

# Do economic and political crises lead to corruption? The role of institutions

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## ABSTRACT

A large body of literature exists on the role of institutions in combating corruption and its influence on economic development. However, there is a paucity of literature on the inter-relationships between economic and political crises, institutions, and corruption. This paper addresses the question: how does institutional quality matter in affecting corruption during political and economic crises? To answer this question, we use a recently released historical panel dataset called V-Dem for over 130 countries during 1800–2020. The results suggest some heterogeneous effects depending on the type of crisis and how we measure it. For example, strong institutions can control corruption in cases of political and civil violence and economic slowdown, but the effect disappears in other crises such as democracy breakdowns, coups, armed-conflict and civil-war and currency, inflation, and debt crisis. Furthermore, strong institutions in advanced economies prevent corruption in a significant way during political and civil violence.

## 1. Introduction

The current COVID-19 pandemic has highlighted the catastrophic effects that a global economic crisis can have on lives and livelihoods.<sup>1</sup> Notwithstanding the pandemic's widespread and large effects on economic and health outcomes, these may be relatively short-lived. 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 lingering consequences. To answer this question, we look at the data on past political and economic crises<sup>2</sup> 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 ascertained as a foremost obstacle to economic development (Aidt, 2009; Andvig and Moene, 1990). There is vast empirical literature on the determinants and effects 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

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<sup>1</sup> For the effects of the pandemic on livelihoods, see Ceballos et al. (2020), Egger et al. (2021), Kansime 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 Arola et al. (2021) and Islam et al. (2021).

<sup>2</sup> 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.

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 the 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 an extended 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 quality that occur incrementally over time. Another advantage of our data is that they provide measures of corruption, political crisis, and the 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 fewer constraints on politicians' and bureaucrats' behaviours, and they may be more likely 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 and Appleton, 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 crises and economic crises and show that they may have different effects on corruption. This is important to do as the causes of a political crisis may be different from those of economic one. A political crisis may be due to inter-elite conflict or the death of a long-term leader. An 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 a political crisis may be different from the role they play in mitigating the effects of an 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 the 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 crises and economic crises to identify their impacts on corruption and whether the impacts differ depending on the type of crisis.

There is 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 hypothesis 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 crises, there may not be any leader in place, and the opportunities for rent-seeking may increase. 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 crises, 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 crises 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 the 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, because of the embedded lack of transparency and loss of trust and credibility of state government administrations, 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 undermined the success of fighting corruption and improving institutional performance following EU accession. Likewise, [Krambia-Kapardis \(2016\)](#) discusses the global financial crisis and how it contributed to rise in corruption in the Eurozone, particularly in Greece, where corruption was endemic. Such a large-scale corruption 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 crises and affect growth.

Similarly, most of the political science literature finds that weak political architecture or political breakdown can foster the level of corruption opportunities. For example, [Nye \(1967\)](#) argues that coups lead 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 crises 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 the 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 legal institutions (such as those with the British common law system) have lower levels of perceived corruption. This is because judges in countries with strong legal 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 legal institutions. Likewise, [Saha et al. \(2014\)](#) assert that the probability of detection and punishment is adequately high to deter corruption with well-functioning institutions. It is reasonably expected that a more-or-less well-functioning institutions result in a society where the power of political elites is substantively kered that in turn lowers the level of corruption ([Fjelde and Hegre, 2007](#)). In contrast, countries that swing to a 'transitional phase' from autocracy encounter a jump in explicit corruption level due to the nascent, weak institutions. [Shleifer and Vishny \(1993\)](#) offer an elegant theoretic rationale using the term 'centralized corruption' for the shift to a transitional society being connected with an increase in corruption. In autocratic regimes, corrupt officials act together as a joint monopolist in extracting bribes to maximize the combined revenue from bribes.

The weak institutional frameworks also spur the opportunities for high-level corruption in newly democratized countries (such as Eastern Europe). 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 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 the press are all associated with lower corruption. [Jetter and Parmeter \(2018\)](#) 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 strong institutions deter corruption. Hence, our second hypothesis is:

**Hypothesis 2.** : Strong institutional quality can lower corruption.

## 2.3. Relationships 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 crises 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 parliaments 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. Also, [Lakshmi et al. \(2020\)](#) find that a strong institution with greater bureaucratic quality can mitigate the ill effects of corruption and increase the stock returns by reducing red tape. 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 presents empirical model, methodology and data that are employed 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, and economic and financial crises on corruption in the presence of strong institutions. The next sub-section produces 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 is 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 corruption with a scale of 0–1.

