

Article

# The Effect of Corporate Governance on the Corruption of Firms in BRICs (Brazil, Russia, India & China)

Kyunga Na <sup>1</sup>, Young-Hee Kang <sup>2,\*</sup> and Yang Sok Kim <sup>3</sup>

<sup>1</sup> Department of Accounting and Taxation, Keimyung University, Euiyang Hall 327, Dalgubeol-daero, Dalseo-gu, Daegu 1095, Korea; kyunga@gw.kmu.ac.kr

<sup>2</sup> Department of Business Administration, Euiyang Hall 412, Keimyung University, Dalgubeol-daero, Dalseo-gu, Daegu 1095, Korea

<sup>3</sup> Department of Management Information System, Euiyang Hall 333, Keimyung University, Dalgubeol-daero, Dalseo-gu, Daegu 1095, Korea; yangsoc.kim@gw.kmu.ac.kr

\* Correspondence: kang02@gw.kmu.ac.kr; Tel.: +82-53-580-6378

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**Abstract:** This study examines the correlation between corporate governance and corruption (firm bribery) using 8885 firms in four emerging economies: Brazil, Russia, India, and China (BRICs). The sample firms are collected from the World Bank Enterprise Survey database. To estimate the corruption of a firm, a logistics regression is used. The dependent variable of the logistics regression is a dummy variable on firm bribery while the test variables are a corporate governance metric composed of an ownership structure proxied by the percentage of the largest ownership and that of foreign ownership, Chief Executive Officer (CEO) characteristics proxied by CEO gender and CEO experience in the same sector, and an external audit on a firm's financial statements. We find that firm bribery is negatively associated with the percentage of the largest ownership and external audit on financial statements, but is positively related to CEO experience. These results suggest that increases in the largest ownership, external audits on financial statements, and a shorter tenure of a CEO in the same sector are negatively associated with firm bribery in BRICs.

**Keywords:** BRICs; emerging markets; corruption; bribery; corporate governance

## 1. Introduction

This study examines how corporate governance affects corruption at the firm level in four countries in the emerging market: Brazil, China, India, and Russia. Emerging economies or emerging markets are defined as developing regions with high economic growth. Among the emerging markets, these four countries have grown to be important in the world economy in the past decade. Goldman Sachs first coined the term “BRICs” (hereinafter BRICs)<sup>1</sup> to refer to these four countries, and expected BRICs to become rising powers around the year 2050 based on their population size, capital accumulation, and productivity (Goldman Sachs 2001, 2003).

BRICs have drawn attention from both academia and industry for several reasons. First, BRICs are within the top ten countries in terms of population size: in 2016, China and India took 1st and 2nd place in terms of population size, while Brazil and Russia took 5th and 9th place (The World Bank 2016). In total, BRICs accounted for 41 percent of the world population (The World Bank 2016), which makes

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<sup>1</sup> Although BRICs became BRICSs when South Africa joined the group in 2010, we do not include South Africa in this study due to its small sample size.

BRICs both a substantial labor market and a powerful product consumption market. These countries also rank in the top ten countries in terms of territory ([The World Bank 2016](#)). They occupy almost 30 percent of the Earth's landmass, with access to plentiful natural resources. With abundant human and natural resources, BRICs have achieved remarkable economic growth: just in 2016, they generated about 22 percent of global national product (GNP), taking 2nd (China), 7th (India), 9th (Brazil), and 11th (Russia) place ([The World Bank 2016](#)).

Unfortunately, an increase in corruption has accompanied the rapid economic growth in these emerging markets. Corruption is defined as the sale of government property by officials for self-benefit, such as receiving bribes for authorizing permits and licenses, clearing customs, or raising an entry barrier against competitors ([Shleifer and Vishny 1993](#)), or as the abuse of public office for personal profit ([Treisman 2000](#)). In this study, we focus on bribery, a type of corruption based on monetary materials and thus the most relevant to firms. Bribery involves two parties: bribe payers (supply side) and bribe takers (demand side) ([Rose-Ackerman 1978](#); [Wu 2005](#)). From the perspectives of the supply side, firms are motivated to be involved in bribery to get favorable treatment on contracts, taxes, or concessions, to obtain permissions or licenses, to bypass laws and regulations, to get things done quickly, or to build entry barriers against potential competitors ([Powpaka 2002](#); [Rose-Ackerman 2002](#); [Wu 2009](#)). Since emerging markets tend to have more economic activities to achieve economic growth, which generates more contracts and requires more government permissions and licenses, firms in such zones may become involved in more bribery compared to those in advanced countries to meet these new requirements quickly and easily ([Nawaz 2011](#)). An unstable political and economic environment, customs and traditions, and other environmental factors also aggravate corruption in emerging markets.

Like other emerging markets, BRICs also have suffered from increasing bribery ([Caron et al. 2012](#)). During the last three years, Brazil has experienced a series of large business bribery scandals, such as the "Operation Car Wash" case between the state-owned petro corporation Petrobras and the construction company Odebrecht, as well as the recent case of the meat packing company JBS (a Brazilian beef giant). These companies have been accused of kickbacks and bribery. Furthermore, the former president of the country was impeached and the current president is under investigation due to these scandals ([Smith et al. 2017](#)).

