Multilevel Determinants of MNC Corruption Risk

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We explore the multi-level determinants of firm-level corruption risk among multinational corporations (MNCs) in both developed and developing market economies in comparative context. We argue that institutional and regulatory environments affect MNCs' anti-corruption performance. We employ a comprehensive measure of MNC corruption risk and find evidence for the influence of country-level institutional and regulatory effects, while firm-level financial characteristics also influence anti-corruption performance. Furthermore, the effects of institutional and regulatory environments differ between developed and developing markets. In general, our framework and results highlight the utility of strong legal and regulatory environments, particularly in developing markets, to combat MNC corruption risk.

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1. Introduction

For many years, corruption has been on the agenda of practitioners and scholars alike. The main reason for interest in this field were not least significant and far-reaching corruption scandals that revealed gaps in existing legislation (e.g. Valarina and Pohlmann 2019; Blanc et al. 2019). For practitioners in the field of policy and regulations, the scandals sparked discussions about the appropriate design of standards, guidelines, and regulations. Business practitioners, mostly situated on the "supply side" of corruption, were then faced with the operational challenge of ensuring compliance on a firm level, including the implementation of appropriate internal controls and reporting channels, and reacting on the mounting public pressure towards transparency and integrity (Sidhu 2009; Cardoni et al. 2020). The "supply side", in contrast to the "demand side" of corruption, describes the offering or giving party of a corrupt transaction, e.g. the giver of a bribery payment. The corrupt act, however, can originate from both the supply and demand side (Bahoo et al. 2020).

However, academic studies, which attempted to provide clarity about the mechanisms behind corrupt practices, have mostly focused on exploring the determinants of corruption on a country level, as existing corruption indices at country level facilitate empirical work (such as the Corruption Perception Index (CPI)). Others have assessed the "demand side" of corruption (see, for example, Beets 2005). In doing that, it has largely ignored that the supply side of corruption consists of manifold organisations with differing financial situations and governance models. Only recently have scholars begun to draw their attention explicitly also to the supply side of corruption and to assessing the determinants of corrupt practices more differentiated on the firm level (for example, Clark et al. 2004 and Chen et al. 2008). However, a key limiting factor to the extant development of this literature is the lack of comparable data on corruption levels of individual enterprises (Lopatta et al. 2017: 47). In lack of a precise measurement, scholars have often referred to country-level measures, the decision to bribe, the amount of bribery payouts or transparency levels as indicators of firm-level corruption (e.g., Bushman et al. 2004; Chen et al. 2008; Tonoyan et al. 2010).

It is paramount to further explore the supply side to give guidance not only to regulators and policy practitioners, but also to business practitioners situated in different economic environments about the causes of corrupt practices within their organisations. For that reason, we depart from much recent work on firm-level corruption by utilising an index that addresses a holistic understanding of corruption at the firm level (TI Index 2012, 2013, 2014, 2016) to answer the following research question: (1) What determines multinationals' corruption risk? Furthermore, the dataset allows to compare organisations within different economic settings, providing practitioners with greater detail about the effectiveness of measures depending on economic development. Therefore, we pose a second research question: (2) Do the determinants in developed market economies differ from the ones in developing markets; and if yes, in what way?

We address these questions through the application of a multilevel approach. At the firm level, financial resources influence the risk of corrupt practices, while administrative burdens and investor and employment protection at the country level also affect MNC corruption risk. Furthermore, these effects vary between developed and developing market economies. We explore the relationship between firm-level and country-level attributes and corruption risk using an original dataset produced by Transparency International that covers MNC affiliates spanning 27 countries.

While we largely find support for our argument, investor protection stands out as the most substantial safeguard against corruption risk. For policymakers and practitioners, particularly in emerging market economies, this points to benefits from strengthening a country's legal environment. Less obvious country-level factors, such as employment and labour laws, also influence corruption risk, and must not be underrated in their significance to impact firms' behaviours.

2. Theoretical Background

Firms and Corruption Risk

A large group of scholars explains the variation in firm corruption with the help of properties and resources of enterprises (Svensson 2003; Clarke and Xu 2004; Arvis and Berenbeim 2003; Chen et al. 2008; Birhanu et al. 2016). Wu (2009), for instance, demonstrates the importance of enterprise-level characteristics for the

explanation of bribery dynamics in Asian firms: large Asian firms are less likely to engage in illicit activities than small ones. The author finds evidence for this hypothesis by utilising data from the World Bank's World Business Environment Survey (WBES), based on the responses of managers of approximately 10.000 enterprises (83 countries) in the time period between 1998 and 2000. The dummy variable accounting for firm size (1 = less than 500 employees, 0 = more than 500 employees) is significantly correlated with enterprises' decision to bribe and the frequency of bribery payments. However, the variable is insignificantly correlated with regard to the amount of bribery payments. This result convincingly supports the hypothesis that the risk of engaging in corrupt practices is higher in smaller firms because they have less-developed internal business fraud procedures and attract less attention from fraud agencies (Wu 2009: 77; Arvis and Berenbeim 2003: 20–25).

Chen et al. (2008) also base their dependant variable, the incident of bribery payouts, on the WBES, but take a larger-scale comparative approach involving firms in 55 countries. They find that a higher amount of current sales and higher employee numbers limit the incidence of bribery payouts, pointing to a negative relationship between firm resources and corruption activities (Wernerfeldt 1984; Barney 1991). This is explained by the fact that firms have more assets and resources to take legal action against corrupt officials or authorities. The authors employ a global scope of the study, which is more extensive than Wu (2009)'s Asia focus, and highlight the importance of investigating both micro and macro level variables. Despite their use of macro-level variables, such as the countries' legal origin, masculinity index or religion, Chen et al. (2008) do not account for the extent and quality of regulations or factors accounting for the political and economic situation of firms. Consequently, the possibility that corruption mechanisms might differ between firms headquartered in various countries at different institutional and economic development stages is largely neglected.

More recently, Lopatta et al. (2017) examine firm-level corruption risk by using an original corruption risk index to assess the 105 largest firms worldwide. Instead of relying upon country-level corruption indices or data obtained through interviews about bribery payments, they quantify the level of reporting transparency on issues related to corruption within firms' annual reports and, thus, obtain a comparatively objective and

re-applicable methodology to determine firms' individual corruption risk scores. In their quantitative research, they find that firms characterised by higher financial constraints and a lower corporate social responsibility performance are more likely to engage in corrupt practices. Financial constraints are measured by firms' reliance on external finance, suggesting that likeliness of corruption increases when financial performance is poor. Yet Lopatta et al.'s (2017) fail to sufficiently elaborate on this correlation and, since the study is mainly concerned with corporations in developed economies, they do not include other variables to control for specific institutional or economic settings.

In contrast to the studies above, which propose a negative relationship between firms' resources and corrupt practices, Svensson (2003) and Clarke and Xu (2004) find evidence that firms' "ability to pay" (Svensson 2003: 208) is positively related to the amounts they pay in bribery payments. In order to explain within-country and within-industry variation, Svensson (2003: 210–211) suggests that the act of determining the amount to pay is best described as an isolated bargaining situation in which the public servant seeks to maximise the amount he or she might obtain. This amount rises in correspondence with firms' resources, although subsequent work has not necessarily confirmed this relationship (Durnev and Kim 2005; Wu 2009).

According to the high number of previous research endeavours, firm-level variables need to be accounted for when explaining the corruption risk of MNCs. However, the literature reveals shortcomings in the definition of the dependant variable, since most studies use either bribery pay-outs or country-level corruption scores. Moreover, the comparison of mechanisms between countries of different economic development stages leaves room for exploration.

Institutions and Corruption Risk

The effects of legal and regulatory environments, such as the efficiency of courts, minority investor protection or ownership concentration, which set the contract enforcement environment for business interactions and influence power configurations in principal-agent relationships, have been subject to extensive investigation (for example, Bushman et al. 2004; Durnev and Kim 2005; Cuervo-Cazurra 2006; Tonoyan 2010; Lopatta et al. 2017).

In one example of this body of work, Durnev and Kim (2005) assess the impact of legal and political economy factors on firms' governance and disclosure practices. Across 27 countries, they demonstrate that the relationship between external financing needs, among two other firm-level variables, and corporate governance practices is stronger in countries with weaker legal institutions. One explanation for this correlation is the fact that firms have to establish the trust of potential investors, who tend to be more hesitant if they lack trust in the legal setting in which the firms operate. Comparing European states, Tonoyan et al. (2010) find that both lower level of efficiency of legal and financial institutions and a poor enforcement increase the likelihood of bribery payments as firms attempt to avoid excessive red tape and do not trust in legal institutions to efficiently and fairly resolve their business disputes. In both Durnev and Kim's (2005) and Tonoyan et al.'s (2010) research, though, the dependent variable is based on business actors' perceptions of the likelihood of bribe payments.

Accounting for the international nature of MNCs, a number of scholarly works has examined the impact of home and host country characteristics in relation to corruption on foreign direct investment (FDI). Godinez and Liu (2015), for example, find evidence in the context of Latin America that a "negative corruption distance", meaning that the corruption levels of the host country are higher than the ones of the home country, significantly decreases the levels of inward FDI. Cuervo-Cazurra (2016), as another example, finds that host countries with higher levels of corruption receive less FDI from countries that have signed the Organization for Economic Cooperation and Development Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, thus, suggesting that international efforts against corrupt practices abroad achieve the desired effect. Moreover, Cuervo-Cazurra's results show that FDI is relatively higher coming from countries with higher corruption levels when corruption levels in host countries are higher. This suggests that investors from more corrupt countries are not deterred by the risks and uncertainties of operating in a country with higher corruption scores, but rather be attracted by those countries because of lower costs of doing business as well as the institutional similarities to their country of origin. Both papers suggest that merely considering home country characteristics would not be sufficient to understand the determinants of MNCs' corruption risks.

