

Nguyen An; Tuan Nguyen; Phuong Hoang

Article

The impact of corporate governance quality on capital structure choices: does national governance quality matter?

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*Corresponding author: Tuan Nguyen,
Faculty of Economics and Business
Administration, Dalat University, 1
Phu Dong Thien Vuong, Dalat,
Vietnam
E-mail: tuannv@dlu.edu.vn

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David McMillan, University of Stirling,
Stirling, United Kingdom

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FINANCIAL ECONOMICS | RESEARCH ARTICLE

The impact of corporate governance quality on capital structure choices: does national governance quality matter?

An Nguyen¹, Tuan Nguyen^{1*} and Phuong Hoang¹

Abstract: This research investigates the moderating effect of national governance quality on the corporate governance—capital structure decision relationship. Using an instrumental variable estimation technique to analyze a multinational dataset containing 23,142 firm-year observations of 3,270 firms in 59 economies from 2004 to 2014, we find evidence for the moderating role of national governance quality. Specifically, a well-functioning firm-level governance system tends to force managers to increase borrowing toward an optimal level for shareholders. The strength of the force, however, seems to decrease as national governance quality increases. Our findings suggest that a transparent and investor-friendly business environment created by the government may complement the firm-level corporate governance mechanism by reducing agency problems, thus reducing the need to use leverage as a tool to discipline managers. The results are robust to different proxies for national governance quality, corporate governance quality, and firm leverage.

Subjects: Finance; Corporate Finance; Corporate Governance

ABOUT THE AUTHORS

An Nguyen is a senior lecturer at the Faculty of Economics and Business Administration, Dalat University, Vietnam. His research interests include corporate governance and finance. He has published research in *International Review of Economics and Finance*, *Economics Bulletin*, *Cogent Economics and Finance*, and *Foundations of Management*.

Tuan Nguyen is a senior lecturer and the former chairperson of the Department of Banking and Finance, the Faculty of Economics and Business Administration, Dalat University, Vietnam. His research areas of interest include corporate governance, corporate finance, and business ethics. He has published research in *International Review of Economics and Finance*, *Economics Modelling*, *International Review of Financial Analysis*, *Journal of Business Ethics*, *Economics Bulletin*, *Cogent Economics and Finance*, *Organizations and Markets in Emerging Economies*, and *Foundations of Management*.

Phuong Hoang is a lecturer at the Faculty of Economics and Business Administration, Dalat University, Vietnam. Her research interests include corporate governance and finance.

PUBLIC INTEREST STATEMENT

Debt is like a double-edged sword. It is an important source of funds and a useful tool to discipline corporate managers. However, abuse of debt would increase the risk of financial distress and threaten the company's viability. This research uncovers how corporate governance systems around the world exploit the benefits of debt as a disciplinary mechanism and what governments should do to complement the process. In particular, empirical evidence shows a general pattern that good corporate governance systems tend to force managers to adopt higher debt ratios to reduce free cash flows and attract more outside monitoring. By building a better national governance system, the government would help create a more transparent and accountable business environment, in which shareholders are better protected and corporate managers can be more easily monitored by the public. This, in turn, reduces the need to use debts as a disciplinary mechanism and, thus, helps limit its downside.

Keywords: capital structure; leverage; corporate governance quality; national governance quality; national institutions

JEL classification: C23; G30; G32; G34

1. Introduction

The purpose of this research is to explore how national governance quality moderates the effectiveness of corporate governance mechanisms in forcing executives to adjust their firm's leverage toward an optimal level for shareholders.

In the past decades, several studies have been done to investigate the nature of the corporate governance quality—capital structure decision relationship. However, the results are still mixed. Recent studies of Jiraporn et al. (2012), Hoang and Nguyen (2020), M. Zhou et al. (2021), Arping and Sautner (2010), and Haque et al. (2011) suggested an inverse relationship between corporate governance quality and debt ratio. That is, poorly governed firms tend to have a higher level of debt. In contrast, Morellec et al. (2012), Liao et al. (2015), and Chang et al. (2015), Thao Nguyen, Bai et al. (2021), and Gyimah et al. (2021) found that better corporate governance (and hence lower agency conflict) is related to increased use of debt in firms' capital structure. Furthermore, researchers have also found that factors affecting capital structure decisions manifest themselves differently among nations (Booth et al., 2001; Demircüç-Kunt & Maksimovic, 1996; Rajan & Zingales, 1995).

We argue that there are two possible reasons for the inconclusive results. Firstly, the inconclusive evidence is caused by the difference in model specifications. While earlier studies, such as studies of Jiraporn et al. (2012), Arping and Sautner (2010), Haque et al. (2011), and Gyimah et al. (2021) used static models to investigate the relationship between corporate governance and debt, the research of Liao et al. (2015), Zaid et al. (2020), (Hoang & Nguyen, 2020), or Thao Nguyen, Bai, et al. (2021) examined the relationship in a dynamic framework. Researches are also different in the variables used. While some studies examine the relationship between corporate governance and debt using individual corporate governance mechanisms such as ownership and/or board structures as proxies for corporate governance quality (e.g., Liao et al. (2015), Zaid et al. (2020), Hoang and Nguyen (2020), and Gyimah et al. (2021), or Thao Nguyen, Bai, et al., (2021)), others used aggregate measures of corporate governance quality e.g., Haque et al. (2011) or Jiraporn et al. (2012).

Secondly, previous studies on the topic did not take institutional differences among economies into account. The majority of previous corporate governance research has concentrated on the United States or the United Kingdom, both of which are characterized by diffused ownership and well-established external governance structures (Filatotchev et al., 2013). Those studies, which use the principal-agent model, neglected the moderating impact of national governance structures (Filatotchev et al., 2013) and therefore cannot provide a comprehensive understanding of the usefulness of corporate governance strategies in various institutional settings (Kumar & Zattoni, 2013). It has therefore been suggested in recent corporate governance literature that the traditional agency framework should be re-examined to better understand the context outside of Anglo-Saxon jurisdictions, especially in Asia, where highly concentrated ownership is a common characteristic (Filatotchev et al., 2013; Tuan Nguyen et al., 2015). This recent literature recognizes that national governance structures, such as the legal system, rule of law, and investor protection, can affect the implementation of corporate governance strategies (Filatotchev et al., 2013). In recent studies on corporate governance, Kumar and Zattoni (2013), Filatotchev et al. (2013), and Tuan Nguyen, Nguyen et al. (2021), among others, have called for exploring the interactive effect of country-level and firm-level variables.

Following this emerging trend of research and given the inconclusive evidence on the corporate governance–capital structure relationship, this research examines whether the relationship between corporate governance quality and capital structure varies depending on the quality of

national governance systems in which firms operate. Specifically, we aim at answering two controversial research questions in the extant literature of corporate governance, namely:

- (i) Whether there are causal relationships between corporate governance quality and capital structure choice, and
- (ii) Whether those causal relationships (if any) are moderated by the national governance quality of the countries in which firms operate.

By analyzing a multinational dataset, including 23,142 firm-year observations of 3,270 firms in 59 economies from 2004 to 2014, we find that corporate governance quality positively impacts firm leverage. That is, a well-functioning firm-level governance system tends to execute better monitoring tasks and to force managers to raise loans toward an optimal level for shareholders. However, the strength of the force tends to decline as the quality of national governance increases. Perhaps this is because nations with better national governance have a more investor-friendly environment, which would mitigate the principal-agent concerns. As the national governance system partly disciplines executives in the interests of shareholders, the direct pressure for capital structure adjustments exerted by the board of directors is reduced. This moderating effect of national governance quality helps explain why past empirical evidence on the corporate governance—capital structure decision differs across economies. Our findings are robust to altered proxies for national governance quality, corporate governance quality, and firm leverage.

This is the first research, to our knowledge, to formally explore the moderating role of national governance quality on the corporate governance–capital structure relationship, and to a larger extent, to expand the research on how national institutional factors affect the effectiveness of corporate governance mechanisms that are currently suggested by Kumar and Zattoni (2013) and Filatotchev et al. (2013), among others. Our findings contribute to the literature by suggesting that the operation and the effectiveness of corporate governance mechanisms do not only depend on the nature of the mechanisms themselves but also on the surrounding institutional environment, in this case, national governance quality. To the extent that this is true, future corporate governance research should formally account for differences in national governance quality.

As a national institution is a broad concept, our findings are also helpful for policymakers in debates on institutional reform by pointing a specific dimension of a national institution, namely national governance quality, at which efforts should be targeted to build an investor-friendly business environment as well as a stronger business community.

