Nr. of shares held by officers and directors has increased by 10% or more	26.0%
18. Governance/nomination committee has a written charter or terms of reference	50.6%
19. Board size is greater than five but less than 16	80.5%
20. Board is controlled by more than 50% of independent outside directors	40.7%
<b>Financial Disclosure and Internal Control</b>	
21. Company has not had a material earnings restatement in the past three years	98.3%
22. Audit committee has a written charter or terms of reference	63.9%
23. Company has not received a qualified audit opinion within the last two fiscal years	99.4%
24. Company is not currently under investigation for accounting irregularities	98.8%
25. Audit committee is wholly composed of independent board members	43.8%
26. Someone other than senior management with sole authority to hire outside auditor	85.1%
27. Audit committee with sole authority to approve non-audit services from outside auditor	41.9%
28. Company did not pay its auditor less for audit related services than for other services	84.4%
<b>Shareholder Rights</b>	
29. Vote results for the last shareholder meeting are disclosed within 14 calendar days	78.5%
30. All common or ordinary equity shares have one-share, one-vote, with no restrictions	68.0%
31. The company provides confidential voting with no or with reasonable exceptions	50.5%
32. Shareholders have a right to convene an EGM with 10% or less of the shares requesting one	90.8%
33. Shareowners have a right to act in concert through written communication	17.6%
34. Voting rights are not capped at a certain percentage	95.4%
<b>Remuneration</b>	
35. Non-executive board members paid in cash and some form of stock-linked compensation	18.1%
36. Company discloses performance targets for the next fiscal year	31.1%
37. Non-executive board members are paid entirely in some form of stock-linked compensation	0.5%
38. CEO without an employment agreement that provides for guaranteed bonus payments	97.9%
39. Goals used to determine incentive awards are aligned with the company's financial goals	44.7%
40. CEO/Managing Director does not sit on the remuneration committee	94.9%
41. Remuneration committee is wholly composed of independent board members	35.9%
42. No repricing of outstanding executive stock options and no option exchange program	98.9%
43. Expensing of employee stock option grants	35.5%
44. Remuneration committee has a written charter or terms of reference	56.4%

45. Potential Dilution from Stock Options Outstanding is below 20%	99.8%
46. Potential Dilution from Stock Options Outstanding + not yet granted is below 20%	99.5%
<b>Market for Control</b>	
47. Company has not adopted a shareholder rights plan ("poison pill")	96.3%
48. Company does not have a staggered ("classified") board	51.4%
49. Company cannot issue blank check preferred stock in the event of a hostile tender offer	89.5%
50. Company's shareholder rights plan ("poison pill") has been ratified by a shareholder vote	3.4%
51. Fair price provision in place or price protection under applicable law	69.9%
52. Shareholder rights plan includes a TIDE provision or a three-year sunset provision	1.1%
53. Company does not require a supermajority vote to approve a merger	42.7%
54. No single shareholder or shareholder group whitt majority of voting power	81.3%
55. Company allows cumulative voting in the election of directors	3.8%
<b>Corporate Behavior</b>	
56. The company have a policy addressing workplace safety	86.0%
57. Company does not have pending criminal litigation against it	96.4%
58. No allegation that the company used sweat shops within the last three years	99.8%
59. Company discloses its environmental performance	52.2%
60. Company discloses its workplace safety record	34.7%
61. No regulatory investigation for a material issue other than for accounting irregularities	91.9%
62. Company discloses its policy regarding corporate level political donations	27.5%
63. Company has not been charged with workplace safety violations within the last two years	98.7%
64. It has not been alleged by a responsible party that the company used child labor	99.7%

The table displays the 64 governance attributes of our sample grouped by the six sub-categories: Board Accountability, Financial Disclosure and Internal Control, Shareholder Rights, Remuneration, Market for Control and Corporate Behavior. For each governance attribute we report the percentage of firms in our sample that meet the respective criteria associated with this attribute. The sample consists of 6,663 firm years.

**Table 3: Summary statistics of corporate governance indices and control variables**

<i>Panel A: Corporate governance indices</i>						
Variable	Obs.	Mean	Median	Std. Dev.	Min	Max
CGI1	6,663	61.47	60.71	11.12	25.00	89.06
CGI2	6,663	53.32	50.77	13.31	16.92	87.69
CGI3	5,627	44.33	47.10	24.04	0.00	100.00

<i>Panel B: Financial data</i>						
Variable	Obs.	Mean	Median	Std. Dev.	Min	Max
Q	6,663	1.59	1.32	0.78	0.54	5.95
LNTA	6,663	8.84	8.57	1.69	4.80	15.14
PGSALES	6,581	0.37	0.25	0.57	-0.57	3.61
RD/SALES	6,647	0.02	0.00	0.06	0.00	2.32
CASH/ASSETS	5,879	0.08	0.05	0.09	0.00	0.83
CAPEX/ASSETS	6,594	0.05	0.04	0.06	0.00	1.64
PPE/SALES	6,541	0.94	0.28	2.30	0.00	14.84
EBIT/SALES	6,604	0.21	0.12	0.30	0.00	1.88
LEVERAGE	6,663	0.59	0.60	0.23	0.00	0.99
ADR	6,663	0.26	0.00	0.44	0.00	1.00
CLOSELY HELD	6,343	0.28	0.24	0.22	0.00	100.00