In Russia, corruption has been considered a cultural practice and bribes a necessary process of getting things done since the 20th century ([Brovkin 2003](#)). In particular, Russia has been characterized by crony capitalism between the politicians and the businessmen. After Gorbachev took power, the Russian economy went through drastic reforms and became a free market economy. During the era of Gorbachev and Yeltsin, the privatization of state-owned companies was composed of corruption between the politicians, especially Yeltsin, and his friends, the orchestrators of the privatization procedure, who became billionaires<sup>2</sup>. President Putin, Yeltsin's successor, has reversed the predecessor's economic reforms by trying to nationalize important sectors such as natural resources and the finance sector, but the previous billionaires simply have been replaced with Putin's close friends ([Djankov 2015](#)).

Although economic reform in China has proceeded slowly but surely, corruption has been pervasive due to an inadequate legal system and traditions such as "guanxi"<sup>3</sup>, which loosely translates to social connections or a social network ([Gold et al. 2004](#)). Guanxi has long been considered an important practice in business as well as other domains of life. To warm up the relationship, people

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<sup>2</sup> They are also known as super rich "oligarchs" ([Brovkin 2003](#)).

<sup>3</sup> "Guanxi" connotes more broad meaning than its literal translation. Guanxi implies the relationships that may result in the exchanges of favors or connections that are beneficial for the parties involved ([Gold et al. 2004](#)). Also, it is sometimes used interchangeably with the term "networking" or "connection" ([Gold et al. 2004](#)). The elements of exchanges based on "guanxi" build mutual trust of involved parties and form inner circles of the people involved. As a consequence, it is important to understand guanxi while doing business in China ([Gold et al. 2004](#)).

offer gifts or other services to the counterparty or government officials. Once the gift is accepted, the receiver returns the favor by delivering services such as giving the relevant permission or license, or ensuring the procurement that the giver wants (Li 2010). The practice of guanxi between firms and government officials often expands to bribery, which weakens a firm's corporate governance and deters further growth (Braendle et al. 2005).

Corruption is pervasive in India as well, but is especially notorious in the healthcare sector (Kumar 2003). In 2014, the Australian medical practitioner David Berger published an article based on his experience working as a volunteer physician in India that revealed the widespread corruption in India's healthcare system. As described in the subtitle of his article (Berger 2014), Berger claims that pharmaceutical companies provide kickbacks to doctors to prescribe particular medicines.

The indices of corruption also indicate the serious level of corruption in BRICs. Table 1 provides the rank of each BRIC country on the latest Corruption Perceptions Index (CPI 2016) and Bribe Payers Index (BPI 2011)<sup>4</sup> issued by Transparency International (Transparency International 2016a, 2016b). The scale for CPI is 0 (extremely corrupt) to 100 (little to none) with an average of 43 from 176 nations in 2016 while that for BPI is 0 (always bribe) to 10 (never bribe) with an average of 7.8 from 28 countries in 2011. According to Table 1, the CPI and BPI scores for BRICs were worse than the average (43 and 7.8). In particular, Russia and China were evaluated as countries with the most bribe payments, being the worst and the second worst in terms of BPI among 28 countries in 2011.

**Table 1.** Corruption Perceptions Index (CPI) 2016 and Bribe Payers Index (BPI) 2011.

|                           | CPI (2016) |      | BPI (2011) |      |
|---------------------------|------------|------|------------|------|
|                           | Raw Score  | Rank | Raw Score  | Rank |
| Brazil                    | 40         | 79   | 7.7        | 14   |
| Russia                    | 29         | 131  | 6.1        | 28   |
| India                     | 40         | 79   | 7.5        | 19   |
| China                     | 40         | 79   | 6.5        | 27   |
| Mean                      | 43         |      | 7.8        |      |
| Total number of countries | 176        |      | 28         |      |

Note: The scale for CPI and BPI are 0 (highly corrupt) to 100 (very clean) and 0 (always bribe) to 10 (never bribe), respectively.

Although a bribe-paying firm may get some temporary advantages using bribe payments to government officials, it incurs various costs in the long run. First, a bribe payment can stunt a firm's growth: approximately 1.5 trillion USD, about 2 percent of world GDP, are used as bribery each year (The World Bank 2017). This huge bribery payment could waste a firm's resources and in turn deter the firm's growth (Wu 2009). Second, a bribe generates a hidden risk premium such as possible legal costs or damages to its reputation from getting caught and punished (Wu 2009). Since most firms in a highly corrupt business environment, such as an emerging market, may have to pay bribe in order to survive, the increased costs can harm the industries as well as the national economy (Athanasouli and Goujard 2015). Moreover, if the practice of bribery is pervasive in countries with enormous global economic influence like BRICs, it can damage the global economy.

After the financial crises of the emerging markets in the late 90s<sup>5</sup> and the US market in the late 2000s<sup>6</sup>, corporate governance has become an important issue. In particular, many researchers

<sup>4</sup> The latest data for these indices were released by Transparency International in 2016 and 2011.

<sup>5</sup> During 1997–1998, many Asian countries experienced severe currency depreciation and stock market collapse, which was called the “Asian Financial Crisis”. Starting from Thailand, the crisis spread to most of Southeast Asia such as Indonesia, Malaysia, and Philippines as well as South Korea and Hong Kong (Johnson et al. 2000).