The rest of the paper is organized as follows. Section 2 contains a brief review of the literature from which research hypotheses are derived. Section 3 introduces the method of the study, together with a description of our data collection and variable definitions. Empirical results are presented and discussed in Section 4. The final section concludes the paper and indicates its limitations.

2. Theoretical background and research hypotheses

2.1. Corporate governance and capital structure

When committing funds to a company, investors want a fair return on their investments. However, when control of the company is given to managers, it can be expected that these managers will act in their interests instead of the interests of the true owners of the company (Jensen & Meckling, 1976). The board of directors is among the mechanisms designed to protect investors' interests. A well-functioning board of directors monitors and disciplines managers in the interests of investors (Nguyen et al., 2017).

On one hand, it is argued that borrowing is not only a mean of financing but also a mean to discipline managers. A high level of debt increases managers' ownership and thereby reduces perquisites (Jensen & Meckling, 1976) and free cash flows to reduce managerial discretion (Jensen, 1986; Stulz, 1990). As an effective board of directors monitors the management team to ensure that they act in the best interest of investors, it can be considered a substitute for leverage. Specifically, better corporate governance reduces agency costs, enhances investor confidence, improves firms' accessibility to cheaper sources of finance, and thus reduces the need to use leverage as a mechanism to discipline managers (Haque et al., 2011; Hoang & Nguyen, 2020; Jiraporn et al., 2012). Moreover, there are other costs of using debt. The excessive use of debt increases the probability of financial distress (Andrade & Kaplan, 1998) and invokes asset substitution (Jensen & Meckling, 1976) or underinvestment (Stulz, 1990), which goes against the best interests of shareholders. From this point of view, it follows that when a well-functioning board of directors is in place, there is less motivation to use debt. In other words, corporate governance quality should have a negative relationship with leverage.

On the other hand, some researchers argue that managers tend to prefer lower debt levels (Berger et al., 1997; Kieschnick & Moussawi, 2018). Firstly, the use of debt constraints managerial discretion and increases performance pressure due to interest payments (Jensen, 1986). The use of debt also attracts more monitoring from creditors (Diamond, 1991) and thus imposes additional constraints on managerial discretion. Secondly, as managers have invested their human capital and reputations, which are considered under-diversified, they would face extreme risks if the firms are in financial distress (Hirshleifer & Thakor, 1992). As a result, agency theory suggests that managers tend to favor sub-optimal leverage levels that do not maximize shareholder value and that an effective board of directors would therefore seek to force managers to increase leverage toward levels optimal for shareholders (Liao et al., 2015; Morellec et al., 2012). In other words, it is predicted that better corporate governance should have a positive relationship with leverage.

Although the direction of this relationship is inconclusive, agency theory, generally, predicts the existence of a relationship between corporate governance and capital structure. As such, we suggest the first hypothesis as follows:

Hypothesis 1: There is a relationship between corporate governance quality and capital structure.

2.2. National governance and corporate governance

By definition, national institutions are a set of constraints that set the rules and boundaries for interactions between economic agents (North, 1991). These constraints may be formal, such as laws, regulations, and institutions, or informal, such as norms, cultures, codes, and conduct, which establish the "rules of the game". In this study, we concentrate on a subset of national institutions known as national governance. National governance is defined as the way governments utilize their economic, political, and administrative authority to manage public affairs.

National institutions provide formal mechanisms, institutions, and processes for members of society to express their interests, exercise legal rights, fulfill obligations, and manage disagreements (DESA, 2016). In a corporate context, the playing field created by national governance institutions determines how power is distributed among stakeholders, the nature of the problems that stakeholders face, and the efficiency of the different mechanisms used to resolve these problems (Filatotchev et al., 2013; Yoshikawa et al., 2014). Thus, it can be argued that different national institutions create different business environments. In fact, recent research has explored the various characteristics of business environments created by different institutional systems, such as liberal market economies versus coordinated market economies (Hall & Soskice, 2003), English-origin countries versus French- or German-origin countries (La Porta et al., 1998), or

fragmented business systems versus highly coordinated business systems (Whitley, 1998), to name a few.

There are two channels through which national governance (NG) can moderate corporate governance-leverage (CG-Lev) relationships. Firstly, research results to date indicate that business environments define the nature as well as the extent of conflicts within the firm. Specifically, it is argued that different business settings would affect the level as well as the type of agency costs (Aslan & Kumar, 2014). For example, investors (both shareholders and bondholders) in business environments characterized by poor legal protection and weak legal enforcement systems may suffer heavily from the manager-investor type of agency conflict (La Porta et al., 2000). Moreover, given the various patterns of ownership concentration and the different identities of large shareholders, such as families, states, banks, foundations, and business groups, agency problems may manifest themselves in various forms across institutional systems (Jackson, 2010).

Consequently, according to the institutional perspective, there is no “one-size-fits-all” solution to corporate governance issues on a global scale. “Anglo-Saxon” institutions, characterized by high investor protection, diverse ownership, and the use of a board of directors as the main corporate governance mechanism, should not be considered a common situation. The legal systems and patterns of ownership are diverse in most parts of the world. For instance, Tuan Nguyen et al. (2015) found that firms in countries with low national governance quality may choose a higher level of ownership concentration as the main governance mechanism rather than a board of directors. This is because of the excessive monitoring costs of dispersing ownership in such a context. As national governance settings may support, inhibit, or even rule out certain firm-level governance mechanisms (Filatotchev et al., 2013), it follows that the effectiveness of a specific governance mechanism, in this case, the board of directors, may differ among nations.

In the context of capital structure decisions, high national governance quality creates a transparent, investor-friendly, and accountable business environment that, by itself, acts as a public disciplinary mechanism on managers and helps lower agency conflicts between managers and investors. As a result, we should expect to see leverage levels closer to optimal levels for shareholders, and this reduces the intensity of interventions by boards of directors. In other words, we should expect to see the effect of corporate governance on leverage fall as national governance quality improves.

Secondly, recent research indicates that an investor-friendly environment also improves the efficiency of the board of directors. Nguyen, Nguyen, et al., (2021) find that better national governance systems foster boardroom gender diversity, which improves the board of directors’ monitoring and counseling performance. Uribe-Bohorquez et al. (2018) find that legal systems that prioritize shareholder protection increase the independence of boards of directors and thereby improve the effectiveness of their monitoring capability. Gupta et al. (2018) point out that corporate governance attributes only help reduce the cost of equity in common law countries with a high level of financial development. Overall, the evidence suggests that national governance seems to affect the firm-level governance—leverage relationship. Taken together, we hypothesize that:

Hypothesis 2: The relationship between corporate governance and capital structure is negatively moderated by the governance quality of the nation where the firm operates.

3. Data and method

3.1. Sample descriptions and data sources

To test the hypotheses, we use a multination dataset, ASSET4, provided by Thomson Reuters. The dataset contains the firm-level financial data of 4,158 companies in 70 countries and territories

from 2003 to 2014. For country-level data on national governance quality, we utilize the dataset provided by the Worldwide Governance Indicators project (Kaufmann et al., 2011). Due to different regulatory environments, which may lead to different capital structure dynamics, firms in the financial industry are excluded. After screening for missing observations, the final sample consists of 23,142 firm-year observations from 2004 to 2014 collected from 3460 firms in 59 economies.

3.2. Variables

3.2.1. Dependent variables

To measure firms' financial leverage, we use two popular indicators: accounting leverage and market leverage (Dao & Ta, 2020). Accounting leverage (denoted *Lev*) is defined as the book value of debts denominated by the book value of total assets. This indicator is used in most research on the topic. As pointed out by Rajan and Zingales (1995), however, the use of accounting leverage has some drawbacks. Firstly, this indicator is calculated using historical values that may not reflect the true current value of debts and assets. Secondly, the accounting leverage indicator does not reflect financial distress and default risks that a firm faces as a result of its capital structure decisions. To complement the accounting leverage measure, this research also uses a market leverage indicator (denoted *Lev_market*), which is defined as the value of debts denominated by the market value of the firm's total assets. This indicator incorporates the market valuation of debts and assets, thereby providing a better reflection of the resulting risks of capital structure choices.

3.2.2. Independent variables

The first independent variable of interest is corporate governance quality. Instead of using variables representing board characteristics as proxies for corporate governance quality, we use a composite index, summarizing the information of 54 indicators on three broad dimensions of governance (namely, management, shareholders, and corporate social responsibility strategy). The resulting corporate governance score (denoted *CGSCORE*) lies between 0 and 100 and is defined by Thomson Reuters as "measuring a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances to generate long-term shareholder value."