The table provides summary statistics for the corporate governance indices (Panel A) and the financial data used in the analysis (Panel B). CGI1 denotes the governance index constructed in the same way as Aggarwal et al. (2008), namely by dividing the governance attributes a company fulfills by the number of governance attributes a company reports data for. CGI2 denotes the governance index constructed in the same way as CGI1 but with missing attributes treated as if these attributes were not fulfilled. CGI3 denotes the governance index constructed by means of principal component analysis (PCA). Q denotes Tobin's Q and is computed as the sum of total assets less the book value of equity plus the market value of equity, divided by total assets, LNTA denotes the logarithm of total assets, PGSALES denotes the two-year growth of sales, RD/SALES denotes the ratio of expenditures for research and development to sales, CASH/ASSETS denotes the ratio of cash to total assets, CAPEX/ASSETS denotes the ratio of capital expenditures to assets, PPE/SALES denotes the ratio of property-plants-equipment to sales, EBIT/SALES denotes the ratio of earnings before interest and taxes to sales, LEVERAGE denotes the ratio of total debt to total assets, ADR is a dummy variable which equals 1 if the firm has American Depository Receipts (ADR) and 0 otherwise, CLOSELY HELD is the percentage of closely held shares.

**Table 4: Corporate governance indices based on principal component analysis (PCA)**

<i>Panel A: Factor loadings for the first five principal components</i>	PC1	PC2	PC3	PC4	PC5
Company has a designated "lead" or senior non-executive board member	-0.2253	0.2489	-0.0012	0.1867	0.1492
No former CEO of the company serves on the board	0.0625	0.1198	<b>0.4759</b>	-0.3088	0.1989
Board size is greater than five but less than 16	0.1650	0.2192	0.1526	0.0046	<b>0.4400</b>
Company has not had a material earnings restatement in the past three years	-0.1378	-0.1373	0.2565	-0.1126	-0.0109
Company has not received a qualified audit opinion within the last two fiscal years	-0.0090	-0.0184	-0.0936	0.1870	0.0133
Board members are subject to annual election by all shareholders	<b>0.5902</b>	0.1230	0.0751	0.1479	0.0572
No single shareholder or shareholder group with majority of voting power	-0.1749	-0.0382	<b>0.4334</b>	0.1720	<b>-0.4310</b>
All common or ordinary equity shares have one-share, one-vote, with no restrictions	-0.2124	0.3507	-0.1886	-0.1457	0.0031
Company discloses its corporate governance policies or guidelines	-0.0902	<b>0.4322</b>	-0.1441	-0.0817	-0.0113
Voting rights are not capped at a certain percentage	-0.0869	-0.1197	0.0199	0.0557	<b>0.6963</b>
Company allows cumulative voting in the election of directors	0.0203	-0.0117	0.0640	<b>-0.6152</b>	0.0376
Shareholders have a right to convene an EGM	0.1002	0.0003	0.0919	<b>0.5708</b>	0.1040
Company does not have a staggered ("classified") board	<b>0.4702</b>	-0.1268	-0.0728	-0.0440	-0.0623
Company does not require a supermajority vote to approve a merger	<b>-0.4474</b>	0.0376	0.1111	0.1627	0.1131
Audit committee is wholly composed of independent board members	0.0267	<b>0.4989</b>	0.0609	0.0693	-0.0108
There have been no related-party transactions in the past three years	0.0254	-0.0154	<b>0.6183</b>	0.0438	0.0018
Board is controlled by more than 50% of independent outside directors	0.1619	<b>0.4991</b>	0.0961	0.0119	-0.2030
<i>Panel B: Expected correlation with firm value and variance explained</i>					
Expected correlation with firm value (principal components)	?	+	+	?	+
Expected correlation with firm value (equally weighted averages of standardized governance attributes with factor loadings in excess of 0.40 in absolute value)	+	+	+	?	+
Variance explained by principal component	0.1636	0.1260	0.0789	0.0772	0.0668
Variance explained by principal component (cumulative)	0.1636	0.2896	0.3685	0.4457	0.5125

Panel A of the table reports the factor loadings of the 17 governance attributes included in the principal components analysis (PCA) for the first five principal components. These five principal components are used as corporate governance indices (CGI\_PCA17\_1 (= CGI3) to CGI\_PCA17\_5). Figures in bold print exhibit factor loadings in excess of 0.40 in absolute terms. To construct a set of alternative PCA-based governance indices, we follow the approach proposed by Larcker et al. (2007) and calculate the equally weighted averages of standardized versions of the governance attributes with factor loadings in excess of 0.40 in absolute terms. Panel B reports the expected sign of the correlation between the PCA-based governance indices and firm value. The expected sign is deviated from the signs and magnitudes of the factor loadings of the individual governance attributes in each component. For the governance indices directly based on the first five principal components, we sum all factor loadings over the 17 governance attributes and attribute a positive expectation for the principal components with a value larger than one (the sums of factor loadings for the five components are 0.24, 2.06, 1.96, 0.30, and 1.09, respectively). For the governance indices based on the equally weighted averages of the standardized attributes, we deviate the sign of the expected correlation from whether the sum of factor loadings in excess of 0.40 in absolute terms is larger than zero (larger than 0.5), smaller than zero (smaller than -0.5), or close to zero (between -0.5 and 0.5).