A number of scholars point to the importance of the industries and sectors in which the firms operate (for example, Svensson 2003; Clarke and Xu 2004; Chen et al. 2008). Chen et al. (2008), for instance, provide compelling evidence that firms in industries in which public officials hold a strong discretionary or "control power" (ibid: 232), measured, among others, as corporations' reliance on public infrastructure and the option to seek a different authority, are more exposed to bribery demands. Consequently, firms in monopolistic and less competitive industries have been found to be more inclined to paying bribes due to their close interaction with administrative officials (Clarke and Xu 2004). All of these studies, however, are concerned with bribery payments as only one indicator of corporate malpractice.

To summarise, the empirical studies discussed above have employed different theoretical levels: firm-level variables such as size, financial constraints or the number of employees mirror the resources or specific characteristics of a firm; and industry or country-level variables (of home and host countries) such as country-level corruption scores, legal enforcement quality, investor protection, administrative burdens, and industry competition display the different institutional settings and environments of doing business which influence corrupt practices on the firm level.

Several areas of enquiry remain to be explored. There has been little quantitative analysis which examine whether the determinants of firm-level corruption in developed markets differ from the those in developing markets. Such a distinction on the supply side of corruption has only been undertaken by Tonoyan et al. (2010) and, in part, by Durnev and Kim (2005), both of whom use a perception-based index to capture corporate malpractices. Therefore, there is a methodological need to build on Lopatta et al.'s (2017) research and to comprehensively and objectively capture firm-level corruption risk as a whole, rather than its components. No previous study has investigated different mechanisms in both mature and developing market economies with regard to enterprise-level corruption risk as a whole.

3. Institutions' Influence on MNC Corruption Risk

We employ a three-level approach to (1) contribute to a better understanding of the determinants of MNCs' individual risk of corruption and (2) assess trends in countries at different stages in economic development, as depicted in Figure 1.

In line with most of the scholarly research introduced above, we argue that, contrary to generating an "ability to pay", firm size and financial resources reduce firm-level corruption risk. This is because firms with abundant resources are more likely to be able to enhance their organizational structures and adopt best practices for reducing agency loss (Wu 2009; Chen et al. 2008; Lopatta et al. 2017). In this case, this involves implementing successful anti-corruption measures and robust monitoring and reporting practices. While costly, undertaking these activities can prevent and limit fallout stemming from socially and financially undesirable activities.

Figure 1: Multilevel approach to explaining firm-level corruption
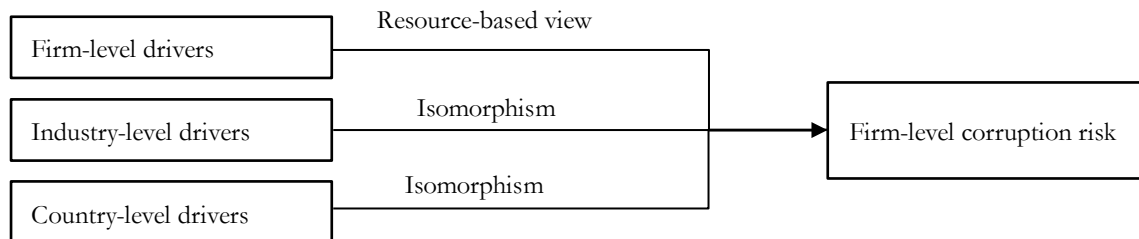
H1a: Companies with more financial resources have a lower risk of corruption.

However, corporate-governance challenges do not exist in a vacuum, often reflecting the quality of the legal environment in which the firm was incorporated. Legal systems in developing markets are often weaker than those of developed countries, a factor that is likely to impinge upon resource availability for emerging-market MNCs. Firms reliant on external financing are dependent on the extent to which potential creditors trust the legal system in which they operate (Durnev and Kim 2005). Consequently, when MNCs reliant on external financing are incorporated in developing markets, where external investors likely have reduced

confidence in the legal system's ability to enforce their rights, MNCs will try to substitute organizational features like disclosure and anti-corruption practices in place of the weak legal environment.[1]

H1b: Companies with a higher dependence on external finance and headquartered in developing-market economies have a lower risk of corruption.

Our industry- and country-level hypotheses are grounded in neo-institutional theory and isomorphic mechanisms (DiMaggio and Powell 1983). Organizations operating in the same environment face similar pressures to align with each other while preserving a certain level of agency and institutional entrepreneurship. Consequently, firms in the same industry should exhibit similar behavioural patterns.

When it comes to corruption, the existing literature is somewhat divided: lower competition either leads to higher levels of corruption due to increased exposure to rent-maximizing officials, or regulatory barriers to entry, which reduce competition, and increase exposure to public officials. In this context, greater regulatory scrutiny would provide an institutionally-driven disincentive for corruption. Along these lines, high levels of intra-industry competition have been linked to greater engagement in non-market activities, such as political lobbying (Kim 2008; Plouffe 2015). Consequently, it is likely that highly competitive industries foster firm-driven supply of corruption, holding all else equal.

H2: Firms operating in more competitive industries demonstrate a higher risk of corruption.

Likewise, isomorphic mechanisms can be described at the national level. Corporations will respond to the rigor of the regulatory environment in which they are incorporated; consequently, MNCs governed by strict regulations will respond with better practices, as the potential costs of malfeasance are likely to outweigh the costs of administrative compliance. The effects of increasing regulatory requirements will differ by host-country characteristics. In particular, developed markets are typically characterised by a robust institutional

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[1] It is very likely that the pressures from external creditors are shaped by whether the creditors are domestic or foreign. Likewise, in parallel to our institutional argument here, similarities differences between regulatory environments may increase the influence of foreign external creditors on an MNC's anti-corruption performance.

environment; therefore, regulatory reform is unlikely to have a substantial effect when compared to reforms in developing market economies.

H3a: Companies in a stricter regulatory environment have a lower corruption risk.

H3b: The negative relation between a stricter regulatory environment and firms' corruption risk is stronger in the case of developing market economies.

Finally, investor protections are likely to influence MNCs' willingness to engage in risky behaviours. Among developed countries, a vibrant body of research demonstrates the root of variations in investor-protection laws in varieties of capitalism (Bushman et al. 2004; Hall and Soskice 2001; Roe 2003; Pontusson 2005). Capitalism's varieties stem from organisational arrangements in finance and labour, which, in turn, shape the principal-agent relations and information asymmetries within firms (Kang and Moon 2011: 90; Pistor et al. 2000; Botero et al. 2004; Wu 2005; Nölke and Claar 2013).

Following Hall and Soskice (2001), many scholars differentiate between social or coordinated market economies (SMEs/CMEs) and liberal market economies (LMEs). In contrast to LMEs, SMEs are characterised by a stronger business coordination with non-market actors, such as labour unions, employer associations or the government, as well as a higher level of employment protection and social welfare, and institutionalised collective bargaining systems (Pontusson 2005). Consequently, labour gains a stronger boardroom voice in SMEs, aligning managerial and employee interests, increasing managerial agency costs to shareholders (Roe 2003). Efforts to control the board in SMEs leads to concentrated ownership, while stronger minority-investor protection among LMEs contributes to diffuse shareholding. Recent work has found that weak protection of minority investors and concentrated ownership leads to a higher risk of corruption, as inside shareholders are likely to use their information advantage and control of the management to execute forms of "self-dealing" to the detriment of minority shareholders (for example, Berglöf and Pajuste 2005; Djankov et al. 2008; Wu 2005). We expect these relationships to hold within our sample and when applied to corruption risks.

H3c: Companies in countries with a higher protection of (minority) investors have a lower corruption risk.

Finally, greater labour protection will have a decreasing effect on firm-level corruption risk, as stringent employment laws might protect employees who report and counteract corporate malpractice (Carr and Lewis 2010), reducing the likelihood that corrupt practices will go unpunished. Firms seeking to guard against employment-related complaints are similarly likely to adopt more transparent practices, which in turn serve as a deterrent against corruption.

H3d: Companies in countries with stricter employment protection have a lower corruption risk.

4. Data and Methods

We test our hypotheses on an original dataset consisting of 243 observations across 30 countries. In our empirical framework, we assess the influence of MNC financial resources, industry-level differences, and variations in the regulatory environment on MNCs' corruption risk using a linear model with year effects. To exclude outliers, the data are winsorised at the first and 99th percentiles.

Our dependent variable is an MNC-level corruption score. As previous scholars have noted (Judge et al. 2011; Lopatta et al. 2017), much research on corruption refers to country-level corruption indices, such as Transparency International's Corruption Perception Index or the World Bank's control of corruption term within the Worldwide Governance Indicators. Studies utilising a firm-level dependent variable employ the decision to bribe, bribery payments or governance and financial transparency as indicators for firm-level corruption (for example, Svensson 2003; Clarke and Xu 2004; Berglöf and Pajuste 2005; Chen et al. 2008; De Jong et al. 2015). Where country-level indices are employed, variation among firms is ignored. Likewise, when discrete acts of firm-level corruption are analysed, the latent firm-level environment, which may permit or discourage these activities, is often effectively ignored.