##### 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.<sup>3</sup> 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 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

<sup>3</sup> We follow Aidt (2009) in using rule of law as a measure of institutional quality.

indicators that reflect government repression and that are not directly referring to elections. The index ranges from low to high with a scale of 0–1.

For robustness check, another four V-Dem indices have been employed that represent political crises 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 1000 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; Aytac, 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 crises—and demonstrates that these alternative crises measurements provide results that are theoretically more nuanced and empirically more robust. Following Krishnarajan (2019), this study considers annual economic growth, economic shocks and slumps, and financial crises measures to represent economic and financial crises.<sup>4</sup>

The annual growth rate of gross domestic product (GDP) per capita is used as the first measure of economic crises 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 crises data on debt, inflation, currency, and banking crises are taken from 'global crises data' by 'country' sourced from Behavioral Finance and Financial Stability, the Harvard Business School. The data is available for more than 70 countries from 1800 to 2020 (for details, see Reinhart et al., 2021).

##### 3.1.3. Control variables

Following Saha and Gounder (2013), income per capita and education level have been incorporated as control variables that explains the level of corruption. Furthermore, the authors argue that equality (such as income equality) reduces corruption. However, the income equality/inequality data measured by the Gini coefficient is not available for this long period of study, hence, instead of income equality, we have used education and health equality based on the literature (Mauro, 1998) and the data availability. Hence, control variables for this 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. Following Coppedge et al., (2021, pp. 206) education equality is constructed to answer the question: "To what extent is high quality basic education guaranteed to all, sufficient to enable them to exercise their basic rights as adult citizens?" Extreme inequality suggests at least 75 percent of children in a country receives such a low-quality education that undermines their ability to exercise their basic rights as adult citizens. On the other hand, basic education equality is where less than five percent of children receives such low-quality education that probably undermines their ability to exercise their basic rights as adult citizens. While the education variable measures the average number of years of schooling, whereas education equality measures the level of achievement to exercise the basic right as adult citizen. Alternatively, education and education equality are entirely different variables which highlight the gap between individuals'

<sup>4</sup> See Table 2 of Krishnarajan (2019) for details: <https://link.springer.com/article/10.1007/s11135-018-0823-5/tables/2>.

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

	Two-way fixed effects							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rule of Law (RL)	-0.743*** (0.006)	-0.609*** (0.012)	-0.587*** (0.012)	-0.590*** (0.012)	-0.745*** (0.007)	-0.606*** (0.012)	-0.587*** (0.013)	-0.590*** (0.012)
Physical violence (VIO)	0.011*** (0.004)	0.039*** (0.006)	0.037*** (0.006)	0.039*** (0.006)				
Political civil liberties (CL)					0.010*** (0.004)	0.043*** (0.006)	0.045*** (0.006)	0.046*** (0.006)
VIO*RL	-0.009 (0.006)	-0.017** (0.009)	-0.022** (0.009)	-0.023** (0.010)				
CL*RL					-0.009 (0.007)	-0.018** (0.008)	-0.019** (0.008)	-0.018** (0.008)
Log GDP per capita (LGDPPC)		-0.029*** (0.002)	-0.027*** (0.003)	-0.027*** (0.003)		-0.028*** (0.002)	-0.026*** (0.003)	-0.026*** (0.003)
Education 15+ (LEDU)		0.054*** (0.003)	0.065*** (0.004)	0.061*** (0.004)		0.055*** (0.003)	0.065*** (0.004)	0.063*** (0.004)
Educational equality (EDUQ)			-0.018*** (0.002)				-0.017*** (0.002)	
Health equality (HQ)				-0.011*** (0.002)				-0.011*** (0.004)
Constant	0.816*** (0.003)	0.924*** (0.020)	0.886*** (0.023)	0.898*** (0.022)	0.817*** (0.004)	0.911*** (0.020)	0.874*** (0.022)	0.884*** (0.022)
Observations	23,630	11,534	10,552	10,552	24,084	11,444	10,462	11,331
Countries	178	133	133	133	178	133	133	133
Adjusted R <sup>2</sup>	0.905	0.937	0.939	0.938	0.905	0.937	0.938	0.935
Wald statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Note: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. Robust standard errors are in parentheses. Educational (EDUQ) and health (HQ) variables have been estimated in separate models and not together.

education level in a particular year. Education and health literature have used these two variables together in a study widely (see for example, Nguyen-Grozavu et al., 2020; Kim et al., 2018; and Blanden and Machin, 2004).

