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Corruption and crisis: do institutions matter?

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Abstract: While the short-term effects of the COVID-19 pandemic on lives and livelihoods are well understood, we know little about the effect of the pandemic for longer-term outcomes such as corruption. We look at the historical data on political and economic crises to assess what we can learn from the long-term effects of past crises on corruption. We hypothesize that strong rule of law institutions may ameliorate the possible adverse effects of political and economic crises on corruption. We test our hypotheses using panel data for over 100 countries during the years 1800–2020. The results suggest heterogeneous effects depending on the type of crisis and how we measure it. We find that rule of law institutions can control corruption in cases of political violence and economic slowdown, but the effect is not seen for democracy breakdowns, coups, armed conflict and civil war, and economic crisis such as currency and debt crisis.

Key words: corruption, institutions, political and economic crises, panel data, rule of law

JEL classification: K42, O11, P48

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1   Introduction

The current COVID-19 pandemic has highlighted the catastrophic effects that a global economic crisis can have on lives and livelihoods.[1] Notwithstanding the pandemic's widespread and large effects on economic and health outcomes, these may be relative short-term effects that may not persist in the post-pandemic period. This raises the question on what we may expect about the effect of the pandemic for longer-term outcomes such as governance quality, which may have effects that persist over time. To answer this question, we look at the historical data on past political and economic crises[2] to assess what we can learn from the long-term effects of past crises on an important dimension of governance quality: the degree of political corruption, defined as the extent to which political actors use political office for private or political gain (see Gerring and Thacker 2004). A separate body of research has looked at the effect of institutions on corruption. But there is scant literature on the inter-relationships between political and economic crises, institutions, and corruption. In this paper, we address the following question: how do political and economic crises and institutional quality affect corruption? We are specifically interested in the joint effect of political and economic crises and institutions on corruption. To address this question, we use panel data for over 100 countries during the years 1800–2020 and estimate the effects of political and economic crises and institutional quality both directly and in their interaction on corruption.

Why should the control of corruption matter? Corruption is seen as a major obstacle to economic development (Aidt 2009; Andvig and Moene 1990). There is vast empirical literature on the consequences of corruption. This body of research was pioneered by Mauro (1995), who observed a significant negative relationship between corruption and economic growth. Mo (2001) subsequently confirmed Mauro's results and others extended them to macroeconomic variables such as foreign direct investment (Wei 2000) and productivity (Lambsdorff 2003). In this paper, our interest is not on the consequences of corruption but on its determinants. In previous research, factors such as political liberalization and economic liberalization have been found to be important determinants of corruption (Saha et al. 2009). In this paper, we focus on two sets of explanatory factors that have been relatively under-studied in the literature. These are political and economic crises and institutional quality, as captured by the rule of law. We are specifically interested in examining whether a higher level of rule of law mitigates the possible negative effect that political and economic crises may have on corruption.

A strength of our paper is that we are able to use a recently released dataset called V-Dem (Coppedge et al. 2019a, 2019b) that provides historical data for 202 countries for over 200 years. This dataset represents a valuable and unique tool to study the geo-political distribution and the historical trends of corruption and the rule of law. Using such a long time period has two key advantages. First, since political and economic crises occur relatively less frequently, a long time-span allows us to increase the number of episodes of political and economic crises in our panel data analysis. Second, since institutional quality (the rule of law) is slow moving, it is necessary to have data for a sufficiently long period of time to allow us to capture the changes in institutional

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[1] For the effects of the pandemic on livelihoods, see Ceballos et al. (2020), Egger et al. (2021), Kansiime et al. (2021), Mahmud and Riley (2021), Malik et al. (2021), Risto et al. (2022), Schotte et al. (2021), and Surbhi et al. (2021), and for effects on lives, see Arolas et al. (2021) and Islam et al. (2021).

[2] Note for readers' clarity: 'political crisis' and 'economic crisis' have been treated as two separate variables and are referred together in the plural as 'crises', but 'economic and financial crisis' have been treated as a single variable and are referred jointly in the singular.

quality that occur incrementally over time. Another advantage of our data is that they provide measures of corruption, political crisis, and rule of law, and minimize the risk of measurement error if the data were from different sources.

Our paper contributes to the literature on corruption by focusing on the joint effect of political and economic crises and institutional quality. Political and economic crises as key determinants of corruption have been relatively under-studied in the literature. This is surprising as political and economic crises can lead to change in individuals' behaviour making them more prone to corrupt behaviour. For example, during a political crisis, there may be less checks and balances on politicians' and bureaucrats' behaviours, and they may be more like to accept bribes for services they provide to citizens. During an economic crisis, which leads to rapid declines in incomes among some sections of the society, the cost–benefit calculation on whether to engage in corruption may be tilted towards corrupt behaviour because the marginal utility of the monetary gains from corruption could increase with lower incomes, relative to the costs of corruption. However, strong institutions may mitigate the effects of political and economic crises on corruption; so countries with better quality institutions, political and economic crises may have less of a detrimental effect on corruption compared with countries with lower-quality institutions. To the best of our knowledge, our paper is the first attempt to quantify the marginal impact of political and economic crises on corruption for different levels of institutional quality.

This paper also contributes to the literature on political and economic crises. Most of the papers in this area look at the effects of crisis on economic outcomes such as declines in output (Aisen and Veiga 2013; Alesina et al. 1996; Matta et al. 2021), or on political outcomes such as reversal of democratization (Edgell et al. 2021). However, we have limited knowledge on the effect of political and economic crises on an important governance outcome such as corruption. A novelty of our paper is that we are able to distinguish between political crisis and economic crisis and show that they may have different effects on corruption. This is important to do as the causes of political crisis may be different from those of economic crisis. Political crisis may be due to inter-elite conflict or the death of a long-term leader. Economic crisis may be due to poor economic management or a sudden exogenous shock such as a currency crisis. The role that institutions play in mitigating the effects of political crisis may be different from the role they play in mitigating the effects of economic crisis. We investigate this possibility in the paper.

Finally, the paper contributes to the vast literature on institutions and development. Starting from Acemoglu et al. (2001), several papers have studied the effects of institutions on economic outcomes such as incomes (see Acemoglu 2009; Rodrik et al. 2004). Other papers also show that the marginal effect of corruption on growth is conditional on the institutional environment, with the marginal effect declining at higher levels of institutional quality (e.g., Aidt 2009). Yet, we know little about how institutions matter in controlling corruption, especially in the presence of political and economic crises. This is important to examine as better-quality institutions can act as a buffer that mitigates the effect of crises on corruption, independent of its direct effect on controlling corruption.

To examine the role of institutions in the corruption–crisis relationship, various levels of institutional quality in terms of rule of law and their impacts are tested. The panel data for over 130 countries for the period 1800–2020 are used. To estimate the arbitrating effect of institutional quality on this relationship, an interaction term between political and economic crises and corruption is incorporated along with individual measures of crisis and institutional quality directly in the regressions. For the crisis variable, we have used various measures of political crisis and economic crisis to identify their impacts on corruption and whether the impacts differ depending on the type of crisis.

We find clear and unambiguous evidence that the effect of political crisis in terms of political and civil violence on corruption is less effective in countries with strong institutions. However, in case of democracy breakdowns, coups, armed conflict, and civil war, institutional quality has no significant impact in controlling corruption since these incidents break or weaken the institutions themselves. On the other hand, institutions can mitigate the adverse effect of economic crisis such as economic slowdown and banking crisis on corruption, but its effect is negligible in cases of currency crisis and inflation and debt crisis.