To measure the quality of national governance, we use the Worldwide Governance Indicators (WGIs) of Kaufmann et al. (2011). These indicators have been used in many previous studies in the field of comparative corporate governance and are considered to be among the most useful indicators in multi-country comparative studies (Kaufmann et al., 2011; Ngobo & Fouda, 2012; Tuan Nguyen et al., 2015). They include six indicators of national governance quality, namely Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption, for over 200 economies since 1996. Following previous research on the topic, such as Knudsen (2011), Van Essen et al. (2013), Tuan Nguyen et al. (2015), and Nguyen, Nguyen, et al., (2021), this paper focuses on the three country-level governance quality measures that are the most relevant for firm operations: Government Effectiveness (*GE*), Regulatory Quality (*RQ*), and Rule of Law (*RL*). These indicators are calculated in standardized units ranging from -2.5 to 2.5, with a larger value indicating better quality (Kaufmann et al., 2011).

As indicated in Globberman and Shapiro (2002), these indicators are highly correlated. Thus, to avoid multicollinearity, this paper applies the methods used in Knudsen (2011), Globberman and Shapiro (2002), and Tuan Nguyen et al. (2015) to combine the three measures to form a single aggregate index representing overall national governance quality. The first method is to take a simple average of the three above-mentioned measures to form an aggregate national governance quality index [denoted as *NGI(1)*]. To complement the first index, factor analysis is used to

extract the first principal component of the three measures to form an alternative aggregate national governance quality index [denoted as *NGI(2)*]. This latter national governance quality index will be used as a robust check for the analysis results found with the former index.

Finally, to study the moderating effect of national governance quality on the relationship between corporate governance quality and firm leverage, an interaction term between *NGI_1* and *NGI_2* and *CGSCORE* is calculated [denoted as *NGI(1)_CGSCORE* and *NGI(2)_CGSCORE*].

To further check for the robustness of the results using the two national governance quality indexes [*NGI(1)* and *NGI(2)*], we also use each of the three national governance quality indicators (*GE*, *RQ*, and *RL*) and their interaction terms with *CGSCORE* (*GE_CGSCORE*, *RQ_CGSCORE*, and *RL_CGSCORE*) as independent variables.

As an alternative measure for corporate governance quality, we use four popular board characteristics, namely, the percentage of female directors on corporate board, the board of director size, the percentage of independent directors on corporate board, and CEO duality (Tran, 2020). These variables are defined in Table 1 and used as a robust check on the moderating effect of national governance quality on the board of director quality—capital structure relationship.

3.2.3. Control variables

Many factors are deemed to affect capital decisions, but some factors are relevant in some countries while not in others (Booth et al., 2001; Myers, 2003; Rajan & Zingales, 1995). To avoid over-controlling in the multination context, we choose several factors deemed to be common to capital decisions across nations. Based on previous relevant research on international capital structures, such as Harris and Raviv (1991), Rajan and Zingales (1995), and Booth et al. (2001), we identify and use five factors as control variables: ownership structure (denoted *Ownership*), tangibility (denoted *Tang*), growth opportunity (denoted *MTB*), profitability (denoted *ROA*), and firm size (denoted *Firm_size*). To control for the effect of the business cycle [see, for example, Halling et al. (2016)] and industry characteristics on leverage, such as differences in industrial regulations (Jensen, 1986, 1989) or industrial organization, [see, for example, Brander and Lewis (1986)], we use dummy variables representing each year and industry in the model, where suitable.

3.3. Method

To test the hypotheses, we use a dynamic model where the first-order lag of the dependent variable is also used as an independent variable. The rationale for this choice is given in Morellec et al. (2012) and Liao et al. (2015). The structure of the model is as follows:

$$\begin{aligned} \text{Leverage}_{it} = & \beta_0 + \beta_1 \text{Leverage}_{it-1} + \beta_3 \text{National governance quality}_{it} \\ & + \beta_4 \text{National governance quality_CGSCORE}_{it} + \sum_{i=5}^{27} \beta_i \text{controls}_{it} + \text{industry dummies} \\ & + \text{year dummies} + u_i + \epsilon_{it} \end{aligned} \quad (1)$$

where *i* indexes observed firms and *t* indexes time, leverage is proxied by accounting leverage (*Lev*) or market leverage (*Lev_market*), national governance quality is proxied by *NGI (1)*, *NGI(2)*, *GE*, *RQ*, and *RL*, and *u_i* is the unobservable time-invariant effect at the firm level.

However, it can be seen that the structure of equation (1) may cause severe multicollinearity problems. By definition, the *NGI* variables are measured at the national level, which means that in any given year, all firms in the same country share the same *NGI* score. Furthermore, the *NGI* variables are very sluggish over time. For these two reasons, the three variables *National governance quality*, *National governance quality_CGSCORE*, and *CGSCORE* are potentially highly correlated. This concern is confirmed by the high VIFs of the concerning variables (3.54, 17.75, and 12.15, respectively). This means that the original structure (equation (1)) would suffer from severe

Table 1. Definition of variables

Variables	Abbreviation	Definition
Dependent variables		
Accounting leverage	Lev	The ratio of total debt to total assets
Market leverage	Lev_market	Lev_market = Total debt/(Total debt + Market capitalization)
Independent variables		
Corporate governance score	CGSCORE	The corporate governance score (0–100) measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders.
Aggregate national governance quality index	NGI(1)	NGI = (Government Effectiveness + Regulatory Quality + Rule of Law)/3
Alternative aggregate national governance quality index	NGI(2)	NGI_2 is constructed by extracting the first principal component of the three national governance quality indicators (Government Effectiveness, Regulatory Quality, and Rule of Law).
Government effectiveness	GE	The Government Effectiveness index was developed by Kaufmann et al. (2011) to measure the perception of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
Regulatory quality	RQ	The Regulatory Quality index was developed by Kaufmann et al. (2011) to measure the perception of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.
Rule of Law	RL	The Rule of Law index developed by Kaufmann et al. (2011) to measure the perception of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Percentage of female directors	Female_per	The percentage of female directors on corporate board.
Board of director size	Lnbsize	The logarithm of the number of directors on corporate board
The percentage of independent directors	Independence	The percentage of independent/ non-executive directors on corporate board.

(Continued)

Variables	Abbreviation	Definition
CEO duality	Duality	Dummy variable with value 1 representing a CEO also takes on the role of a board of director chairperson.
Control variables		
Ownership concentration	Ownership	Dummy variable that takes a value of 1 if there is at least one shareholder having majority voting rights, and 0 otherwise.
Tangibility	Tang	Tangibility = (Total assets—Current assets) / Total assets
Market-to-book value	MTB	MTB = (Market Capitalization + Total Debt) / Total Assets
Return on assets	ROA	ROA = Net income / Total assets.
Firm size	Firm_size	The natural logarithm of the book value of total assets
Industry dummy variables	Industry dummies	A dummy variable for each of the nine industries classified by ICB, including Basic Materials, Industrials, Consumer Goods, Health Care, Consumer Services, Telecommunications, Utilities, Financials, and Technologies.
Year dummy variables	Year dummies	A dummy variable for each year from 2004 to 2014

multicollinearity problems and the relating standard errors of the three variables would not be estimated correctly. To remedy this, we choose to drop the variable *National governance quality*, i.e., we would only keep the *CGSCORE* and its interaction terms with the *NGI* variables in the regression model. This would fix the multicollinearity problem (the VIFs of the remaining two variables, *NGI_CGSCORE*, and *CGSCORE*, are 6.58 and 6.06, respectively) while, at the same time, leaving the tests that we intend to perform unaffected while still allowing us to test the proposed hypotheses. This practice was also used in Terjesen et al. (2016).