Our approach to MNC corruption differs from both of the predominant methods in that we employ a firm-level index that captures a corporation's risk of engaging in corruption, rather than relying on discrete acts of corruption or a country-level indicator. We use Transparency International's *Transparency in in Corporate Reporting* index (TI Index 2012, 2013, 2014, 2016), which captures public disclosure of financial data and governance structures, financial disclosure of country-by-country operations, and self-reported

anti-corruption programmes. This last category incorporates efforts to reduce or uncover bribery, protection of whistleblowers, and political payments. Greater firm-level reporting-practice transparency is associated with increased risk of exposure for corrupt activities, and thus reduced corruption risk, although this should not be directly equated with a firm's anti-corruption performance as such. Rather than capturing discrete acts of corruption, the index operationalises the latent corporate environment within which these behaviours may take place.

The index ranges from zero to ten, with increasing scores indicating improving anti-corruption performance; the resulting variable in our study is referred to as *score*. The questionnaire used to compile the index was applied to the 105 and 124 largest publicly listed companies in 2012 and 2014, covering 25 countries, and to the top 100 emerging-market MNCs in 2013 and 2016, covering 15 countries. Transparency International used the same methodology throughout, which makes the four waves of reports comparable.

Multilevel Variables of Interest

Our hypotheses are concerned with factors at three different levels of aggregation and their effects on MNC corruption risk. In increasing levels of aggregation, these are firm resources (H1a-b), industry structure (H2), and home-country institutional environment (H3a-d). This gives us a series of variables of interest at these different levels of aggregation.

At the firm level, we employ the Kaplan-Zingales Index (*KZ index*) and total assets (*size*) to capture financial constraints and available resources, respectively. The Kaplan-Zingales Index captures these constraints through the application of a linear combination of accounting ratios (Kaplan and Zingales 1997; Lamont et al. 2001; Farre-Mensa and Ljungqvist 2016).[2] We follow Lopatta et al.'s (2017) example in calculating firm *size* as the log-transformed total value assets of the prior year.

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[2] Following Lamont et al. (2001: 532, 551–552), who themselves refer to Kaplan and Zingales (1997) as a basis for their measurements, the Kaplan–Zingales index (KZ index) was calculated as the following linear formula of five accounting ratios:

We assign MNCs to one of nine industries based on Transparency International's reports;[3] the small number of MNCs in our analysis and the potentially wide scope of their output make reliance on a more finely grained industry- or product-level classification undesirable. We exclude the financial sector because its reporting standards differ from other sectors, reducing comparability. However, we still retain sufficient information to assess H2: extractive, telecommunications, and utilities industries widely feature lower levels of competition than others through limited resource or regulatory access.

We capture country-level determinants of the home-economy business environment using three distinct terms. The first of these is an index of the strictness of the home country's regulatory environment (H3a, H3b) based on a global indicator of the burden of government regulations (*regulatory burden*), sourced from the World Economic Forum's Global Competitiveness Index (GCI, indicator 1.09) (Schwab and Sala-i-Martín 2012, 2014, 2016). Each country receives a score ranging from zero to seven in decimals, with higher scores indicating lower regulatory burdens. We create three categorical variables (*low burden*, *medium burden*, and *high burden*); *low burden* and *high burden* capture observations of regulatory burdens lying greater than a standard deviation away from the mean. We incorporate these two measures in the model to capture the potential for MNCs' variability in reacting to their regulatory environment.

Our incorporation of *legal origins* (H3c) is informed by the varieties of capitalism literature, which has identified wide-ranging patterns of economic behaviours linked to long-term political and institutional

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KZ Index = -1.001909 x (Cash Flow$_t$ / K$_{t-1}$) + 0.2826389 x Q$_t$ + 3.139193 x (Debt$_t$ / Total Capital$_t$) + (-39.3678) x (Dividends$_t$ / K$_{t-1}$) + (-1.314759) x (Cash$_t$ / K$_{t-1}$)

Cash flow comprises income before extraordinary items and total depreciation and amortisation; Q is calculated as market capitalisation added to total shareholder's equity minus the book value of common equity minus deferred tax assets all over total shareholder's equity; debt is the total long-term debt and debt in current liabilities; dividends entail common and preferred dividends; cash equates cash and short-term investment; and K refers to lagged gross property, plant and equipment (PP&E$_{t-1}$). Besides K, all other accounting values are measured at the time t. Due to the lack of access to the value for market capitalisation, it was substituted with the sum of common/ordinary stock (CSTK) and preferred stock (PSTK).

[3] These are basic materials, consumer goods, consumer services, healthcare, industrials, extractives (oil, gas and energy), technology, telecommunications, and utilities. To facilitate convergence in the mixed-effects model presented in Table A4 in the appendix, we divide these into three sectors: regulated/restricted (basic materials, extractives, telecommunications, utilities), manufacturing (consumer goods, industrials, technology), and services (consumer services, healthcare).

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configurations. While this body of research focuses explicitly on developed western democracies, its insights have been adapted to a wider range of countries (Nölke and Claar 2013). La Porta et al. (1997, 2008) have found evidence that countries with civil law, originating from Roman law, protect shareholders to a lesser extent than countries with common law, which stands in the English legal tradition. Following the example of Bushman et al. (2004), we categorise countries according to their *legal origins* in French, German or Scandinavian civil law, or English common law using data from La Porta et al. (2008).

Our final country-level term is *employment protection* (H3d), which is operationalised using the OECD's employment protection index (OECD, 2012). While our first two country-level variables focus on individuals' incentives within the firm, particularly those that influence senior managers' structuring and reporting decisions, *employment protection* captures individuals' incentives to act outside the boundaries of the firm. Furthermore, the implications of *employment protection* are relevant for workers at all levels of the firm, not just those in a decision-making capacity.

Table 1: Summary of variable operationalisations

Name	Description	Source	Measurement	Expected mechanism
Score	Index constructed based on public disclosure of anti-corruption programs, organizational structure, and country-level reporting	TI Index (2012, 2013, 2014, 2016)	0−10 (0 = highest risk, 10 = lowest risk)	Dependent variable
KZ Index	Kaplan-Zingales index of financial constraints (See endnote 1 for a formal definition)	Compustat, Wharton Research Data Services (WRDS)	Lower values = lower financial constraints	Lower KZ Index → lower corruption. Risk (H1a/H1b)
Size	Firm size as measured by log-transformed total assets	Compustat, Wharton Research Data Services (WRDS)	Higher values = more resources	Higher size values → lower corruption risk (H1a/H1b)
Industry	Industry classification, as assigned by Transparency International	TI Index (2012, 2013, 2014, 2016)	Categorical	Extractive, Telecomm., Utility → higher corruption risk (H2)
Regulatory Burden	Index of executive survey on burden of regulations when doing business	Global Competitiveness Index (GCI, indicator no. 1.09)	0−7 (0 = burdensome, 7 = not burdensome)	Higher regulatory burden (lower score) → lower corruption risk (H3a/H3b)
Legal Origins	Indicator for legal origins in French, German, or Scandinavian law	La Porta et al. (2008: 289)	Categorical	English legal origin → lower corruption risk (H3c)
Employment Protection	Index indicating protections afforded through law, case law, and collective-bargaining agreements	OECD 2012	0−5 (0 = low protection, 5 = high protection)	Higher Employment Protection → lower corruption risk (H3d)

Table 1 presents a summary of our key variables at all three levels of aggregation, along with their sources and the hypotheses to which they are applied.

Additional Control Variables

Following Berglöf and Pajuste (2005) and Lopatta et al. (2017), we also employ several lagged firm-level financial controls, listed in Table 2. These terms all contribute to a fuller picture of firm-level resource availability than *size* and *KZ Index* alone.

As firms with greater resources and fewer financial constraints are less at risk of engaging in corrupt activities, we expect that firms with less debt, higher returns on assets, and a higher book-to-market ratio have a lower risk of corruption, indicated by higher values of the dependent variable. Converse coefficient directions are expected in countries with weak institutions.

Table 2: Financial control variables

Variable	Variable name	Measurement	Expected direction (RBV)	Expected direction (developing markets)
Debt	DEBT	Total debt over total assets	−	+
Return on assets	ROA	Income before extraordinary items over total assets	+	−
Book-to-market	BTM	Common equity over the market value of equity	+	−
Notes: Calculations of the ratios adopted from Lopatta et al. (2017); expected directions adopted from Berglöf and Pajuste (2005).				

At the country, or macroeconomic, level, we add four additional terms. *Polconiii* is a widely used index of political constraints, indicating the extent to which political actors are limited in their actions to shape future policies (Henisz, 2002); we create three indicators for *Polconiii*, with *low Polcon* and *high Polcon* capturing observations at least a standard deviation away from the mean. We also incorporate *GDP* to capture the size of the home economy and, inversely, concentration of market power. Finally, we also account for *year* effects.

Methodological Approach

The multilevel nature of our data presents an analytical challenge, as the MNCs are clustered in both industries and countries, and several of our variables of interest focus explicitly on capturing characteristics of these higher levels in which MNCs are clustered, rendering a typical fixed-effects approach unsuitable. Our dataset, like many others, is somewhat sparse in the higher levels, with an average of nine MNC observations per country. Research using simulated data has shown multilevel models to generate valid and reliable parameter estimates with an average of five observations per upper-level group (Clarke, 2008), reducing this sparseness concern (although failing to address further considerations around group-level heterogeneity in sparseness).