The rest of the paper is organized as follows. Section 2 reviews the literature on corruption, institutions, and political and economic crises and develops testable hypotheses from the literature. Section 3 provides a discussion on the empirical analysis, including model, methodology, and the data. The main results are presented in Section 4 and Section 5 concludes.

2   Literature review and hypotheses development

In this section, we review three sets of literature: first, the literature on the relationship between political and economic crises and corruption; second, the literature on institutional quality and corruption; and third, the literature on the inter-relationships between political and economic crises, institutional quality, and corruption. We also develop testable hypotheses from the literature.

2.1   Relationship between political and economic crises and corruption

From a theoretical standpoint, one may expect that corruption may increase in periods of political and economic crises. In periods of political crisis, there may not be any leader in place, and the opportunities for rent-seeking may increase. Further, in such periods, third-party accountability institutions such as the Supreme Court or national audit agencies may have their powers curtailed or may be ineffectual in disciplining corrupt government officials and politicians, such as when there is a military coup or the death of a strong national leader. In periods of economic crisis, living standards tend to rapidly decline, leading to higher incentives to engage in corrupt behaviour. This may happen when salaries of politicians are cut in nominal terms due to the implementation of a bank-fund structural adjustment reform programme in the country. The earnings of politicians may also decline in real terms due to high inflation, which often accompanies an economic crisis (see Reinhart and Rogoff 2009).

However, the empirical literature on the effects of political and economic crises on corruption is scarce. Some recent studies in Eastern European countries find a strong relationship between economic crisis and corruption during the period of the global financial crisis. Using household level data, Ivlevs and Hinks (2015) find possible positive linkages between the effects of the 2008–09 economic crisis and experience of corruption in the transition economies of Central and Eastern Europe and Central Asia. The study shows that among those who have contact with public officials, households affected by crisis are more likely to pay bribes. This finding supports the conjecture that public officials misuse sensitive information about crisis victims (e.g., about their job history, savings, migrant connections) to inform bribe extortion decisions. Torsello (2010) finds that the economic recession during the global financial crisis in Eastern Europe coupled with the style of structural funding scheme in the European Union (EU) seriously undermines the success of fighting corruption and improving institutional performance following EU accession because of the lack of transparency and loss of trust and credibility of state government administrations. Likewise, Krambia-Kapardis (2016) discusses the global financial crisis and how it contributed to rise in corruption in the Eurozone and particularly in Greece, where

corruption was endemic. Corruption on such a large scale is a malignant cancer that sinks a country ever deeper into national debt.

Duri (2021) argues that humanitarian and economic crises create the perfect storm for corruption to thrive because of the huge influx of financial aid and the need for emergency procurement and disbursement of funds to mitigate the crisis, with minimal oversight. In addition, evidence from previous crises as well as the current COVID-19 pandemic have indicated that corruption reduces the quantity and quality of aid or stimulus packages reaching the targeted beneficiaries, which may prolong crisis and affect growth.

Similarly, most of the political science literature finds that weak political structure or political breakdown can flourish the level of corruption opportunities. For example, Nye (1967) argues that coup leads to corruption. Holmes (1997) makes some initial comparative observations and argues that the significance of post-communist corruption reaches far beyond the post-communist countries themselves. The argument is rooted in the fact that during the 1980s and 1990s, many countries in the world saw a spike in corruption with fall in communism and with a rise of democracy. Thus, we propose the following hypothesis:

HYPOTHESIS 1: Political/economic crisis increases corruption.

2.2 Relationship between institutional quality and corruption

Emerging literature has studied the effect of institutions on corruption. One set of papers has looked at the role of political institutions. Gerring and Thacker (2004) find that unitary and parliamentary forms of government reduce corruption, and argue that in such political systems, centralized constitutions help foster lower levels of corruption. Treisman (2000, 2007) finds that corruption is lower in long-established liberal democracies, as the freedom of press observed in these countries along with greater civic monitoring leads to greater coverage of episodes of political corruption and closer monitoring of public officials. Another set of papers has examined the role of economic institutions. Moreover, the studies find that countries with stronger rule of law institutions (such as those with the British common law system) have lower levels of perceived corruption. This is because judges in countries with strong rule of law institutions are willing to follow procedures and have little respect for hierarchy and authority of offices. This implies that the chances of official corruption being exposed is higher in countries with strong rule of law institutions. Likewise, Saha et al. (2014) assert that the probability of detection and punishment is sufficiently high to deter corruption with well-functioning institutions. Thus, it is reasonable to expect that a more-or-less well-functioning institution results in a society where the power of political elites is substantially moderated and consequently the level of corruption is lower (Fjelde and Hegre 2007). In contrast, societies that shift from autocracy to a 'transitional phase' experience a jump in explicit corruption level due to the newly born weak institutions. Shleifer and Vishny (1993) provide an elegant theoretic rationale for the shift to a transitional society being associated with an increase in corruption. Using the term 'centralized corruption' to characterize corrupt autocratic regimes, they note that bribe-extracting officials act together as a joint monopolist to maximize the combined revenue from bribes.

The weak institutional frameworks in newly democratized countries (such as Eastern Europe) also increase the opportunities for high-level corruption. Political institutions in a newly formed electoral democracy lack the institutional resources to restrict corrupt political elites from furthering their own interests. Shleifer and Vishny (1993) also claim that the structure of government institutions and political process are the most important determinants of corruption. Levin and Satarov (2000) describe the institutions and social norms that have accommodated corruption in the Russian Federation in the post-transition years, where corruption is sustained by

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ill-defined boundaries between political and private business activity, and how the role of the state facilitates rather than hinders corruption. The authors suggested changes in economic, political, and judicial conduct that would make corruption more difficult.

In the empirical literature, Lederman et al. (2005) and Aidt (2009) study the role of political institutions in determining the prevalence of corruption. Strong institutions, good governance, democracies, parliamentary systems, political stability, and freedom of press are all associated with lower corruption. Jetter et al. (2018) attempt to identify the robust determinants of corruption among cultural, economic, institutional, and geographical factors using Bayesian model averaging to analyse a comprehensive list of 36 potential corruption determinants across 123 countries (covering 87 per cent of the world population). The results indicate that economic and institutional characteristics matter. The rule of law emerges as the most persistent predictor with a posterior inclusion probability (PIP) in the true model of 1.00, and strong evidence for government effectiveness (PIP of 0.88), as meaningful determinants of lowering corruption levels. Saha and Gounder (2013) also confirm that a strong institution deters corruption. Hence, our second hypothesis is:

> HYPOTHESIS 2: Strong institutional quality can lower corruption.

2.3 Relationship between political and economic crises, institutional quality, and corruption

What is the role of institutional quality in mediating the effect of political and economic crises on corruption? The apparent epidemic of corruption in post-communist countries prompted a great deal of concern and spurs the literature on why post-communist countries are particularly more corrupt. Treisman (2003) finds that a spike in corruption in Eastern Europe and Soviet Union is not because of post-communist effect but mainly due to poor quality governments, largely because of lack of post-war history of democracy. Likewise, Bankole and Olaniyi's (2021) study on leadership crisis and corruption in Nigeria concludes that for Nigeria to experience sustainable socio-economic development, responsible, credible, and true leaders who will build strong and transparent institutions, as well as leaders who are dedicated to how history will remember them for transforming society rather than for accumulation of private wealth, must emerge to implant the act of good and selfless governance in Nigeria. Both studies confirm that in countries that suffer from political and economic crises, building strong institutions that deliver good governance reduces corruption.