Thus, the model is re-structured as follows:

$$\begin{aligned}
 \text{Leverage}_{it} = & \beta_0 + \beta_1 \text{Leverage}_{it-1} + \beta_2 \text{CGSCORE}_{it} \\
 & + \beta_3 \text{National governance quality_CGSCORE}_{it} + \sum_{i=4}^{27} \beta_i \text{controls}_{it} \\
 & + \text{industry dummies} + \text{year dummies} + u_i + \epsilon_{it}
 \end{aligned} \quad (2)$$

As indicated in Wintoki et al. (2012), Q. Zhou et al. (2014), and Flannery and Hankins (2013), the use of a dynamic model with the above structure introduces endogeneity into the model, which renders popular estimating methods such as pooled ordinary least squares (POLS) and fixed effects (FE) inconsistent. Thus, to estimate the equations, we use the two-stage least squares method in which the first- and second-order lag of the difference of the dependent variables (i.e., *DL_Leverage* and *L2D_Leverage*) are instruments for a potential endogenous variable (i.e., *L_Leverage*). Similar in-sample instruments are also used in Nguyen, Nguyen, et al., (2021). For comparison, POLS and FE estimates for equation (2) are presented. To address the potential endogeneity of the corporate governance variables used in this research, namely *CGSCORE* and its interaction terms with *NGI(1)* and *NGI(2)*, we use the first lag of the corresponding variables

as instruments. Tests for endogeneity and the validity, as well as, the efficiency of the instruments were also conducted to ensure the validity of the method.

The use of a complex panel dataset that covers many countries with different business environments and contains a mixture of national level and firm-level data raises three main concerns over the estimation of standard errors, namely the problem of heteroscedasticity, serial correlation, and clustering effect. To ensure that standard errors are robust to heteroscedasticity and autocorrelation, we use the method developed by Newey and West (1987). The potential clustering effect caused by the use of national-level data together with firm-level data, in the context of equation (2) the variable *National governance quality_CGSCORE*, is also addressed by using the method by Froot (1989). The technical details of the treatments are presented in Baum et al. (2007) and Roger (1993).

In the context of equation (2), the test of hypothesis 1 amounts to testing the joint hypothesis of whether β_2 or/and β_3 are significantly different from zero. This test must be carried out first and is very important because it lays the foundations for the test of the second hypothesis. It would be nonsense to test the moderating effect of national governance quality on the corporate governance-leverage relationship if we cannot prove that such relationship actually exists in the first place.

Once hypothesis 1 is tested and yields appropriate results, the test of the second hypothesis amount to the test of whether the regression coefficient corresponding to the interaction term (i.e., β_3) is negative and statistically significant.

4. Empirical results and discussion

4.1. Descriptive statistics

Tables 2 and 3 summarize the descriptive statistics for the variables used in this study. For the whole sample, the means for both accounting leverage (*Lev*) and market leverage (*Lev_market*) are roughly 24.3% and 23.9%, respectively, and the observations are widely scattered among firms, with standard deviations of 18% and 21%, respectively. There are, however, several accounting leverage observations that exceed the boundary of 100%, which may raise doubts concerning the data. After double-checking, we find that these are not errors. These observations are sourced from companies that have suffered huge and consistent losses over the years and end up with total accounting debts that exceed total accounting assets (i.e., in deficit). Even though it is uncommon, a situation where leverage exceeds one can occur in reality, indicating that the company is in serious financial trouble. Concerning corporate governance quality, *CGSCORE* ranges from 1.15 to 98.75, with the majority of firms scoring over 60. For national governance quality measures, the values are within the theoretical range of -2.5 to $+2.5$, with means around 1.3 to 1.4 for *NGI(1)*, *GE*, *RL*, and *RQ*. However, the data for *NGI(2)* are significantly different, with a mean of just 0.16, a minimum of -3.28 , and a maximum of 1.35. This difference is due to the methods used to construct the indexes and is desirable as it provides a mean for checking the robustness of the results.

Table 3 breaks down the dataset by economies. We can see that the dataset contains observations in economies around the world, that are different in terms of geological locations, level of development, and national institutions. This broad coverage is vital for the test of our proposed hypotheses. It can also be seen from Table 3 that economies are also quite diverse in terms of leverage. The average national leverage level ranges from 3% to 51%, with the majority of values falling between 21% and 29% (see, Table 3).

Regarding the change over the research time frame, the average level of leverage shows little changes around the mean of 24% of the whole period. It starts at 24% in 2004, then drops to 23% in 2005 and 2006. It increases back to 24% in 2007 and tops at 26% in 2008 before gradually

Table 2. Descriptive statistics

	Observations	Mean	Median	SD	Min	Max
Lev	23,142	0.243	0.23	0.18	0.00	2.88
Lev_market	23,142	0.239	0.19	0.21	0.00	0.99
CGSCORE	23142	51.81	59.26	30.68	1.15	98.75
NGI(1)	23,142	1.37	1.54	0.54	−0.79	2.10
NGI(2)	23,142	0.16	0.43	0.86	−3.28	1.35
RL	23142	1.36	1.58	0.60	−0.99	2.12
RQ	23142	1.31	1.45	0.53	−0.68	2.23
GE	23142	1.42	1.55	0.53	−0.87	2.43
Female_per	23,037	0.1	0.08	0.11	0	0.67
Lnbsize	23,016	2.27	2.3	0.34	0	3.81
Independence	19,538	0.67	0.71	0.23	0	1
Duality	23,142	0.69	1	0.46	0	1
Ownership	23,142	0.15	0.00	0.35	0.00	1.00
Tang	23,142	0.59	0.60	0.21	0.00	1.00
MTB	23142	1.55	1.14	1.55	0.07	83.77
ROA	23142	0.05	0.05	0.13	−10.03	3.36
Firm_size	23,142	16.58	16.05	2.61	8.68	26.08

Note. The variables are defined as follows: Lev: Total debt/Total assets; Lev_market: Total debt/(Total debt + Market capitalization); CGSCORE: Corporate governance score; NGI(1): $(GE + RQ + RL)/3$; NGI(2): First principal component of GE, RQ, and RL; GE: Government effectiveness index; RQ: Regulatory quality index; RL: Rule of law index; Ownership: Ownership concentration; Tang: Asset tangibility; MTB: Market-to-book value; Firm_size: $\ln(\text{Total assets})$; Female_per: the percentage of female directors on corporate board; Lnbsize: logarithm of the number of directors on corporate board; Independent: the percentage of independent/non-executive directors on corporate board; Duality: dummy variable taking on a value of 1 if CEO is also the board of director chairperson.

decreasing to 24% in 2011 and 22% in 2014. To take into account the different levels of leverage over the period, we use dummies variables representing each year in the regression analyses.

Descriptive statistics also show that there are differences in leverage level by industries. Over the period, the Technologies industry has the lowest leverage level (15%), followed by Health Care (21%), Basic Materials (22%), Consumer Goods (23%), and Oil and Gas (23%). The Industrials, Consumer Services, and Telecommunications sectors have medium levels of leverage of 25%, 27%, and 33%, respectively. The Utilities industry has the highest level of leverage of 38%. To account for the different levels of leverage by industries, we use dummies variables representing each industry in the regression analyses.

Table 4 presents the correlation matrix of the variables used in the model. As the correlation structures of variables in different research scenarios show similar characteristics, we present only the correlation matrix for accounting leverage (*Lev*) and the main independent variables for brevity. As can be seen from Table 4, the dependent variable is significantly related to its first-order lag, indicating that the dynamic model structure is justified.

Furthermore, Table 4 also indicates that the level of national governance quality, represented by *NGI(1)* and *NGI(2)*, is negatively and significantly related to the level of leverage. The quality of corporate governance (represented by *CGSCORE*) is positively and statistically significantly related to the leverage level, with a correlation coefficient of 0.02. It also seems that countries with a higher average level of national governance quality usually have better firm-level corporate governance quality, with the correlation coefficients of *CGSCORE* and the *NGIs* at the

