Corporate Systems in Emerging Market Economies

A Comparison of China and Eastern Europe

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Chapter 10

Corporate Crime

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10 Corporate Crime

10.1 Introduction

Corporate crime sometimes sends violent shockwaves across the country where it occurs and can have a profound impact globally. The list of offenses committed by large corporations appears to be endless. Notable examples include the large-scale international corruption case in 1976 known as the Lockheed bribery scandal; the 1992 General Electric fraud case, in which the company was accused of defrauding the US federal government of large sums of money; Chevron's violation of the Clean Water Act; the concealment of substantial losses by Daiwa Bank's New York branch in 1995; the fraudulent accounting scandals involving Enron Corporation and WorldCom in the early 2000s; the manipulation of the London Interbank Offered Rate (LIBOR) by Barclays Bank in 2012; and Volkswagen's manipulation of emissions tests to meet regulatory standards in 2015, to name just a few (Salinger, 2012; Wall, 2023). Even today, cases of window dressing, fraud, bribery, fraudulent certification, and fraudulent billing by leading companies are reported almost every year worldwide. Each incident erodes the credibility of industrial and business communities and causes significant losses to stakeholders.

Companies in advanced economies such as Europe, the United States, and Japan have been the "key culprits" behind many internationally notorious corporate crimes because the overwhelming majority of large companies and multinationals involved in the most scandalous corporate crimes are based in these regions. However, the landscape of corporate crime has shifted significantly in recent years due to the increasing presence of firms from emerging markets in the global economy. Misconduct and crimes committed by firms based in emerging market powers such as China and Russia, which occur with alarming frequency, have undoubtedly attracted increasing global attention.

In fact, the "One Belt, One Road" initiative promoted by the Xi Jinping administration has encouraged Chinese firms to expand overseas, especially in the Indo-Pacific region, where they have been involved in various types of misconduct related to the project, including corruption, labor code

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violations, pollution, and environmental destruction (Indo-Pacific Defense Forum, 2022). Russian firms have been criticized by the international community for engaging in money laundering and cybercrimes in collusion with criminal syndicates, primarily targeting developed countries. Moreover, Russia has gained notoriety for corporate crimes related to fossil fuel exports (Woolfson and Beck, 2005). Additionally, Chinese and Russian companies are deeply engaged in industrial espionage, aiming to illicitly uncover advanced technologies and proprietary information from competitors, which has led to numerous instances of them being barred or sanctioned by the governments of the United States and other advanced nations. In the context of Russia's military invasion of Ukraine, which began in February 2022, G7 countries have sanctioned major Russian enterprises led by so-called "oligarchs" and several Chinese companies involved in transferring materials and components for weapons and arms production from third countries to Russia. A common factor in such internationally notorious misconduct and criminal acts by emerging market firms is the significant influence of the state behind them.

These issues have increasingly captured the attention of the international community concerning crimes committed by corporations in China, Russia, and other emerging markets. However, surprisingly, few academic studies have provided a comprehensive overview of such crimes. To the best of our knowledge, the only formal studies on corporate crimes committed by firms in Central and East European emerging markets include Batory (2012) on Central and East Europe and Banerjee et al. (2022) on Russia, neither of which directly addresses corporate criminal acts. In stark contrast, the volume of studies on China matches that of advanced nations since the 2000s, including a pioneering work by Chen et al. (2006). However, the majority of these studies, particularly those addressing corporate misconduct by Chinese firms, tend to rely heavily on specific sources such as sanctions reports from the Shanghai Stock Exchange or the Shenzhen Stock Exchange and the China Stock Market and Accounting Research (CSMAR) database. Consequently, these studies often appear similar to one another, with an extremely limited range of corporate fraud and crimes included in their empirical analyses. Moreover, the narrow focus on specific countries is a prevalent issue in corporate crime studies, with most research concentrating on crimes committed in individual states or comparing situations across a limited number of countries. This leads to a scarcity of studies that provide comprehensive knowledge and insights that can best be derived from multinational comparative analyses.

This chapter addresses a significant bottleneck in the academic research mentioned above and contributes to the literature on both corporate crime and emerging markets. First, this study measures and compares the incidence of corporate crime in European emerging markets and China by constructing a large-scale international dataset that encompasses these countries and regions. This dataset is derived from a source of information on corporate

crimes that has not been utilized before within the realm of economic studies. The comprehensive information source encompasses a wide range of economic, political, social, and international crimes involving firms, far exceeding the scope of corporate misconduct and criminal acts addressed by previous studies. It also highlights corporate crimes in many Central and East European emerging markets, which have largely been overlooked in prior research.

Second, this work contributes empirical evidence to the ongoing debate regarding the role of the board of directors in preventing corporate crime within emerging markets. While numerous studies have examined the relationship between board composition and corporate misconduct/crime, there remains a lack of empirical evidence specifically for companies in European emerging markets. Consequently, it remains uncertain whether and to what extent the corporate governance systems in these countries are effective in deterring corporate crime. In this chapter, we empirically test a series of hypotheses concerning the causal relationship between board composition and corporate crime. Our empirical analysis incorporates multiple perspectives—including the entirety of emerging markets, specific country groups, and types of crime—to introduce new insights into the knowledge base of emerging markets. This study also examines the relationship between other firm attributes and the incidence of corporate crime to compare with findings from existing literature in advanced nations with the aim of highlighting characteristics unique to firms in emerging markets.

Third, this work enhances the literature by focusing on national institutions as a key element of the empirical analysis, which may serve as a particularly strong deterrent to corporate crime—a topic that cannot be fully addressed by studies limited to a single country. Previous studies often rest on the naive assumption that firms themselves are capable of preventing misconduct and criminal acts, largely overlooking the quality of institutional frameworks within the countries where these firms operate. The quality of the judicial system, the regulatory capacity of administrative agencies, the investigative and reporting skills of the mass media, and the effectiveness of ombudsman systems operated by civil society vary significantly across countries and regions, likely contributing to international disparities in corporate crime rates. Regrettably, the only study that has empirically examined this aspect is by Keresztúri et al. (2023), which explores the relationship between press freedom and crime detection using macro-aggregate data. Inspired by the same objective, this chapter adopts a broader perspective on national institutions and examines their deterrent effects on corporate crime using large-scale firm-level data.

An investigation into the criminal history of 36,815 firms located across 20 European emerging markets and China revealed that 2,259 firms, or about 6% of all firms investigated, committed a total of 5,980 charged crimes between January 2020 and September 2023. Our empirical analysis indicates that while a larger board size is associated with a higher frequency of

corporate crime, the presence of female managers and directors significantly reduces the occurrence of crimes. It also confirms that board independence does not serve as a deterrent against crime. In addition, the effects of board composition on crime deterrence vary substantially depending on the country and the type of crime committed. In contrast, national institutions demonstrate strong deterrent effects on corporate crime across all emerging market firms.

The remainder of this chapter is organized as follows. The next section develops a series of hypotheses regarding the determinants of corporate crime in emerging markets. Section 10.3 describes the data and methodology used for hypothesis testing. Section 10.4 provides the landscape of corporate crime in emerging markets. Section 10.5 reports the empirical results. Last, Section 10.6 summarizes the main findings and concludes.

10.2 Literature Review and Hypothesis Development

In accordance with Auditing Standard No. 5, Paragraph 25, under Section 404 of the Sarbanes–Oxley Act, management is responsible for setting an appropriate tone at the top, establishing and maintaining a culture of integrity and high ethical values, and implementing appropriate internal controls to prevent, deter, and detect misconduct. However, this standard also highlights the potential limitations of internal controls, noting that "internal control can be circumvented by collusion or management override." This warning underscores that the effectiveness of internal controls as a defense against corporate crime heavily relies on the integrity and commitment of management. It also suggests that internal controls may not effectively prevent misconduct committed by managers themselves. Therefore, the board of directors, which exercises oversight and control over top management, must play a crucial role in ensuring management's commitment to establishing and maintaining truly effective internal controls and preventing management from engaging in wrongful acts.

Over the past several decades, researchers in corporate finance and business administration have repeatedly demonstrated that the effectiveness of management oversight by the board of directors heavily depends on the board's composition. Here, we specifically focus on board size (number of directors) and board independence from management—variables that have long been central to research in this field. In addition, we also consider gender diversity, a relatively new aspect that is gaining attention among researchers. These three elements are also crucial when evaluating the functions of boards in emerging market firms, as discussed in Chapters 3 and 5.