<sup>6</sup> The financial crisis in 2007–2008, viewed as the worst crisis since the Great Depression in 1930s, led to the collapse of large financial companies like Bear Stearns and Lehman Brothers (Erkens et al. 2012).

(Wu 2005; Caron et al. 2012; Ramdani and Witteloostuijn 2012) argue that good corporate governance can act as a way to restrict the bribery of a firm. With the increasing influence of BRICs on the global economy, it has become crucial to investigate whether sound corporate governance can reduce corruption of firms in these countries. Yet, little empirical research has been performed regarding the effects of corporate governance on corruption at the firm level in BRICs. To fill this gap, this study provides an empirical analysis on whether the corporate governance of firms affects corruption at the firm level in BRICs. In the analysis, the largest ownership, foreign ownership, CEO gender, CEO experience, and external audit on financial statements are used as corporate governance metrics while corruption is proxied by an indicator variable on a firm's bribery. A logistics regression on 8885 firms from BRICs reveal that greater ownership by the largest owner, less CEO experience in the same sector, and externally audited financial statements can significantly reduce a firm's corrupt behavior. This paper adds to the current research on corruption by empirically showing the relations between corruption at the firm level and corporate governance in the context of the four largest emerging markets. The findings of this study can also shed light for standard setters and regulators on the direction to avoid or limit bribery of firms.

The rest of this paper is organized as follows: Section 2 encompasses the literature review, followed by the research design and results in Sections 3 and 4, respectively, while concluding remarks make up Section 5.

## 2. Literature Review and Theoretical Background

### 2.1. Corruption

Corruption involves two parties: bribe payers (supply side) and bribe takers (demand side) (Rose-Ackerman 1978; Wu 2005). Early studies on corruption look at the demand side, the corrupt officials who receive the bribe. Shleifer and Vishny (1993) view corruption as the sale of government property by officials for their own benefit, such as taking bribes for authorizing permits and licenses, clearing customs, or prohibiting the entry of competitors. They argue that corruption is prevalent and costly while the level of corruption depends on the government structure and political process.

Treisman (2000) examines the causes of corruption using three perceived corruption indices from Transparency International (TI). He finds six factors that affect the level of corruption: legal system (common law/British heritage vs. civil law), economic status (i.e., GDP size), historical tradition, type of government (federal vs. unitary), degree of exposure to democracy, and openness to trade. More specifically, there is less corruption in countries with histories of British rule, more developed economies, Protestant traditions, unitary government, longer periods of exposure to democracy, and greater openness to trade.

In the 2000's, attention has shifted to the supply side of corruption, the private sector that pays the bribe, which is mostly made up of business corporations (Wu 2005). Wu (2005) argues that corruption increases costs to a firm in the form of the actual bribe payments as well as the substantial legal costs and financial risks associated with being caught in the future, extortion of subsequent bribe payments by bribe takers, and decline of motivation to develop long-term competitive advantages. Since these costs may exceed the short-term benefits, Wu (2005) suggests that firms avoid or minimize the practice of bribery to protect the interests of the shareholders. Gaviria (2002) uses a survey of private firms in Latin America and finds that corruption not only harms firm competitiveness by reducing sales growth, investment, and employment growth, but also increases bureaucratic interference.

Since the early 2000s, the World Bank has prepared and released the World Bank Enterprise Survey Database (hereinafter WBES), a survey data from interviews with executives over 155,000 firms mainly in developing countries such as BRICs. As firm-level data have become available, many researchers have tried to identify the determinants of firm bribery. For example, using the firm level data from *Business Environment Surveys* (BES) conducted by the World Bank in 1999 and 2000, Herrera et al. (2007) provide empirical evidence on whether the corruption network structure affects the incidence and

amount of bribery for a firm. [Clarke and Xu \(2004\)](#) examine the determinants of corruption related to utilities at the cross-national level over 21 countries located in Central Asia and Eastern Europe from the WBES. They find that utility providers have greater chance of taking bribes if there are greater constraints on utility capacity, and lower competition in the utility sector, or if government owns and controls utilities. On the other hand, firms with more profits or those with more delayed payment to utilities tend to pay bribes. Also, they claim that newly established private firms have a greater likelihood of paying a bribe. [Wu \(2009\)](#) has performed a more comprehensive empirical research on the determinants of firm level bribery. Using over 1867 in 12 Asian countries from WBES, the author suggests a list of factors that affect bribery of firms in Asia, both internal and external factors. [Wu \(2009\)](#) suggests that smaller firms and family-run firms tend to pay more bribes, but firms with less competition in the market, a more transparent legal system, a more efficient bureaucracy/tax system, and less licensing requirements tend to pay fewer bribes.

Recently, [Athanasouli and Goujard \(2015\)](#) have investigated the relation between regional corruption and the management practices in the manufacturing industry of ten transitional economies located in Central and Eastern Europe. They find that corruption can deteriorate the management quality of a firm. Specifically, a firm belonging to contract-dependent industries and situated in more corrupt areas are more likely to have worse management quality, less investment in R & D, smaller product markets, a more centralized decision process, and administrative staffs with lower education level.