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. As stated in Coppedge et al., (2021) “poor-quality healthcare can make citizens unable to exercise their basic rights as adult citizens by failing to adequately treat preventable and treatable illnesses that render them unable to work, participate in social or political organizations, or vote (where voting is allowed)”. Mauro (1998) study claims that corrupt government spends less on education and health where it is difficult maintain secrecy due to high level of transparency.

All the control variables are obtained from the V-Dem dataset for economic variables. Most of the control variables are available from 1800 onwards. Hence, 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 historical V-Dem data in the economic literature. The descriptive statistics, correlation coefficients and the list of countries under study are reported in Appendix Tables A1, A2 and A3, respectively. Table A2 displays that the correlation coefficients between education and education equality and education and health equality are 0.526 and 0.537, respectively, which surmounts the multicollinearity concerns and the risk of spurious regression.<sup>5</sup> As the correlation coefficient between education equality and health equality is high (0.731), hence, we use either educational or health variable separately, not putting together in a model.

### 3.2. Model

The interaction term is estimated to capture the effect of political,

<sup>5</sup> The first step to check the multicollinearity of the explanatory variables in a multiple regression model is the correlation coefficient and if it is below the threshold point (say 0.8), there is no risk of spurious regression.

and economic and financial crises on corruption in the presence of a variety of institutional quality. The interaction effect between political (economic and financial) crises 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 (term) 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:

$$CORR_{it} = \alpha_0 + \alpha_1 PolC(E\&FC)_{it} + \alpha_2 RL_{it} + \alpha_3 PolC(E\&FC) * RL_{it} + \alpha_4 LRGDPPC_{it} + \alpha_5 LEDU_{it} + \alpha_6 EDUQ_{it}(HQ_{it}) + \epsilon_{it} \tag{1}$$

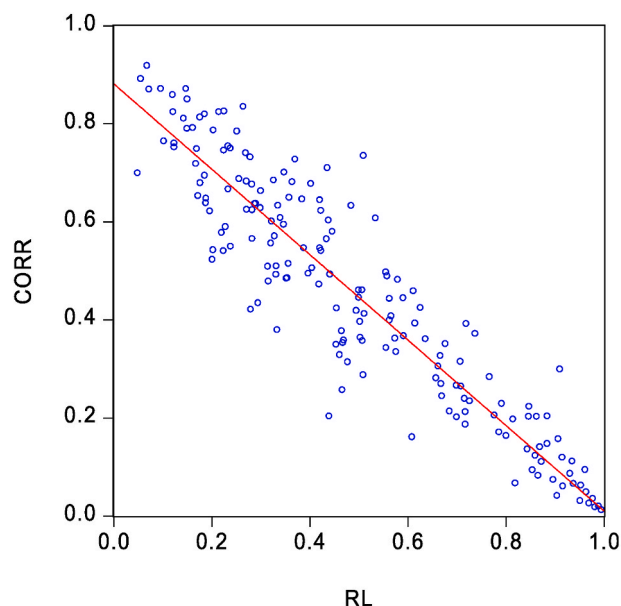
where CORR is corruption; PolC is political crisis; E&FC is economic and financial crises; RL is the rule of law, a measure of institutional quality; LRGDPPC is logarithm of real GDP per capita as a measure of economic growth; EDU is education variable; EDUQ is educational equality; HQ is health equality;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

The coefficient  $\alpha_3$  and its sign and significance level are of interest, which captures the joint effect of political (economic and financial) crises 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:

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

Equation (2) is the marginal impact of political (economic and financial) crises 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) crises yields a smaller increase in corruption as the degree of institutional quality expands.<sup>6</sup> Alternatively, an increase in political (economic and financial) crises lowers corruption when countries have strong institutions. Moreover, Equation (2) represents our hypothesis that the impact of political crises/economic and financial crises on

<sup>6</sup> The V-Dem corruption index value ranges from zero to one, with a higher value indicating a higher level of corruption.



Note: CORR and RL denote corruption and rule of law, respectively.

Fig. 1. Relationship between corruption and rule of law: average 1800–2020  
Note: CORR and RL denote corruption and rule of law, respectively.

corruption is less in societies with strong institutions.

Various studies, mainly in political science, have shown that crises 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 reveal 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 bribes and public officials misuse sensitive information about crisis victims and extract more bribes 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,  $\alpha_1$  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 firm rule of law, where the probability of being caught acting corruptly is high, is shown to be crucial for controlling corruption. We expect  $\alpha_2$  to be negative.

For the control variables, both  $\alpha_4$  and  $\alpha_5$  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 crises 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. However, the level of education may increase the level of corruption because with a higher level of education, corrupt activities can be performed more efficiently and in a secret manner (Saha and Gounder, 2013), which may lead to positive coefficient for the education variable.