Regarding board size, Jensen and Meckling (1976) suggested that an excessively large board may fail to effectively fulfill its oversight functions. The literature remains divided on the optimal size of boards, with perspectives varying based on the intended functions of the board. Some researchers, emphasizing the board's role as a "knowledge tank," favor larger boards

(Dalton et al., 1999; Coles et al., 2008). Others argue that larger boards are essential for effectively managing the increasing scale and complexity of firm operations (Lehn et al., 2008).

Conversely, proponents of the board's management oversight function echo Jensen and Meckling's perspective, advocating for smaller, more compact boards. In fact, O'Reilly et al. (1989) argued that larger boards often face challenges related to communication and coordination. Furthermore, Lipton and Lorsch (1992) suggested that larger boards create more opportunities for board members to engage in free riding, which can undermine the board's oversight effectiveness. Michael Jensen later argued that smaller board sizes enhance coordination and communication, thereby facilitating more efficient decision-making (Jensen, 1993). It is widely recognized that being part of a large organization can diminish the presence of each member, thereby weakening their sense of responsibility and loyalty toward the organization (MacDermid et al., 2001). As Boone et al. (2007) pointed out, board size involves a trade-off between the costs and benefits of monitoring.[1] However, from the perspective of deterring corporate crime, it is crucial to consider the potential negative correlation between board size and the effectiveness of management oversight mechanisms. Therefore, we test the following hypothesis:

> **Hypothesis H1:** *Firms with larger board sizes are likely to have a higher incidence of crime.*

There is no denying that board independence from top management is a crucial firm-level factor determining the effectiveness of the board's oversight function and in preventing corporate misconduct and crime. Board independence is frequently highlighted in corporate crime research as a significant factor influencing the incidence of misconduct, typically assessed by the route of appointing the board chairman and the proportion of outside/independent directors on boards. For instance, Uzen et al. (2004) demonstrated the effectiveness of board independence in reducing corporate misconduct by identifying a negative correlation between the incidence of corporate misconduct in the USA from the 1970s to the 2000s and the number of independent directors serving on boards and their audit and remuneration committees. Ebaid (2023), analyzing listed firms in Saudi Arabia, also reported that greater board independence correlates with a lower likelihood of financial statement manipulation. Similarly, numerous studies in China have shown that the presence of outside/independent directors on boards has a deterrent effect on corporate fraud (Kong et al., 2019; Chen et al., 2022; Xiang and Zhu, 2023). Conversely, several studies have indicated that firms in which the same individual holds both CEO and board chairman roles tend to exhibit a high incidence of noncompliance (Zhou et al., 2018; Zhao et al., 2021; Wang et al., 2022a). These findings from previous studies might be broadly applicable to emerging markets as well. Thus, we propose to test the

following hypothesis regarding the effectiveness of board independence in reducing corporate crime:

> **Hypothesis H2:** *Board independence in emerging market firms inhibits the incidence of corporate crimes.*

Gender diversity has attracted significant attention from researchers in recent years due to the advantages it offers to corporate management. Indeed, numerous studies have closely examined the association between board gender diversity and various corporate activities, including financial performance, and have generally received positive evaluations. As reported in Chapter 5, Central and East European countries and China are on par with advanced nations in terms of the prevalence of firms recruiting female board members and the proportion of female directorship, with the presence of women on boards garnering considerable attention in these emerging markets.

Board gender diversity is also a focal point in several studies on corporate misconduct. For instance, Arnaboldi et al. (2021) investigated the frequency of fines received by European banks from US regulators over a ten-year period from 2008 to 2018 and found that greater female representation on boards leads to a proportional reduction in the frequency of fines, equivalent to savings of $7.48 million per year. These authors argue that the preventive effect of board gender diversity on misconduct stems from the relatively higher ethical standards and stronger risk aversion among female directors rather than merely their contribution to diversity. Chinese researchers have focused more on board gender diversity than their counterparts globally, producing numerous empirical studies. The pioneering study by Cumming et al. (2015b) identified a negative correlation between securities fraud committed in China from 2001 to 2010 and board gender diversity, supporting the hypothesis that female presence effectively reduces both the frequency and severity of misconduct in the male-dominated securities industry. Luo et al. (2020) used data from Chinese listed firms to support their hypothesis that firms with female CFOs are less likely to engage in risky and unethical behavior as compared to their counterparts with male CFOs. This finding builds on psychological and sociological research indicating that women tend to be more risk-averse and ethical than men. Subsequent studies by Wang et al. (2022b), Chen et al. (2023), and Chu et al. (2023) have also provided empirical evidence that the presence of female managers and directors on boards and their advancement in these roles significantly deter misconduct in Chinese firms. Based on these findings, we test the following hypothesis regarding board gender diversity in emerging market firms:

> **Hypothesis H3:** *Board gender diversity in emerging market firms reduces the incidence of corporate crimes.*

Countless studies have evaluated the impact of state-level institutional quality on corporate behavior and performance, with the majority identifying a positive causality between these factors. Examples include Baumöhl et al. (2019), who found a positive relationship between institutional quality and firm survival in European emerging markets; Matemilola et al. (2019), who demonstrated a positive impact of institutional quality on the capital structure of firms in developing countries; Agostino et al. (2020), who observed positive effects of institutional quality on total factor productivity among small and medium-sized manufacturing firms in Europe; and Iwasaki et al. (2022), who reported that institutional quality and the maturity of financial institutions significantly influence the survival of small and medium-sized enterprises in Central and East European economies. Regrettably, as mentioned earlier in this chapter, almost all available studies on corporate crime focus solely on crimes committed in a specific country or compare situations across a limited number of countries, often overlooking the national institutions that are expected to significantly influence the incidence of corporate crimes. An exception is Keresztúri et al. (2023). Their macroeconomic study, which covers 79 countries between 2011 and 2019, regresses the total number of corporate misconduct events by country onto the World Press Freedom Index, compiled and released by the NGO Reporters Without Borders. As a result, they conclude that press freedom effectively detects corporate crime.

Historically, national institutions have played a pivotal role in maintaining social order and deterring crime and misconduct. Judicial and police systems are indeed the primary state apparatuses serving this purpose. Additionally, various government regulations, legal protections for freedom of the press and speech, accountability mechanisms, and the monitoring capabilities of civil society also play crucial roles in this context. The quality of these national institutions is expected to significantly influence the incidence of corporate crime. Therefore, we propose to test the following hypothesis:

> **Hypothesis H4:** *The quality of national institutions influences the incidence of corporate crime in emerging markets.*

While sharing the same research interest as Keresztúri et al. (2023), we will examine Hypothesis H4 by employing a broader perspective on national institutions and utilizing a large-scale firm-level dataset.

10.3 Data and Empirical Methodology

This section describes the data and empirical methodology used to test the four hypotheses presented in the previous section.

10.3.1 Data

The dataset employed for the empirical analysis in this chapter is compiled from three different sources. The first source is Orbis, a comprehensive

company database compiled by Bureau van Dijk, a Moody's Analytics company. The board structure data provided by Orbis includes job titles and genders of individual board members. This allows for detailed analysis of the total number of board members per firm, their appointment processes (internal vs. external), and their gender. Utilizing this feature of the Orbis database, we searched for listed and unlisted firms in 21 emerging markets that were confirmed to have had certain business activities from 2017 to 2018 and demonstrated ongoing activities in 2019, ensuring that information on the job titles and genders of all board members was available. These markets include 11 European Union (EU) member countries in Central and Eastern Europe (Bulgaria, Croatia, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, Slovenia, Romania) and 9 non-EU member countries in Eastern Europe (Albania, Belarus, Bosnia and Herzegovina, Moldova, Montenegro, North Macedonia, Russia, Serbia, Ukraine), along with China. The final sample comprised a total of 36,815 firms, of which 11,801 were listed and 25,014 were unlisted. The sample covers firms of various sizes and spans a wide range of industrial sectors. It is sufficiently representative of the firms in Central and East European countries and China, according to the official statistics available. In addition to information on the board structure of each sample firm, we also have collected data from Orbis on the industrial sector, firm size, firm age, and financial performance.[2]

The second data source is the Global Risk Information Database (GRID), also provided by Moody's Analytics. The GRID is a unique source compiling a comprehensive range of risk-relevant information from around the globe. It includes media reports, official gazettes, and other publications by international organizations and national government agencies, as well as additional data on sanctions and penalties applied to corporations and businesspeople. Its risk data is linked to company- and ownership-related data maintained in Orbis, which effectively reduces false positives that may arise during the process of screening companies and individuals. We screened the 36,815 sample firms for criminal information using their names and locations in the GRID and extracted criminal data that also matched the corporate IDs in Orbis.[3] As reported in Table 10.1, of the 57 crime categories across three crime types registered in the GRID, our data confirms that 43 were actually committed by one or more of the sample firms between January 2020 and September 2023.[4]

The third data source is the Worldwide Governance Indicators, compiled and released by the World Bank. These indicators provide comparable data on the quality of governance across more than 200 countries and territories, including all 21 emerging markets analyzed in this chapter. From the Worldwide Governance Indicator database, for each country included in the study, we extracted data on five governance dimensions over a three-year period from 2017 to 2019. These dimensions are (a) the Rule of Law, (b) Regulatory Quality, (c) Government Effectiveness, (d) Voice and Accountability, and (e) Control of Corruption.