Obydenkova and Arpino (2017) examine the association between corruption and trust in national and European parliaments before and after the start of the Great Recession of 2008 using data from the European Social Survey. The authors find that over the crisis, the effect of corruption on trust in national parliament becomes more negative than it was before 2008. They also find a positive association between corruption and trust in the EU before the crisis. Their findings clearly suggest that the global financial crisis reduced trust on the effectiveness of the government. We therefore posit the following hypothesis:

> HYPOTHESIS 3: Strong institutional quality can mitigate the adverse effect of political and economic crises on corruption.

The next section discusses our empirical methodology and data that we use to test our three core hypotheses.

3   Empirical model, methodology, and data

This section discusses data, model, and methodology used to explore the impact of political crisis and economic and financial crisis on corruption in the presence of strong institutions. The next sub-section discusses the definition of data and the data sources used in the study in detail.

3.1   Data definition

The main source of the data used in this study is from the Varieties of Democracy (V-Dem) dataset, which considers a new approach to conceptualizing and measuring democracy. It provides a multidimensional and disaggregated dataset that reflects the complexity of the concept of democracy as a system of rule that goes beyond the simple presence of elections. The data are available from 1789 to 2020 at an annual frequency and across 200 countries (see V-Dem Institute n.d.).

3.1.1 Dependent variable

A lack of a general definition and the lack of cross-national objective data on corruption are the major obstacles to the comparative study of corruption. V-Dem's political corruption index is used as the dependent variable in this study. The V-Dem corruption index is a broad measure of corruption which includes six distinct types of corruption that cover both different areas and levels of the polity realm, distinguishing between executive, legislative, and judicial corruption. Within the executive realm, the measures are also to distinguish between corruption mostly pertaining to bribery and corruption due to embezzlement. Finally, the index differentiates between corruption in the highest echelons of the executive at the level of the rulers/cabinet as well as in the public sector at large. The measures thus tap into several types of corruption: 'petty' and 'grand', bribery and theft, and those influencing law making and affecting implementation. Overall, the index is an average of (a) public sector corruption, (b) executive corruption, (c) legislative corruption, and (d) judicial corruption. In other words, these four different government spheres are weighted equally in the resulting index. The index ranges from low to high with a scale of 0 to 1.

3.1.2 Independent variables

Institutional quality, one of the main independent variables, is measured by the rule of law from the V-Dem rule of law index.[3] Like the corruption index, this index also includes broader coverage and is formed by taking the point estimates from a Bayesian factor analysis model of the indicators for compliance with high court, compliance with judiciary, high court independence, lower court independence, executive respects constitution, rigorous and impartial public administration, transparent laws with predictable enforcement, access to justice for men, access to justice for women, and judicial accountability. The index ranges from 0 to 1 and the higher value indicates the better rule of law.

For political crisis, V-Dem's physical violence index is considered, which measures physical integrity as understood as freedom from political killings and torture by the government. Among the set of civil liberties, these liberal rights are the most relevant for political competition and accountability. The index is based on indicators that reflect violence committed by government agents and that are not directly referring to elections. The index ranges from 0 to 1 and the high value represents greater violence. An alternative index used for political crisis is the political civil

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[3] We follow Aidt (2009) in using rule of law as a measure of institutional quality.

liberties index, which understands freedom as freedom of association and freedom of expression. It measures the extent to which political liberties are respected. The index is based on indicators that reflect government repression and that are not directly referring to elections. The index ranges from low to high with a scale of 0 to 1.

For robustness check, another four V-Dem indices have been used that represent political crisis such as democratic breakdowns (the number of previous democratic breakdowns), coups (whether a coup occurred), armed conflict (whether the country participated in an international armed conflict in a given year), and civil war (at least one intra-state war with at least 1,000 battle deaths for each country-year). These indicators are mostly dummy variables.

Regarding the measure of economic crisis variable(s), most of the political science literature on the impact of economic crisis on various political outcomes relies on annual growth rates to specify economic crisis (e.g., Alesina et al. 1996; Aytaç 2018). However, Krishnarajan (2019) argues that this canonical approach comes with several logical shortcomings and leads to misguided impressions of crisis severity; it makes no distinction between rapid expansion years and rapid recovery years; and it disregards the financial dimension of economic crisis. Accordingly, the study presents three alternative approaches of measuring economic crisis—economic shocks, economic slumps, and measures of financial crisis—and demonstrates that these alternative crisis measurements provide results that are theoretically more nuanced and empirically more robust. Following Krishnarajan (2019), this study considered annual economic growth, economic shocks and slumps, and financial crisis measures to represent economic and financial crisis (see Table 2 of Krishnarajan [2019] for details: https://link.springer.com/article/10.1007/s11135-018-0823-5/tables/2).

The annual growth rate of gross domestic product (GDP) per capita is used as the first measure of economic crisis and the data are collected from the V-Dem dataset based on the Maddison Project dataset (see Bolt et al. 2018). Economic shocks and slumps are measured by creating a dummy variable with negative growth of GDP per capita and negative economic growth for several years consecutively. The financial crisis data on debt, inflation, currency, and banking crises are taken from 'global crises data' by 'country' sourced from Behavioral Finance & Financial Stability, the Harvard Business School. The data are available for more than 70 countries from 1800 to 2020 (for details, see Reinhart et al. 2021).

3.1.3 Control variables

Control variables for the study are logged GDP per capita, the average years of education in the total population aged 15 years and older for the education variable, and educational equality that measures the extent to which high-quality basic education is guaranteed for all, sufficient to enable them to exercise their basic rights as adult citizens.[4] Also, the health equality variable is considered as the control variable that measures the extent to which high-quality basic healthcare is guaranteed for all, sufficient to enable them to exercise their basic political rights as adult citizens. All the economic control variables are obtained from the V-Dem dataset for economic variables. Most of the control variables are available from 1800 onwards. Based on data availability, the period of the study covers from 1800 to 2020. One of the important contributions of this study is to use the V-Dem data in the economic literature. The descriptive statistics and the list of countries under study are reported in Appendix Tables A1 and A2, respectively.

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[4] Basic education refers to ages typically between 6 and 16 years of age but this varies slightly among countries.

3.2 Model

To capture the effect of political crisis and economic and financial crisis on corruption in the presence of various institutional quality, the interaction effect is estimated. The interaction effect between political (economic and financial) crisis and institutional quality is measured to quantify the impact of various crises on corruption at different levels of institutional quality (such as weak, moderate, and strong). This interaction effect is the prime focus of this study. The basic model using panel data technique for the period 1800–2020 over 130 countries is structured as follows:

$$\text{CORR}_{it} = \alpha_0 + \alpha_1 \text{PolC}(\text{E\&FC})_{it} + \alpha_2 \text{RL}_{it} + \alpha_3 \text{PolC}(\text{E\&FC}) * \text{RL}_{it} + \alpha_4 \text{LRGDPPC}_{it} + \alpha_5 \text{EDU}_{it} + \alpha_6 \text{EDUQ}_{it} + \alpha_7 \text{HQ}_{it} + \varepsilon_{it} \tag{1}$$

where CORR is corruption; PolC is political crisis; E&FC is economic and financial crisis; RL is rule of law, a measure of institutional quality; LRGDPPC is logarithm of real GDP per capita as a measure of economic growth; EDU is education variable; EDUQ is educational equality; HQ is health equality; and ε is error term. Subscripts t is for time and i is country.