Based on the studies discussed above, corruption is harmful to a firm in the following perspectives: it is costly ([Shleifer and Vishny 1993; Wu 2005](#)), it harms competitiveness and management quality, and it reduces growth and investment opportunities ([Gaviria 2002; Athanasouli and Goujard 2015](#)). Also, corruption of a firm can be influenced by not only the business environment, such as government structure, legal system, or corruption network structure ([Shleifer and Vishny 1993; Treisman 2000; Wu 2005](#)), but also internal factors of the firm such as corporate governance, firm age, or growth rate ([Clarke and Xu 2004; Wu 2005, 2009](#)). In this research, we focus on corruption's supply side and the relations between corruption and the corporate governance of a firm using firm level data from WBES.

## 2.2. Corporate Governance and Corruption

Prior literature considers corporate governance to be one of the key determinants of corruption. For example, firms in highly corrupt nations tend to have poor corporate governance while countries with a lack of sound corporate governance can breed corruption ([Rose-Ackerman 1999; Hellman et al. 2000; Wu 2005](#)). [Wu \(2005\)](#) examines the relations between corporate governance and corruption using country-level data, and finds that countries with corporate boards that effectively reflect the interests of the shareholders and actively prevent accounting irregularities experience less corruption. Also, [Wu \(2009\)](#) argues that good corporate governance can decrease firm bribery based on firms in 12 Asian countries from the end of 1998 to the mid-2000 from the WBES data set. Similar to [Wu \(2009\)](#), [Ramdani and Witteloostuijn \(2012\)](#) use firm level data from WBES for 2002–2005, and show that the corporate governance has a strong association with corruption at the firm level. [Hanousek et al. \(2017\)](#) reveal that the negative effect of corruption on firm efficiency varies with corporate governance structure.

Corporate governance involves different parties such as shareholders, management, auditors, and other stakeholders ([Wu 2005; OECD 2017](#)). From the perspective of the firms, key stakeholders who are responsible for the decision related to bribery are the shareholders and management (or the owner and CEO) since they set the firm's goal and strategic directions ([Hanousek et al. 2017](#)). Also, an external auditor can monitor and detect a firm's bribery by tracing accounting numbers. Thus, we focus on ownership structure, CEO characteristics, and external auditing of the financial statements of firms as the corporate governance metrics.



### 2.2.1. Ownership Structure

Shareholders, the owners of a firm, make important business decisions by voting and receive dividend directly related to firm profit. Among them, the largest shareholder often has the largest influence on the decisions and therefore the greatest influence on a firm's bribe payment. [Ramdani and Witteloostuijn \(2012\)](#) show using sample firms from WBES that the share of the largest shareholders is negatively related to bribery.

Compared to domestic firms, foreign firms can perform more responsible and transparent business practices due to the concern about their reputation and/or the ignorance of the local business environment ([Zaheer 1995](#); [Zaheer and Mosakowski 1997](#); [Cuervo-Cazurra et al. 2007](#); [Hanousek et al. 2017](#)). Consequently, foreign ownership can also act as a control device on a firm's corrupt activities, especially in developing countries. A survey conducted by [Gaviria \(2002\)](#) over the firms in Latin America reveals that corruption affects foreign direct investment negatively and the level of unofficial activity positively since foreign investors avoid firms in corrupt nations and an unofficial economy will expand if corruption is high. [Abotsi \(2015\)](#) also discovers that foreign ownership is negatively related to informal payments (i.e., bribes), using 3290 African firms from WBES. Finally, using a survey from 11,000 firms across 125 nations, [D'Souza and Kaufmann \(2013\)](#) reveal that larger foreign-owned firms have a lower likelihood of bribing than smaller domestic firms partly because multinational firms tend to be more concerned about reputation in their own countries.

### 2.2.2. CEO Characteristics

While shareholders own a firm, the management actually controls the daily operations of the firm. Since the management is more directly involved in paying bribes, managerial characteristics can have a significant impact on the corruption of a firm. Among managerial characteristics, gender has been a frequent center of debate on a firm's performance, as well as other issues such as risks related to a firm. Across various branches of social science, gender is known to influence people's behavior, especially their attitude toward risk: compared to men, women tend to be more risk-averse ([Eckel and Grossman 1998](#); [Neelakantan 2010](#)). Older literature on business support this notion, documenting that female professionals such as female CEOs and female fund managers are less likely to take risks, such as investing in risky assets, compared to their male counterparts ([Niessen-Ruenzi and Ruenzi 2017](#); [Huang and Kisgen 2013](#); [Khan and Vieito 2013](#); [Liu et al. 2014](#); [Faccio et al. 2016](#)) since men are presumably brasher than women ([Barber and Odean 2001](#)). They also find that males are more likely to engage in criminal activities or tolerate such activities more than females ([Mocan and Rees 2005](#); [Swamy et al. 2001](#)). Under this notion, given that bribery is an illegal activity and entails the risk of being caught and punished, women would avoid it more than men do.

Also, compared to women, men are more likely to be the targets of bribery because men are usually more active than women in the workforce, which in turn exposes more men to government officials and bribery ([Jha and Sarangi 2018](#); [Mocan 2008](#)). Several studies examine gender-corruption relations. For example, [Dollar et al. \(2001\)](#) find that more female representatives in parliament are related with less corruption. Similarly, [Swamy et al. \(2001\)](#) show that greater participation of women in the workforce and the government is again related to less corruption using cross-country data, and that firms managed by men tend to get involved in bribery using survey data from firms in Georgia. Also, [Ramdani and Witteloostuijn \(2012\)](#) reveal that male owner-managers have a significant and positive impact on bribery.