However, with 30 countries in the full sample (16 developed markets and 14 developing markets), we have a small number of higher-level clusters, especially when analysing developed and developing markets separately. Consequently, while we do fit mixed-effects models to our data, which are discussed in the section on robustness checks, our preferred specifications are less sensitive to the small number of countries in the tests involving only developed- or developing-market MNCs.

We employ generalized estimating equations (GEEs) with cluster-robust standard errors for the bulk of our analyses, including the models presented in the following section. GEEs are widely employed in cases where correlation in outcomes reflects clustering among observations. One of the chief advantages of GEE is its ability to generate unbiased inference in cases like ours, where both hierarchical and ordinary least squares approaches struggle. The resulting GEE parameter coefficients capture estimates of population-average effects.

5. Analysis and Results

We present summary statistics of our key variables in Table 3. At the MNC level, the dataset contains 243 observations with a mean corruption score of 4.36. With a minimum of 1.0 and maximum of 7.3, scores are widely distributed along the index's 0-10 scale. However, the 75th percentile for *score* is 5.4, indicating

that, from a purely theoretical standpoint, many MNCs are underperforming with respect to corruption risk.

Calculating country-level corruption-risk scores demonstrates significant cross-national differentiation in MNC anti-corruption performance (these figures are presented in Table A1 in the appendix). The distribution of MNCs across countries broadly reflects global market shares, with major economies like the US, Japan, and China represented by a much larger number of MNCs than smaller economies like Colombia, Denmark, and Saudi Arabia. At the country level, MNCs with the best anti-corruption scores come from Norway (7.45), Australia, (6.65), and Italy (6.08). Chinese (2.78) and Japanese (2.45) MNCs, by contrast exhibit the highest levels of corruption risk.

Table 3: Summary statistics of main variables

Variable	Name	N	Mean	Median	SD	Min	P25	P75	Max
(Anti-)Corruption score	Score	239	4.352	4.400	1.360	1.176	3.400	5.400	7.200
Financial constraints	KZ Index	239	−2.906	−0.791	5.424	−22.161	−4.222	0.495	3.096
Financial resources	Size	239	11.199	11.503	1.629	7.048	10.034	12.496	13.838
Regulatory context	Regulatory Burden	239	3.251	3.300	0.597	1.700	3.000	3.500	4.262
Var. of Capitalism	Employment Protection	239	1.883	2.159	1.136	0.257	1.262	2.921	4.075

Notes: Following Lopatta et al. (2017), the values were winsorised at the first and 99th percentiles. P25 and P75 represent the 25th and 75th percentiles, respectively.

Table 4 presents the results from our GEE models. We divide the presentation of our covariates by the theoretical role they play in our framework: firm-level variables of interest are followed by country-level variables of interest; these are then followed by firm-level financial controls, country-level controls, and industry and year effects. Model 1 contains all the observations in our dataset; Models 2 and 3 present results for MNCs based in developed markets and developing markets, respectively.

Table 4: Generalized estimating equation results

Determinants of firms' corruption risk			
	All countries (4)	Developed markets (5)	Developing markets (6)
Firm-level variables			
KZ Index	0.011 (0.012)	0.006 (0.016)	-0.048** (0.020)
Size	0.193*** (0.068)	0.211*** (0.078)	0.235*** (0.073)
Country-level variables			
Regulatory Burden – low	0.065 (0.427)	0.282 (0.256)	0.785** (0.305)
Regulatory Burden – high	-0.387 (0.598)	1.399** (0.705)	0.554 (0.353)
Employment Protection	0.306 (0.208)	1.529*** (0.229)	0.148 (0.150)
French legal origin	-0.787** (0.365)	-2.300*** (0.457)	-0.920*** (0.145)
German legal origin	-0.869 (0.696)	-2.348*** (0.490)	-2.010*** (0.342)
Scandinavian legal origin	0.372 (0.829)	-0.632 (0.689)	
Financial controls			
Debt	-0.232 (0.593)	-0.068 (0.757)	0.255 (0.880)
ROA	-0.110 (1.934)	2.532* (1.428)	-6.175*** (1.659)
BTM	0.122 (0.554)	2.609*** (0.445)	-0.459 (0.305)
Country-level controls			
Log(GDP)	-0.384*** (0.109)	0.010 (0.163)	-0.452*** (0.113)
Political constraints – low	0.298 (0.190)		0.785*** (0.202)
Political constraints – high	-0.175 (0.404)	-1.226 (0.492)	0.487** (0.194)
Constant	8.271*** (2.081)	0.806 (2.312)	7.992*** (1.863)
Industry effects			
Basic materials	0.382* (0.207)	0.790*** (0.202)	0.324 (0.220)
Consumer goods	0.446*** (0.171)	0.381* (0.195)	0.747*** (0.238)
Healthcare	0.167 (0.220)	-0.151 (0.285)	1.465*** (0.308)
Industrials	0.587*** (0.161)	0.635*** (0.148)	0.783** (0.325)
Oil, gas and energy	0.277 (0.339)	0.452 (0.330)	0.238 (0.463)
Technology	0.639** (0.291)	0.146 (0.206)	1.570*** (0.294)
Telecommunication	0.731** (0.323)	0.207 (0.346)	1.630*** (0.189)
Utilities	0.580* (0.324)	0.203 (0.408)	
Year effects	Yes	Yes	Yes
Observations	243	135	108
Correlation matrix	Exchangeable	Exchangeable	Exchangeable

Notes: *p<0.1; **p<0.05; ***p<0.01. GEE models with cluster robust standard errors in parenthesis. Industry and year effects are included in all models, with consumer services set as the baseline industry. The dependent variable is *score* (firms' corruption risks taken from the TI Index (2012, 2013, 2014, 2016)). A higher score indicates a better anti-corruption performance and a lower risk of corruption.

Firm-Level Influences

Among our firm-level variables of interest, we find some support for the effects of resource availability on reduced corruption risk. Across all three models, *size* is associated with improved anti-corruption performance (H1a). Among developing-market MNCs, *KZ index*, which captures financial constraints, is positively linked to higher corruption risk (H1b). Taken together, these results point to the role of firm resources in corruption risk, as better resourced firms are more capable of implementing anti-corruption reforms.

Our firm-level controls exhibit different effects across developed and developing markets. As a result, none of these variables is significant in Model 1. Among developed-market MNCs, *btm* is negatively linked to corruption risk (Model 2). In Model 3, *roa* gains significance among developing-market MNCs. This indicates that while financial resources enable developed-market MNCs to guard against corruption risk, this is not necessarily the case among developing-market MNCs, where returns on assets appear to reduce incentives to undertake anti-corruption measures. In developing markets, where regulatory requirements are weaker, asset-dependent MNCs are likely to benefit from a more lenient approach to corruption as this leaves open a wide range of options for engaging bureaucrats and politicians in home and host countries.

Industry-Level Influences

Our industry indicators are compared against consumer services, the industry with the lowest average anti-corruption performance score, as a baseline. Table 5 presents industry means of the MNC anti-corruption scores across the full sample for reference. We include uncontrolled two-sample difference-of-means tests comparing each industry to the those with the three highest mean anti-corruption scores. These three industries (oil, gas and energy, telecommunications, utilities) are characterised by significant capital- or regulation-driven barriers to entry, and exhibit statistically significantly higher anti-corruption performance than most of the other industries.

This prima facie evidence is supported by the industry-level results in our Table 4 models. When controlling for MNC- and country-level influences on corruption risk, industry effects remain. In Model 1's full sample, the four industries with the largest industry-specific reductions in corruption risk from the baseline are

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industrials, technology, telecommunications, and utilities. Among developed-market economies (Model 2), basic materials, consumer goods, and industrials are the only industries with significant anti-corruption risk improvements over consumer services. The anti-corruption bonus afforded to the high entry-cost industries disappears within this sample. Turning to the developing-market economies (Model 3), basic materials and oil, gas and energy are the only industries with indistinguishable effects on corruption risk from those of consumer services. The largest effects on anti-corruption performance are exhibited by the healthcare, technology, and telecommunications industries.

Table 5: Differences in means test: Industry corruption risk scores

Industry	Mean scores (1)		Oil, gas and energy (2)		Telecommunication (3)		Utilities (4)	
	No.	Mean	T-Value	P-Value	T-Value	P-Value	T-Value	P-Value
Basic materials	40	4.328	-1.374	0.177	-2.557	0.015	-4.363	0.000
Consumer goods	43	4.091	-3.056	0.004	-4.650	0.000	-7.082	0.000
Consumer services	14	3.721	-3.471	0.004	-4.592	0.001	-6.303	0.000
Healthcare	28	4.382	-1.606	0.120	-3.232	0.003	-5.714	0.000
Industrials	31	4.113	-2.700	0.011	-4.161	0.000	-6.391	0.000
Oil, gas and energy	36	4.692	-	-	-	-	-	-
Technology	21	4.162	-2.251	0.036	-3.583	0.002	-5.616	0.000
Telecommunication	20	5.005	-	-	-	-	-	-
Utilities	6	5.483	-	-	-	-	-	-

Notes: Mean scores of corruption risk scores of each industry (column (1)) are compared with the help of differences in means tests with the mean scores of the three highest scoring industries (Oil, gas and energy, telecommunication, utilities) (columns (2)-(4)).