The coefficient α_3 and its sign and significance level are of interest, which captures the joint effect of political (economic and financial) crisis and institutional quality on corruption. In addition, the marginal effects of various crises at different levels of institutional quality (RL) on corruption are computed as follows:

$$\frac{\partial \text{CORR}_{it}}{\partial \text{PolC}(\text{E\&FC})_{it}} = \alpha_1 + \alpha_3 \text{RL}_{it} \tag{2}$$

Equation (2) is the marginal impact of political (economic and financial) crisis on corruption at various levels of institutional quality. If $\alpha_3 < 0$, then Equation (2) illustrates that a one unit rise in political (economic and financial) crisis yields less increase in corruption as the degree of institutional quality expands.[5] Alternatively, an increase in political (economic and financial) crisis lowers corruption when countries have strong institutions. Moreover, Equation (2) represents our hypothesis that the impact of political crisis/economic and financial crisis on corruption is less in societies with strong institutions.

Various studies, mainly in political science, have shown that crisis and corruption are highly correlated (e.g., Flynn 1993, 2007; Johnston 1986; Porta and Vannucci 1997). The fall of autocratic regimes and transition towards democracy in many countries at the end of the 1980s and the beginning of the 1990s also evidence a spike in corruption, demonstrating that political and economic crises may lead to a high level of corruption. Ivlevs and Hinks (2015) studied the effect of the global economic crisis in 2008–09 on the household experience of bribing public officials. Their study finds that households hit by the crisis are more likely to pay bribe and public officials misuse sensitive information about crisis victims and extract more bribe from the victims. In other words, among those who have contact with public officials, households affected by crisis are more likely to pay bribes. Hence, α_1 is expected to be positive.

In contrast, Saha et al. (2014) argue that well-functioning institutions deter most decision makers from choosing to act corruptly because of a higher probability of detection and punishment. In other words, a well-functioning democracy with a strong rule of law, where the probability of being

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[5] The V-Dem corruption index value ranges from zero to one, with a higher value indicating a higher level of corruption.

caught acting corruptly is high, is shown to be crucial for controlling corruption. We expect α_2 to be negative.

For the control variables, both α_4 and α_5 coefficients tend to be associated with increase in the level of development, which leads to reduction in corruption (Saha et al. 2014). Ivlevs and Hinks (2015) also find that the link between crisis and bribery is stronger in the poorest countries of the region of the study. Thus, the sign of the coefficients is expected to be negative. Saha et al. (2014) show that income inequality increases the level of corruption. With increased inequality rich people have greater resources to pay bribes to buy public services (Glaeser et al. 2003; You and Khagram 2005). Hence, the higher income inequality in a country can accelerate education and health inequality, and the sign of the coefficients is expected to be negative as more equality lowers corruption.

3.3 Methodology

The proposed hypothesis is tested using a panel estimation technique for over 100 countries during the period 1800–2020. Although the V-Dem dataset is available from 1789, many variables are missing towards the early years and not all data for the study are available for the beginning year. To take advantage of the long dataset as well as to confirm our hypothesis, we estimate the model for the period 1800–2020 and 1900–2020 separately. A panel fixed-effect model is employed to identify the country- and time-specific differences in the corruption–crisis relationship. Next, a Hausman test is performed to verify the results of fixed effect by comparing the variances of parameters acquired from a random-effect model. All estimators in the fixed-effect model, even with small number of cross sections N, are consistent as time (t) increases and approaches to infinity, whereas in the random-effect model, the regression error term $v_{i,t}=u_i+\varepsilon_{i,t}$, where u_i is the time-invariant random individual effect in addition to error term $\varepsilon_{i,t}$ denoting all other missing elements (Baltagi 2008; Basu et al. 2019). Moreover, in both random- and fixed-effect models, by assumption all explanatory variables are independent from error terms v_{it} and u_i, identically distributed, and to be normally distributed. All estimations are performed with both heteroskedasticity and serial correlation corrected robust standard errors.

Also, the problem of endogeneity (among economic development, crisis, and corruption) can render biased estimates and can cause the error terms to be correlated with dependent variable(s). The issue is addressed by using the two-stage least square by employing instrumental variables that may affect economic development (or crisis) but not be affected by corruption. Following Saha and Gounder (2013), we use life expectancy and infant mortality rate as instruments for economic development. The raw data also confirm that the correlations between corruption with life expectancy and infant mortality rate are just 0.238 and 239, respectively, but the correlation between log per capita income and life expectancy (infant mortality) is around 0.780 (0.735).[6] We also use 5–10 years of lag of the main dependent right-hand side variables as instruments.

4   Empirical analysis

We examine both political crisis and economic and financial crisis and their relationship with corruption. We start our investigation with the scatter plots of the relationship between corruption and rule of law and corruption with the political crisis variable (as economic and financial crisis variable is mostly the dummy variable). The scatter plots depicting the relationship between

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[6] The correlation results are not reported here but available upon request from authors.

corruption and rule of law indicates that a strong rule of law lowers corruption (Figure 1). In other words, a stronger institution is correlated with low corruption level. For example, the average value of rule of law during 1800–2020 in Nigeria is around 0.177, and the corruption score is 0.813, whereas the average rule of law and corruption level in the United Kingdom are 0.975 and 0.030, respectively. The results support the common claim that a weak rule of law enhances corruption (Saha et al. 2014).

Figure 1: Relationship between corruption and rule of law: average for years 1800–2020
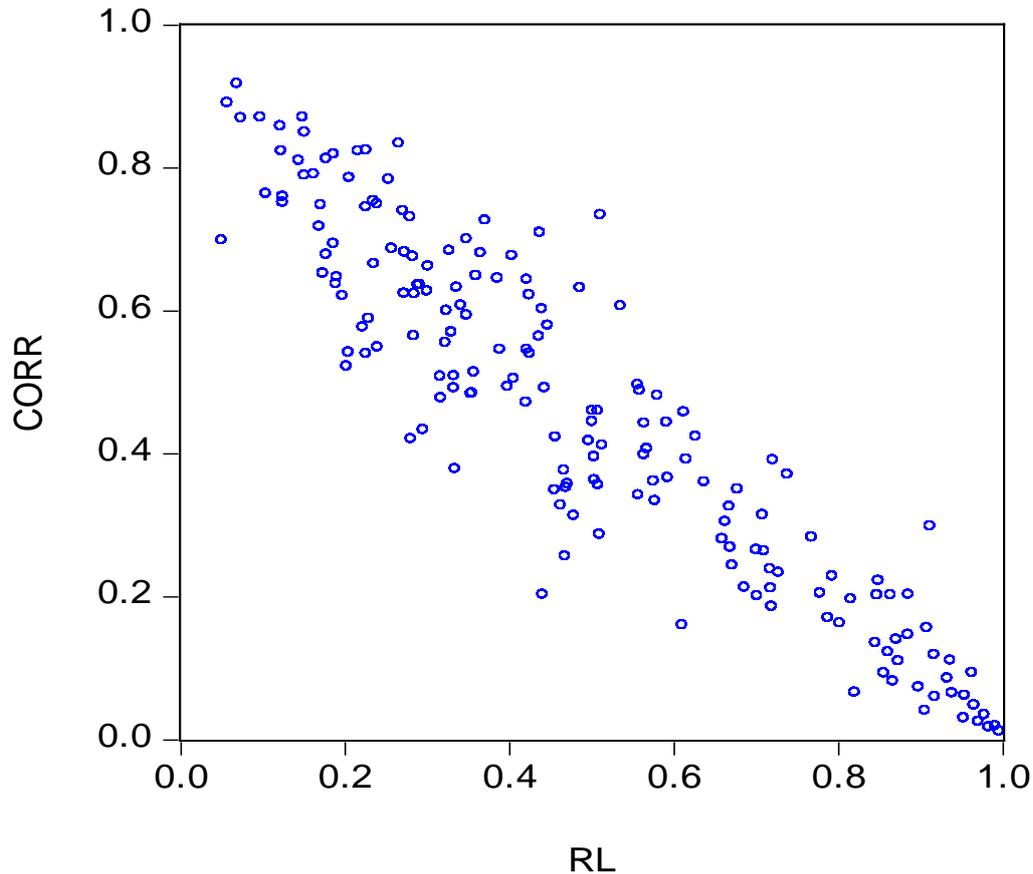
Source: authors' compilation based on the V-Dem dataset.