**Table 5: Fixed effects regressions of Tobin's Q on alternative governance indices and control variables**

Dependent Variable: Tobin's Q	Standard Specification			Country, Industry and Year FE			Country-Adjusted CGI	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	2.827 *** (18.755)	3.128 *** (24.855)	3.155 *** (17.759)	1.718 *** (15.239)	1.578 *** (28.215)	2.057 *** (40.397)	2.799 *** (26.272)	3.076 *** (28.324)
CGI1	0.005 ** (2.039)			0.006 *** (3.208)			0.013 *** (20.85)	
CGI2		0.011 *** (14.859)			0.009 *** (72.923)			0.011 *** (16.218)
CGI3			0.045 *** (6.394)			0.025 ** (2.087)		
LNTA	-0.195 *** (-5.721)	-0.288 *** (-14.440)	-0.198 *** (-9.668)	-0.174 *** (-12.810)	-0.18 *** (-15.629)	-0.172 *** (-23.032)	-0.269 *** (-14.248)	-0.286 *** (-14.570)
PGSALES	-0.002 (-0.154)	0.011 (0.912)	-0.027 * (-1.878)	0.104 *** (8.562)	0.106 *** (8.414)	0.09 *** (4.438)	0.009 (0.825)	0.012 (1.069)
RD/SALES	-0.044 (-0.162)	-0.094 (-0.354)	0.125 (0.761)	1.12 *** (2.846)	1.105 *** (2.834)	0.99 *** (3.429)	-0.079 (-0.294)	-0.09 (-0.337)
CASH/SALES	0.345 *** (3.738)	0.334 *** (4.238)	0.271 *** (3.361)	1.42 *** (18.000)	1.412 *** (18.601)	1.38 *** (19.852)	0.352 *** (4.605)	0.34 *** (4.486)
CAPEX/ASSETS	0.532 *** (4.922)	0.446 *** (5.984)	0.603 *** (4.004)	0.932 *** (-3.333)	0.922 *** (3.227)	0.952 *** (3.301)	0.475 *** (5.707)	0.447 *** (6.232)
PPE/SALES	-0.052 *** (-11.574)	-0.044 *** (-18.490)	-0.049 *** (-11.578)	-0.068 *** (-27.160)	-0.067 *** (-27.656)	-0.067 *** (-42.662)	-0.046 *** (-17.393)	-0.044 *** (-18.576)
EBIT/SALES	0.218 *** (5.721)	0.192 *** (6.014)	0.174 *** (6.833)	0.485 *** (7.809)	0.491 *** (7.805)	0.455 *** (10.958)	0.196 *** (5.98)	0.191 *** (5.926)
LEVERAGE	-0.187 *** (-3.419)	-0.011 (-0.128)	-0.096 * (-1.747)	0.117 *** (3.127)	0.125 *** (3.249)	0.179 *** (5.005)	-0.054 (-0.770)	-0.015 (-0.192)
ADR	1.036 *** (8.209)	1.477 *** (13.321)	1.02 *** (9.98)	0.161 *** (25.726)	0.152 *** (29.582)	0.17 *** (32.149)	1.416 *** (12.641)	1.466 *** (13.154)
CLOSELY HELD	-0.001 *** (-3.345)	-0.001 *** (-2.584)	-0.001 *** (-4.134)	0.002 *** (4.936)	0.002 *** (4.769)	0.001 *** (2.826)	-0.001 ** (-2.554)	-0.001 *** (-2.618)
R-squared (within)	0.057	0.099	0.059	-	-	-	0.091	0.100
R-squared	-	-	-	0.304	0.307	0.293	-	-
Firms	1,625	1,625	1,497	1,625	1,625	1,497	1,625	1,625
Observations	5,453	5,453	4,630	5,453	5,453	4,630	5,453	5,453