Table 10.1 Criminal types and categories registered in the Global Risk Information Database (GRID)

Crime type[a]	*Crime category*[b]
Economic crimes	Bankruptcy and estate administration-related misconduct; Business crimes; Forfeiture*; Shams and frauds; Marijuana dispensaries*; Loan sharking; Money laundering; Listing of illegal financial dealers in the USA, Canada, France, etc.*; Mortgage wrongdoing*; Fraudulent real estate actions; Regulatory action; Securities violations; Smuggling; Tax evasion
Political and social crimes	Abuse; Arson; Assault/battery; Bribery; Burglary*; Conspiracy*; Copyright infringement; Counterfeiting; Cybercrime; Data privacy/protection violation; Drug possession*; Drug trafficking; Environmental crimes; Fugitive*; Illegal gambling: Hate crimes/hate group activities*; Human rights violations; Human trafficking; Identity theft*; Kidnapping*; Misdemeanors/fraud; Murder; Nonspecific crimes; Obscenity*; Organized crime; Perjury; Political asylum; Possession of stolen property; Prostitution; Robbery; Sex offenses; Theft; Virtual currency; Illegal weapon possession
International crimes	Denied entity; Foreign Agents Registration Act (designation by the US Department of Justice as an agent representing the interests of foreign powers with political or quasi-political authority)*; Listing on the US Department of the Treasury's Office of Foreign Assets Control's (OFAC) listing of specially designated nationals (SDN) and blocked persons*; Listing on the international sanctions list; Iran connections; Sanctions connections; Spying; Terrorism; Watch list (Government-designated listing of persons/organizations involved in terrorist acts, proliferation of weapons of mass destruction, and other security and diplomatic issues)

Notes:

[a] Classification by the authors.

[b] Those marked with an asterisk (*) indicate that the corresponding criminal record was not found in this study.

Source: Moody's Analytics (2021).

10.3.2 Empirical Methodology

Hypotheses H1 to H3, regarding the effect of board composition on corporate crime, will be tested by regressing the number of crimes (*crime*) committed by the *i*-th firm against five board composition variables (*board_composition*) while controlling for a series of firm attributes (*control*) that potentially influence the incidence of crime and the fixed effects of the industry and state to which the *i*-th firm belongs. Board composition variables include: (1) Board

size (total number of directors) of the firm; (2) outside board chairmanship, which assigns a value of one to firms that elect the chairman of the board from among outside directors; (3) board independence, as proxied by the ratio of outside/independent directors to all directors; (4) female CEO, capturing firms with a female CEO as one[5]; and (5) board female representation (the proportion of female directors on the board). The Poisson maximum likelihood estimator will be utilized to estimate the following equation:

$$crime_{i,t} = \mu + \beta \cdot board\_composition_{i,t-1} + \sum_{n=1}^{8} \gamma_n \cdot control_{n,i,t-1} + \theta_j + \varphi_k + \varepsilon_i, \quad (1)$$

where μ is a constant term, β and γ are the parameters to be estimated, θ represents the fixed effects for the j-th industry to which the i-th firm belongs, φ represents the fixed effects of the k-th country in which the i-th firm is located, and ε is a disturbance term.

Hypothesis H4, which predicts the negative impact of the quality of national institutions on the incidence of corporate crime, will be tested by estimating the effects of five national institution variables: (1) Rule of Law, (2) Regulatory Quality, (3) Government Effectiveness, (4) Voice and Accountability, and (5) Control of Corruption. These variables are introduced in place of country-level fixed effects, with control for all firm attributes, including board composition, as outlined in the following equation:

$$crime_{i,t} = \mu + \alpha \cdot national\_institution_{k,t-1} + \sum_{m=1}^{5} \beta_m \cdot board\_composition_{m,i,t-1} + \sum_{n=1}^{8} \gamma_n \cdot control_{n,i,t-1} + \theta_j + \varepsilon_i, \quad (2)$$

where α represents the parameter associated with each national institution variable.

Drawing on the survey articles by Cumming et al. (2015a) and Cole et al. (2021), along with empirical results from previous studies cited in Section 10.2, this work will employ eight variables as controls. These variables capture (a) listing status, (b) ownership concentration, (c) state ownership, (d) foreign ownership, (e) firm size, (f) firm age, (g) profitability, and (h) solvency, and will be estimated simultaneously with board composition and national institution variables. According to the literature, listed firms under government and market surveillance are less likely to commit corporate crimes as compared to their unlisted counterparts, *ceteris paribus*. Similarly, firms controlled by large shareholders, the state, or foreign investors, where managers are subject to strict oversight, also show a lower propensity for misconduct. Conversely, large corporations and firms that have been operational for an extended period tend to have a higher likelihood of misconduct and crime due to the complex relationships within their internal

organization and with stakeholders. Furthermore, researchers have argued and demonstrated that highly profitable firms are more prone to crimes due to lax managerial discipline, whereas firms with high solvency often avoid criminal risks due to their ample cash reserves. Therefore, five variables—listing status, ownership concentration, state ownership, foreign ownership, and solvency—are expected to act in ways that reduce corporate crime, while three variables—firm size, firm age, and profitability—are expected to act in ways that encourage it.

As indicated by regression equations (1) and (2), a total of 18 independent variables, ranging from board size to solvency, are predetermined relative to the dependent variables. Specifically, the variable of corporate crimes refers to events occurring from January 2020 to September 2023, while 11 variables, including the 5 board composition variables and 6 control variables from listing status to firm age, pertain to events from 2019, and the remaining 7 variables consisting of 5 national institution variables along with profitability and solvency are calculated as averages for the period from 2017 to 2019. In this way, we can avoid endogeneity arising from simultaneous causality between dependent and independent variables. Industry-level fixed effects, θ, are controlled by incorporating a total of 13 industry dummy variables, with the manufacturing industry serving as the reference category.[6] The statistical significance of regression coefficients is computed using heteroscedasticity-consistent robust standard errors.[7]

10.4 Corporate Crime in Emerging Markets: A Statistical Overview

Before reporting the empirical results, this section provides a statistical overview of corporate crime in the 21 emerging markets using the dataset described in the previous section.

As depicted in Figure 10.1, among the 36,815 firms across the 21 emerging markets, 2,259 firms, or 6.1% of the total, have committed offenses corresponding to the crime categories listed in Table 10.1, according to corporate crime records extracted from the GRID. Of these companies implicated in crimes, 1,219 (54.0% of such firms) committed a single offense, 798 (35.3%) had between two and five criminal records, and 242 (10.7%) were involved in six or more offenses, indicating that approximately half of the firms engaged in misconduct are habitual offenders. Furthermore, these firms committed a total of 5,980 offenses during the observation period, with 2,550 (42.6%) classified as economic crimes, 1,313 (22.0%) as political and social crimes, and the remaining 2,117 (35.4%) as international crimes.