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). The higher income inequality in a country can reflect higher education and health inequality as well. Also, Mauro (1998) finds that a corrupt government invests less in health and education. As more equality lowers corruption, the sign of the coefficients is expected to be

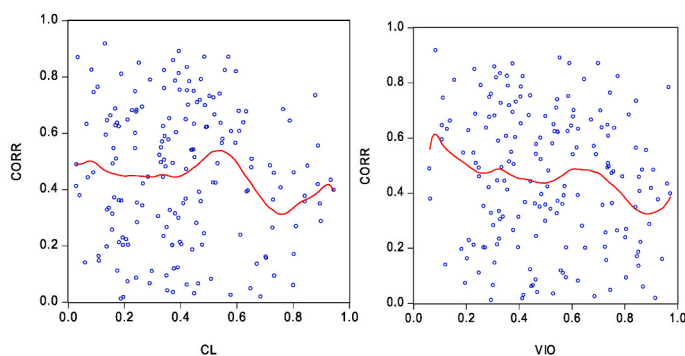
negative. To overcome the multicollinearity problem, we have used natural logarithm of GDP per capita and education variables. The correlation coefficient between education and health equality is 0.91, indicating these two equality variables are highly correlated. Hence, we have also taken the natural logarithm of both education and health equality variables but due to the negative values of many observations, it generates quite a significant amount of missing data. Although we did not report the results, the results are very similar. However, we have estimated education and health equality in separate model and reported the results in Table 1.

### 3.3. Methodology

The proposed hypothesis is tested using a panel estimation technique for over 100 countries during 1800–2020. Although the V-Dem dataset is available from 1789, however, many variables are missing towards the early years and not all data for the study are available for the beginning years. 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.<sup>7</sup> A panel fixed-effect model is employed to identify the country- and time-specific differences in the corruption–crisis relationship. Fixed effects model is advantageous because it removes omitted variable bias by including dummy variables for the missing or unknown characteristics to measure changes within groups across time. Next, a Hausman test is performed to verify the results of fixed effect by comparing the parameters' variances 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  $v_{it} = u_i + \varepsilon_{it}$ , where  $u_i$  is the time-invariant random individual effect in addition to error term  $\varepsilon_{it}$  denotes all other missing elements (Baltagi, 2008; Basu et al., 2019). Moreover, in both random- and fixed-effect models, by assuming 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, many of the variables in equation (1) are likely to be endogenous. For example, a weak institution is conducive to corruption, however, corruption itself can hinder institutional development. Likewise, political instability or crisis may enhance incentives for corruption, but corruption may itself prompt public protests, challenges to the incumbent regime, even external invasion — in short, political instability (Treisman, 2000). Hence, political crises may increase corruption, and pervasive corruption can create an environment to escalate political crises. Finally, a low level of economic development can contribute to corruption, although it is a well-known fact that corruption is a growth inhibitor. Hence, the problem of endogeneity (among the rule of law, economic development, crises, and corruption) can render biased estimates and can cause the error terms to be correlated with dependent variable(s). According to Wooldridge (2002), two-stage-least-squares estimator (TSLS) is less efficient than OLS if the explanatory variables are exogenous. The Hausman test for endogeneity of the explanatory variables is estimated by obtaining the residuals from the first-stage (reduced form) regression. Hence, testing for endogeneity of the explanatory variables is vital to find out if two-stage-least-squares is necessary. Following Hausman (1978) the endogeneity test is conducted to see if the estimates of the OLS and TSLS are practically different. This is to note here that we have tested the endogeneity of each of the independent variables and the results show that as expected income per

<sup>7</sup> The results for the period 1900–2020 are not reported here, but available upon request from authors.



Note: CORR is corruption and CL and VIO denote physical violence and political civil liberties indices, respectively.

Fig. 2. Relationship between corruption and political crisis: average 1800–2020 Note: CORR is corruption and CL and VIO denote physical violence and political civil liberties indices, respectively.

capita, rule of law and the political crisis variables are endogenous.<sup>8</sup> The standard technique to overcome endogeneity problem is two-stage-least-squares using instrumental variables (Wooldridge, 2002, 2006). This, however, requires the identification of suitable instruments. A good instrumental variable should be highly correlated with the endogenous independent variable and should not directly influence the dependent variable. In other words, instrumental variables may affect economic development, institution or crises but not be affected by corruption.