### Table 5 – continued

The table reports estimates from fixed effects regressions of Tobin's Q on alternative corporate governance indices and control variables. CGI1 denotes the governance index constructed in the same way as Aggarwal et al. (2008), namely by dividing the governance attributes a company fulfills by the number of governance attributes a company reports data for. CGI2 denotes the governance index constructed in the same way as CGI1 but with missing attributes treated as if these attributes were not fulfilled. CGI3 denotes the governance index constructed by means of principal component analysis (PCA). LNTA denotes the logarithm of total assets, PGSALES denotes the two-year growth of sales, RD/SALES denotes the ratio of expenditures for research and development to sales, CASH/ASSETS denotes the ratio of cash to total assets, CAPEX/ASSETS denotes the ratio of capital expenditures to assets, PPE/SALES denotes the ratio of property-plants-equipments to sales, EBIT/SALES denotes the ratio of earnings before interest and taxes to sales, LEVERAGE denotes the ratio of total debt to total assets, ADR is a dummy variable which equals 1 if the firm has American Depository Receipts (ADR) and 0 otherwise, CLOSELY HELD is the percentage of closely held shares. The regressions reported in Columns 1 to 3 and 7 and 8 use our standard specification and firm fixed effects, the regressions in Columns 4 to 7 use industry, year and country fixed effects. For the regressions in Columns 7 and 8, we adjust the CGI1 and CGI2 scores in a way proposed by Chhaochharia and Laeven (2009) and subtract the number of governance attributes that every firm in a given country fulfills in a given year. The *t*-values (in parentheses) are based on Driscoll and Kraay (1998) standard errors which are heteroskedasticity-consistent and robust to general forms of cross-sectional and temporal dependence. \*\*\*, \*\*, \* denotes statistical significance at the 1%, 5%, 10% level.

**Table 6: Fixed effects regressions of Tobin's Q on CGI1 by year and country**

Dependent Variable: Tobin's Q										
Sample restricted to:	2003	2004	2005	2006	2007	Japan	U.K.	Canada	Australia	France
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	1.801 *** (5.843)	2.095 *** (10.525)	2.015 *** (9.806)	2.516 *** (12.144)	2.174 *** (9.635)	1.006 (1.367)	2.409 *** (15.576)	3.672 *** (11.696)	1.771 *** (4.622)	7.024 *** (7.907)
CGI1	0.002 (0.559)	0.008 *** (4.001)	0.012 *** (6.161)	0.009 *** (4.498)	0.010 *** (4.716)	-0.004 (-1.567)	0.014 *** (8.877)	0.008 ** (2.050)	0.027 *** (7.966)	0.010 *** (7.009)
LNTA	-0.098 *** (-4.072)	-0.179 *** (-9.547)	-0.191 *** (-10.474)	-0.200 *** (-11.691)	-0.170 *** (-9.287)	0.148 (1.607)	-0.281 *** (-25.093)	-0.149 * (-1.962)	-0.212 *** (-3.816)	-0.675 *** (-5.374)
PGSALES	0.251 *** (2.893)	0.079 ** (2.022)	0.099 * (1.799)	0.084 ** (2.288)	0.172 *** (4.489)	-0.006 (-0.117)	0.049 *** (5.139)	0.011 (0.533)	-0.103 ** (-2.421)	-0.024 (-0.831)
RD/SALES	4.578 *** (3.629)	1.759 ** (2.058)	2.632 *** (2.869)	0.632 (1.056)	0.633 (1.382)	-2.772 ** (-2.009)	0.206 ** (2.210)	-7.480 *** (-3.557)	-10.419 (-0.931)	0.533 (0.944)
CASH/ASSETS	0.362 (0.446)	1.487 *** (4.591)	0.777 ** (2.575)	1.425 *** (4.766)	0.902 *** (2.776)	0.437 (1.568)	-0.241 ** (-2.033)		2.076 *** (6.900)	0.987 *** (3.710)
CAPEX/ASSETS	0.286 (0.706)	0.706 (1.573)	0.694 (1.408)	1.938 *** (2.963)	2.260 *** (3.330)	1.205 *** (4.709)	-0.766 ** (-1.986)	2.861 *** (3.466)	0.527 ** (2.004)	0.256 (0.636)
PPE/SALES	-0.159 *** (-5.148)	-0.068 *** (-6.394)	-0.086 *** (-6.614)	-0.087 *** (-6.060)	-0.078 *** (-8.644)	-0.150 *** (-3.345)	-0.036 *** (-3.077)	-0.222 *** (-4.333)	-0.013 *** (-3.271)	-0.754 *** (-4.715)
EBIT/SALES	1.715 *** (3.399)	0.490 *** (2.953)	0.542 *** (4.028)	0.406 *** (3.205)	0.322 *** (3.861)	0.284 *** (3.553)	0.208 *** (4.247)	-0.139 (-1.382)	-0.197 *** (-3.619)	1.764 *** (6.582)
LEVERAGE	0.009 (0.043)	0.186 (1.408)	0.204 (1.526)	0.072 (0.532)	-0.036 (-0.268)	-1.243 *** (-17.888)	0.386 ** (2.500)	-1.641 *** (-9.095)	0.079 (0.515)	0.867 (1.660)
ADR	0.198 *** (3.630)	0.164 *** (3.462)	0.137 *** (3.137)	0.168 *** (3.640)	0.195 *** (4.263)		1.697 *** (35.459)			
CLOSELY HELD	0.001 (0.525)	0.004 *** (4.481)	0.005 *** (4.612)	0.002 ** (2.129)	0.003 *** (2.902)	0.001 (0.642)	-0.004 *** (-8.392)	-0.004 * (-1.943)	0.001 (1.218)	0.006 ** (2.488)
R-squared	0.308	0.260	0.263	0.256	0.218	-	-	-	-	-
R-squared (within)	-	-	-	-	-	0.113	0.129	0.265	0.188	0.477
Firms	460	1,127	1,149	1,336	1,381	411	369	143	101	95
Observations	460	1,127	1,149	1,336	1,381	1,642	1,195	388	346	307