Interestingly, the frequency and patterns of corporate crime vary significantly across different country groups. In fact, the proportion of sample firms engaged in misconduct is considerably higher in East European non-EU countries (10.3%) as compared to Central and East EU member countries (4.8%) and China (5.3%). Moreover, the breakdown of criminal firms by

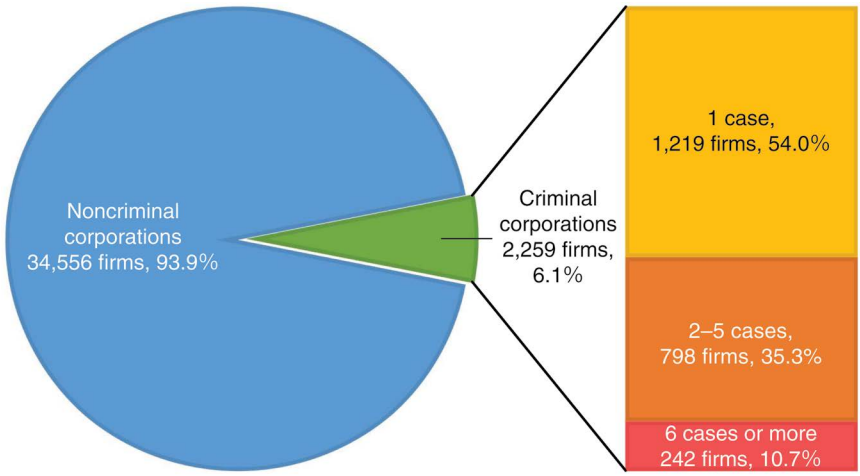

Figure 10.1 Proportion of criminal corporations and their number of crimes among 36,815 enterprises in 21 emerging markets

Source: Authors' illustration based on the Global Risk Information Database (GRID) and Orbis Company Information Database.

the number of offenses shows that the proportion of criminal firms with six or more offenses is significantly higher in East European non-EU countries as compared to the other two groups. This relatively high incidence of corporate crime and a strong tendency toward habitual offenses in East European non-EU countries may stem from the vulnerability of state governance there, in contrast to the more robust systems in Central and East EU member countries and China.

More importantly, East European non-EU countries are implicated in international crimes with surprising frequency. A staggering 66.2% of corporate crimes in these countries are categorized as international, as compared to only 1.7% in Central and East EU member countries and 12.5% in China. In Central and East EU member countries and China, unlawful corporate acts are predominantly domestic, mainly consisting of economic malpractice or tax evasion. In contrast, firms in East European non-EU countries are often involved in espionage, terrorism, and other activities that provoke security and foreign policy concerns, frequently leading to international sanctions. This issue may be partially attributed to the presence of so-called "authoritarian states," notably Russia, in this group of countries, which are known for their hostile stance toward democratic nations.[8]

Table 10.2 examines whether the incidence of these corporate crimes in emerging markets correlates with board composition and state-level institutional quality. This table compares differences between criminal and noncriminal firms, as well as among three groups of criminal firms categorized by the number of offenses, using variables related to board composition and national

Table 10.2 Univariate comparison between noncriminal and criminal corporations and among criminal corporations by number of cases

		Criminal corporations					
	Noncriminal corporations (a)	*All criminal corporations (b)*	*Corporations with 1 criminal case (c)*	*Corporations with 2–5 criminal cases (d)*	*Corporations with 6 or more criminal cases (e)*	*Comparison between noncriminal and criminal corporations (a, b)*[a]	*Multiple comparisons between criminal corporations by number of cases (c, d, e)*[b]
Board composition variables							
Board size	6.889	12.072	11.122	11.959	17.227	–36.21***	22.12***
Outside board chairmanship	0.473	0.525	0.501	0.553	0.550	–4.75†††	2.90*
Board independence	43.290	49.583	47.725	50.879	54.664	–8.51***	6.03***
Female CEO	0.052	0.060	0.057	0.068	0.050	–1.69†	0.72
Board female representation	21.767	20.180	20.575	20.011	18.750	3.37***	0.94
National institution variables							
Rule of Law	0.025	–0.188	–0.126	–0.189	–0.492	17.29***	44.02***
Regulatory Quality	0.201	0.024	0.095	0.003	–0.259	13.62***	40.79***
Government Effectiveness	0.355	0.249	0.271	0.253	0.123	13.32***	18.25***
Voice and Accountability	–0.373	–0.566	–0.462	–0.616	–0.921	8.67***	26.53***
Control of Corruption	–0.134	–0.304	–0.247	–0.311	–0.571	15.11***	40.93***
Total number of sample firms	34556	2259	1219	798	242		

Notes: The numbers in the figure in columns (a) to (e) represent the mean value of the variable in question.

[a] ***: The means are significantly different between the two at the 1% level by *t*-test; †††: The ratios are significantly different between the two at the 1% level by the test of difference in proportions; †: at the 10% level.

[b] ***: The ratios are significantly different between the three groups of criminal corporations at the 1% level by ANOVA; *: at the 10% level.

Source: Authors' estimations. See **Online Appendix 10.2** for definitions and descriptive statistics of the variables used.

institutions. According to the table, the mean values of board composition variables are typically higher for criminal firms than for noncriminal ones, with the exception of board female representation. The differences between criminal and noncriminal firms are statistically significant according to the *t*-test and the test for differences in proportions. Furthermore, among the three groups of criminal firms, those with a higher number of offenses tend to have larger boards and greater board independence, as evidenced by the mean values of these variables. Multiple group comparisons using analysis of variance (ANOVA) corroborate this trend. These results affirm Hypotheses H1 and H3 but contradict the expectation set forth in Hypothesis H2. Conversely, the relationship between the incidence rates of corporate crimes and the quality of national institutions aligns strongly with Hypothesis H4. Notably, the mean values for all five national institution variables are statistically significantly higher for noncriminal firms than criminal firms. In addition, the number of offenses committed by criminal firms shows a significant inverse correlation with national institution variables, without exception.

Table 10.3 evaluates the correlation coefficients between the number of offenses committed by firms and the variables of board composition and national institutions. The coefficients have been calculated for all 21 emerging markets, as well as by specific country groups and types of crime. Across the 21 emerging markets, the correlation coefficients between the number of offenses and variables such as board size, outside board chairmanship, and board independence are significantly positive, whereas the correlation coefficient for board female representation is significantly negative, which aligns with the findings presented in Table 10.2. However, these trends do not consistently persist across data segmented by country group and crime type, except for board size. Moreover, the correlation coefficient for female CEOs is significantly negative in East European non-EU countries. In contrast, the correlation coefficients between the number of offenses and national institution variables are significantly negative in all but two cases, reinforcing the deterrent effect of state-level institutional quality on corporate crimes across various country groups and crime types.

The findings presented in Tables 10.2 and 10.3 generally support Hypotheses H1, H3, and H4. However, these univariate analyses lack control over other factors that may affect the incidence of corporate crime. Therefore, the final judgment on hypothesis testing will be deferred to the regression analysis in the following section.

10.5 Empirical Results

This section reports the results of the hypothesis tests conducted using the data and methods described in Section 10.3. Subsections 10.5.1 and 10.5.2 present findings on the effects of board composition and national institutions on corporate crime, respectively. Subsection 10.5.3 examines the synergistic effects between board composition and national institutions. Finally,

Table 10.3 Correlation coefficients between the number of corporate crimes and board composition variables and national institution variables

		Country group			*Crime type*		
	21 emerging markets	*Central and East European Union member states*	*East European non-EU countries*	*China*	*Economic crimes*	*Political and social crimes*	*International crimes*
Board composition variables							
Board size	0.1705***	0.1296***	0.1915***	0.2066***	0.1458***	0.0948***	0.1025***
Outside board chairmanship	0.0169***	0.0526***	0.0303***	0.0081	0.0387***	0.0087*	–0.0067
Board independence	0.0393***	0.0352***	–0.0059	0.0666***	0.0304***	0.0254***	0.0243***
Female CEO	0.0060	0.0059	–0.0350***	0.0260***	0.0126**	–0.0019	–0.0072
Board female representation	–0.0167***	–0.0006	–0.0537***	–0.0394***	–0.0150***	–0.0073	–0.0104**
National institution variables							
Rule of Law	–0.0936***	–0.0396***	–0.0554***	—	–0.0209***	–0.0222***	–0.1123***
Regulatory Quality	–0.0781***	–0.0241***	–0.0539***	—	–0.0231***	–0.0104**	–0.0936***
Government Effectiveness	–0.0676***	–0.0164***	–0.0298***	—	–0.0052	–0.0178***	–0.0873***
Voice and Accountability	–0.0525***	–0.0304***	–0.0578***	—	–0.0264***	–0.0009	–0.0590***
Control of Corruption	–0.0856***	–0.0202***	–0.0419***	—	–0.0176***	–0.0153***	–0.1062***

Notes: ***: Correlation coefficient with the number of corporate crimes is statistically significant at the 1% level; **: significant at the 5% level; *: significant at the 10% level.