It is a well-known fact that finding reasonable instrument/s is a difficult task. Following Saha and Gounder (2013), we use life expectancy as an instrument for economic development. The raw data confirms that the correlation coefficients between life expectancy and log (GDPPC) and life expectancy corruption are 0.780 and  $-0.238$ , respectively. In addition, following Savoia et al. (2022), the instrument used for the rule of law is judicial constraints on the executive (JUCON) from the V-Dem dataset. The ‘judicial constraints on the executive’ index measures ‘To what extent does the executive respect the constitution and comply with court rulings, and to what extent is the judiciary able to act in an independent fashion?’ The JUCON variable may affect corruption via the rule of law. The correlation coefficients between CORR and JUCON and RL and JUCON are 0.008 and 0.1, respectively.<sup>9</sup> We also use 5–10 years lag of the political crises variables as instruments as lagged explanatory variables are widely used in economic and political science literature as instrumental variables (IVs) to address endogeneity concerns in observational data (Bellemare et al., 2017; Reed, 2015).<sup>10</sup> Furthermore, as the interaction term between RL and political crisis is generated through the multiplication of the two variables, hence, it is difficult to find a suitable dummy for the interaction term. However, following the literature lagged interaction terms have been used as instruments. All the regressions are estimated after controlling for the heteroscedasticity with robust standard errors and that can confirm the efficient estimators from TSLS.

Finally, level of economic development can play vital role in controlling the extent of the crises that can affect both institutional quality

<sup>8</sup> The results of the endogeneity tests are not reported here, however, available upon request from the authors.

<sup>9</sup> The correlation results are not reported here but available upon request from authors.

<sup>10</sup> Usually, crisis does not happen on a regular basis, and previous crisis may have an impact on the current crisis. Past crisis can affect corruption via the current crisis. Hence, mostly 5–10 years lags of political crisis have been used as instruments.

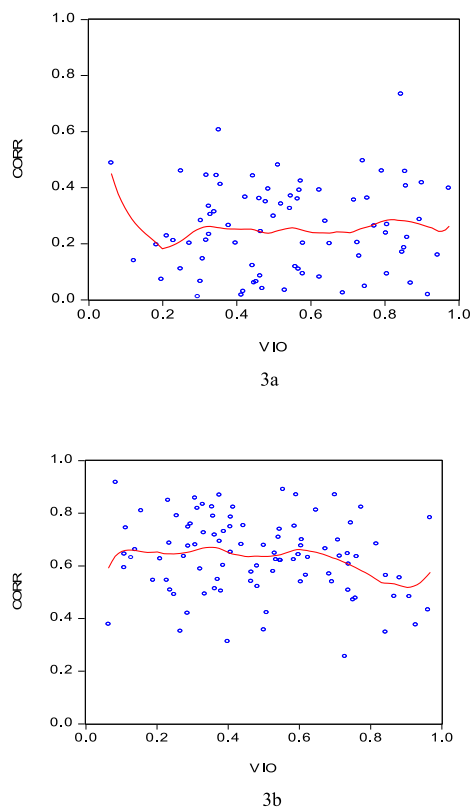
and corruption. Hence, we disaggregate the total sample for the economically advanced countries and examine if the impact of crises and the rule of law on corruption differ due to the level of development.

#### 4. Empirical analysis

We examine both political crises and economic and financial crises and their relationship with corruption. We start our investigation with the scatter plots of the relationships between corruption and the rule of law and corruption with the political crisis variables (as economic and financial crises variables are mostly the dummy variables). The scatter plots depicting the relationship between average level of corruption and the rule of law for the countries under study indicates that a firm rule of law lowers corruption (Fig. 1). In other words, a stronger institution is correlated with low corruption level. For example, the average value of the 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).

However, Fig. 2 shows some mixed relationship between political crises and corruption for both the variables, namely, violation of civil liberties (CL) and physical violence index (VIO). The Kernel Density Estimations represented by the Kernel fit lines illustrate the non-monotonic relationships. The greater the political crisis in terms physical political violence and the violation of civil liberties, the higher the level of corruption in some countries, whereas opposite relationship exists in other countries. 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 corruption countries, such as Austria and Netherland, is quite low. The result corroborates the prevalent argument in the political science literature that political crisis structures the opportunities for corruption (e.g., Flynn, 2007; Johnston, 1986). However, country like Benin shows low political crises but a higher level of corruption and Botswana experiences low level of crises despite high political violence. Hence, there may be some other factor that can play a crucial role in the political crisis and corruption relationship.

To categorise the non-monotonic relationship, it is imperative to explore the interaction effect of crises and the rule of law to identify if a strong institutional quality can mitigate the adverse effect generated from the crises. Fig. 3 shows the scatter plots of political crises 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



Note: CORR and VIO denote corruption and physical violence indices, respectively.