At best, we find partial evidence for H2 in our models, driven by cross-industry variations in corruption risk among developing-market economies. The Model 1 result for utilities is driven by weak anti-corruption performance in developing-market consumer services, which draws the baseline down in the full sample. While oil, gas and energy scores highly for anti-corruption performance in the uncontrolled means test (Table 5), its effect is indistinguishable from the baseline when assessed in the regression models. Telecommunications provides the best support for H2, with the effect driven by the developing-market sample.

Country-Level Influences

At the country level, we generally find evidence for our argument for the effects of institutions on corruption risk, but with different effects among developed- and developing-market economies. In Model 1's combined sample, only the coefficient for *French legal origins* gains significance, with its negative

coefficient indicating reduced anti-corruption performance among French MNCs. This lends partial support to the investor protection aspect of the varieties of capitalism component of our argument (H3c). Among our country-level controls, only *GDP* is significant in the combined sample, with a negative effect on anti-corruption performance.

As with the industry results, country-level institutional effects in our full sample appear to suffer from pooling issues when developed- and developing-market economies are combined. Among the developed-market economies in Model 2, *high regulatory burdens* and *employment protection* are positively associated with better anti-corruption performance (H3a, H3d). Countries with both French and German legal origins are linked to higher corruption risk than countries with English legal origins (H3c). Among our control variables at this level, only *high Polconiii* is significant, linked to higher corruption risk.

Among developing-market economies, presented in Model 3, country-level effects on MNC corruption risk differ from those in developed-market economies. *Low regulatory burdens* in this sample are associated with reduced corruption risk, running counter to our expectations (H3b). The effects of our country-level controls within this sample are quite different from the developed-market sample as well. *GDP* is positively associated with increased corruption risk, and effect that appears to drive the result in the combined sample. Both *low* and *high* levels of *Polconiii* are positively linked to anti-corruption performance.

Returning to the relationship between *regulatory burden* and *anti-corruption performance*, we examine the possibility of a China effect. The mean score for Chinese MNCs' anti-corruption performance is less than 2.8, the lowest among developing-market economies (see Table A1 in the appendix), originating in a highly burdensome regulatory environment. Figure A1 in the appendix illustrates this vividly, with Chinese MNCs clustered on the right-hand side of the figure, primarily in the lower quadrant. This causes a line fitted to the unconditional bivariate relationship to take on a negative slope. When the Chinese MNC observations are removed (Figure A2 in the appendix), the relationship between *regulatory burden* and *anti-corruption performance* becomes positive, as illustrated by the fitted line.

We find a similar effect when examining *employment protection* among developing markets. Figure A3 in the appendix illustrates a nearly horizontal fitted line in a scatterplot comparing anti-*corruption performance* with *employment protection* among developing-market economies. When Chinese MNCs are removed, *employment protection* becomes positively correlated with *anti-corruption performance* among developing markets, as illustrated in Figure A4 in the appendix.

Discussion

Our results point to differing influences on MNCs' corruption risks in developed- and developing-market economies. At the firm level, we find some evidence for RBV-driven variables. MNCs with greater resources, as captured through *size*, have better anti-corruption performance. Financial constraints, as captured through the *KZ index*, inhibit anti-corruption performance in developing-market MNCs. Interestingly, the effect of *ROA* in developing markets, while not central to our argument, appears to strongly disincentivise anti-corruption performance.

At the industry level, we find weaker support for our argument. Uncontrolled mean comparisons provide some prima facie evidence of the effects of regulatory limits on entry and competition on MNC corruption risk. In our models, this effect is not as readily apparent: there are apparent differences in levels of corruption risk across industries, but many of these appear to be driven by the developing-market sample, and do not necessarily map cleanly onto the competition-based logic of our argument. Given the role played by government regulation in promoting or inhibiting competition, particularly in certain sectors (Mitton, 2008), our industry variables effectively capture the residual variation beyond national-level regulations. As a result, the lack of effects among developed markets could be the result of more coherent and harmonised regulatory regimes across industries in these countries.

The country-level results point to the importance of regulations and institutions in influencing MNC corruption risk. Greater regulatory burdens and employment protection in developed markets improves anti-corruption performance, while comparable effects are observed in the developing-market sample when Chinese MNCs are excluded. We also find support for the effects of institutional variations along the lines of varieties of capitalism: the English common-law system, which historically has protected the rights of

small shareholders, contributes to reduced corruption risk when compared to legal systems that have favoured large blockholders.

Robustness Checks

We assess the robustness of our results in two different ways. First, we employ a mixed-effects model, replicating the models discussed above. Second, we employ alternative measures of our key variables within the same GEE framework used to estimate the models presented in the previous section.

The results of the mixed-effects models are presented in Table A4 in the appendix. These models have been fit using restricted maximum likelihood (REML) and bootstrapped standard errors due to both techniques' favourable performance with small numbers of clusters when compared to alternative estimating approaches in mixed models (see, for example, McNeish and Stapleton, 2016).[4] The model allows us to estimate subject-specific parameters at the MNC level and variance components for our higher-level variables of interest. The firm-level variables exhibit some similar patterns to those in our main results, pointing to the importance of firm resources for anti-corruption performance. The upper-level variances present a somewhat consistent story as well. Here, values extremely close to zero indicate a lack of effect, while larger values point to more substantial variations across upper-level groupings. The standard errors provide additional information about the extent to which the variances differ (or do not differ) across groups. Among all of the models in Table A4, variables capturing aspects of the regulatory environment, legal origins, and industry variables exhibit effects on corruption risk, as captured through the variance components.

Our other robustness tests focus on alternative measures of our regulatory and institutional variables of interest. In place of *regulatory burden*, we introduce two variables from the Worldwide Governance Indicators (WGI): *regulatory quality* and *rule of law*. These two indices capture slightly different constructs from the extent to which regulations are likely to be burdensome to firms. *Regulatory quality* provides a measure of a country's

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[4] Another estimation option for clustered data is to run a linear model with bootstrap-clustered standard errors. However, this approach is unsuited for the complex clustering observed in our data.

regulatory environment for promoting private-sector growth. *Rule of law* indicates the extent to which firms can expect fair legal treatment when complying with laws and regulations in their home countries. We transform these variables in the same manner as *regulatory burden*, with indicators for observations greater than a standard deviation away from the mean. In place of *employment protection*, we use an index of worker rights from the International Trade Union Confederation (ITUC). The *worker rights* index scores countries on a five-point scale, with increasing values indicating weaker rights. We separate each level in the scale into a separate indicator variable. Finally, we replace the legal origins variables with a variable from the World Bank's Doing Business (WBDB) database that captures protections for minority investors (*investment protection*). We again create indicator variables for the tail observations to capture potential nonlinear effects on corruption risk.

We make these substitutions on an individual basis, and results are reported in Tables A5-A7 in the appendix. The results for our alternative models are largely consistent with those presented in Table 4. The results for *regulatory quality* and *rule of law* are largely similar to those for *regulatory burden*, with one notable exception: in developing-market economies, low levels of *rule of law* are associated with greater corruption risk. On the whole, *worker rights* do not appear to have a consistent effect on corruption risk: some levels are associated with a statistically significant increase in corruption risk when compared to the baseline (where *worker rights* takes a value of one), while others appear to have no significant effect. Ultimately, there appears to be no consistent relationship between *worker rights* and corruption risk. The mixed performance of *worker rights* points to the influence of specific countries within the sample. For example, Chinese and Indian MNCs make up roughly 80% of the observations where worker rights are weakest; in contrast, French and German MNCs constitute 60% of the observations within the strongest level of worker rights, while American MNCs account for 75% of the category (four, or second weakest) containing the US. *Investment protection* similarly is largely insignificant in our models, although low investment protection is associated with increased corruption risk in the developing-market sample (Table A7).

Limitations and Intra-MNC Heterogeneity

While we examine the effects of MNCs' home-country environments, corporation-level characteristics, and industry influences on corruption risk, additional sources of pressures on anti-corruption performance are likely to exist. Core to the definition of the MNC is the trans-boundary nature of its operations, spanning multiple sovereign legal jurisdictions. The anti-corruption performance of an MNC's foreign affiliates may consequently differ from that of the parent firm (Tan and Wang, 2011). This may be the result of differing host-country regulatory demands: where an affiliate operates in a country possessing relatively stringent anti-corruption regulations, it may report more information than an affiliate located in a country with a lax regulatory environment.

MNCs based in developed markets are likely to exhibit similar anti-corruption behaviours across their foreign subsidiaries, with domestic legislation such as the US's Foreign Corrupt Practices Act or the UK's Bribery Act of 2010, as well as the OECD's Anti-Bribery Convention, constraining the activities of those hosted in markets with weaker anti-corruption rules. For example, Jensen and Malesky (2018) find the Anti-Bribery Convention to improve anti-corruption performance among signatories. Developing-market MNCs, in contrast, are less likely to have the most rigorous anti-corruption standards applied in their parent company's home jurisdiction or to be covered by extraterritorial regulations. Consequently, they may have subsidiaries for which the host country's regulations require greater reporting transparency. It is also possible that, where a particular subsidiary faces stricter standards, these are adopted as common practice across the corporation as a means of reducing errors and the risk of penalties.

Likewise, as Yang and Rivers (2009) argue with respect to foreign affiliates and corporate social responsibility (CSR), differences in social and organizational contexts may drive variations in affiliates' performances. As a result, divergences in stakeholders both within the organization and outside of it, as well as an affiliate's ability to operate independently of the parent corporation, may provide internal drivers for deviations in anti-corruption performance across subsidiaries. However, organizational pressures to maintain internal legitimacy are likely to limit any intra-MNC variations in corruption risk (Yang and Rivers, 2009; Tan and Wang, 2011).