Source: Authors' estimations. See **Online Appendix 10.2** for definitions and descriptive statistics of the variables used.

Subsection 10.5.4 evaluates the statistical robustness of the estimation results from multiple perspectives.

10.5.1 The Effect of Board Composition on Corporate Crime

The estimation results for Eq. (1) are summarized in Table 10.4. Models [1] through [5] indicate that board size has a significantly positive coefficient, while outside board chairmanship, female CEO, and board female representation each has significant and negative coefficients, while the coefficient for board independence is statistically insignificant. These results support Hypotheses H1 to H3 concerning the impact of board composition on corporate crime for all board composition variables except board independence. However, when all board composition variables are estimated simultaneously in Model [6], the statistical significance of the variables of outside board chairmanship and female CEO decreases to below the 10% threshold, indicating that the empirical results for these variables are not robust.

Although Table 10.4 assumes a monotonic or linear effect of board composition, several previous studies discussing the optimality of board structure have strongly suggested its nonlinearity (Raheja, 2005; Adams and Ferreira, 2007; Ning et al., 2010). The possibility that board composition in emerging market firms may exert nonlinear effects on corporate crimes cannot be ruled out. To address this issue, we estimated Eq. (1) by incorporating squared values for the three board composition variables of board size, board independence, and board female representation. The results show that the squared terms of board size and board independence are estimated to be significantly negative, indicating nonlinearities for these two variables. However, their small regression coefficients suggest that the effect size decreases only very gradually. On the other hand, the squared term of board female representation is not significant, suggesting that the impact of female directors on reducing corporate crime is either monotonic or linear.[9] Based on these observations, we have concluded that there are no analytical issues with estimating only the linear terms of the board composition variables in subsequent regression analyses.

10.5.2 The Effect of National Institutions on Corporate Crime

The estimation results for Eq. (2) are shown in **Table 10.5**. All five models yield negative estimates for national institution variables with very high statistical significance. Actually, the *t*-values for all five institution variables range from -9.690 (for Voice and Accountability) to -12.969 (for Rule of Law). The magnitudes of these coefficients clearly demonstrate a strong deterrent effect of the national institutional quality on corporate crime across emerging markets, providing strong support for Hypothesis H4.

The Worldwide Governance Indicators, developed by the World Bank, employ highly consistent measurement methods across all indices, potentially

Table 10.4 Impact of board composition on corporate crimes: Baseline estimation

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Board composition variables						
Board size	0.02439***					0.02442***
	(0.0030)					(0.0030)
Outside board chairmanship		–0.16296*				–0.05223
		(0.0899)				(0.0966)
Board independence			0.00112			0.00074
			(0.0013)			(0.0014)
Female CEO				–0.21920*		–0.11929
				(0.1222)		(0.1307)
Board female representation					–0.00775***	–0.00744***
					(0.0017)	(0.0018)
Control variables						
Listing status	–0.14465	–0.41251***	–0.47112***	–0.47795***	–0.46409***	–0.09919
	(0.1093)	(0.1057)	(0.1062)	(0.1052)	(0.1038)	(0.1098)
Ownership concentration	–0.54306***	–0.64736***	–0.65428***	–0.66117***	–0.64704***	–0.52204***
	(0.1126)	(0.1133)	(0.1121)	(0.1132)	(0.1129)	(0.1108)
State ownership	1.18076***	1.34775***	1.34577***	1.34736***	1.32207***	1.14909***
	(0.0900)	(0.0832)	(0.0840)	(0.0833)	(0.0829)	(0.0894)
Foreign ownership	–0.14276	–0.10743	–0.10048	–0.10350	–0.12542	–0.15823
	(0.0990)	(0.0992)	(0.0994)	(0.0991)	(0.0995)	(0.0992)
Firm size	0.10676***	0.12556***	0.12419***	0.12504***	0.12242***	0.10390***
	(0.0128)	(0.0124)	(0.0123)	(0.0124)	(0.0124)	(0.0130)
Firm age	0.00420***	0.00542***	0.00567***	0.00568***	0.00574***	0.00411***
	(0.0010)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0010)

(Continued)

Table 10.4 (Continued)

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Profitability	0.01095***	0.01277***	0.01308***	0.01293***	0.01250***	0.01062***
	(0.0027)	(0.0026)	(0.0025)	(0.0025)	(0.0025)	(0.0027)
Solvency	–0.00928***	–0.01031***	–0.01040***	–0.01036***	–0.01005***	–0.00901***
	(0.0010)	(0.0010)	(0.0009)	(0.0009)	(0.0009)	(0.0010)
Const.	–3.53397***	–3.85492***	–3.80238***	–3.75395***	–3.62114***	–3.43449***
	(0.2322)	(0.2437)	(0.2348)	(0.2306)	(0.2301)	(0.2446)
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	36815	36815	36815	36815	36815	36815
Log pseudolikelihood	–17899.09	–18152.73	–18160.71	–18155.36	–18103.25	–17835.14
Pseudo R^2	0.1949	0.1835	0.1832	0.1834	0.1858	0.1978
Wald test (χ^2)	1655.29***	2192.42***	2221.31***	2215.02***	2206.70***	1829.94***

Notes: Standard errors are computed using the Huber–White sandwich estimator and are reported in parentheses beneath the corresponding coefficients. The Wald test examines the null hypothesis that all regression coefficients are zero. *** and * denote statistical significance at the 1% and 10% levels, respectively.

Source: Authors' estimations. See **Online Appendix 10.2** for definitions and descriptive statistics of the variables used.

Table 10.5 Impact of national institutions on corporate crimes: Baseline estimation

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*
National institution variables					
Rule of Law	–0.95413***				
	(0.0736)				
Regulatory Quality		–0.80374***			
		(0.0698)			
Government Effectiveness			–0.86514***		
			(0.0893)		
Voice and Accountability				–0.36619***	
				(0.0371)	
Control of Corruption					–0.96703***
					(0.0838)
Board composition variables					
Board size	0.02580***	0.02578***	0.02554***	0.02640***	0.02483***
	(0.0026)	(0.0026)	(0.0026)	(0.0025)	(0.0026)
Outside board chairmanship	–0.05400	–0.14988*	–0.06131	–0.23030***	–0.07642
	(0.0880)	(0.0875)	(0.0926)	(0.0890)	(0.0888)
Board independence	0.00232*	0.00345***	0.00541***	0.00419***	0.00287**
	(0.0012)	(0.0012)	(0.0011)	(0.0012)	(0.0012)
Female CEO	–0.20408	–0.20426	–0.11823	–0.20334	–0.15998
	(0.1421)	(0.1461)	(0.1403)	(0.1554)	(0.1402)
Board female representation	–0.00545***	–0.00495***	–0.00637***	–0.00380**	–0.00608***
	(0.0017)	(0.0017)	(0.0017)	(0.0017)	(0.0017)
Control variables					
Listing status	–0.25639***	–0.33994***	–0.17072*	–0.46362***	–0.19568**
	(0.0912)	(0.0938)	(0.0930)	(0.1017)	(0.0910)
Ownership concentration	–0.51153***	–0.49825***	–0.60620***	–0.55199***	–0.52366***
	(0.1101)	(0.1099)	(0.1101)	(0.1112)	(0.1102)
State ownership	1.15877***	1.18459***	1.25050***	1.27377***	1.17344***
	(0.0877)	(0.0877)	(0.0892)	(0.0875)	(0.0883)
Foreign ownership	–0.14397	–0.14815	–0.41383***	–0.17579*	–0.21465**
	(0.0984)	(0.0996)	(0.0997)	(0.0999)	(0.0976)
Firm size	0.09217***	0.08012***	0.06186***	0.05843***	0.08891***
	(0.0111)	(0.0108)	(0.0110)	(0.0109)	(0.0110)
Firm age	0.00667***	0.00799***	0.00653***	0.00913***	0.00702***
	(0.0009)	(0.0008)	(0.0009)	(0.0008)	(0.0009)
Profitability	0.00986***	0.01010***	0.01212***	0.01043***	0.01035***
	(0.0027)	(0.0027)	(0.0028)	(0.0028)	(0.0027)
Solvency	–0.00907***	–0.00918***	–0.00965***	–0.00966***	–0.00903***
	(0.0010)	(0.0010)	(0.0010)	(0.0011)	(0.0010)
Const.	–3.12178***	–2.81242***	–2.35420***	–2.73882***	–3.21183***
	(0.2047)	(0.2025)	(0.2045)	(0.2060)	(0.2041)
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes
Country-level fixed effects	No	No	No	No	No
N	36815	36815	36815	36815	36815
Log pseudolikelihood	–18266.92	–18417.75	–18579.91	–18587.34	–18370.56
Pseudo R^2	0.1784	0.1716	0.1643	0.1640	0.1737
Wald test (χ^2)	1576.02***	1651.75***	1470.91***	1651.18***	1568.51***