**Fig. 3.** a: Corruption and political violence relationship when rule of law is above average:1800–2020, b: Corruption and political violence relationship when rule of law is below average:1800–2020 Note: CORR and VIO denote corruption and physical violence indices, respectively.

political crises is much lower in countries with strong institutional quality than in those with weak institutions.<sup>11</sup> 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.

#### 4.1. Regression results

##### 4.1.1. Political crises

A potential source of concern is the existence of omitted variable bias and to resolve the issue a two-way fixed effect model is employed which incorporates the changes within group over time by including the dummy variable for the unknown attributes. The estimated regression coefficients using two-way fixed effects for the base model (equation (1)) are reported in Table 1. The FE regression results without controls and using VIO as political crisis measure show that the rule of law and political violence coefficients are negative and positive, respectively and both the coefficients are highly significant (column 1). The results suggest that a strong institution lowers corruption significantly. The result is consistent with Lederman et al. (2005) which argues that the role of political institutions is important in reducing corruption as their study find democracies, parliamentary systems, political stability, and freedom of the 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

<sup>11</sup> Similar results are also found for the period 1900–2020, although not reported here.

for the perceived legitimacy of the police and courts. The interaction term is negative but insignificant. However, the results with control variables show the negative and significant interaction coefficient indicating that the adverse impact of political crisis on corruption decreases as the institutional quality of a country increases. In other words, the positive effect of political crisis on corruption gets diluted as the level of institutional quality expands. With strong institutions, 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 the rule of law (RL) of 0.494 is 0.031, which is significant, suggesting that a one standard deviation point increase in VIO increases corruption by 0.031 points at the mean RL index, which is lower than the individual effect (0.039) of VIO on corruption (column 2, Table 1). The impact of VIO on corruption illustrates some mixed effects. If institutional quality in a country is weak, then more political violence is associated with higher corruption. Alternatively, the effect of VIO on corruption is less positive as the level of institutional quality expands. Likewise, the interaction effect of the violation of civil liberties (CL) and RL confirmed the similar effect on corruption (columns 5–8). If a country has low quality of institution, then more violation of civil liberties is corruption enhancing. These results confirm our hypothesis that the impact of political crises on corruption is less in societies with strong institutions as political violence and violation of civil liberties are 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 effects results for both with and without control variables substantiate that political crisis is corruption-enhancing with weak institutions. In addition, the magnitude of the coefficient of the interaction term amplifies after including the control variables. All the control variables display the expected signs, such as higher income per capita reduces the level of corruption, which is consistent with Saha and Gounder (2013). However, educational attainment shows a higher level of education is corruption-enhancing which supports our argument that a higher educational attainment can encourage engagement with corrupt activities in a more secret and efficient manner without being caught. Also, this result is similar to what has found in Saha and Gounder (2013) and Saha et al. (2009). In contrast, the coefficient of educational equality is negative and significant suggesting that education equality significantly combats corruption. This finding is consistent with the idea that corruption is costly due to its illegality and there is a need for secrecy (Shleifer and Vishny, 1993). If majority of the population receives a high quality of education, then it is difficult to keep the corruption activities secret. Moreover, the rent from the corrupt behaviour decreases due to the transitional shift from ‘joint monopoly’ to ‘individual monopoly’ where instead of cooperating each other to make corruption activities secret, education provides everyone the ability to exercise their own skill to make it secret and the cooperation is no longer needed.

Likewise, health equality controls corruption in a country significantly.<sup>12</sup> The coefficients of control variables are expected in signs and remain significant in most of the regressions including robustness check (Table 1, columns 3–4 and 7–8).

##### 4.1.1.1. Robustness check

**4.1.1.1.1. Two-stage least square.** As discussed earlier, judicial constraints on the executive (JUCON), life expectancy and 5–10 years of lagged political crises variables have been used as instruments for rule of law, economic development and political crises to estimate two-stage least square regressions. The results show that judicial constraints on the executive (JUCON), life expectancy and 5–10 years lagged of

<sup>12</sup> To note here that as education and health equality are highly correlated (correlation coefficient 0.73), we estimate each equality in a separate model and the results of the interaction term remain the same including the significance level.