## Table 6 – continued

The table reports estimates from regressions of Tobin's Q on CGII and control variables for single years and countries. In Columns 1 to 5, the sample is divided in sub-samples based on calendar years. Column 1 reports the results for 2003, Column 2 for 2004, Column 3 for 2005, Column 4 for 2006, and Column 5 for 2007. Columns 6 to 10 break down the sample by country. Column 6 contains only U.K., Column 7 Canadian, Column 8 Australian, Column 9 French, and Column 10 German firms. CGII denotes the governance index constructed in the same way as Aggarwal et al. (2008), namely by dividing the governance attributes a company fulfills by the number of governance attributes a company reports data for. LNTA denotes the logarithm of total assets, PGSALES denotes the two-year growth of sales, RD/SALES denotes the ratio of expenditures for research and development to sales, CASH/ASSETS denotes the ratio of cash to total assets, CAPEX/ASSETS denotes the ratio of capital expenditures to assets, PPE/SALES denotes the ratio of property-plants-equipments to sales, EBIT/SALES denotes the ratio of earnings before interest and taxes to sales, LEVERAGE denotes the ratio of total debt to total assets, ADR is a dummy variable which equals 1 if the firm has American Depository Receipts (ADR) and 0 otherwise, CLOSELY HELD is the percentage of closely held shares. The dummy variable whether the firm has American Depository Receipts, ADR, is dropped from the regressions reported in Columns 7 to 10 as there is no time-series variability in the variable. The regressions in Columns 6 to 10 include firm fixed effects. The *t*-values (in parentheses) in Columns 1 to 5 are based on White (1980) standard errors which are heteroskedasticity-consistent. The *t*-values (in parentheses) in Columns 6 to 10 are based on Driscoll and Kraay (1998) standard errors which are heteroskedasticity-consistent and robust to general forms of cross-sectional and temporal dependence. \*\*\*, \*\*, \* denotes statistical significance at the 1%, 5%, 10% level.

**Table 7: Fixed effects regressions of Tobin's Q on alternative PCA-based governance indices**

Dependent Variable: Tobin's Q							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	3.177 *** (19.809)	3.043 *** (15.590)	3.214 *** (21.062)	3.230 *** (17.219)	3.242 *** (18.514)	3.037 *** (15.529)	3.211 *** (21.041)
CGI_PCA17_1 (= CGI3)	0.037 *** (9.228)						
CGI_PCA17_2	0.042 *** (2.582)						
CGI_PCA17_3	-0.000 (-0.032)						
CGI_PCA17_4	0.033 *** (3.904)						
CGI_PCA17_5	0.001 (0.170)						
CGI_PCA17L_1		0.062 *** (3.484)	0.066 *** (3.554)				
CGI_PCA17L_2			0.068 *** (7.466)				
CGI_PCA17L_3			0.008 (0.429)				
CGI_PCA17L_4			0.051 *** (4.836)				
CGI_PCA17L_5			0.028 *** (8.832)				
CGI_PCA21_1				0.041 *** (5.901)	0.034 *** (6.137)		
CGI_PCA21_2					0.042 ** (2.055)		
CGI_PCA21_3					0.021 (1.636)		
CGI_PCA21_4					0.012 *** (3.016)		
CGI_PCA21_5					0.011 (1.265)		
CGI_PCA21L_1						0.061 *** (3.369)	0.064 *** (3.438)
CGI_PCA21L_2							0.069 *** (7.467)
CGI_PCA21L_3							0.008 (0.426)
CGI_PCA21L_4							0.049 *** (4.059)
CGI_PCA21L_5							0.028 *** (9.153)
R-squared (within)	0.065	0.053	0.067	0.072	0.076	0.053	0.066
Firms	1,497	1,571	1,499	1,316	1,316	1,571	1,499
Observations	4,630	5,057	4,647	3,828	3,828	5,057	4,647

The table reports estimates from fixed effects regressions of Tobin's Q on alternative corporate governance indices and control variables. To save space, the coefficients on the control variables are not reported in the table. Variables CGI\_PCA17\_1 to CGI\_PCA17\_5 denote the first five principal components obtained from principal component analysis using 17 governance attributes. Variables CGI\_PCA17L\_1 to CGI\_PCA17L\_5 denote the components obtained by following Larcker et al. (2007) using 17 governance attributes. Variables CGI\_PCA21\_1 to CGI\_PCA21\_5 denote the first five principal components obtained from principal component analysis using 21 governance attributes. Variables CGI\_PCA21L\_1 to CGI\_PCA21L\_5 denote are the components obtained by following Larcker et al. (2007) using 21 governance attributes. All regressions include firm fixed effects. The *t*-values (in parentheses) are based on Driscoll and Kraay (1998) standard errors which are heteroskedasticity-consistent and robust to general forms of cross-sectional and temporal dependence. \*\*\*, \*\*, \* denotes statistical significance at the 1%, 5%, 10% level.