Notes: Standard errors are computed using the Huber–White sandwich estimator and are reported in parentheses beneath the corresponding coefficients. The Wald test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimations. See **Online Appendix 10.2** for definitions and descriptive statistics of the variables used.

leading to similar estimation results for different governance aspects. To address this concern, we utilized alternative institutional indicators developed by various research organizations, each employing distinct measurement approaches. These include five indices, which were developed and released by three organizations, including the Varieties of Democracy Institute, Reporters Without Borders, and Transparency International. Table 10.6 shows that these alternative national institution variables consistently yield significantly negative estimates. In fact, the *t*-values for Rule of Law II, Access to Justice, and Corruption Perception range from -10.794 to -11.838, aligning closely with those obtained using the Worldwide Governance Indicators. Meanwhile, the *t*-values for Civil Society and Press Freedom are somewhat lower, at -7.209 and -5.514, respectively. These findings underscore the relatively robust influence of public authority as a deterrent against corporate crime.

On the other hand, both the five models reported in Table 10.5 and another five models in Table 10.6 yield significantly positive estimates for board size and significantly negative estimates for board female representation, although data for these two variables are not reported in Table 10.6. Moreover, these models consistently produce significantly positive estimates for board independence, while the variable of outside board chairmanship is estimated

Table 10.6 Impact of national institutions on corporate crimes: Estimation of alternative variables

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*
Alternative national institution variables					
Rule of Law II	–1.66141*** (0.1539)				
Access to Justice		–1.82584*** (0.1554)			
Civil Society			–0.86885*** (0.1205)		
Press Freedom				–0.00910*** (0.0017)	
Corruption Perception					–0.04904*** (0.0041)
Board composition variables	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes
Country-level fixed effects	No	No	No	No	No
N	36815	36815	36815	36815	36815
Log pseudolikelihood	–18463.91	–18469.30	–18691.28	–18742.19	–18346.35
Pseudo R^2	0.1695	0.1693	0.1593	0.1570	0.1748
Wald test (χ^2)	1655.97***	1652.45***	1620.86***	1576.89***	1597.92***

Notes: Standard errors are computed using the Huber–White sandwich estimator and are reported in parentheses beneath the corresponding coefficients. The Wald test examines the null hypothesis that all regression coefficients are zero. *** denotes statistical significance at the 1% level.

Source: Authors' estimations. See **Online Appendix 10.2** for definitions and descriptive statistics of the variables used.

to be significantly negative in five models. With regard to the variable of female CEO, although it shows negative coefficients across all models, these are not statistically significant.

10.5.3 Synergistic Effects between Board Composition and National Institutions

While the estimation results presented in Subsections 10.5.1 and 10.5.2 align with Hypotheses H1, H3, and H4 concerning board size, the presence of female board members, and the quality of national institutions, they offer limited support for Hypothesis H2, which pertains to the role of outside/independent directors. This raises a pertinent question: Are the quality of national institutions and board composition mutually independent in their function? More specifically, does a board's capability to prevent corporate crime vary between firms in countries with robust institutional frameworks and those in countries with weak national institutions, where boards may need to independently curb managerial and employee misconduct without significant reliance on administrative or judicial support?

To explore the potential synergistic effects between board composition and national institutions, we incorporated their interaction terms into Eq. (2). Table 10.7 shows the results. As shown in Model [3] in the table, when board independence is used as a board composition variable, its interaction with the Rule of Law shows a significantly negative estimate.[10] The absolute value of the regression coefficient for the interaction term between Rule of Law and board independence exceeds that of the linear term for board independence, suggesting profound implications. More specifically, the Rule of Law index spans a range of 2.108—from Belarus's minimum of −0.877 to Estonia's maximum of 1.231. This range indicates that the negative synergistic effect between national institutions and board independence not only negates the positive effects of board independence but might also contribute to a net reduction in corporate crime. Meanwhile, the interaction terms in the other four models are not significant, implying that the synergistic effects between corporate boards and national institutions might be particularly linked to the legal status and powers of outside/independent directors.

10.5.4 Robustness Checks

We have assessed the robustness of the baseline estimates reported in Tables 10.4 and 10.5 by examining the nonlinearity of board composition in **Online Appendix 10.4**, estimating alternative national institution variables in Table 10.6, and exploring the synergistic effects between national institution variables and board composition variables in Table 10.7. We will now proceed to further evaluate the statistical robustness of the hypothesis-testing results from additional perspectives.

Table 10.7 Synergy effects between national institution and board composition

Board composition variables	*Board size*	*Outside board chairmanship*	*Board independence*	*Female CEO*	*Board female representation*
Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*
National institution variable (Rule of Law)	–1.00762*** (0.0813)	–0.90524*** (0.0840)	–0.51575*** (0.1047)	–0.38035*** (0.0366)	–1.05138*** (0.1064)
Board composition variable	0.02576*** (0.0023)	0.02711 (0.0751)	0.00420*** (0.0010)	–0.04699 (0.1232)	–0.00615*** (0.0015)
National institution variable x Board composition variable	0.00327 (0.0043)	0.14694 (0.1421)	–0.00572*** (0.0011)	0.25226 (0.2313)	–0.00023 (0.0027)
Control variables	Yes	Yes	Yes	Yes	Yes
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes
Country-level fixed effects	No	No	No	No	No
N	36815	36815	36815	36815	36815
Log pseudolikelihood	–18319.45	–18787.18	–18875.47	–18985.97	–18682.92
Pseudo R^2	0.1760	0.1550	0.1510	0.1461	0.1597
Wald test (χ^2)	1748.12***	2090.00***	1964.09***	2140.59***	2119.43***

Notes: Standard errors are computed using the Huber–White sandwich estimator and are reported in parentheses beneath the corresponding coefficients. The Wald test examines the null hypothesis that all regression coefficients are zero. *** denotes statistical significance at the 1% level.

Source: Authors' estimations. See **Online Appendix 10.2** for definitions and descriptive statistics of the variables used.

As a first step, we estimated Eq. (1) and Eq. (2) by country group.[11] The results reveal that the effects of board composition on the number of offenses committed by firms vary significantly across different country groups. In fact, larger board sizes are associated with an increase in corporate crime in all three country groups. However, the significantly positive effects of board independence mentioned earlier are observed only among Central and East EU member countries, while the presence of female directors significantly inhibits corporate crime in East European non-EU countries and China. These variations suggest that the country context significantly influences the relationship between boards and corporate crime. Consequently, interpreting hypothesis test results presented in Tables 10.4 through 10.7 necessitates caution. Furthermore, the variable of the Rule of Law was found to be significantly negative across all country groups, which underscores the universal deterrent effect of national institutions on corporate crime.

The second robustness test focuses on estimation by crime type.[12] The results show that the Rule of Law demonstrates significantly negative coefficients across all models, indicating a strong deterrent effect against international crime in particular. Conversely, the deterrent effects of board composition variables are sensitive to differences in crime type, with the

exception of board size. Notably, significant deterrent effects of board female representation are limited to international crime. Therefore, we note that the impact of board composition on the number of offenses committed by firms is greatly influenced not only by the country context but also by the type of crime.