However, Figure 2 shows some positive relationship between political crisis and corruption for both the variables, namely, violation of civil liberties (CL) and physical violence index (VIO), illustrating that higher the political crisis in terms physical political violence and the violation of civil liberties, the higher the level of corruption. In other words, countries with greater violation of civil liberties exhibit higher corruption (such as Honduras and Nigeria). On the other hand, political violence in low corrupt countries such as Austria and Netherland is quite low. The result corroborates the prevalent argument in the political science literature that political crisis stipulates the opportunities for corruption (e.g., Flynn 2007; Johnston 1986).
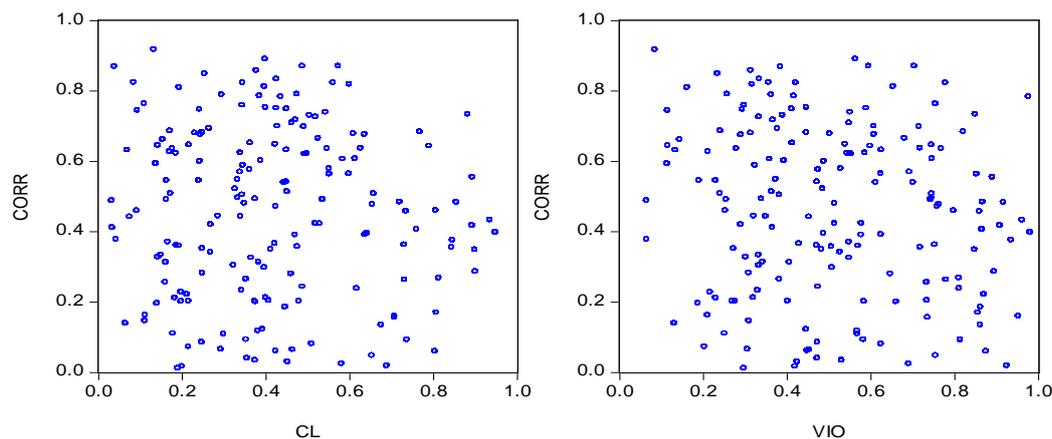
Figure 2: Relationship between corruption and political crisis: average for years 1800–2020

Source: authors' compilation based on the V-Dem dataset.

However, it is interesting to explore the interaction effect of crisis and rule of law to identify if a strong institutional quality can mitigate the adverse effect generated from crisis. Figure 3 shows the scatter of political crisis and corruption for two groups of countries with above and below average rule of law. It is evident from the figures that corruption created by the political crisis is much lower in countries with strong institutional quality than in those with weak institutions.[7] Moreover, we estimate the interaction effects using two-way fixed effect for the period 1800–2020 to get further support of the results, which are discussed in Section 4.1.

Figure 3: Corruption and political violence relationship when rule of law is (a) above average and (b) below average, 1800–2020
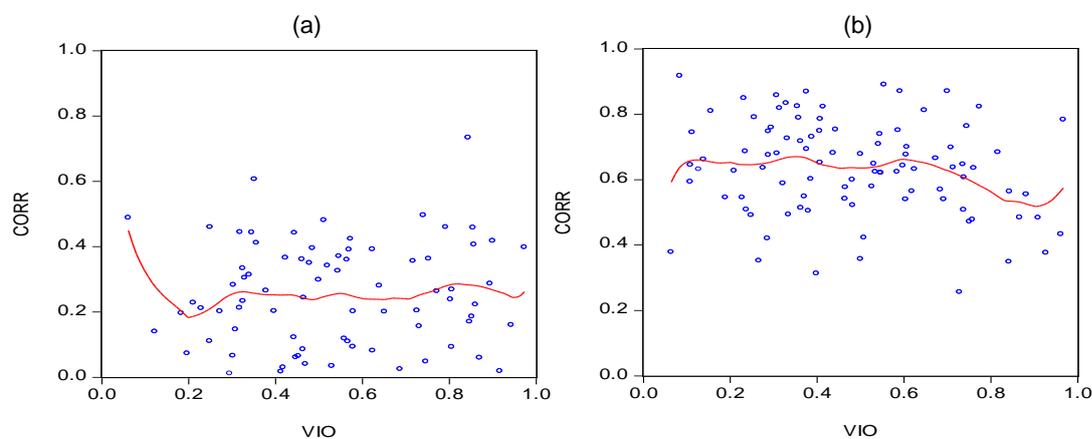
Source: authors' compilation based on the V-Dem dataset.

4.1 Regression results

4.1.1 Political crisis

The estimated regression coefficients of the base model (Equation (1)) using fixed effects and two-stage least square are shown in Table 1. The fixed effects results without control variables and using physical violence (VIO) as a measure of political crisis show that rule of law and political violence coefficients are negative and positive, respectively, and both the coefficients are highly significant (Table 1, column 1). The results suggest that a strong institution lowers corruption

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[7] Similar results are also found for the period 1900–2020, although not reported here.

significantly. The result is consistent with those of Lederman et al. (2005) who argue that the role of political institutions is important in reducing corruption as their study finds democracies, parliamentary systems, political stability, and freedom of press are all associated with lower corruption. However, political violence increases corruption in a country. The result supports the finding of Gillanders and Werff (2021), which shows that corruption is associated with permissive attitudes to violence even after controlling for the perceived legitimacy of the police and courts. The interaction term is negative but insignificant. However, the results with control variables show that the interaction coefficient is negative and significant at the 1 per cent level of significance, indicating that the adverse impact of political crisis on corruption decreases as the institutional quality of a country increases. In other words, the effect of political crisis on corruption turns negative as the level of institutional quality expands. With a strong institution, it is possible to control the level of corruption.

Based on Equation (2), the interaction effect of VIO on corruption at the mean score of rule of law (RL) of 0.547 is 0.019, which is significant, suggesting that a one standard deviation point increase in VIO increases corruption by 0.019 points at the mean RL index, which is lower than the individual effect (0.039) of VIO on corruption (Table 1, column 2). The impact of VIO on corruption demonstrates some mixed effects. If institutional quality in a country is weak then more political violence increases the level of corruption. Conversely, the effect of VIO on corruption is weak as the level of institutional quality magnifies. Likewise, the interaction effect of the violation of civil liberties (CL) and rule of law (RL) confirmed similar effect on corruption (Table 1, columns 5 and 6, respectively). If a country has low-quality institutions, then more violation of civil liberties enhances corruption. These results confirm our hypothesis that the impact of political crisis on corruption is less in societies with strong institutions as political violence and violation of civil liberties is controlled by good institutions The results of these interactive effects are interpreted in detail in the partial (marginal) effect estimation.