**Table 8: Corporate governance and firm value: Dynamic panel GMM estimations**

Dependent variable: Tobin's Q			
Lagged Tobin's Q	0.842 *** (20.370)	0.870 *** (24.197)	0.896 *** (19.561)
CGI1	0.007 * (1.735)		
CGI2		0.008 ** (2.008)	
CGI3			0.049 ** (2.179)
LNTA	-0.150 *** (-3.407)	-0.067 * (-1.730)	-0.101 ** (-2.029)
PGSALES	0.257 *** (2.806)	0.224 ** (2.553)	0.201 ** (2.112)
RD/SALES	-0.198 (-0.790)	0.033 (0.147)	-0.165 (-0.620)
CASH/SALES	1.271 * (1.861)	0.684 (1.163)	1.510 ** (2.043)
CAPEX/ASSETS	1.528 ** (2.222)	1.658 ** (2.556)	1.503 ** (2.183)
PPE/SALES	0.073 *** (3.284)	0.072 *** (3.540)	0.083 *** (3.700)
EBIT/SALES	-0.434 ** (-2.161)	-0.499 *** (-2.607)	-0.649 *** (-3.051)
LEVERAGE	-0.779 ** (-2.470)	-0.928 *** (-3.145)	-1.010 *** (-3.231)
ADR	0.265 * (1.794)	0.393 *** (2.964)	0.347 ** (2.169)
CLOSELY HELD	-0.005 (-1.608)	-0.002 (-0.576)	-0.003 (-1.072)
<i>p</i> -Value of AR(1) test	0.002	0.001	0.002
<i>p</i> -Value of AR(2) test	0.904	0.716	0.727
Firms	1,451	1,451	1,342
Observations	3,949	3,949	3,565

The table reports the results from regressions of Tobin's Q on lagged Q, alternative corporate governance indices, and control variables. The regressions are estimated by using a dynamic panel GMM estimator as proposed by Arellano and Bover (1995) and Blundell and Bond (1998). CGI1 denotes the governance index constructed in the same way as Aggarwal et al. (2008), namely by dividing the governance attributes a company fulfills by the number of governance attributes a company reports data for. CGI2 denotes the governance index constructed in the same way as CGI1 but with missing attributes treated as if these attributes were not fulfilled. CGI3 denotes the governance index constructed by means of principal component analysis (PCA). LNTA denotes the logarithm of total assets, PGSALES denotes the two-year growth of sales, RD/SALES denotes the ratio of expenditures for research and development to sales, CASH/ASSETS denotes the ratio of cash to total assets, CAPEX/ASSETS denotes the ratio of capital expenditures to assets, PPE/SALES denotes the ratio of property-plants-equipments to sales, EBIT/SALES denotes the ratio of earnings before interest and taxes to sales, LEVERAGE denotes the ratio of total debt to total assets, ADR is a dummy variable which equals 1 if the firm has American Depository Receipts (ADR) and 0 otherwise, CLOSELY HELD is the percentage of closely held shares. All regressions include year fixed effects. Firm fixed effects drop out because the regression is estimated in first differences. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first differenced residuals with the null hypothesis of no serial correlation. \*\*\*, \*\*, \* denotes statistical significance at the 1%, 5%, 10% level.