Table 3. Descriptive statistics of key variables at the national level

Nation/ Territory	N	Average corporate governance score(CGSCORE)	Average national governance quality score (NGI_1)	Average national governance quality score (NGI_2)	Average accounting leverage(Lev)	Average market leverage (Lev_market)
Australia	1,363	61.77	1.74	0.76	0.21	0.2
Austria	106	36.66	1.71	0.7	0.26	0.3
Belgium	164	51.2	1.43	0.26	0.28	0.31
Bermuda	78	53.58	1.12	−0.22	0.36	0.34
Brazil	285	27.57	−0.03	−2.07	0.33	0.32
Canada	1,419	74.84	1.74	0.76	0.22	0.21
Cayman Islands	14	61.07	1.09	−0.28	0.17	0.14
Chile	87	8.58	1.35	0.14	0.29	0.24
China	514	26.34	−0.19	−2.32	0.22	0.23
Colombia	25	31.89	−0.01	−2.02	0.19	0.19
Cyprus	11	60.08	1.22	−0.06	0.51	0.32
Czech Republic	11	21.36	1.02	−0.39	0.18	0.15
Denmark	198	37.12	1.97	1.12	0.21	0.18
Egypt	25	9.29	−0.45	−2.76	0.37	0.38
Finland	231	59.02	1.96	1.11	0.23	0.24
France	728	51.51	1.39	0.19	0.27	0.3
Germany	617	31.71	1.59	0.51	0.25	0.29
Greece	101	19.2	0.68	−0.94	0.29	0.41
Hong Kong (P.R.C.)	494	31.95	1.74	0.76	0.23	0.23
Hungary	15	49.1	0.79	−0.77	0.24	0.33
India	304	29.4	−0.19	−2.34	0.23	0.22
Indonesia	101	22.92	−0.38	−2.63	0.2	0.13
Ireland	223	69.48	1.63	0.57	0.26	0.23
Israel	54	43.98	1.12	−0.22	0.3	0.22
Italy	254	46.3	0.58	−1.09	0.35	0.39
Japan	3,272	11.9	1.32	0.08	0.22	0.28
Jersey	9	88.35	1.42	0.23	0.03	0.02
Kazakhstan	5	54.26	−0.47	−2.77	0.05	0.05
Korea (South)	392	13.63	1.03	−0.38	0.28	0.36
Kuwait	6	13.49	0.22	−1.7	0.24	0.22
Luxembourg	63	55.37	1.74	0.75	0.23	0.19
Macau (P.R.C.)	9	31.52	1.06	−0.3	0.34	0.08
Malaysia	155	43.97	0.71	−0.88	0.26	0.22
Mexico	124	18.58	0.01	−1.98	0.25	0.19
Morocco	6	8.11	−0.14	−2.25	0.13	0.05
Netherlands	278	66.21	1.78	0.83	0.24	0.22
New Zealand	94	59	1.83	0.9	0.33	0.26
Norway	142	59.4	1.76	0.78	0.24	0.24
Panama	5	34.09	0.15	−1.77	0.35	0.24
Papua New Guinea	10	62.39	−0.73	−3.19	0.15	0.08
Peru	9	33.32	−0.13	−2.2	0.11	0.08

(Continued)

Nation/ Territory	N	Average corporate governance score(CGSCORE)	Average national governance quality score (NGI_1)	Average national governance quality score (NGI_2)	Average accounting leverage(Lev)	Average market leverage (Lev_market)
Philippines	60	28.96	-0.2	-2.33	0.34	0.26
Poland	66	19.66	0.76	-0.8	0.19	0.23
Portugal	74	54.47	1.01	-0.41	0.42	0.46
Qatar	6	3.78	0.83	-0.71	0.18	0.07
Russian Federation	182	29.48	-0.52	-2.85	0.23	0.26
Saudi Arabia	30	5.36	0.09	-1.89	0.22	0.24
Singapore	242	47.36	1.92	1.05	0.22	0.2
South Africa	339	61.33	0.29	-1.55	0.18	0.17
Spain	308	47.11	1.12	-0.23	0.35	0.36
Sweden	361	54.03	1.86	0.94	0.25	0.23
Switzerland	487	51.11	1.79	0.84	0.19	0.16
Taiwan (R.O.C.)	454	11.47	1.11	-0.25	0.23	0.24
Thailand	78	44.59	0.09	-1.87	0.32	0.26
Turkey	79	21.14	0.26	-1.6	0.28	0.27
Ukraine	5	18.51	-0.68	-3.11	0.32	0.31
United Arab Emirates	22	50.72	0.69	-0.91	0.14	0.16
United Kingdom	2,177	72.72	1.68	0.65	0.24	0.22
United States	6,171	75.23	1.53	0.41	0.25	0.22
Total	23,142	51.81	1.37	0.16	0.24	0.24

national level being about 0.36 and are statistically significant at 5%. From the above analyses, we can see that national governance quality seems to have a role in the corporate governance quality-leverage relationship, and leaving it out of the scene may confound the true relationship between corporate governance quality and leverage. This provides a rationale for further checking with regression modeling.

4.2. Multiple regression results

Table 5 presents the regression results for model (2) with accounting leverage (*Lev*) and market leverage (*Lev_market*) as measures of firm leverage and *NGI(1)* as a measure of national governance quality. Columns (1), (2), (4), and (5) present the estimates of equation (2) using the POLS and fixed effects methods. As noted in Section 3, equation (2) suffers from an endogeneity problem and cannot be consistently estimated by either the POLS or fixed effects methods. The results are, nevertheless, useful as a cross-check because they provide upper and lower bounds for estimates by other endogeneity-consistent estimators (Baltagi, 2008).

Column (3) presents the regression results using the two-stage least squares (2SLS) method with *Lev* as the dependent variable. The Durbin-Wu-Hausman test for endogeneity ($P\text{-value} = 0.0444367$) confirms that the concerning variables (including *L_Lev*, *CGSCORE*, *NGI(1)_CGSCORE*) are endogenous. To remedy this, we use the first- and second-order lagged difference of *Lev* (*DL_Lev* and *D2L_Lev*) as instruments for the endogenous variable *L_Lev* and the first lag of *CGSCORE* and *NGI(1)_CGSCORE* as instruments for *CGSCORE* and *NGI(1)_CGSCORE*. The first stage Kleibergen-Paap F statistic is 57.53697, larger than any corresponding Stock-Yogo weak

Table 4. Correlation matrix for variables

	Lev	L_lev	Ngil(1)	Ngil(1)_CGSCORE	CGSCORE	Ngil(2)	Ngil(2)_CGSCORE	Female_Per
Lev	1.00							
L_lev	0.90***	1.00						
Ngil(1)	-0.04***	-0.03***	1.00					
Ngil(1)_CGSCORE	-0.00	-0.00	0.64***	1.00				
CGSCORE	0.02**	0.01*	0.36***	0.91***	1.00			
Ngil(2)	-0.04***	-0.03***	1.00***	0.64***	0.36***	1.00		
Ngil(2)_CGSCORE	-0.03***	-0.02***	0.84***	0.77***	0.45***	0.84***	1.00	
Female_Per	0.04***	0.04***	0.15***	0.36***	0.39***	0.15***	0.19***	1.00
Lnbsize	0.13***	0.14***	-0.12***	-0.06***	0.00	-0.12***	-0.13***	0.09***
Independence	0.01**	0.01	0.23***	0.60***	0.65***	0.23***	0.31***	0.36***
Duality	-0.01*	-0.01	0.00	-0.02***	-0.04***	0.01	0.01**	-0.02**
Ownership	0.02***	0.02**	-0.28***	-0.27***	-0.21***	-0.28***	-0.25***	-0.01
Tang	0.34***	0.33***	0.03***	0.14***	0.16***	0.03***	0.07***	0.08***
MTB	-0.15***	-0.14***	-0.01**	0.04***	0.04***	-0.01**	0.01	0.04***
ROA	-0.15***	-0.08***	-0.05***	-0.00	0.02**	-0.05***	-0.03***	0.05***
Firmsize	0.10***	0.11***	-0.38***	-0.52***	-0.48***	-0.38***	-0.40***	-0.20***
Lnbsize	1.00							
Indep_Nonexe	-0.04***	1.00						
Duality	-0.06***	-0.08***	1.00					
Ownership	0.07***	-0.09***	0.09***	1.00				
Tang	0.11***	0.15***	0.01	0.05***	1.00			
MTB	-0.14***	0.07***	-0.01	0.02***	-0.18***	1.00		
ROA	0.02***	0.02**	-0.01*	0.05***	-0.08***	0.31***	1.00	
Firmsize	0.30***	-0.43***	-0.10***	0.09***	0.02***	-0.23***	0.00	1.00

***, **, and * indicate significance at 10%, 5%, and 1%, respectively. The variables are defined as follows: Lev: Total debt/Total assets; Lev_market: Total debt/(Total debt + Market capitalization); CGSCORE: Corporate governance score; NGil(1): (GE + RQ+RL)/3; NGil(2): First principal component of GE, RQ, and RL; GE: Government effectiveness index; RQ: Regulatory quality index; RL: Rule of law index; Ownership: Ownership concentration; Tang: Asset tangibility; MTB: Market-to-book value; Firm_size: Ln(Total assets); Female_per: the percentage of female directors on corporate board; Lnbsize: logarithm of the number of directors on corporate board; Independence: the percentage of independent/non-executive directors on corporate board; Duality: dummy variable taking on a value of 1 if CEO is also the board of director chairperson.

instrument test critical values. This implies that the instruments are correlated with endogenous variables and are thus efficient instruments. The P-value for the Hansen-J test statistic of 0.774281 indicates that the instruments are not correlated with the error terms, which proves that the instruments used are valid. A further check on the control variables shows that the signs of the estimates are generally in agreement with previous research, such as (Parsons & Titman, 2008). In particular, tangibility (*Tang*) and firm size (*Firm_size*) positively affect firms' leverage levels.