The panel two-way fixed-effect results for both with and without controls substantiates that political crisis augments corruption in the presence of weak institutions. In addition, the magnitude of the interaction term proliferates after incorporating the control variables. Control variables are all expected in signs, such as higher per capita income and educational accomplishment lower the level of corruption, which is consistent with Saha and Gounder (2013). Likewise, educational and health equality control corruption in a country significantly. The coefficients of control variables are expected in signs and remain significant in most of the regressions including robustness check.

Table 1: The effects of political crisis, rule of law, and their interactions on corruption, 1800–2020

	Two-way fixed effects						Two-stage least square			
Rule of law (RL)	−0.743***	−0.605***	−0.595***	−0.745***	−0.601***	−0.591***	−0.643***	−0.620***	−0.668***	−0.634***
	(0.006)	(0.012)	(0.014)	(0.007)	(0.012)	(0.013)	(0.015)	(0.021)	(0.014)	(0.017)
Physical violence (VIO)	0.011***	0.039***	0.037***				0.077***	0.069***		
	(0.004)	(0.005)	(0.005)				(0.015)	(0.018)		
Political civil liberties (CL)				0.010***	0.051***	0.053***			0.043***	0.045***
				(0.004)	(0.006)	(0.006)			(0.010)	(0.012)
VIO*RL	−0.009	−0.036***	−0.033***				−0.085***	−0.058*		
	(0.006)	(0.008)	(0.008)				(0.024)	(0.031)		
CL*RL				−0.009	−0.049***	−0.044***			−0.035**	−0.032*
				(0.007)	(0.008)	(0.008)			(0.016)	(0.019)
Log real GDP per capita (LRGDPPC)		−0.032***	−0.032***		−0.031***	−0.031***		−0.029***		−0.029***
		(0.003)	(0.003)		(0.003)	(0.003)		(0.003)		(0.003)
Education 15+ (EDU)		−0.011***	−0.009***		−0.011***	−0.009***		−0.010***		−0.010***
		(0.001)	(0.001)		(0.001)	(0.002)		(0.002)		(0.002)
Educational equality (EDUQ)			−0.011***			−0.011***		−0.010***		−0.010***
			(0.002)			(0.002)		(0.002)		(0.002)
Health equality (HQ)			−0.003*			−0.003*		−0.0001		0.0003
			(0.002)			(0.002)		(0.002)		(0.002)
Constant	0.816***	1.079***	1.081***	0.817***	1.068***	1.068***	0.773***	1.065***	0.792***	1.077***
	(0.003)	(0.028)	(0.035)	(0.004)	(0.028)	(0.034)	(0.009)	(0.034)	(0.008)	(0.034)
Observations	23,630	11,534	10,552	24,084	11,444	10,462	11,331	10,328	11,341	10,360
Countries	178	133	133	178	133	133	133	133	133	133
Adjusted R^2	0.905	0.937	0.935	0.905	0.937	0.935	0.935	0.935	0.935	0.935
Wald statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: robust standard errors are in parentheses. ***, **, and * indicate significance level at 1, 5, and 10 per cent, respectively.

Source: authors' compilation based on the V-Dem dataset.

4.1.1.1 Robustness test

Two-stage least square

The two-stage least square estimates illustrate that infant mortality, life expectancy, and lagged endogenous variables are good predictors of economic development and political crisis. The estimates also confirm that the joint effect of political crisis and institutional quality combats corruption (Table 1, columns 7–10) and is consistent with two-way fixed effect results. The results of the first-stage regression are shown in Appendix Table A3. This robust finding postulates strong evidence that political crisis does itself increase corruption when institution is weak in a country.

Alternative political crisis measures

Democracy breakdown, coups, armed conflict, and civil war are incorporated as alternative measures of political crisis. However, the results show that institution does not work efficiently in controlling corruption in such a situation (Appendix Table A5); even a coup or a democracy breakdown can end the democratic process (Maeda 2010). Furthermore, Besaw et al. (2019) argue that coup events continue to have a negative effect on institutional democratic norms, worsen civil conflict, trigger political violence, and reverse economic development and growth. Hence, broken institutions along with a democracy breakdown can increase corruption quite significantly (Appendix Table A4, column 1).

Marginal effects of political crisis

This sub-section provides more rigorous analysis for the interaction effect between political crisis and institution on corruption. The earlier findings show that greater political or civil violence does not foster corruption if a country has a strong institution where rule of law works efficiently to counteract the violence and control corruption. Conversely, weak institutions boost the corruption level in the presence of political violence. To interpret the impact of political crisis and rule of law on corruption, the marginal effects are estimated based on Equation (2). The marginal effect results of political and civil violence on corruption at different levels (0.00 to 1.00) of rule of law using panel two-way fixed effects are reported in Table 2.

Table 2: Marginal effect of political crisis on corruption on different levels of rule of law

RL	Country	VIO	CL
0.00	Yemen	0.037*** (0.018)	0.0528*** (0.014)
0.2	Bahrain	0.0304*** (0.004)	0.04396*** (0.005)
0.4	Afghanistan	0.0238*** (0.003)	0.0352*** (0.003)
0.6	Greece	0.0172*** (0.003)	0.0263*** (0.003)
0.8	India	0.0106*** (0.003)	0.0175*** (0.003)
1.00	Denmark	0.004 (0.005)	0.0087** (0.004)