**Table 9: Fixed effects regressions of Tobin's Q on corporate behavior, governance indices, and control variables**

Dependent Variable: Tobin's Q	Standard Specification			Industry, Country and Year FE	
	(1)	(2)	(3)	(4)	(5)
Constant	3.166 *** (26.582)	2.420 *** (3.295)	3.162 *** (26.641)	1.475 *** (15.179)	1.594 *** (27.451)
CGI_CB	0.003 *** (4.875)			0.003 *** (2.716)	
CGI_CB_PCA		0.043 *** (3.204)			0.019 *** (3.440)
CGI_CB_ADJ			0.003 *** (5.213)		
CGI_CB_CONTR	0.007 *** (7.149)	0.012 *** (3.690)	0.007 *** (7.050)	0.007 *** (16.279)	0.008 *** (17.058)
LNTA	-0.285 *** (-13.924)	-0.141 * (-1.912)	-0.287 *** (-13.561)	-0.169 *** (-23.210)	-0.166 *** (-21.795)
PGSALES	0.010 (0.835)	0.001 (0.120)	0.013 (1.265)	0.127 *** (6.710)	0.160 *** (5.195)
RD/SALES	-0.089 (-0.334)	0.381 *** (3.061)	-0.091 (-0.336)	1.335 *** (2.844)	0.793 *** (2.865)
CASH/ASSETS	0.332 *** (4.094)	-0.205 (-1.236)	0.349 *** (4.237)	1.210 *** (16.700)	1.298 *** (17.084)
CAPEX/ASSETS	0.438 *** (6.336)	0.763 *** (4.323)	0.431 *** (6.342)	0.986 *** (3.178)	0.807 ** (2.286)
PPE/SALES	-0.044 *** (-17.452)	-0.040 *** (-16.631)	-0.043 *** (-17.606)	-0.075 *** (-27.260)	-0.077 *** (-12.067)
EBIT/SALES	0.191 *** (5.991)	0.122 * (1.783)	0.191 *** (5.890)	0.575 *** (9.193)	0.491 *** (8.486)
LEVERAGE	-0.005 (-0.054)	-0.158 (-1.213)	0.010 (0.106)	0.146 *** (4.079)	-0.049 (-1.069)
ADR	1.428 *** (11.792)		1.405 *** (11.748)	0.150 *** (25.086)	0.158 *** (10.270)
CLOSELY HELD	-0.001 *** (-2.597)	-0.002 *** (-5.261)	-0.001 *** (-2.642)	0.003 *** (6.496)	0.002 *** (5.745)
R-squared (within)	0.101	0.059	0.102	-	-
R-squared	-	-	-	0.265	0.272
Firms	1,625	1,111	1,625	1,625	1,111
Observations	5,453	2,763	5,453	5,453	2,763

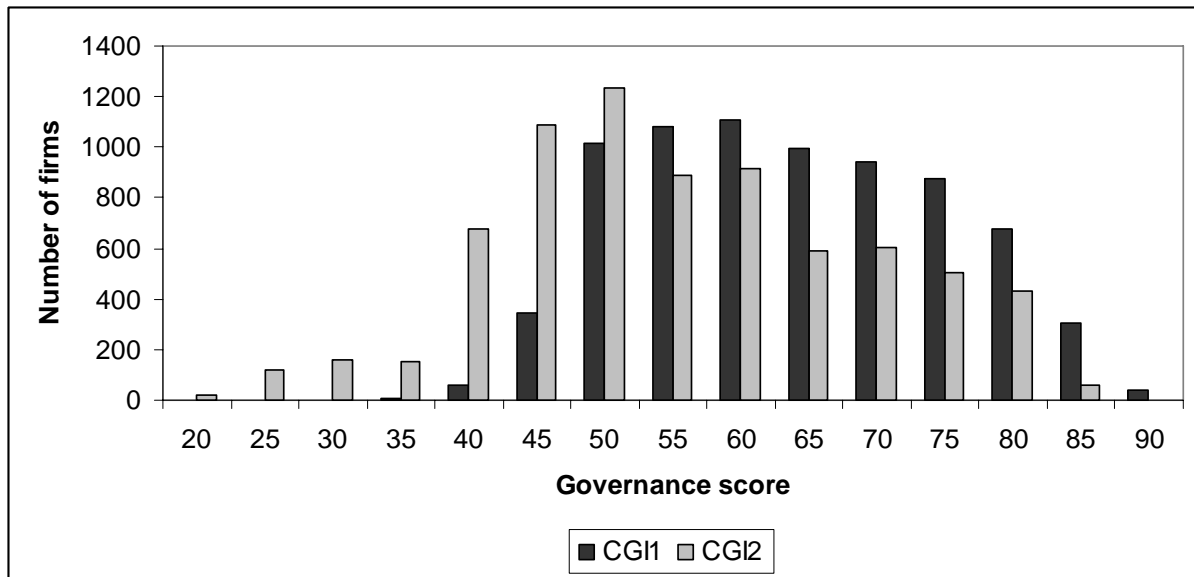
The table reports estimates from fixed effects regressions of Tobin's Q on alternative corporate behavior indices and control variables. CGI\_CB denotes the corporate behavior index constructed in the same way as CGI2, using the nine corporate behavior governance attributes and treating missing attributes as if they were not in place. CGI\_CB\_PCA denotes the corporate behavior index constructed by means of principal component analysis (PCA), using the nine corporate behavior governance attributes. CGI\_CB\_ADJ denotes the adjusted CHI\_CB index. The adjustment is similar to the one proposed by Chhaochharia and Laeven (2009), and subtracts the number of governance attributes that every firm in a given country fulfills in a given year. CGI\_CB\_CONTR denotes the governance index constructed of the governance attributes that are not part of the company behaviour category. LNTA denotes the logarithm of total assets, PGSALES denotes the two-year growth of sales, RD/SALES denotes the ratio of expenditures for research and development to sales, CASH/ASSETS denotes the ratio of cash to total assets, CAPEX/ASSETS denotes the ratio of capital expenditures to assets, PPE/SALES denotes the ratio of property-plants-equipments to sales, EBIT/SALES denotes the ratio of earnings before interest and taxes to sales, LEVERAGE denotes the ratio of total debt to total assets, ADR is a dummy variable which equals 1 if the firm has American Depository Receipts (ADR) and 0 otherwise, CLOSELY HELD is the percentage of closely held shares. The dummy variable whether the firm has American Depository Receipts, ADR, is dropped from the regression reported in Columns 2 as there is no time-series variability in the variable. The regressions reported in Columns 1 to 3 use firm fixed effects, the regressions reported in Columns 4 and 5 use industry, country and year fixed effects. The *t*-values (in parentheses) are based on Driscoll and Kraay (1998) standard errors which are heteroskedasticity-consistent and robust to general forms of cross-sectional and temporal dependence. \*\*\*, \*\*, \* denotes statistical significance at the 1%, 5%, 10% level.