The procedures are reapplied to estimate equation (2) with *Lev_market* as the dependent variable. As with the case of accounting leverage, the results of the diagnostic tests presented in column (6) indicate that the endogenous problem exists and is properly treated. Overall, the model diagnosis test results indicate that the endogeneity problem is properly treated, and thus the 2SLS estimates in columns (3) and (6) are consistent and can be used for making inferences.

The test of hypothesis 1 amounts to testing the joint hypothesis of whether β_2 or/and β_3 are significantly different from zero. The results in columns (3) and (6) show that the regression coefficients corresponding to *CGSCORE* and its interaction terms with *NGI(1)* are statistically significant at the 1% level, indicating that corporate governance quality does indeed affects firms' leverage levels, whether measured by accounting leverage or market leverage. Thus, our hypothesis 1 is confirmed. This result is important because it lays the foundation for the test of the second hypothesis. It would be illogical to test the moderating effect of national governance quality on the corporate governance—leverage relationship when there is no such relationship exists. Furthermore, the empirical results seem to indicate a positive relationship between corporate governance quality and leverage decision. Thus, the results seem to validate the agency theory approach to the corporate governance—capital structure decision, where managers tend to prefer lower than optimal level of debts and a more efficient board of directors seems to push managers to increase borrowing more toward the optimal level for investors.

The test of the second hypothesis amount to the test of whether the regression coefficient corresponding to the interaction term (namely *NGI(1)_CGSCORE*) is negative and statistically significant. The results in columns (3) and (6) indicate that the regression coefficient corresponding to the interaction term between national governance quality and corporate governance quality [namely, *NGI(1)_CGSCORE*] is negative and significant at the 1% level, implying that national governance quality negatively moderates the relationship between firm-level governance quality and leverage decisions.

The negative coefficient corresponding to the interaction terms shows the effect of corporate governance on leverage is weaker in economies with better national governance quality. In economies with low national governance quality, i.e. the “rules of the game” are not very investor-friendly, the role of corporate governance is more important in disciplining the managers. This results in a higher effect of corporate governance on a firm's debt level. Contrarily, in economies where national governance quality is high, i.e. investors are better protected in general, the disciplinary effect of firm-level corporate governance seems to be less important.

Cautions should be taken when interpreting the effect size of corporate governance. At first sight, the regression coefficients of *CGSCORE* and *NGI(1)_CGSCORE* are so small, rendering them trivial. However, we should consider what is a meaningful change in firm-level corporate governance quality and national governance quality. As defined in Table 1, *CGSCORE* is measured on a scale of 1 to 100 and *NGI(1)* of -2.5 to $+2.5$. It is not meaningful as well as unrealistic to consider the effect of corporate governance quality on leverage of two companies that are different from each other of 1 unit in *CGSCORE* (e.g., 50 versus 51). Likewise, it is hard to interpret the difference of 1 unit of *NGI(1)*. To make a more meaningful and realistic comparison, we suggest using quartile 1 and quartile 3 of *CGSCORE* as an indication of the low and high firm-level quality of corporate governance. Likewise, we also use quartile 1 and quartile 3 of *NGI(1)* to contrast between a low and high level of national governance quality. To illustrate, we calculate the differences in leverage

Table 5. The effect of corporate governance quality on leverage with national governance quality as a moderator

	Dependent variable: Lev			Dependent variable: Lev_market		
	Pooled OLS	Fixed-Effects	2SLS	Pooled OLS	Fixed-Effects	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
L_Lev	0.88725*** [133.034]	0.50997*** [36.473]	0.87264*** [36.769]	-	-	-
L_Lev_market				0.83553*** [126.137]	0.44826*** [37.641]	0.77116*** [41.552]
NGI(1)_CGSCORE	-0.00010*** [-4.838]	-0.00012* [-1.685]	-0.00013*** [-5.411]	-0.00016*** [-5.670]	-0.00021** [-2.245]	-0.00021*** [-6.715]
CGSCORE	0.00018*** [4.744]	0.00012 [1.029]	0.00025*** [5.332]	0.00022*** [4.650]	0.00028* [1.928]	0.00030*** [5.205]
Ownership	0.00069 [0.401]	-0.00207 [-0.481]	0.00009 [0.055]	-0.00003 [-0.015]	-0.00455 [-0.855]	-0.00207 [-1.051]
Tang	0.03614*** [8.318]	0.07140*** [3.256]	0.03891*** [5.260]	0.04036*** [10.760]	0.07776*** [5.190]	0.05797*** [11.653]
MTB	0.00270** [2.167]	0.00022 [0.178]	0.00355** [2.146]	-0.00640*** [-3.593]	-0.00842** [-2.098]	-0.00378** [-2.252]
ROA	-0.12030*** [-3.035]	-0.13777*** [-2.607]	-0.12393*** [-2.684]	-0.10338*** [-3.382]	-0.13825*** [-3.059]	-0.12513*** [-2.946]
Firm_size	0.00062** [2.173]	0.01711*** [4.843]	0.00076** [2.010]	0.00223*** [6.136]	0.04620*** [11.086]	0.00369*** [6.991]
Constant	-0.02094** [-2.504]	-0.20015*** [-3.522]	-0.01625** [-2.217]	-0.04741*** [-4.164]	-0.66512*** [-9.309]	-0.04850*** [-5.099]
Industry dummies	Yes	No	Yes	Yes	No	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	22,883	22,883	18,672	22,883	22,883	18,672
R-squared	.8254119	.3419297	.8411863	.8149964	.4098538	.8257489
F statistic	2175.715	141.51	1044.264	3382.138	291.3213	1441.722
Kleibergen-Paap F statistic			57.53697			200.5313
Hansen J (P-value)			.774281			.0652836
Durbin-Wu-Hausman test (P-value)			.0444367			0.00000

*, **, *** indicate significance at 10%, 5%, and 1%. The t-statistics are presented in brackets. Columns (1) to (6) give the regression results for the following model:

$$\begin{aligned} \text{Leverage}_{it} = & \beta_0 + \beta_1 \text{Leverage}_{it-1} + \beta_2 \text{CGSCORE}_{it} \\ & + \beta_3 \text{National governance quality}_{it} + \sum_{i=4}^{27} \beta_i \text{controls}_{it} \\ & + \text{industry dummies} + \text{year dummies} + u_i + \epsilon_{it} \end{aligned}$$

The variables are defined as follows: Lev: Total debt/Total assets; Lev_market: Total debt/(Total debt + Market capitalization); CGSCORE: Corporate governance score; NGI(1): (GE + RQ + RL)/3; NGI(2): First principal component of GE, RQ, and RL; GE: Government effectiveness index; RQ: Regulatory quality index; RL: Rule of law index; Ownership: Ownership concentration; Tang: Asset tangibility; MTB: Market-to-book value; Firm_size: Ln(Total assets).

level of firms with high and low corporate governance quality in economies with high and low national governance quality, using the results in column (3) of Table 5. The results are presented in Table 6.

The results in Table 6 indicates that in economies with a low level of national governance quality (i.e., *NGI(1)* is below 1.29), firms with a high level of corporate governance quality (i.e., *CGSCORE* is above 79.3) have leverage levels of about 0.48% higher than those of firms with a low level of governance quality (i.e., *CGSCORE* is below 20.6), everything else is the same. In economies with a high level of national governance quality (i.e., *NGI(1)* is above 1.71), this difference is reduced to 0.16%, as predicted. Considering that the average level of borrowing of firms is about 24% and relative to the effect size of other factors in the model (e.g., *Firm size*), these differences are not trivial as first seem.

4.3. Robust tests

To check the robustness of the above results, we re-estimate equation (2) using different measures of national governance quality. The results with *Lev* as the dependent variable are presented in Table 7. In particular, columns (1), (2), and (3) present the regression results using different dimensions of national governance quality, *GE*, *RL*, and *RQ*, respectively. Column (4) presents the regression results of equation (2) with *NGI(2)* as the measure of national governance quality, and where *NGI(2)* contains the values predicted using the first principal component of the factor analysis of the three above-mentioned national governance dimensions.