The construction of the TI anti-corruption performance index incorporates the extent to which MNCs report their operational finances. The focus on the MNC as the unit of analysis precludes closer examination of the potential for intra-MNC variations in anti-corruption performance described here. However, variations in the reporting performance of MNCs within countries and industries, particularly among those based in developing markets, do provide some prima facie support for the influence of these corporation- and subsidiary-specific effects (see, for example, TI Index, 2016). While it is not possible to examine these topics effectively in the current study, we expect a focus on the influences on MNCs' subsidiaries anti-corruption practices to be a valuable pathway for future research.

6. Conclusions and Implications

In this study, we seek to contribute to a better understanding of the determinants of firm-level corruption in both developed and developing economies. Rather than follow the most common practices of employing country-level corruption scores or observed incidences of bribery, we utilise a firm-level index of anti-corruption performance to assess firms' latent corruption risk. This allows us to provide the first crossnational examination of the influences of both firm-level financial resources and country-level regulatory environments on firm-specific anti-corruption performance.

Our argument focuses on the ways in which MNCs' home regulatory and competitive environments shape their organizational structures, consequently influencing their latent susceptibility to the risk of corruption. Strong regulations, particularly those protecting the interests of minority shareholders and workers, are expected to improve anti-corruption performance. Regulations also shape industry influences on MNCs' corruption risk through competition effects and exposure to regulator scrutiny. At the firm level, we apply insights from the resource-based view: MNCs with greater resources will be more able to implement anti-corruption measures, while those in developing markets that are highly dependent on external finance will do the same to facilitate investment.

In our analysis, we find some support for the influence of firm-level resources on corruption risk (H1a), although reliance on external financing does not appear to be associated with anti-corruption performance

(H1b). We find some evidence of industry-specific effects, with competition-based influences driven by variation among developing markets (H2). At the country level, we find evidence for the influence of regulatory burdens on anti-corruption performance (H3a), along with the presence of a China effect among developing markets that greatly influences the relationship within this sample (H3b). We link varieties of capitalism and legal-origins research to corruption risk through protection of minority investors, finding greater investor protections to be associated with reduced corruption risk (H3c). Likewise, employment protections appear to offer another means of improving firms' anti-corruption performance in developed markets (H3d), while the relationship in developing markets is impacted by the poor anti-corruption performance of Chinese MNCs.

Our research highlights the importance of environmental factors in influencing MNC corruption risk. However, in our study MNCs' internal structures have been ignored. Qualitative research incorporating insights from the corporate governance literature could do much to unveil organizational structures and best practices for reducing firm-level corruption risk across different regulatory and institutional environments. Similarly, applying stakeholder and institutional logics at the subsidiary level may provide valuable insights to variations in corruption risk within MNCs. The insights we provide here into the effects of regulations on MNC corruption risk are likely to also apply to domestic-market firms. Further exploration into the effects of employment protection and minority investor protections is warranted: these two regulatory concerns tend to be readily divided between varieties of capitalism among developed countries, but policymakers seeking to reduce corporate corruption risk may want to look to the potential for complementary effects between the two issues. Likewise, variations in stakeholder characteristics, like the differences between foreign and domestic external creditors are likely to influence corruption risk. Finally, while our study, like many others, follows an institutionalist framework for examining influences on corruption risk, the role of cultural values and norms in influencing behaviours should not be ignored, and contributions to understanding these relationships in a comparative perspective could provide a valuable basis for understanding firm behaviours beyond institutional and regulatory pressures.

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Appendix

Table A1: Country corruption risk scores

Country	N	Mean	Min	Max
Australia	2	6.650	6.100	7.200
Belgium	2	3.700	2.900	4.500
Brazil	17	3.953	2.400	5.600
Chile	2	4.550	4.500	4.600
China	24	2.775	0.800	5.800
Colombia	1	5.500	-	-
Denmark	1	3.900	-	-
France	12	4.792	3.100	6.600
Germany	12	5.817	5.200	6.700
Hungary	2	4.600	4.600	4.600
India	20	5.365	3.300	7.100
Indonesia	3	4.600	3.700	5.300
Israel	2	3.400	3.300	3.500
Italy	4	6.075	4.900	7.300
Japan	8	2.450	1.300	3.200
Luxembourg	2	6.350	5.800	6.900
Mexico	12	4.058	2.700	5.700
Netherlands	4	5.000	3.700	6.200
Norway	2	7.450	6.600	8.300
Russia	9	3.389	2.200	6.200
Saudi Arabia	1	5.800	-	-
South Africa	7	4.586	3.000	5.900
Spain	2	5.600	5.000	6.200
Switzerland	6	4.967	3.300	6.500
Taiwan	1	3.300	-	-
Thailand	6	4.867	2.800	5.600
Turkey	4	4.650	4.200	4.900
UAE	2	4.000	3.400	4.600
UK	15	5.733	3.700	7.200
USA	59	3.941	2.000	6.400

Source: TI Index (2012, 2013, 2014, 2016)

Table A2: Differences in means: Developed and emerging markets

Variable	Developed markets		Emerging markets		Differences in means	
	N	Mean	N	Mean	T-Value	P-Value
Score	140	4.474	99	4.179	2.567	0.011
KZ Index	140	-3.591	99	-1.936	-3.606	0.000
Size	140	11.977	99	10.010	16.695	0.000
Regulatory Burden	140	3.306	99	3.172	3.759	0.000
Employment Protection	140	1.341	99	2.650	-14.712	0.000
GDP (in USD billion)	140	8526.7	99	3515.6	0.008	0.993
POLCONiii	140	0.445	99	0.409	5.795	0.000

Table A3: Key bivariate correlations, full sample

Variable	1	2	3	4	5	6	7	8	9
Score	1								
KZ Index	0.044	1							
Size	0.239	−0.014	1						
Debt	−0.010	0.336	−0.023	1					
ROA	0.039	0.127	0.090	−0.495	1				
BTM	0.004	−0.537	−0.130	0.203	−0.170	1			
Regulatory Burden	−0.114	−0.102	0.033	−0.150	0.047	−0.069	1		
Employment Protection	0.088	0.204	−0.393	0.110	−0.285	0.150	0.101	1	
GDP	−0.342	−0.237	0.299	−0.139	0.185	−0.129	0.290	−0.675	1
POLCONiii	0.361	−0.016	0.047	0.109	0.051	-0.009	−0.386	0.043	−0.345

Figure A1: Regulatory burden in developing markets
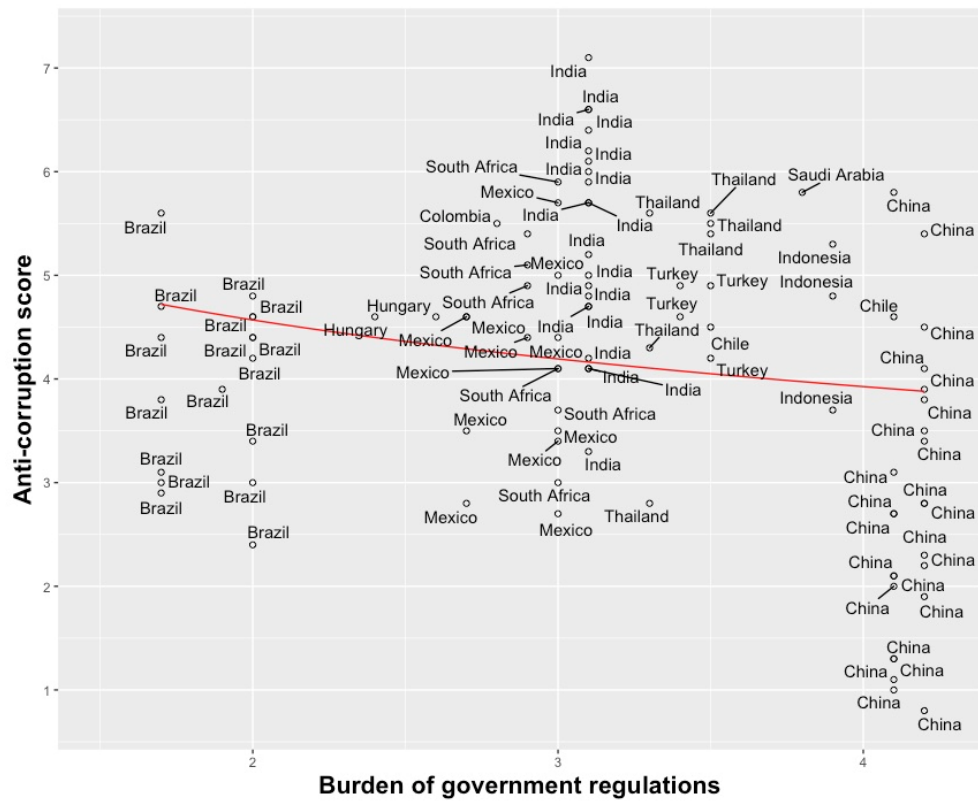