**Table 2**

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

	Two-stage least square			
	(1)	(2)	(3)	(4)
Rule of Law (RL)	−0.085 (0.172)	−0.917*** (0.117)	−0.231*** (0.069)	−0.864*** (0.101)
Physical violence (VIO)	1.664*** (0.185)	0.870*** (0.257)		
Political civil liberties (CL)			1.691*** (0.121)	0.878*** (0.225)
VIO*RL	−1.955*** (0.262)	−0.753*** (0.279)		
CL*RL			−2.008** (0.156)	−0.853*** (0.254)
LRGDPPC		0.132*** (0.043)		0.115*** (0.036)
LEDU		0.071*** (0.009)		0.058*** (0.008)
EDUQ		−0.009** (0.005)		−0.009** (0.008)
Constant	0.177 (0.110)	−0.492 (0.411)	0.286*** (0.048)	−0.316 (0.318)
Observations	11,666	9564	11,552	9468
Adjusted R <sup>2</sup>	0.545	0.747	0.498	0.768
No of instruments	6	6	6	6
Wald statistics (p-value)	0.000	0.000	0.000	0.000

Note: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. Robust standard errors are in parentheses.

political crises variables are good predictors of the rule of law, economic development and political crises and confirm the results of two-way fixed effect estimates that joint effects of political crises and institutional quality are corruption-controlling (Table 2, columns 1–4).<sup>13</sup> Also, to report here that the OLS and TSLS coefficients of the endogenous variables (such as RL, CL, and LRGDPPC) are significantly different. The Hausman test results for the endogeneity of the explanatory variables confirm that RL, CL and LRGDPPC are endogenous (see Table A5). The results of the first-stage regression with economic development, rule of law and political crisis as dependent variables regressed on the selected instruments and control variables are shown in appendix Table A4. The coefficients of the instruments are significant and show expected signs suggesting that judicial constraints on the executives, life expectancy and past crisis boost economic development, the rule of law and the current political crisis, respectively. This finding is robust and provides strong evidence that past crises, judicial constraints and life expectancy (as proxy for economic development) increase corruption via the current crises, rule of law and economic development, respectively.<sup>14</sup> Also, the *F*-statistic on the first stage regressions (in Table A4) range from 134.51 to 421.06, suggesting that the instruments are strong (see Wooldridge, 2002). We have also run the second stage regression by using the fitted value of the first stage regressions of endogenous variables replacing the actual endogenous variables. The results are consistent to the two-stage regression reported in Table 2.<sup>15</sup>

4.1.1.1.2. *Alternative political crises measures.* Democracy breakdown, coups, armed conflict and civil war are estimated as alternative measures of political crises. Interestingly, the individual effects of democracy breakdown, coups, armed conflict and civil war are not

<sup>13</sup> As the coefficients of life expectancy, judicial constraints and lag political violence are all expected in signs and highly significant in the first-step regression with the endogenous variables as the dependent variables.

<sup>14</sup> The first stage regressions in Table A4 incorporating 10-year lag of political crisis also show the similar results. Also, regressing health equality separately as control variable provides the similar results, not reported here. The results are available from authors upon request.

<sup>15</sup> The results of the second stage regression are not reported here, available upon request from the authors.

**Table 3**

The effects of political crisis, rule of law and their interactions on corruption during 1800–2020: Period fixed effect.

	(1)	(2)	(3)	(4)
Rule of Law (RL)	−0.593*** (0.007)	−0.513*** (0.007)	−0.553*** (0.008)	−0.532*** (0.007)
Democracy breakdown (Dbreak)	−0.030*** (0.003)			
Coups (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*** (0.019)	0.795*** (0.021)	0.799*** (0.021)	0.836*** (0.023)
Observations	9380	8397	9380	8094
Countries	133	132	133	131
Adjusted R <sup>2</sup>	0.944	0.944	0.944	0.952
Wald statistics (p-value)	0.000	0.000	0.000	0.000

Note: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. All regressions include control variables, however not reported here. Robust standard errors are in parentheses.

**Table 4**

Marginal effect of political crisis on corruption on different levels of rule of law: Two-way fixed effect.

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: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. Robust standard errors are in parentheses.

corruption-enhancing (Table 3). However, the interaction effects show that institutions do not work efficiently in controlling corruption in such situations, even a coup or democracy breakdown can end the democratic process and increase corruption (Maeda, 2010). Furthermore, Besaw et al. (2019) argue that coup events continue to have further adverse effect on institutional democratic norms, worsen civil conflict, trigger political violence, and reverse economic development and growth. Hence, broken institutions along with democratic breakdown can increase corruption quite significantly (Table 3, column 1).