As can be seen in Table 7, corporate governance quality (represented by *CGSCORE*) is positively related to accounting leverage in all four model specifications. This confirms the previous conclusion that better corporate governance quality at the firm level tends to force executives to increase borrowing toward levels preferred by shareholders. As for the moderating effect of national governance quality, it has a positive relationship with accounting leverage for all four alternative measures of governance quality [*NGI(1)*, *GE*, *RL*, and *RQ*], which means that investor-friendly national institutions reduce agency problems and the pressure on executives to adjust their firm's leverage.

The same process was reapplied with market leverage (*Lev_market*) as the dependent variable and the results are presented in Table 8. Again, we see the same patterns emerge. At the firm level, corporate governance quality (represented by *CGSCORE*) is positively related to market leverage in three out of four model specifications [see columns (1), (2), and (3)]. At the national level, all four measures of national governance quality are negatively related to leverage, confirming the moderating effect of national governance quality on the effectiveness of firm-level corporate governance quality.

The statistical results with different proxies for national governance quality presented in Tables 7 and Table 8 are generally in line with those using *NGI(1)* as the proxy for national governance quality. This implies that the estimation results shown in Table 5 are robust to various proxies for national governance quality.

To further test the robustness of the above results using other proxies for board efficiency, we re-estimate equation (1) with popular board characteristics, namely board gender diversity (measured by the percentage of female directors), board size (measured by logarithm of the number of

Table 6. An illustration of how leverage level changes with high and low levels of national governance quality and corporate governance quality

		NGI(1)		
		Quartile 1 = 1.29	Median = 1.54	Quartile 3 = 1.71
CGSCORE	Quartile 1 = 20.6	22.98%	22.91%	22.86%
	Quartile 3 = 79.3	23.46%	23.20%	23.03%
Delta		0.48%	0.29%	0.16%

Table 7. Robust check using accounting leverage and different measures of national governance quality

	Dependent variable: Lev			
	(1)	(2)	(3)	(4)
L_Lev	0.87306*** [36.740]	0.87234*** [36.740]	0.87288*** [36.777]	0.87263*** [36.767]
RL_CGSCORE	-0.00010*** [-4.530]			
RQ_CGSCORE		-0.00014*** [-5.613]		
GE_CGSCORE			-0.00012*** [-5.122]	
NGI(2)_CGSCORE				-0.00008*** [-5.430]
CGSCORE	0.00021*** [4.685]	0.00026*** [5.640]	0.00024*** [5.044]	0.00009*** [3.042]
Ownership	-0.00002 [-0.012]	0.00015 [0.087]	0.00029 [0.171]	0.00010 [0.057]
Tang	0.03986*** [5.419]	0.03933*** [5.296]	0.03855*** [5.220]	0.03891*** [5.261]
MTB	0.00512*** [2.699]	0.00352** [2.126]	0.00358** [2.162]	0.00355** [2.145]
ROA	-0.12889*** [-2.697]	-0.12391*** [-2.685]	-0.12390*** [-2.684]	-0.12393*** [-2.684]
Firm_size	0.00103** [2.532]	0.00067* [1.748]	0.00085** [2.238]	0.00076** [2.005]
Constant	-0.02426*** [-2.922]	-0.01445* [-1.958]	-0.01716** [-2.352]	-0.01619** [-2.208]
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Number of observations	18,672	18,672	18,672	18,672
R-squared	.8410653	.8411904	.8411766	.8411868
F statistic	1039.764	1045.184	1044.344	1044.354
Kleibergen-Paap F statistic	45.35483	57.42685	57.53352	57.53017
Hansen J (P-value)	.7521881	.7749928	.7714558	.7742698
Endogeneity test (P-value)	.0102168	.0235312	.041965	.0425501

*, **, *** indicate significance at 10%, 5%, and 1%, respectively. The t-statistics are presented in brackets. Columns (1) to (4) give the regression results for the following model:

$$\text{Leverage}_{it} = \beta_0 + \beta_1 \text{Leverage}_{it-1} + \beta_2 \text{CGSCORE}_{it} + \beta_3 \text{National governance quality}_{it} + \sum_{i=4}^{27} \beta_i \text{controls}_{it} + \text{industry dummies} + \text{year dummies} + u_i + \epsilon_{it}$$

The variables are defined as follows: Lev: Total debt/Total assets; Lev_market: Total debt/(Total debt + Market capitalization); CGSCORE: Corporate governance score; NGI(1): (GE + RQ+RL)/3; NGI(2): First principal component of GE, RQ, and RL; GE: Government effectiveness index; RQ: Regulatory quality index; RL: Rule of law index; Ownership: Ownership concentration; Tang: Asset tangibility; MTB: Market-to-book value; Firm_size: Ln(Total assets).

directors), board independent (measured by the percentage independent and non-executive directors), and CEO duality (measured by a dummy variable with the value of 1 representing CEO duality). The regression results are presented in Table 9.

The regression results using the above board characteristics as proxies for board efficiency are consistent with the results using a composite index of the 54 corporate governance indicators as presented in Table 5, Table 7, Table 8. Specifically, the regression coefficients corresponding to *Female_per*, *Lnbsize*, *Independence*, and *Duality* are positive and statistically significant at 1%, meaning that more efficient boards tend to induce firms to afford higher leverage levels. The coefficients of interaction terms between the board characteristics and *NGI(1)* are negative and statistically significant at 1%, indicating that the effect of the board characteristics would be weakened as national governance quality increases.

The empirical evidence discussed above confirms the two hypotheses proposed in this research. Firstly, the analyses show that corporate governance quality, whether represented by composite indexes summarizing several aspects of the firm governance system or by various board characteristics, seems to positively affect firms' leverage levels. These results confirm the previous theory and empirical evidence by Morellec et al. (2012) and Liao et al. (2015). In particular, the evidence suggests that managers tend to prefer a lower than optimal level of leverage and that better corporate governance by boards of directors forces managers to increase leverage toward shareholders' desired levels. The negative relationship observed in some previous research, such as Arping and Sautner (2010), Jiraporn et al. (2012), and Haque et al. (2011), maybe because those studies did not take the dynamics of capital structure into account.

Secondly, the results also indicate that the effect of corporate governance on capital structure decisions should differ among economies. In particular, better national governance quality reduces the effect of corporate governance on capital structure decisions. This may be because better national governance quality creates a more investor-friendly environment and thus fewer agency problems. If agency problems are reduced and investors are better protected, it follows that the disciplinary role of corporate governance would not need to be as intensive and that the effect of corporate governance on leverage decisions would diminish. The moderating effect of national governance quality may explain the phenomenon observed in a previous study by Demirgüç-Kunt and Maksimovic (1996) in which the authors found that companies operating in economies with different levels of financial market development had different leverage levels. In particular, the authors found that firms operating in newly-developing financial markets tend to have higher levels of borrowing. In contrast, firms operating in long-developed financial markets tend to substitute equity for debt. Demirgüç-Kunt and Maksimovic (1996), however, did not present a detailed explanation for their results.

To the extent that national governance in the form of regulations and policies fosters the development of large and transparent financial markets and reduces agency problems, the moderating effect of national institutions on the corporate governance–leverage level, as indicated in this research, is not only a confirmation of the differences in capital structure choices reported in previous studies, such as Demirgüç-Kunt and Maksimovic (1996), Rajan and Zingales (1995), and Booth et al. (2001) but also a possible explanation for the observed phenomenon.

To a larger extent, the moderating effect of national governance quality on the corporate governance quality–capital structure found in this research adds to the mounting evidence on the moderating effect of national institutions on the effectiveness of several corporate governance mechanisms, which has been raised by some recent researchers, such as Filatotchev et al. (2013), and empirically tested by Tuan Nguyen et al. (2021) on the board gender diversity–firm performance relationship.