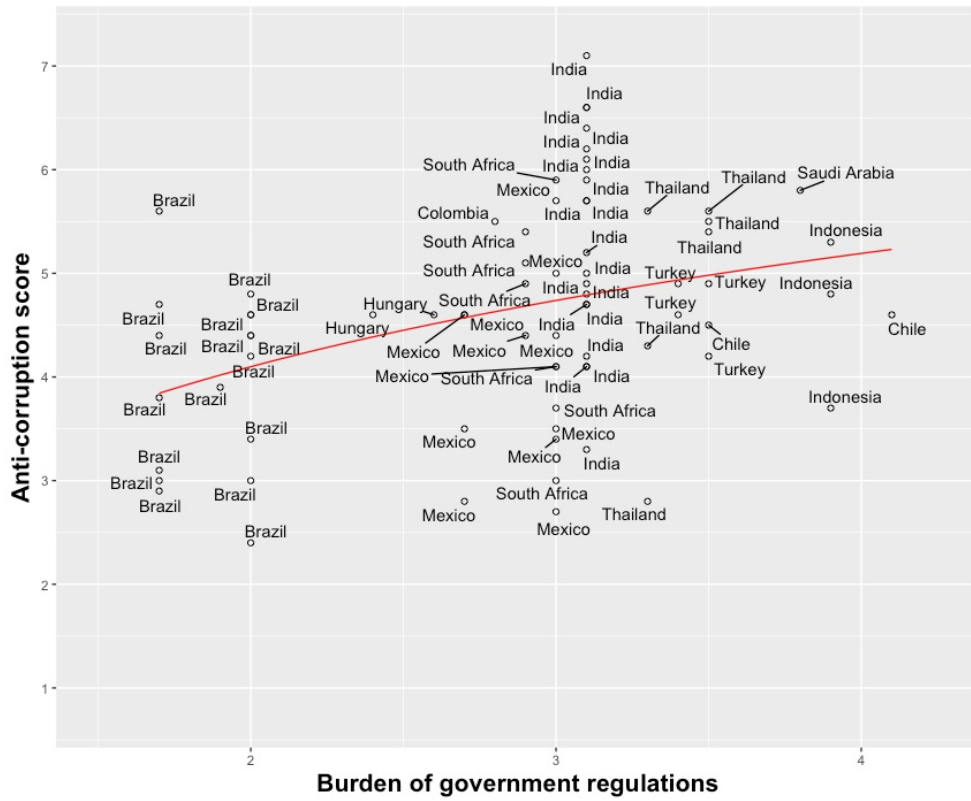**Figure A2: Regulatory burden in developing markets, China omitted**

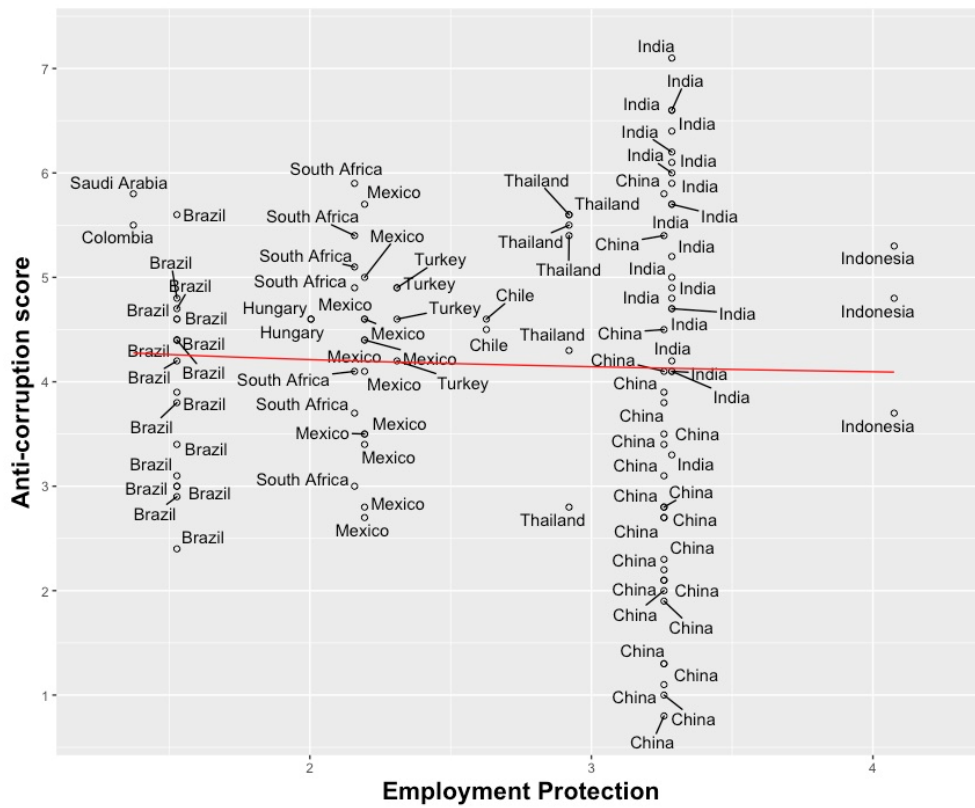**Figure A3: Employment protection in developing markets**

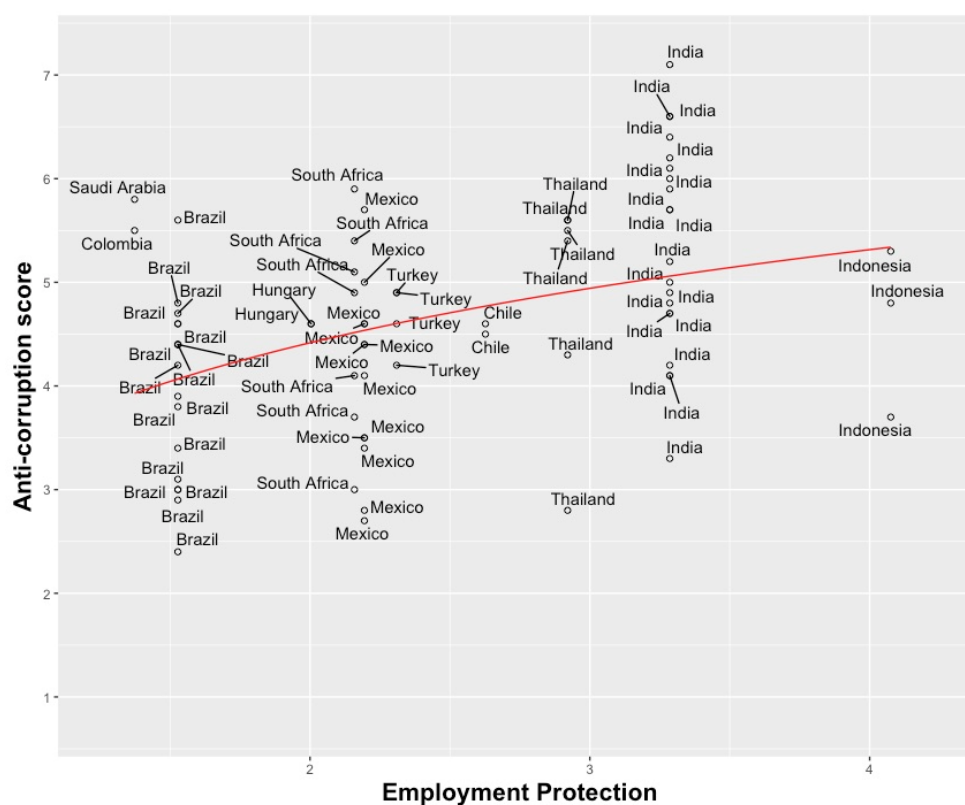**Figure A4: Employment protection in developing markets (without China)**

Table A4: Cross-classified mixed-effects models

Determinants of firms' corruption risk			
	All countries	Developed markets	Developing markets
Firm-level variables			
KZ Index	0.016 (0.013)	0.031*** (0.010)	-0.020 (0.025)
Size	0.163** (0.067)	0.133 (0.111)	0.199*** (0.072)
Country-level variables (variances)			
Regulatory Burden – low	0.004 (0.068)	0.035 (0.582)	1.5×10^{-20} (2.1×10^{-19})
Regulatory Burden – high	2.1×10^{-10} (2.6×10^{-9})	6.0×10^{-15} (3.2×10^{-14})	2.709 (54.85)
Employment Protection	1.5×10^{-13} (2.0×10^{-12})	1.5×10^{-14} (8.3×10^{-14})	3.9×10^{-15} (6.9×10^{-14})
French legal origin	1.9×10^{-12} (2.6×10^{-11})	3.6×10^{-15} (2.1×10^{-14})	0.311 (5.763)
German legal origin	0.808 (0.394)	1.124 (13.07)	8.9×10^{-19} (1.8×10^{-17})
Scandinavian legal origin	1.882 (24.17)	2.090 (25.35)	
Financial controls			
Debt	-0.101 (0.476)	-0.310 (0.648)	0.038 (0.686)
ROA	0.959 (1.442)	3.223 (2.162)	-2.306 (2.191)
BTM	4.0×10^{-4} (0.518)	2.061*** (0.661)	-0.771 (0.562)
Constant	2.937*** (0.819)	3.298** (1.401)	2.718*** (0.906)

Country-level controls (variances)			
Log(GDP)	0.002 (0.001)	0.001 (0.010)	4.0×10^{-20} (3.1×10^{-19})
Political constraints – low	2.4×10^{-10} (4.0×10^{-9})		0.459 (8.875)
Political constraints – high	2.5×10^{-7} (4.4×10^{-6})	0.544 (9.749)	0.417 (7.436)
Intercept (variance)	7.9×10^{-12} (6.3×10^{-11})	3.2×10^{-6} (3.8×10^{-5})	1.2×10^{-18} (8.4×10^{-18})
Sector (variance)	0.064 (0.045)	0.053 (0.670)	0.045 (0.523)
Year (variance)	0.269 (0.087)	0.540 (0.144)	1.0×10^{-20} (1.8×10^{-19})
Observations	243	135	108
Residual	0.732 (0.118)	0.456 (0.100)	0.982 (0.203)

Notes: *$p<0.1$; **$p<0.05$; ***$p<0.01$, reported only for Level-1 point estimates, and not for Level-2 variances. Linear mixed-effects REML models with bootstrapped standard errors in parentheses. Variances and standard errors around variances for upper-level variables are presented. The dependent variable is score (firms' corruption risks taken from the TI Index (2012, 2013, 2014, 2016)). A higher score indicates a better anti-corruption performance and a lower risk of corruption.