However, more recent studies suggest that the relation between the gender of a decision-maker in business and bribery is unclear. Specifically, [Jha and Sarangi \(2018\)](#) address the endogenous issues involved in gender-corruption in relation in the previous studies and use instrumental variables (IV) as a control for this problem. With the IV approach, [Jha and Sarangi \(2018\)](#) examine the impact of female presence in different occupations on corruption, and reveal that while female presence in politics tends to decrease corruption, their presence in the labor force or managerial positions does not.

Another CEO characteristic that we consider is CEO experience in the same sector. The CEO's experience has both benefits and costs. A CEO with a longer tenure in the same industry may bring more knowledge, skills specialized experience in that sector (Limbach et al. 2016), as well as established relations with insiders and outsiders of the firm such as employees, customers, and government officials (Luo et al. 2013; Limbach et al. 2016); however, compared to CEOs without prior experience in the same sector, a more experienced CEO is likely to pose less challenges or innovations on the business. They will often be reluctant to accept changes or mistakes or to consider the advice of others, and often become stereotyped with increased managerial entrenchment (Miller 1991; Limbach et al. 2016). Up to now, little evidence between CEO experience and corruption exists.

### 2.2.3. External Audit

Although external auditing is not a main function of a firm, it is closely linked to corporate governance as a control device that can monitor and detect a firm's bribery activities. However, there have been only a handful of papers on the relationship between external auditors and corruption, and they give a somewhat unclear direction. Uecker et al. (1981) examine whether firm managers perceive the internal auditor as well as external auditors as deterrents, like "police officers" to corporate irregularities, but find no significant evidence on this issue. Similarly, Wu (2009) does not find any significant association between the external audit of financial statements and bribery. In contrast, Albrecht et al. (2012) reveal that countries are perceived to be less corrupt if they establish an oversight body for auditors, and require practical experience, theoretical knowledge, and a licensing examination before practicing auditing. Kimbro (2002) also provides empirical evidence that countries with a more effective legal and accounting system as well as a greater number of accountants are more likely to detect corruption.

## 3. Sample and Research Design

### 3.1. Sample

The original data is gathered from the WBES, the enterprise survey data provided by the World Bank. Deleting the data points with missing values leaves 8885 firms, of which the distribution is summarized in Table 2. Since the survey was conducted in different years across the countries, the fiscal year for each country of BRICs is not the same: the fiscal year is 2008 for Brazil, 2011 for Russia and China, and 2013 for India. Panels A and B of Table 2 present the distributions of the sample by country and by industry, respectively. Among 8885 firms, about 60 percent and 25 percent are firms from India (5291 firms) and Russia (2217 firms), respectively, whereas China and Brazil take 9.75 percent (867 firms) and 5.74 percent (510 firms), less than 10 percent each (see Panel A). The largest industry across the BRICs is the manufacturing industry (68.94 percent), followed by wholesale and retail (15.12 percent), and service industry (11.53 percent). The construction industry takes less than 10 percent at 4.41 percent (see Panel B).

**Table 2.** Sample Distribution.

| <b>Panel A: Sample Distribution by Country</b> |                  |          |
|--|------------------|----------|
|  | <b>Frequency</b> | <b>%</b> |
| Brazil (fiscal year 2008)                      | 510              | 5.74     |
| Russia (fiscal year 2011)                      | 2217             | 24.95    |
| India (fiscal year 2013)                       | 5291             | 59.56    |
| China (fiscal year 2011)                       | 867              | 9.75     |
| Total  | 8885             | 100.00   |

Table 2. Cont.

| Panel B: Sample Distribution by Industry |           |        |
|--|-----------|--------|
|  | Frequency | %      |
| Manufacturing                            | 6125      | 68.94  |
| Wholesale and Retail                     | 1343      | 15.12  |
| Service                                  | 1024      | 11.53  |
| Construction                             | 393       | 4.41   |
| Total                                    | 8885      | 100.00 |

Note: Original sample is collected from the World Bank Enterprise Survey database. We deleted the missing values, which leads to the final sample of 8885 firms.

### 3.2. Research Design

To test our research question, we construct the logistics regression model in Equation (1).<sup>7</sup> We winsorize all continuous variables (top and bottom 1%) to control for the outliers' effects. Also, the robust standard errors are used in order to control for firm clustering effects and heteroscedasticity (Petersen 2009).

$$CORRUPTION = \alpha + \beta_i \text{Corporate Governance Metrics} + \sum \text{Control} + \varepsilon_i \quad (1)$$

#### 3.2.1. Dependent Variable (CORRUPTION)

The dependent variable in Equation (1), *CORRUPTION*, is an indicator variable that is one if a firm is involved in any kind of informal gift or payment (i.e., bribe) and zero otherwise. More specifically, the variable is coded one if answers for any of the survey questions in Table 3 are greater than 0 and zero otherwise. Since people tend to provide answers that conform to the social norms for sensitive questions such as those relating to bribery, the variable *CORRUPTION* could be underestimated compared to the real level of bribery; i.e., there may be an unknown amount of downward bias.