5. Conclusions and limitations

By using a multinational dataset containing 23,142 firm-year observations of 3,270 firms in 59 economies from 2004 to 2014, our analyses indicate that firm-level corporate governance quality seems positive affects leverage. This supports the agency theory approach to corporate governance—capital structure decision relationship, where managers tend to prefer a sub-optimal level of debt, and a better corporate governance system tends to force managers to increase the firm's

Table 8. Robust check using market leverage and different measures of national governance quality

	Dependent variable: Lev_market			
	(1)	(2)	(3)	(4)
L_Lev_market	0.77058*** [41.584]	0.77242*** [41.640]	0.77110*** [41.478]	0.77119*** [41.551]
RL_CGSCORE	-0.00021*** [-7.241]			
RQ_CGSCORE		-0.00016*** [-4.976]		
GE_CGSCORE			-0.00023*** [-7.082]	
NGI(2)_CGSCORE				-0.00013*** [-6.682]
CGSCORE	0.00030*** [5.480]	0.00022*** [3.808]	0.00033*** [5.476]	0.00003 [1.021]
Ownership	-0.00253 [-1.279]	-0.00134 [-0.681]	-0.00194 [-0.989]	-0.00205 [-1.039]
Tang	0.05805*** [11.694]	0.05790*** [11.604]	0.05752*** [11.567]	0.05796*** [11.650]
MTB	-0.00383** [-2.275]	-0.00364** [-2.182]	-0.00377** [-2.254]	-0.00378** [-2.251]
ROA	-0.12522*** [-2.946]	-0.12493*** [-2.947]	-0.12515*** [-2.944]	-0.12512*** [-2.946]
Firm_size	0.00369*** [6.959]	0.00372*** [7.006]	0.00379*** [7.246]	0.00369*** [6.995]
Constant	-0.04948*** [-5.205]	-0.04909*** [-5.125]	-0.04925*** [-5.220]	-0.04848*** [-5.096]
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Number of observations	18,672	18,672	18,672	18,672
R-squared	.8256939	.8257289	.825825	.8257511
F statistic	1439.836	1446.31	1441.396	1441.821
Kleibergen-Paap F statistic	202.1578	199.519	201.1271	200.4697
Hansen J (P-value)	.0659272	.065512	.0644738	.065258
Endogeneity test (P-value)	0.0000	0.0000	0.0000	0.0000

*, **, *** indicate significance at 10%, 5%, and 1%. The t-statistics are presented in brackets. Columns (1) to (4) give the regression results for the following model:

$$\begin{aligned}
 \text{Leverage}_{it} = & \beta_0 + \beta_1 \text{Leverage}_{it-1} + \beta_2 \text{CGSCORE}_{it} \\
 & + \beta_3 \text{National governance quality}_{it} \\
 & + \beta_4 \text{National governance quality_CGSCORE}_{it} \\
 & + \sum_{i=5}^{13} \beta_i \text{controls}_{it} + \text{industry dummies} \\
 & + \text{year dummies} + u_i + \epsilon_{it}
 \end{aligned}$$

The variables are defined as follows: Lev: Total debt/Total assets; Lev_market: Total debt/(Total debt + Market capitalization); CGSCORE: Corporate governance score; NGI(1): (GE + RQ+RL)/3; NGI(2): First principal component of GE, RQ, and RL; GE: Government effectiveness index; RQ: Regulatory quality index; RL: Rule of law index; Ownership: Ownership concentration; Tang: Asset tangibility; MTB: Market-to-book value; Firm_size: Ln(Total assets).

Table 9. Robust check using accounting leverage and different board characteristics		Dependent variable: Lev		
	(1)	(2)	(3)	(4)
L_Lev	0.87435** [36.819]	0.87266*** [36.627]	0.84017*** [34.581]	0.87267*** [36.833]
Female_per	0.04301*** [3.021]			
NGI(1)_Female_per	-0.01990** [-2.437]			
Lnbsize		0.00786*** [3.373]		
NGI(1)_Lnbsize		-0.00236*** [-5.378]		
Independence			0.02748*** [6.748]	
NGI(1)_Independence			-0.00937*** [-5.042]	
Duality				0.00624*** [2.991]
NGI(1)_Duality				-0.00584*** [-5.034]
Ownership	0.00004 [0.025]	-0.00160 [-1.008]	-0.00138 [-0.749]	-0.00087 [-0.534]
Tang	0.03917*** [5.397]	0.03997*** [5.518]	0.04218*** [5.389]	0.04029*** [5.509]
MTB	0.00365** [2.220]	0.00353** [2.140]	0.00588*** [3.771]	0.00347** [2.121]

(Continued)

Table9. (Continued)		Dependent variable: Lev			
	(1)	(2)	(3)	(4)	
ROA	-0.12338*** [-2.686]	-0.12325*** [-2.685]	-0.19704*** [-4.911]	-0.12306*** [-2.690]	
Firm_size	0.00080** [2.539]	0.00021 [0.785]	0.00149*** [3.957]	0.00032 [1.172]	
Constant	-0.01479** [-2.505]	-0.01405* [-1.931]	-0.02870*** [-3.493]	-0.00470 [-0.819]	
Industry dummies	Yes	Yes	Yes	Yes	
Year dummies	Yes	Yes	Yes	Yes	
Number of observations	18,556	18,520	14,922	18,672	
R-squared	.8404762	.8404654	.8352223	.8412094	
F statistic	1025.322	1025.851	778.5251	1025.33	
Kleibergen-Paap F statistic	57.27541	56.73179	46.89703	57.89623	
Hansen J (P-value)	.7590503	.7652136	.2696951	.7575776	

*** ***, indicate significance at 10%, 5%, and 1%. The t-statistics are presented in brackets.

Columns (1) to (4) give the regression results for the following model:

$$Leverage_{it} = \theta_0 + \theta_1Leverage_{it-1} + \theta_2BOARD_CHARACTERISTIC_{it} + \theta_3Nationalgovernancequality_{it} + \theta_4ROA_{it} + \theta_5Firm_size_{it} + \theta_6Tangibility_{it} + \theta_7CGSCORE_{it} + \theta_8Duality_{it} + \theta_9Female_per_{it} + \theta_{10}Constant$$

ROA: Return on Assets; Firm_size: Ln(Total assets); Tangibility: Market-to-book value; CGSCORE: Corporate governance score; Duality: a dummy variable with the value of 1 representing CEO duality.

leverage. These results are robust with different measures of corporate governance, whether these measures are aggregate indexes or board of director characteristics.

However, the magnitude of the effect of corporate governance quality on the leverage level is moderated by the quality of national governance. Specifically, given the same quality of corporate governance, the pressure to borrow more is lower for firms in economies with better national governance quality, i.e., economies with better law enforcement systems, regulation quality, and government efficiency. This indicates better that the national governance system creates a transparent, investor-friendly, and accountable business environment, which by itself acts as a public disciplinary mechanism on managers and helps lower agency conflicts between managers and investors. As agency conflicts are less severe, management disciplinary mechanisms, in this case, corporate governance systems, are less relevant in capital structure decisions.

The findings of this study are interesting in two regards. Firstly, the results contribute to the literature by suggesting that the operation and the effectiveness of corporate governance mechanisms do not only depend on the nature of the mechanisms themselves but also the national governance quality. The moderating effect of national governance quality can only be detected using multinational datasets and this helps explain the inconclusive evidence of previous research that used single-nation datasets. To the extent that this is true, our findings also add to the call for future corporate governance research to formally account for differences in national governance quality (Aslan & Kumar, 2012; Filatotchev et al., 2013; Kumar & Zattoni, 2013; Tuan Nguyen et al., 2015; Tuan Nguyen et al., 2021; Terjesen & Singh, 2008).

Secondly, insofar as a national institution is a broad concept, our findings are also helpful for policymakers in debates on institutional reform by pointing out a specific dimension of a national institution, namely national governance quality, at which efforts should be targeted to build an investor-friendly business environment as well as a stronger business community.

Given the contributions, this research inevitably has limitations, some of which can be fruitful for future research. Firstly, it can be seen that the dataset used in this research just covers the period from 2004 to 2014. This limits the ability to extrapolate the results to the current time frame. Notwithstanding, this limitation opens up a direction for future research. It would be interesting to see how the corporate governance—capital structure relationship and the moderating role of national governance quality have evolved in future research with more up-to-date data. Secondly, this research limits its attention to narrow and formal aspects of a national institution, namely national governance mechanisms. As a national institution is a broad concept, encapsulating formal as well as informal mechanisms, the dimensions of national institution used in this research touch on only a very small part of the picture. Following the encouraging results from this study, we suggest that future research further explore the moderating role of national governance quality as well as other aspects of national institutions on other corporate financial choices and mechanisms.

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Author details

An Nguyen¹

Tuan Nguyen¹

E-mail: tuannv@dlu.edu.vn

ORCID ID: <http://orcid.org/0000-0002-9958-8574>

Phuong Hoang¹

¹ Faculty of Economics and Business Administration, Dalat University, 1 Phu Dong Thien Vuong, Dalat, Vietnam.

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