Table A5: Alternative institutional and regulatory measures, full sample

	Regulatory burden (Regulatory quality)	Regulatory burden (Rule of law)	Employment protection (Worker Rights)	Legal origin (Investor protection)
Financial resources				
KZ Index	0.011 (0.010)	0.013 (0.012)	0.014 (0.012)	0.013 (0.012)
Size	0.128** (0.059)	0.141* (0.075)	0.180*** (0.063)	0.178** (0.072)
Debt	-0.118 (0.568)	-0.103 (0.577)	-0.115 (0.591)	-0.185 (0.564)
ROA	-0.453 (1.829)	0.099 (1.802)	0.147 (1.930)	0.329 (1.860)
BTM	0.077 (0.480)	0.039 (0.560)	0.138 (0.545)	-0.152 (0.556)
Regulatory environment				
Regulatory quality – low	-0.295 (0.397)			
Regulatory quality – high	1.304*** (0.336)			
Rule of law – low		-0.842** (0.389)		
Rule of law – high		1.040*** (0.335)		
Regulatory burden – low			0.020 (0.420)	-0.316 (0.454)
Regulatory burden – high			-0.678 (0.527)	-0.629* (0.378)
Varieties of Capitalism				
Employment Protection	0.324 (0.207)	0.366** (0.161)		0.140 (0.201)
Worker rights – 2			-0.768* (0.435)	
Worker rights – 3			-0.486 (0.460)	
Worker rights – 4			-0.661* (0.360)	
Worker rights – 5			0.059 (0.482)	
Investor protection - low				-0.159 (0.301)
Investor protection - high				-0.095 (0.389)
French legal origin	-0.661** (0.306)	-0.385 (0.291)	-0.629** (0.303)	
German legal origin	-1.392*** (0.314)	-0.944** (0.426)	-0.524 (0.539)	
Scandinavian legal origin	-0.278 (0.726)	0.038 (0.738)	0.143 (0.844)	
Other control variables				
Log(GDP)	-0.209 (0.127)	-0.189 (0.130)	-0.422*** (0.091)	-0.409*** (0.110)
Political constraints – low	0.262 (0.231)	0.257 (0.265)	-0.035 (0.397)	0.311 (0.190)
Political constraints – high	-0.064 (0.331)	0.049 (0.333)	-0.237 (0.365)	
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Constant	5.866** (2.276)	5.426** (2.317)	9.778*** (1.296)	8.746*** (1.985)
Observations	243	243	245	243

Note: *p<0.1; **p<0.05; ***p<0.01. GEE with cluster-robust standard errors in parentheses. Regulatory quality refers to the capability to introduce and enforce business-promoting policies and regulations (WGI); rule of law indicates agents' opinion on the quality of contract enforcement, courts and control of crime-related issues (WGI); worker rights scores refer to the compliance of countries with collective labour rights regarding freedom of association, the right to collective bargaining and to pursue strike action (1 = best, 5 = worst) (ITUC); the measure of investor protection captures their rights and role in the corporation and how well minority investors are protected from conflicts of interests (WBDB).

Table A6: Alternative institutional and regulatory measures, developed markets

	Regulatory burden (Regulatory quality)	Regulatory burden (Rule of law)	Employment protection (Worker Rights)	Legal origin (Investor protection)
Financial resources				
KZ Index	0.011 (0.014)	0.004 (0.018)	0.005 (0.017)	0.003 (0.023)
Size	0.242*** (0.046)	0.285*** (0.051)	0.282** (0.115)	0.293*** (0.107)
Debt	0.073 (0.686)	-0.029 (0.707)	-0.093 (0.881)	-0.356 (0.925)
ROA	2.409* (1.313)	2.578* (1.421)	3.583** (1.632)	4.633** (1.846)
BTM	2.354*** (0.292)	2.644*** (0.341)	3.063*** (0.688)	3.060*** (0.809)
Regulatory environment				
Regulatory quality − low				
Regulatory quality − high	1.112*** (0.143)			
Rule of law – low				
Rule of law – high		0.798*** (0.218)		
Regulatory burden – low			0.321 (0.484)	-0.070 (0.371)
Regulatory burden – high			1.010 (0.785)	-0.879* (0.495)
Varieties of Capitalism				
Employment Protection	0.663*** (0.152)	0.945*** (0.144)		0.328 (0.228)
Worker rights − 2			-1.291* (0.693)	
Worker rights − 3			0.087 (0.414)	
Worker rights − 4			-1.401*** (0.447)	
Worker rights – 5				
Investor protection - low				0.426 (0.399)
Investor protection - high				0.363 (0.447)
French legal origin	-0.602*** (0.221)	-1.157*** (0.335)	-0.591 (0.363)	
German legal origin	-1.272*** (0.208)	-1.330*** (0.257)	-0.320 (0.557)	
Scandinavian legal origin	-0.070 (0.667)	-0.249 (0.659)	0.852 (0.920)	
Other control variables				
Log(GDP)	-0.041 (0.060)	-0.047 (0.079)	-0.075 (0.161)	-0.357* (0.198)
Political constraints − high	-1.297*** (0.216)	-1.317*** (0.205)	-0.717 (0.535)	-1.479*** (0.453)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Constant	1.510 (0.923)	1.095 (1.281)	3.082 (2.645)	5.790 (3.638)
Observations	135	135	135	135

Note: *p<0.1; **p<0.05; ***p<0.01. GEE with cluster-robust standard errors in parentheses. Regulatory quality refers to the capability to introduce and enforce business-promoting policies and regulations (WGI); rule of law indicates agents' opinion on the quality of contract enforcement, courts and control of crime-related issues (WGI); worker rights scores refer to the compliance of countries with collective labour rights regarding freedom of association, the right to collective bargaining and to pursue strike action (1 = best, 5 = worst) (ITUC); the measure of investor protection captures their rights and role in the corporation and how well minority investors are protected from conflicts of interests (WBDB).

Table A7: Alternative institutional and regulatory measures, developing markets

	Regulatory burden (Regulatory quality)	Regulatory burden (Rule of law)	Employment protection (Worker Rights)	Legal origin (Investor protection)
Financial resources				
KZ Index	-0.056*** (0.017)	-0.039 (0.025)	-0.034 (0.026)	-0.039 (0.027)
Size	0.221*** (0.064)	0.191** (0.086)	0.199** (0.082)	0.214** (0.089)
Debt	0.433 (0.819)	0.256 (0.837)	0.319 (0.843)	0.033 (0.974)
ROA	-7.152*** (1.723)	-5.453*** (1.925)	-5.287*** (2.030)	-4.880*** (1.788)
BTM	-0.296 (0.486)	-0.485 (0.599)	-0.570 (0.649)	-1.129** (0.546)
Regulatory environment				
Regulatory quality – low	0.346* (0.182)			
Regulatory quality – high	0.485 (0.400)			
Rule of law – low		-0.759** (0.337)		
Rule of law – high				
Regulatory burden – low			0.690** (0.336)	1.060*** (0.396)
Regulatory burden – high			-1.105** (0.549)	-0.138 (0.364)
Varieties of Capitalism				
Employment Protection	-0.250 (0.168)	0.105 (0.140)		0.511* (0.305)
Worker rights – 2			-0.681* (0.361)	
Worker rights – 3			-0.537* (0.288)	
Worker rights – 4			-0.372 (0.308)	
Worker rights – 5			0.195 (0.397)	
Investor protection - low				-1.140** (0.559)
Investor protection - high				0.086 (0.711)
French legal origin	-0.932*** (0.167)	-0.258 (0.330)	-0.585** (0.244)	
German legal origin	-1.621*** (0.352)	-0.943*** (0.265)	-0.834* (0.458)	
Other control variables				
Log(GDP)	-0.409*** (0.132)	-0.328*** (0.108)	-0.287* (0.149)	-0.423*** (0.162)
Political constraints - low	0.625*** (0.178)	0.730*** (0.194)	0.509* (0.282)	0.723*** (0.273)
Political constraints - high	0.304* (0.174)	0.438*** (0.162)	0.099 (0.215)	0.399 (0.278)
Industry effects	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Constant	8.767*** (2.006)	7.000*** (1.668)	7.266*** (2.023)	6.593** (2.576)
Observations	108	108	110	108

Note: *p<0.1; **p<0.05; ***p<0.01. GEE with cluster-robust standard errors in parentheses. Regulatory quality refers to the capability to introduce and enforce business-promoting policies and regulations (WGI); rule of law indicates agents' opinion on the quality of contract enforcement, courts and control of crime-related issues (WGI); worker rights scores refer to the compliance of countries with collective labour rights regarding freedom of association, the right to collective bargaining and to pursue strike action (1 = best, 5 = worst) (ITUC); the measure of investor protection captures their rights and role in the corporation and how well minority investors are protected from conflicts of interests (WBDB).

Additional Data Sources

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