Table 3. Survey questions related to dependent variable (*CORRUPTION*).

| Question No. | Description   |
|--------------|---|
| C.14         | An informal gift or payment related to a water connection                                   |
| C.21         | An informal gift or payment related to a telephone connection                               |
| G.4          | An informal gift or payment related to a construction-related permit                        |
| J.5          | An informal gift or payment related to an inspection by tax officials or meetings with them |
| J.6          | % of the contract value paid in informal payments   |
| j7a          | % of total annual sales paid in informal payments   |
| j7b          | Total annual informal payment   |
| J.12         | An informal gift or payment related to an import license                                    |
| j15          | An informal gift or payment related to an operating license                                 |

Note: The dependent variable, *CORRUPTION*, is coded one if answers for any of the above survey questions in Table 3 are greater than 0 and zero otherwise.

#### 3.2.2. Test Variable (Corporate Governance Metrics)

Our test variable is a firm's corporate governance captured by corporate governance metrics, which consists of ownership structure, CEO characteristics, and the accounting information quality (i.e., external auditing). Specifically, *OWN\_LARGEST* (the largest ownership, % owned by the largest owner), *OWN\_FOREIGN* (foreign ownership, % owned by foreign domestic individuals, companies or organizations), *CEO\_FEMALE* (a dummy that is one for a female CEO and zero for a male CEO),

<sup>7</sup> Since *CORRUPTION* is a dummy variable, the logistics regression model is considered to be appropriate in this study.



*CEO\_EXPERIENCE* (CEO experience, natural logarithm of top manager's working years in the same sector), and *AUDIT* (accounting quality, a dummy that is one if an external auditor audited the firm's financial statements and zero otherwise).

### 3.2.3. Control Variable (Control)

Equation (1) also includes control variables known to influence a firm's corruption based on previous literature: *SIZE\_SMALL* (small size firm, a dummy variable that is one if the total number of employees is less than 21 and zero otherwise (Mittelstaedt et al. 2003; Kang et al. 2018)<sup>8</sup>), *SALES* (natural logarithm of sales in US Dollar (Wu 2009)), *FIRM\_AGE* (natural logarithm of firm age (Ramdani and Witteloostuijn 2012)), *COMPETITION* (informal competition, a dummy that is one if a firm competes with informal firms and zero otherwise (Wu 2009)), *MARKET* (market type, a dummy that is one if the main market is a domestic market and zero otherwise (Ramdani and Witteloostuijn 2012)), and *LIST* (listing status, a dummy that is one if a firm is publicly listed and zero otherwise (Ramdani and Witteloostuijn 2012)). Finally, industry dummies are included to control for industry effects while country dummies are included in the regression in order to control for country specific effects such as culture (Jha and Panda 2017).

## 4. Results

### 4.1. Descriptive Statistics

Table 4 reports the mean and standard deviation for each variable, other than industry and country dummies, in the main regression. The mean value of *CORRUPTION* is 0.33, showing that on average one third (33 percent) of the sample firms are involved in bribery. While the average % of ownership by the largest owner (*OWN\_LARGEST*) is 76 percent, only 1 percent of shares are owned by foreign individuals or a corporation (*OWN\_FOREIGN*). Among 8885 firms, 12 percent of firms have a female CEO (*CEO\_FEMALE*), suggesting that a male CEO (88 percent) is much more preferred in BRICs. The mean value of *CEO\_EXPERIENCE* is 2.55. If converted into number of years, the average working experience of a CEO in the same sector is about 14.43 years. The mean value of *AUDIT* is 64 percent, suggesting that more than half of the sample firms have an external audit on their financial statements. About 37 percent of total firms are small size firms with employees equal to or less than 20. The mean value of *SALES* and that of *FIRM\_AGE* is 13.74 and 2.55, respectively. If they are converted into US dollars and number of years (before log transformation), the average dollar sales of sample firms is \$927,408 while the average firm age is 15.68 years. While 40 percent of firms appear to compete with informal firms, almost all firms sell their products in the domestic market (94 percent). Finally, only a few firms (2 percent) are listed.

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<sup>8</sup> Results using the different threshold of 50 employees for variable *SIZE\_SMALL* ([http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition\\_en](http://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en)) are qualitatively the same.

**Table 4.** Descriptive Statistics (Total Observations = 8885).

| Variable              | Definition  | Mean  | Std Dev |
|-----------------------|---|-------|---------|
| <i>CORRUPTION</i>     | Dummy variable. 1 = Bribe; 0 = No bribe   | 0.33  | 0.47    |
| <i>OWN_LARGEST</i>    | Percentage owned by the Largest owner   | 0.76  | 0.26    |
| <i>OWN_FOREIGN</i>    | Percentage owned by Foreign domestic individuals, companies or organizations                  | 0.01  | 0.08    |
| <i>CEO_FEMALE</i>     | Dummy variable. 1 = Female CEO; 0 = Male CEO  | 0.12  | 0.32    |
| <i>CEO_EXPERIENCE</i> | Natural logarithm of top manager's working experience in the sector                           | 2.55  | 0.62    |
| <i>AUDIT</i>          | Dummy variable. 1 = Audited financial statement; 0 = Un-audited financial statement           | 0.64  | 0.48    |
| <i>SIZE_SMALL</i>     | Dummy variable. 1 = Small size (the total number of employees is less than 21); 0 = Otherwise | 0.37  | 0.48    |
| <i>SALES</i>          | Natural logarithm of sales in US Dollar   | 13.74 | 2.21    |
| <i>FIRM_AGE</i>       | Natural logarithm of firm age   | 2.55  | 0.72    |
| <i>COMPETITION</i>    | Dummy variable. 1 = Informal competition (competition with informal firms); 0 = Otherwise     | 0.40  | 0.49    |
| <i>MARKET</i>         | Dummy variable. 1 = Domestic market as a main market; 0 = Otherwise                           | 0.94  | 0.24    |
| <i>LIST</i>           | Dummy variable. 1 = Listed firm; 0 = Otherwise  | 0.02  | 0.12    |