The third robustness test involves estimations applying various sample and estimation constraints. This test examines several factors: The industrial sector, size, and age of the sample firms; firms with multiple offenses; outliers among the independent variables; the regional and institutional heterogeneity of China; and the presence of Russia and Ukraine, countries that initiated warfare during the observation period. Estimations were performed by dividing sample firms into mining and manufacturing versus non-mining and manufacturing sectors, categorizing firms into upper and lower halves based on median firm size and age, excluding firms with ten or more criminal records, winsorizing independent variables at the first and 99th percentiles, and excluding firms from China or firms from Russia and Ukraine.

The results reveal that the Rule of Law consistently receives significantly negative estimates across all models, which aligns with Hypothesis H4.[13] At the same time, its regression coefficients are somewhat sensitive to sample constraints. Notably, the deterrent effect of national institutions on corporate crimes is more pronounced among mining and manufacturing firms, as well as smaller and younger firms, as compared to non-mining and manufacturing firms and larger, older firms. Additionally, board size is significantly positive in all models, which underlines the statistical robustness of the test results for Hypothesis H1. Regarding Hypothesis H3, which concerns the effectiveness of female directors in preventing corporate crime, female CEO and board female representation are repeatedly estimated to be significant and negative, showcasing their relative robustness against the sample constraints mentioned above. On the other hand, Hypothesis H2 regarding board independence once again failed to find empirical support.

Finally, we examine the effect of data structure on our estimation results. As shown in Figure 10.1, a vast majority of the sample firms have never engaged in any criminal activity. This indicates that the data presented in this chapter are zero-inflated count data. Although the Poisson regression model is a typical functional form for analyzing count data as dependent variables, applying this model to zero-inflated data exhibiting overdispersion, where the variance exceeds the mean, may lead to incorrect estimations of errors in regression coefficients. To examine the impact of this issue on the hypothesis test results in Subsections 10.5.1 and 10.5.2, we conducted logistic regression using a binomial distribution model with the probability of a firm being criminal as the dependent variable. We also performed Poisson complementary log-log regression of a hurdle model that combines a point mass at zero with a positive count distribution (Zeileis et al., 2008). Assuming that the

probability a firm commits at least one offense is $\pi = P(Y > 0)$, and considering the probability distribution of the number of offenses before truncation as $p(y \mid \theta)$, the hurdle model can be expressed with the following equation:

$$P(Y = y) = (1 - \pi) I(y = 0) + \pi \frac{p(y \mid \theta)}{1 - p(0 \mid \theta)} I(y > 0), \tag{3}$$

where $I(y = 0)$, $I(y > 0)$ are indicator variables that return one if the logical expression within the parentheses is true and zero if it is false. As demonstrated by this equation, the hurdle model is a regression model that employs a structure where a positive count is only observed if the hurdle of zero occurrences is overcome.

The estimation results from the logistic regression model, which utilizes the probability of a firm being criminal as the dependent variable, are detailed in Panel (a) of Table 10.8. The regression coefficients are expressed as odds ratios, indicating the likelihood of a firm committing a crime relative to not committing one. An odds ratio of ≤1.0 indicates a deterrent effect on corporate crime, whereas an odds ratio of ≥1.0 suggests a factor that may encourage corporate crime. As shown in this table, the results of Model [1] are in complete alignment with those of Model [6] from Table 10.4 regarding the crime deterrent effects of board composition. Furthermore, Models [2] to [6] correspond precisely with their respective models in Table 10.5 concerning the deterrent effects of national institutions. These findings confirm that using the probability of a firm being criminal as the dependent variable—where the zero-inflated structure of the data does not present a significant issue—yields hypothesis-testing results consistent with those reported earlier in this paper.

Panel (b) of Table 10.8 presents the estimation results for the second term on the right-hand side of Eq. (3) using the Poisson complementary log-log hurdle regression model. As shown in this table, the impact of board size and national institution variables on the positive count distribution $(y > 0)$ is highly consistent with the results of Model [6] in Table 10.4 and the corresponding models in Table 10.5.[14] These results suggest that board size has a promoting effect on repeated offenses, while national institutions exert a deterring effect. On the other hand, as demonstrated in Panel (b) of Table 10.8, board female representation does not show any robust deterrent effect on repeated offenses in emerging market firms. This finding also underscores the need for caution when interpreting the hypothesis test results.

10.6 Conclusions

This chapter unraveled the criminal records of 36,815 firms located in China and 20 emerging markets in Europe and conducted an empirical analysis of the deterrent effects of board composition and national institutions on corporate crime. The corporate crime records extracted from the GRID indicated

Table 10.8 Treatment of zero-inflated data structure

(a) Logistic regression estimation of the baseline model[a]

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
National institution variables						
Rule of Law		0.56911***				
		(0.0282)				
Regulatory Quality			0.64707***			
			(0.0311)			
Government Effectiveness				0.59665***		
				(0.0386)		
Voice and Accountability					0.80253***	
					(0.0232)	
Control of Corruption						0.60496***
						(0.0335)
Board composition variables						
Board size	1.03703***	1.03853***	1.03853***	1.03825***	1.03956***	1.03782***
	(0.0031)	(0.0029)	(0.0029)	(0.0029)	(0.0030)	(0.0029)
Outside board chairmanship	1.04579	0.90366	0.84927***	0.89810*	0.81474***	0.87718**
	(0.0740)	(0.0564)	(0.0582)	(0.0582)	(0.0512)	(0.0552)
Board independence	1.00045	1.00167**	1.00238***	1.00334***	1.00259***	1.00205**
	(0.0010)	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0008)
Female CEO	1.01322	0.99195	1.00763	1.03873	1.01695	1.02123
	(0.1090)	(0.1052)	(0.1068)	(0.1096)	(0.1079)	(0.1082)
Board female representation	0.99476***	0.99630***	0.99652***	0.99591***	0.99711**	0.99605***
	(0.0013)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Control variables						
Listing status	1.40528***	0.97319	0.93537	1.04870	0.86302*	1.02036
	(0.1244)	(0.0719)	(0.0701)	(0.0790)	(0.0671)	(0.0758)

(Continued)

Table 10.8 (Continued)

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Ownership concentration	0.66880***	0.63571***	0.63152***	0.59357***	0.61030***	0.62222***
	(0.0521)	(0.0489)	(0.0484)	(0.0453)	(0.0470)	(0.0476)
State ownership	3.11133***	3.03301***	3.10653***	3.22878***	3.26978***	3.10842***
	(0.2211)	(0.2135)	(0.2192)	(0.2274)	(0.2280)	(0.2203)
Foreign ownership	0.75126***	0.75773***	0.74696***	0.66499***	0.74382***	0.72474***
	(0.0588)	(0.0577)	(0.0570)	(0.0498)	(0.0569)	(0.0548)
Firm size	1.12161***	1.11592***	1.10731***	1.09445***	1.09620***	1.11065***
	(0.0113)	(0.0098)	(0.0096)	(0.0095)	(0.0095)	(0.0097)
Firm age	1.00637***	1.00868***	1.00960***	1.00851***	1.01035***	1.00910***
	(0.0009)	(0.0009)	(0.0009)	(0.0008)	(0.0009)	(0.0009)
Profitability	1.00893***	1.00811***	1.00814***	1.00935***	1.00802***	1.00840***
	(0.0019)	(0.0019)	(0.0019)	(0.0020)	(0.0020)	(0.0019)
Solvency	0.99193***	0.99218***	0.99212***	0.99190***	0.99190***	0.99218***
	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)	(0.0009)
Const.	0.00791***	0.01117***	0.01345***	0.01769***	0.01343***	0.01118***
	(0.0015)	(0.0018)	(0.0021)	(0.0028)	(0.0022)	(0.0018)
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-level fixed effects	Yes	No	No	No	No	No
N	36815	36815	36815	36815	36815	36815
Log pseudolikelihood	–7349.89	–7496.57	–7523.95	–7538.70	–7539.76	–7519.87
Pseudo R^2	0.1346	0.1173	0.1141	0.1124	0.1122	0.1146
Wald test (χ^2)	2249.72***	2086.87***	2019.52***	1989.30***	1947.61***	2040.14***

(Continued)

Table 10.8 (Continued)

(b) Poisson complementary log-log hurdle regression estimation of the baseline model