Note: robust standard errors are in parentheses. ***, **, and * indicate significance level at 1, 5, and 10 per cent, respectively.
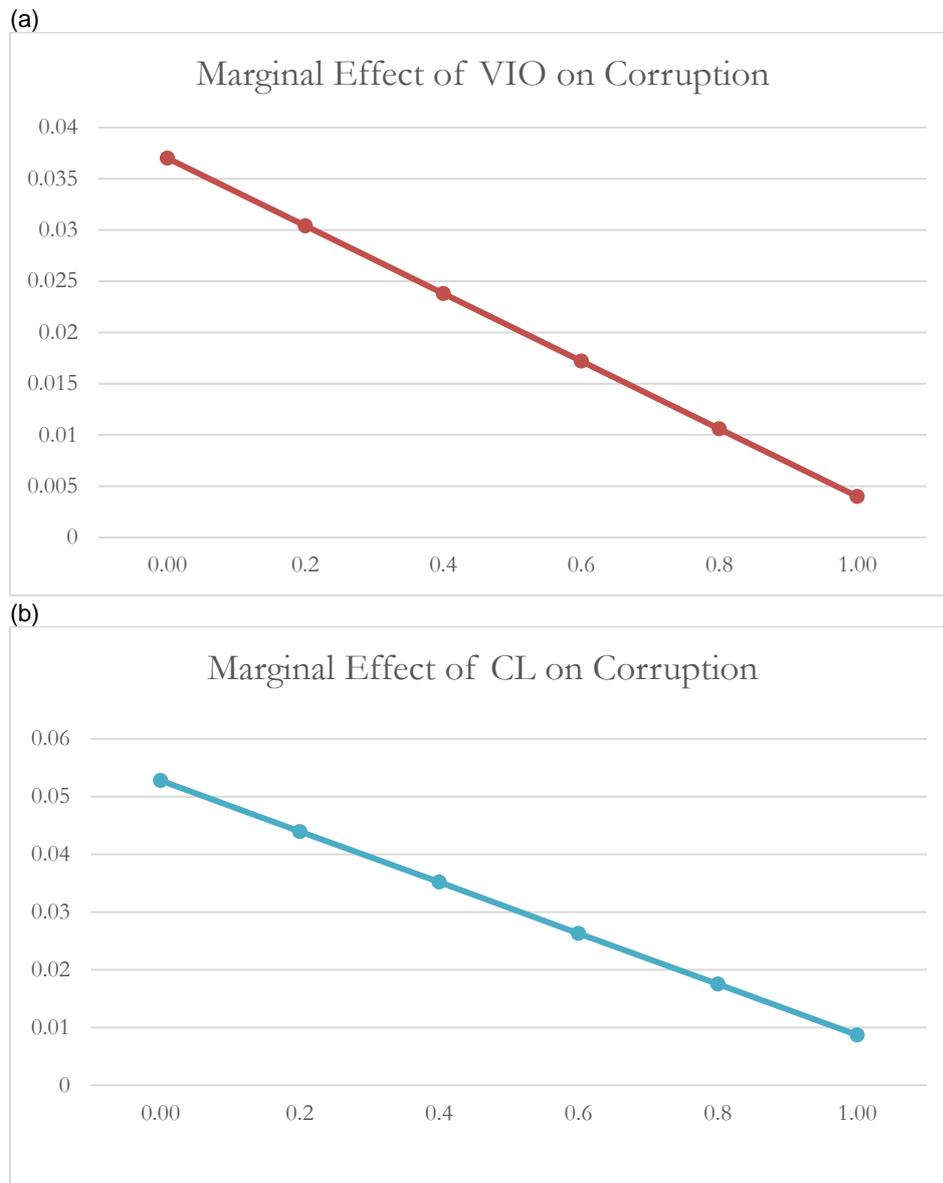
Source: authors' compilation based on the V-Dem dataset.

For an insightful perspective, the names of the countries to which these levels correspond are provided in Table 2. The results show that VIO increases corruption significantly when the level of RL is very low; yet, once past the threshold point (i.e. between 0.8 and 1.0), corruption is

substantially lower as the country has a strong institutional quality. The threshold point is where the RL index is between 0.8 and 1.0. Also, it is worth noting that the effect of VIO in increasing the corruption level becomes weak as the level of RL increases with decreasing magnitude of the coefficient. This suggests that rule of law is a cure for corruption but only at the right environment. Some observations regarding the country-specific examples can be seen in various cases. If a strong institution already exists in a country (say Denmark). then political violence can be managed by combating corruption. However, in countries like Yemen and Afghanistan, political crisis increases corruption because of a very low level of RL. Similar results are found when CL is used as a political crisis variable. The empirical results appropriately portray the theoretical conjectures conferred in the introduction.

Marginal effects of RL and VIO (CL) are displayed in Figure 4. It is clear from the figure that the marginal effect line is downward sloping for both VIO and CL, suggesting that corruption decreases as institutional quality increases.

Figure 4: Marginal effect of (a) VIO and (b) CL on corruption, 1800–2020

(a)

(b)

Source: authors' compilation based on the V-Dem dataset.

4.1.2 *Economic and financial crisis*

The estimation results of the effect of economic and financial crisis on corruption are reported in Table 3. Six different crisis variables are used in the estimation. The individual effect of negative economic growth suggests that negative growth increases corruption if a country faces slowdown or recession. Among other economic and financial crisis, a banking and currency crisis significantly increases corruption but economic shocks and slumps, inflation, and debt crisis increase corruption, although the effect is not significant. The interaction effects between economic and financial crisis and rule of law suggest that a strong institution can control the level of corruption in case of negative economic growth and banking crisis; however, for prolonged economic slumps and currency crisis, a strong institution works but the effect is not significant. Inflation and debt crisis do not have much impact on corruption. Evidence of the 2008 global financial crisis suggests that strong institutions in the United States and the United Kingdom are able to control the level of corruption by initializing banking and financial institution reforms put in place. Overall, for economic and financial crisis, institutional quality can be effective in combating corruption for banking crisis and currency crisis.

Table 3: The effects of economic and financial crisis, rule of law, and their interactions on corruption, 1800–2020

	Two-way fixed effects					
Rule of law (RL)	−0.621***	−0.617***	−0.544***	−0.553***	−0.515***	−0.562***
	(0.006)	(0.007)	(0.016)	(0.015)	(0.015)	(0.016)
Growth rate (GDPg)	−0.041**					
	(0.018)					
Economic shocks and slumps (ES)		0.004				
		(0.004)				
Banking crisis (BC)			0.075***			
			(0.011)			
Currency crisis (CC)				0.016*		
				(0.009)		
Inflation crisis (IC)					0.013	
					(0.010)	
Debt crisis (DC)						0.0017
						(0.007)
GDPg*RL	0.092***					
	(0.036)					
ES*RL		−0.008				
		(0.006)				
BC*RL			−0.103***			
			(0.016)			
CC*RL				−0.003		
				(0.010)		
IC*RL					0.009	
					(0.011)	
DC*RL						0.0137
						(0.012)
Constant	0.471***	0.465***	0.977***	0.986***	0.777***	0.415***
	(0.034)	(0.034)	(0.033)	(0.033)	(0.031)	(0.029)
Observations	10,505	10,505	6,177	6,519	6,370	7,177
Adjusted R^2	0.936	0.936	0.948	0.948	0.941	0.922
Wald statistics (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000

Note: robust standard errors are in parentheses. ***, **, and * indicate significance level at 1, 5, and 10 per cent, respectively. All estimates include control variables not reported here.

Source: authors' compilation based on the V-Dem dataset and Reinhart et al. (2021).

4.1.3 Period robustness check

Note here that the number of observations reduces significantly after incorporating control variables due to a large number of missing values of some variables during 1800. Hence, for the robustness check of our results, we re-run all regression for the period 1900–2020. The results remain the same in most cases and confirm our hypothesis that the effects of political crisis and economic and financial crisis are less in enhancing corruption in the presence of strong institutional quality (Appendix Tables A5 and A6).

5   Conclusion

A large body of literature examines the impact of political crisis on economic growth. However, there is not much literature of how institutions act on crisis and its resultant effect on corruption. This study examines the consequence of both political crisis and economic and financial crisis on corruption and whether institutional quality can have an impact on the crisis–corruption relationship. In other words, this study looks at whether a presence of strong institutions in a country can compact the level of corruption. A long historical panel dataset of over 100 countries is used for the period 1800–2020. The relationships of political crisis and economic and financial crisis with corruption are estimated using various panel estimation techniques such as two-way fixed effects and two-stage least square. In addition, alternative measures of political crisis and economic and financial crisis are used. The results show some heterogeneous effect of institutions on corruption during crisis. The impact varies depending on the type of crisis. We find that on average, the effect of a political crisis in terms of political and civil violence on corruption is less positive in countries with strong institutions. However, institutions become weak during a political crisis such as democracy breakdowns, coups, armed conflict, and civil war, and they have less or no impact in controlling corruption.

On the other hand, institutions can control economic crisis like economic slowdown and banking crisis and lower the corruption level, but for other financial crisis like currency crisis, inflation, and debt crisis, their role is weak or negligible. The results are remarkably consistent across different empirical specifications.