Note: In Table 4, we winsorize all continuous variables (top and bottom 1%) to control for possible problems from outliers. All monetary terms are converted into the US dollar value while all percent terms are deflated by 100.

#### 4.2. Correlation

Table 5 demonstrates the Pearson correlations between model variables, except for industry and country dummies, in Equation (1). The proxy for corruption of a firm, *CORRUPTION*, is negatively associated with *OWN\_LARGEST*, *CEO\_FEMALE*, *AUDIT*, *SALE*, and *COMPETITION*. The pair-wise Pearson correlation coefficients are  $-0.08$ ,  $-0.03$ ,  $-0.33$ ,  $-0.06$  and  $-0.10$ , respectively and they are all significant at the 1 percent level. In contrast, *CORRUPTION* is positively associated with *CEO\_EXPERIENCE*, *SIZE\_SMALL*, *FIRM\_AGE*, and *MARKET*. The corresponding correlation coefficients are 0.24, 0.20, 0.57, and 0.10, respectively, all significant at the 1 percent level. Although several independent variables seem to be correlated, the largest condition index and the largest variance inflation factors are 5.44 and 5.86, respectively (un-tabulated). Thus, multicollinearity does not seem to be an issue.

**Table 5.** Correlation Matrix (Total Observations = 8885).

| No. | Variable              | 1         | 2         | 3        | 4         | 5         | 6         | 7         | 8         | 9         | 10   | 11   | 12   |
|-----|-----------------------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|------|------|------|
| 1.  | <i>CORRUPTION</i>     | 1.00      |           |          |           |           |           |           |           |           |      |      |      |
| 2.  | <i>OWN_LARGEST</i>    | −0.08 *** | 1.00      |          |           |           |           |           |           |           |      |      |      |
| 3.  | <i>OWN_FOREIGN</i>    | −0.01     | −0.02 *   | 1.00     |           |           |           |           |           |           |      |      |      |
| 4.  | <i>CEO_FEMALE</i>     | −0.03 **  | 0.00      | 0.01     | 1.00      |           |           |           |           |           |      |      |      |
| 5.  | <i>CEO_EXPERIENCE</i> | 0.24 ***  | −0.19 *** | 0.03 **  | −0.02     | 1.00      |           |           |           |           |      |      |      |
| 6.  | <i>AUDIT</i>          | −0.33 *** | 0.06 ***  | 0.01     | 0.01      | −0.12 *** | 1.00      |           |           |           |      |      |      |
| 7.  | <i>SIZE_SMALL</i>     | 0.20 ***  | −0.02     | 0.00     | −0.01     | 0.11 ***  | −0.12 *** | 1.00      |           |           |      |      |      |
| 8.  | <i>SALES</i>          | −0.06 *** | −0.05 *** | 0.05 *** | 0.01      | 0.06 ***  | 0.18 ***  | −0.43 *** | 1.00      |           |      |      |      |
| 9.  | <i>FIRM_AGE</i>       | 0.57 ***  | −0.08 *** | −0.01    | −0.07 *** | 0.34 ***  | −0.24 *** | 0.27 ***  | −0.10 *** | 1.00      |      |      |      |
| 10. | <i>COMPETITION</i>    | −0.10 *** | 0.00      | −0.02    | 0.00      | −0.03 **  | −0.03 **  | −0.01     | −0.09 *** | −0.09 *** | 1.00 |      |      |
| 11. | <i>MARKET</i>         | 0.10 ***  | −0.02 †   | 0.01     | −0.01     | 0.04 ***  | −0.10 *** | 0.13 ***  | −0.17 *** | 0.10 ***  | 0.01 | 1.00 |      |
| 12. | <i>LIST</i>           | 0.02 *    | −0.05 *** | 0.04 *** | 0.00      | 0.03 **   | −0.02 *   | −0.01     | 0.00      | 0.06 ***  | 0.01 | 0.00 | 1.00 |

Note: For variable definition, please refer to Table 4. †, \*, \*\*, and \*\*\* indicate the significance based on *p*-value of less than the 10 percent level, 5 percent level, 1 percent, and 0.1 percent level (two-tailed), respectively.