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
National institution variables						
Rule of Law		–0.60960***				
		(0.0866)				
Regulatory Quality			–0.56640***			
			(0.0850)			
Government Effectiveness				–0.65607***		
				(0.1377)		
Voice and Accountability					–0.27153***	
					(0.0478)	
Control of Corruption						–0.67048***
						(0.0961)
Board composition variables						
Board size	0.01246***	0.01128***	0.01109***	0.01090***	0.01165***	0.01056***
	(0.0024)	(0.0023)	(0.0024)	(0.0023)	(0.0024)	(0.0023)
Outside board chairmanship	–0.13923	–0.08994	–0.14394*	–0.08493	–0.17478**	–0.09860
	(0.0893)	(0.0858)	(0.0857)	(0.0890)	(0.0867)	(0.0859)
Board independence	0.00116	0.00190	0.00226*	0.00333***	0.00245**	0.00206*
	(0.0014)	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Female CEO	–0.08160	–0.12900	–0.15533	–0.08690	–0.17247	–0.10478
	(0.1296)	(0.1279)	(0.1281)	(0.1298)	(0.1290)	(0.1284)
Board female representation	–0.00294	–0.00273	–0.00247	–0.00376*	–0.00184	–0.00319*
	(0.0020)	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0019)
Control variables						
Listing status	–0.13374	–0.24360***	–0.30285***	–0.16766*	–0.41265***	–0.19554**
	(0.1067)	(0.0870)	(0.0875)	(0.0913)	(0.0926)	(0.0874)

(Continued)

Table 10.8 (Continued)

Model	*[1]*	*[2]*	*[3]*	*[4]*	*[5]*	*[6]*
Ownership concentration	–0.24746**	–0.18245	–0.15109	–0.22382*	–0.18485	–0.16540
	(0.1209)	(0.1195)	(0.1196)	(0.1198)	(0.1213)	(0.1200)
State ownership	0.31219***	0.31555***	0.30791***	0.35658***	0.34085***	0.32107***
	(0.0772)	(0.0760)	(0.0763)	(0.0765)	(0.0764)	(0.0763)
Foreign ownership	0.08391	0.10031	0.08756	–0.09366	0.07331	0.05653
	(0.1084)	(0.1054)	(0.1070)	(0.1057)	(0.1083)	(0.1043)
Firm size	0.03719***	0.02811**	0.02337**	0.00803	0.00418	0.02840**
	(0.0134)	(0.0121)	(0.0119)	(0.0114)	(0.0115)	(0.0120)
Firm age	–0.00083	0.00010	0.00116	–0.00047	0.00196*	0.00024
	(0.0012)	(0.0010)	(0.0010)	(0.0011)	(0.0010)	(0.0010)
Profitability	0.00215	0.00214	0.00190	0.00406	0.00211	0.00233
	(0.0024)	(0.0025)	(0.0025)	(0.0025)	(0.0026)	(0.0025)
Solvency	–0.00303***	–0.00275**	–0.00261**	–0.00335***	–0.00290***	–0.00270**
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Const.	0.36119	0.42058*	0.59935***	1.02884***	0.73770***	0.31928
	(0.2514)	(0.2186)	(0.2103)	(0.1966)	(0.2121)	(0.2245)
Industry-level fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-level fixed effects	Yes	No	No	No	No	No
N	36815	36815	36815	36815	36815	36815
Log pseudolikelihood	–12103.45	–12345.12	–12391.69	–12461.71	–12457.49	–12374.54
Wald test (χ^2)	2561.98***	2404.60***	2367.78***	2313.05***	2279.43***	2384.25***

Notes: In Panel (a), reported coefficients are odds ratios. Robust standard errors are reported in parentheses. The Wald test examines the null hypothesis that all regression coefficients are zero. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors' estimations. See **Online Appendix 10.2** for definitions and descriptive statistics of the variables used.

that 2,259 companies, or 6.1% of all sample firms, committed a total of 5,980 crimes between January 2020 and September 2023. Furthermore, of these implicated firms, 1,040 were involved in multiple offenses.

We empirically analyzed factors influencing the incidence of corporate crime and found robust support for the hypotheses that larger boards tend to encourage corporate crime while the presence of female managers and board directors acts as a deterrent. Contrary to initial expectations, however, the presence of outside/independent directors on boards did not exert significant deterrent effects on corporate crime. The inability of board independence to inhibit corporate crime poses a significant challenge to corporate governance in emerging markets. The estimation results for the synergistic effects between national institutions and board composition, as indicated in Table 10.7, strongly suggest that high-quality state-level institutions enhance the net deterrent effect of board independence on corporate crime. This further implies that the generally weak institutional frameworks in emerging markets could be responsible for the limited authority and social influence of outside/independent directors in these regions. Effective corporate laws are urgently needed to address this issue. The empirical findings in this chapter also demonstrate that the crime deterrence effects of board composition vary significantly depending on the country and the type of crime committed.

In contrast, national institutions demonstrated strong deterrent effects on corporate crime across all emerging market firms. Indeed, all indices measuring the quality of national institutions, including those released by the World Bank and other think tanks, were statistically significant and showed exceptional robustness against sample constraints such as country group, crime type, industrial sector, firm size, and age. There is still considerable room for improvement in the quality of national institutions in emerging markets, where disparities in institutional quality are stark. In this context, democratic and liberal institutional reforms by governments in emerging markets are likely to yield even greater benefits in the future than similar reforms by governments in developed nations.

Firm attributes estimated as control variables in our empirical analyses also yielded significant findings. Consistent with the findings of numerous previous studies, listed firms subject to strict government and market surveillance are less likely to engage in criminal activities as compared to their unlisted counterparts, *ceteris paribus*. However, it is notable that, in emerging markets, listed firms are generally more prone to committing economic crimes than unlisted ones.[15]

Also consistent with previous studies are the empirical results indicating that firms with higher ownership concentrations are less likely to commit crimes. Large shareholders play a critical role in managing firms by inhibiting crime and misconduct not only in developed countries but also in emerging markets. While the dominant presence of foreign investors acts as a deterrent to corporate crime in East European non-EU countries, state-owned enterprises in these and other emerging markets engage in crimes with much

higher frequency than their private counterparts. The finding that state-owned enterprises are more prone to crime despite being under direct state supervision raises important questions about the state–business relationship in emerging markets.

On the other hand, the empirical results in this chapter revealed that larger and older firms tend to have a higher likelihood of crime, which is consistent with the findings of many previous studies. The complex relationships that these firms maintain within their internal organization and with stakeholders create a breeding ground for corporate crime in both developed countries and emerging markets. This chapter also reproduces empirical findings from previous studies indicating that firms with higher profitability, and thus lax managerial discipline, have a higher risk of committing crimes, while firms with high solvency are averse to it. The findings presented in this work on the effects of various firm attributes, along with the influence of board composition and national institutions on corporate crime, provide valuable insights into understanding the realities faced by firms in emerging markets.

Notes

1 The existence of this trade-off relationship is precisely why empirical evaluations in previous studies have been divided over the impact of board size on firm performance (Guest, 2009).
2 Section 3.4 in Chapter 3 describes the Orbis database in detail. **Online Appendix 10.1** shows a breakdown of the 36,815 firms, organized into four country groups.
3 Although criminal information extracted from the GRID may include some records of crimes committed by individual managers or employees, the majority concerns organized crime and misconduct committed by firms.
4 Further details on the GRID can be found on the Moody's Analytics website (https://www.moodys.com/web/en/us/kyc/products/grid.html).
5 This chapter uses only the female CEO variable because, in almost all sampled firms with a female CEO, the CEO also holds the position of board chairman.
6 The industrial sector categories correspond to those listed in **Online Appendix 10.1**.
7 The names, definitions, and descriptive statistics of the variables are detailed in **Online Appendix 10.2**.
8 See **Online Appendix 10.3** for more details.
9 **Online Appendix 10.4** reports these estimation results.
10 While Rule of Law is used here as a representative variable for national institutions, similar estimation results were confirmed with other variables, including alternative measures of national institutions.
11 The estimation results are shown in **Online Appendix 10.5**.
12 **Online Appendix 10.6** reports the results.
13 See the results in **Online Appendix 10.7**.
14 Although omitted here due to space constraints, the estimation results for the first term on the right-hand side of Eq. (3) using the complementary log-log model aligned almost perfectly with the results of the logistic regression model reported in Panel (a) of Table 10.8.
15 Refer to Model [1] in **Online Appendix 10.6**.

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