**Table 10: Individual corporate governance attributes**

<i>Panel A: Corporate governance attributes selected for PCA</i>	Coefficient	t-value	Coefficient	t-value
	(1)		(2)	
Company has a designated "lead" or senior non-executive board member	-0.012	-0.638	-0.023	-0.849
No former CEO of the company serves on the board	0.002	0.252	0.014	1.231
Board size is greater than five but less than 16	0.062 ***	3.733	0.057 ***	3.531
Company has not had a material earnings restatement in the past three years	-0.011	-0.390	-0.020	-0.720
Company has not received a qualified audit opinion within the last two fiscal years	0.331 ***	13.063	0.341 ***	11.072
Board members are subject to annual election by all shareholders	0.020	1.285	0.010	0.585
No single shareholder or shareholder group with majority of voting power	0.013	0.435	-0.008	-0.224
All common or ordinary equity shares have one-share, one-vote, with no restrictions	0.046 ***	2.319	0.044 **	1.980
Company discloses its corporate governance policies or guidelines	0.065 **	2.192	0.057 *	1.751
Voting rights are not capped at a certain percentage	-0.060	-0.601	-0.067	-0.716
Company allows cumulative voting in the election of directors	0.009	0.450	-0.022	-1.519
Shareholders have a right to convene an EGM	0.182 ***	10.697	0.178 ***	9.307
Company does not have a staggered ("classified") board	-0.047	-1.538	-0.064 *	-1.730
Company does not require a supermajority vote to approve a merger	-0.092 ***	-4.172	-0.010 ***	-3.845
Audit committee is wholly composed of independent board members	0.073 ***	11.366	0.051 ***	4.567
There have been no related-party transactions in the past three years	0.001	1.124	-0.011	-0.906
Board is controlled by more than 50% of independent outside directors	0.046 ***	3.265	0.018	1.312
<i>Panel B: Governance attributes pertaining to corporate behavior</i>				
Company has a policy addressing workplace safety	-0.001	-0.11	0.005	0.34
Company does not have pending criminal litigation against it	0.026	1.12	0.049 ***	3.17
No allegation that company used sweat shops within the last three years	0.015	0.94	0.032	1.40
Company discloses its environmental performance	0.007	0.67	0.024 **	2.09
Company discloses its workplace safety record	0.025 *	1.79	0.037 ***	2.73
No regulatory investigation for a material issue other than accounting irregularities	0.041 ***	3.40	0.044 ***	3.02
Company discloses its policy regarding corporate level political donations	0.063 ***	3.88	0.063 ***	3.93
Company has not been charged with workplace safety violations	0.064 ***	5.17	0.058 ***	3.67
It has not been alleged that the company uses child labor	-0.018	-0.75	-0.014	-0.49

Panel A of the table reports the results from fixed effects regressions of Tobin's Q on individual governance attributes and control variables. The 17 attributes correspond to those included in the basic principal component analysis used to construct CGI3. Panel B of the table reports the results from fixed effects regressions of Tobin's Q on individual corporate behavior attributes. Each attribute of GMI's corporate behavior category is included. In Column 1, each attribute is individually included in the regression, in Column 2 all attributes are included jointly. In the regressions using corporate behavior attributes, we additionally include the control variable CGI\_CB\_CONTR. The t-values (in parentheses) are based on Driscoll and Kraay (1998) standard errors which are heteroskedasticity-consistent and robust to general forms of cross-sectional and temporal dependence. \*\*\*, \*\*, \* denotes statistical significance at the 1%, 5%, 10% level.

**Figure 1: Empirical distribution of governance scores for CGI1 and CGI2**



The figure shows the distribution of our two additively constructed corporate governance indices, CGI1 and CGI2. Dark grey represents the scores according to CGI1, light grey represents the scores according to CGI2. CGI1 denotes the governance index constructed in the same way as Aggarwal et al. (2008), namely by dividing the governance attributes a company fulfills by the number of governance attributes a company reports data for. CGI2 denotes the governance index constructed in the same way as CGI1 but with missing attributes treated as if these attributes were not fulfilled.