### 4.3. Regression Results

Table 6 provides the logistics regression results over the 8885 sample firms. The coefficient estimates on *OWN\_LARGEST* and *AUDIT* are negative and significant at the 1 percent and 0.1 percent level, respectively (two-tailed), indicating that more concentrated ownership of the largest owner and external auditing on financial statements decrease the bribery of a firm significantly. On the other hand, the coefficient estimate on the *CEO\_EXPERIENCE* is significantly positive at the 0.1 percent level (two-tailed), suggesting that the likelihood of bribery increases as CEO experience in the same sector increases. The coefficient estimates on *OWN\_LARGEST*, *AUDIT*, and *CEO\_EXPERIENCE* are  $-0.32$ ,  $-1.06$ , and  $0.18$  with the corresponding *Wald*-statistics of 8.74, 343.27, and 11.88, respectively. However, the relations between *CORRUPTION* and *OWN\_FOREIGN* or between *CORRUPTION* and *CEO\_FEMALE* are insignificant.

**Table 6.** Regression Results (Total Observations = 8885).

| <i>Variable</i>                | <i>Coefficient</i> | <i>Standard Error</i> | <i>Wald-Stat</i> |
|--------------------------------|--------------------|-----------------------|------------------|
| <i>Intercept</i>               | −7.43              | 0.41                  | 333.38 ***       |
| <b><i>Test Variables</i></b>   |                    |                       |                  |
| <i>OWN_LARGEST</i>             | −0.32              | 0.11                  | 8.74 **          |
| <i>OWN_FOREIGN</i>             | −0.05              | 0.44                  | 0.01             |
| <i>CEO_FEMALE</i>              | 0.06               | 0.09                  | 0.36             |
| <i>CEO_EXPERIENCE</i>          | 0.18               | 0.05                  | 11.88 ***        |
| <i>AUDIT</i>                   | −1.06              | 0.06                  | 343.27 ***       |
| <b><i>Control Variable</i></b> |                    |                       |                  |
| <i>SIZE_SMALL</i>              | 0.26               | 0.07                  | 15.01 ***        |
| <i>SALES</i>                   | 0.03               | 0.02                  | 2.31             |
| <i>FIRM_AGE</i>                | 2.31               | 0.11                  | 474.89 ***       |
| <i>COMPETITION</i>             | −0.31              | 0.06                  | 28.25 ***        |
| <i>MARKET</i>                  | 0.51               | 0.16                  | 10.34 **         |
| <i>LIST</i>                    | −0.32              | 0.18                  | 3.12 †           |
| <i>Industry Dummy</i>          |                    | Included              |                  |
| <i>Country Dummy</i>           |                    | Included              |                  |
| <b>Pseudo R<sup>2</sup></b>    |                    | 36.67%                |                  |
| <b>Wald X<sup>2</sup></b>      |                    | 1593.61 ***           |                  |
| <b>N</b>                       |                    | 8885                  |                  |

Note: †, \*, \*\*, and \*\*\* indicate the significance based on *p*-value of less than the 10 percent level, 5 percent level, 1 percent, and 0.1 percent level (two-tailed), respectively. The robust standard errors are used in order to control for firm clustering effects and heteroscedasticity (Petersen 2009).

In addition, except for *SALES* and *LIST*, all other control variables appear to significantly affect a firm's bribery at least at the 1 percent level. The coefficient on *SIZE\_SMALL*, *FIRM\_AGE*, *COMPETITION*, and *MARKET* are 0.26, 2.31,  $-0.31$ , and 0.51 (*WALD*-stat. = 15.01, 474.89, 28.25, and 10.34). Thus, small size, long-established, or domestic market oriented firms have greater likelihood of paying bribes while competition with informal firms would decrease a firm's bribery behavior.

## 5. Conclusions

This study aims to explore how corporate governance is related to corruption in over 8,885 firms in BRICs (Brazil, China, India, and Russia). Specifically, we investigate the influence of ownership structure proxied by the percentage of the largest ownership and that of a foreign individual or companies, CEO characteristics proxied by CEO gender and CEO experience, and external audit on financial statements, on a firm's bribery. The logistics regression results support the impact of three among the five elements of corporate governance: the proportion of the largest ownership,

CEO experience, and external audit. Increases in shares of the largest shareholder or external auditing on financial statements could reduce a firm's bribe behavior, which provides empirical evidence on methods to prevent or limit bribery in the emerging market context, especially BRICs. On the other hand, increases in CEO tenure in the same sector appear to enhance a firm's bribery, warning that long experience in the same industry may make a CEO a target that the bribe takers can easily notice due to their long exposure. This finding may support the previous evidence that as the working experience of CEO increases the CEO tends to be less innovative in order to avoid risk.

Although this study provides valuable empirical findings on corporate governance and corruption, some limitations must be considered when interpreting the results. First, the data collection year and sample size are different across the countries, which may affect the results in spite of using industry and country dummies. Also, the sample size is restricted to four countries (BRICs), which may make the results inapplicable to other emerging economies. Lastly, Jha and Sarangi (2018) show that endogeneity is a key issue when discussing the relation between gender and corruption. Although the results of this paper support their findings that CEO gender does not have a significant relation with corruption, it should be noted that endogeneity may not have been adequately controlled.

In future research, it can be worthwhile to extend our research to other emerging economies such as South East Asian countries or East and Central European countries. Another interesting topic to explore would be whether corporate governance affects corruption differently across different business environments by comparing emerging markets and advanced countries. If this research is applied to other emerging markets or advanced countries in the future, an improved research design that addresses and controls for the endogeneity issue should be considered.

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