Our findings have important policy implications for the control of corruption when countries are experiencing large-scale political and economic crises. While such crises are expected to increase corruption, strong rule of law institutions are likely to lessen the impact of political and economic crises on corruption. For policy-makers in developing countries, given the adverse effect of corruption in economic development, it is important to prioritize the strengthening of rule of institutions such as strong, accountable, and independent judicial systems. Rigorous and impartial public administration, and transparent laws with predictable and enforcement can control rise in corruption.

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Appendix

Table A1: Descriptive statistics

	CORR	RL	VIO	CL	LRGDPPC	EDU	HQ	EDUQ
Mean	0.451	0.494	0.508	0.419	8.338	4.571	−0.259	−0.316
Median	0.459	0.451	0.484	0.34	8.22	3.888	−0.523	−0.55
Maximum	0.968	0.999	0.989	0.985	11.96	13.61	3.606	3.675
Minimum	0.002	0.004	0.013	0.008	5.69	0.01	−3.431	−3.308
Standard deviation	0.284	0.303	0.299	0.310	1.101	3.512	1.646	1.680
Observations	23,878	24,607	24,558	24,250	14,538	14,901	18,412	18,412

Note: CORR, corruption; RL, rule of law, a measure of institutional quality; VIO, physical violence index; CL, civil liberties; LRGDPPC, logarithm of real gross domestic product (GDP) per capita as a measure of economic growth; EDU is education variable; HQ is health equality; EDUQ is educational equality.

Source: authors' compilation based on study data.

Table A2: Countries under study

Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burma/Myanmar, Burundi, Cambodia, Cameroon, Canada, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Democratic Republic of the Congo, Denmark, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Eswatini, Ethiopia, Fiji, France, Gabon, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kosovo, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, North Korea, North Macedonia, Norway, Oman, Pakistan, Palestine/West Bank, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of the Congo, Romania, Russia, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, Sudan, Suriname, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, The Gambia, Togo, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela, Yemen, Zambia, Zimbabwe

Source: authors' compilation based on study data.

Table A3: First-stage regression results, dependent variable: infant mortality rate

	Ordinary least square	Fixed effect
RL(-5)	37.092***	13.699*
	(0.82)	(7.772)
VIO (-5)	4.34***	13.278**
	(0.719)	(5.743)
LRGDPPC	−12.718***	7.547
	(0.820)	(4.752)
EDU	−8.637***	−7.092***
	(0.363)	(2.402)
EDUQ	−1.487**	−0.498
	(0.635)	(2.509)
HQ	−7.164***	−3.218
	(0.512)	(2.686)
Constant	207.35***	32.731
	(6.06)	(35.318)
Observations	8,702	8,702
Countries	132	132
Adjusted R^2	0.688	0.866
Wald statistics (*p*-value)	0.000	0.000

Note: robust standard errors are in parentheses. ***, **, and * indicate significance level at 1, 5, and 10 per cent, respectively.

Source: authors' compilation based on study data.

Table A4: Effects of political crisis, rule of law, and their interactions on corruption during 1800–2020

	Period fixed effect			
Rule of law (RL)	−0.593***	−0.513***	−0.553***	−0.532***
	(0.007)	(0.007)	(0.008)	(0.007)
Democracy breakdown (Dbreak)	−0.030***			
	(0.003)			
Coup (CP)		−0.015**		
		(0.007)		
Armed conflict (AC)			0.005	
			(0.006)	
Civil war (CW)				−0.019***
				(0.006)
Dbreak*RL	0.049***			
	(0.006)			
CP*RL		−0.021		
		(0.019)		
AC*RL			−0.007	
			(0.013)	
CW*RL				0.008
				(0.016)
Constant	0.799***	0.795***	0.799***	0.836***
	(0.019)	(0.021)	(0.021)	(0.023)
Observations	9,380	8,397	9,380	8,094
Countries	133	132	133	131
Adjusted R^2	0.944	0.944	0.944	0.952
Wald statistics (*p*-value)	0.000	0.000	0.000	0.000

Note: robust standard errors are in parentheses. ***, **, and * indicate significance level at 1, 5, and 10 per cent, respectively. All regressions include control variables.

Source: authors' compilation based on study data.

Table A5: Effects of political crisis, rule of law, and their interactions on corruption, 1900–2020

	Period fixed effects					
Rule of law (RL)	−0.588***	−0.590***	−0.556***	−0.550***	−0.553***	−0.495***
	(0.015)	(0.016)	(0.013)	(0.012)	(0.017)	(0.015)
Physical violence (VIO)	0.015***					
	(0.006)					
Political civil liberties (CL)		0.026***				
		(0.006)				
Democracy breakdown (Dbreak)			−0.030***			
			(0.004)			
Coup (CP)				−0.009		
				(0.007)		
Armed conflict (AC)					0.005	
					(0.006)	
Civil war (CW)						−0.020**
						(0.010)
VIO*RL	−0.018*					
	(0.010)					
CL*RL		−0.014*				
		(0.008)				
Dbreak*RL			0.049***			
			(0.007)			
CP*RL				−0.021		
				(0.019)		
AC*RL					−0.007	
					(0.010)	
CW*RL						0.030
						(0.020)
Constant	0.932***	0.923***	0.799***	0.875***	0.972***	0.765***
	(0.026)	(0.026)	(0.021)	(0.024)	(0.034)	(0.026)
Observations	10,552	10,462	9,380	8,397	8,253	8,094
Adjusted R^2	0.922	0.921	0.944	0.950	0.925	0.946
Wald statistics (*p*-value)	0.000	0.000	0.000	0.000	0.000	0.000

Note: robust standard errors are in parentheses. ***, **, and * indicate significance level at 1, 5, and 10 per cent, respectively. All regressions include control variables not reported here.

Source: authors' compilation based on study data.

Table A6: Effects of economic and financial crisis, rule of law, and their interactions on corruption, 1900–2020

	Two-way fixed effects					
Rule of law (RL)	−0.604***	−0.605***	−0.544***	−0.554***	−0.559***	−0.562***
	(0.016)	(0.016)	(0.015)	(0.014)	(0.014)	(0.016)
Growth rate (GDPg)	−0.020					
	(0.028)					
Economic shocks and slumps (ES)		−0.002				
		(0.005)				
Banking crisis (BC)			0.113***			
			(0.014)			
Currency crisis (CC)				0.036***		
				(0.010)		
Inflation crisis (IC)					0.011	
					(0.010)	
Debt crisis (DC)						0.0017
						(0.007)
GDPg*RL	0.043					
	(0.039)					
ES*RL		0.008				
		(0.007)				
BC*RL			−0.131***			
			(0.016)			
CC*RL				−0.021***		
				(0.011)		
IC*RL					0.022*	
					(0.012)	
DC*RL						0.0137
						(0.012)
Constant	0.551***	0.548***	0.417***	0.401***	0.408***	0.415***
	(0.041)	(0.041)	(0.026)	(0.028)	(0.027)	(0.029)
Observations	10,505	10,505	7,145	7,491	7,341	7,177
Adjusted R^2	0.923	0.922	0.926	0.926	0.924	0.922
Wald statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000

Note: robust standard errors are in parentheses. ***, **, and * indicate significance level at 1, 5, and 10 per cent, respectively. All estimates include control variables not reported here.

Source: authors' compilation based on study data.