4.1.1.1.3. *Marginal effect of political crises.* This subsection provides more rigorous analysis for the interaction effects between political crises and institution on corruption. The above findings show that a greater political or civil violence does not foster corruption if a country has strong institutions where the rule of law works efficiently to counteract the violence and controls corruption. Oppositely, weak institutions boost the corruption level in the presence of political violence. To interpret the impacts of political crises and the rule of law on corruption, the marginal effects are estimated based on equation (2) and rewritten as:

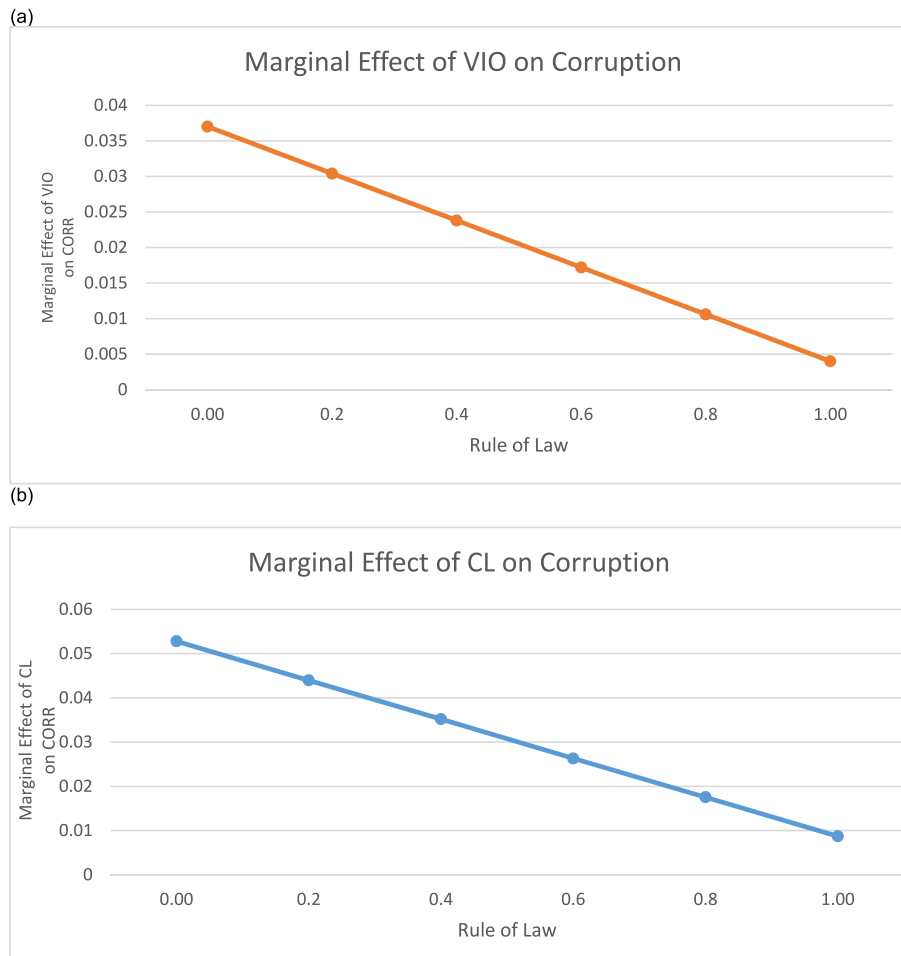


Fig. 4. Marginal effect of (a) VIO and (b) CL on corruption, 1800–2020 Source: authors’ compilation based on the V-Dem dataset.

Table 5

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

	Two-way fixed effects					
	(1)	(2)	(3)	(4)	(5)	(6)
Rule of Law (RL)	−0.493*** (0.037)	−0.592*** (0.012)	−0.524*** (0.016)	−0.534*** (0.015)	−0.535*** (0.014)	−0.538*** (0.015)
Negative growth rate (NGDPg)	0.028 (0.025)					
Economic shocks and slumps (ES)		0.002 (0.005)				
Banking crisis (BC)			0.058*** (0.011)			
Currency crisis (CC)				0.011 (0.009)		
Inflation crisis (IC)					0.002 (0.009)	
Debt crisis (DC)						−0.040*** (0.009)
NGDPg*RL	−0.103*** (0.038)					
ES*RL		−0.008 (0.006)				
BC*RL			−0.077*** (0.014)			
CC*RL				0.001 (0.010)		
IC*RL					0.016 (0.011)	
DC*RL						0.051*** (0.015)
LRGDPPC	−0.027*** (0.003)	−0.027*** (0.003)	−0.025*** (0.003)	−0.025*** (0.003)	−0.024*** (0.003)	−0.026*** (0.003)
LEDU	0.063*** (0.004)	0.063*** (0.003)	0.066*** (0.004)	0.070*** (0.004)	0.070*** (0.004)	0.070*** (0.004)
EDUQ	−0.017*** (0.002)	−0.017*** (0.002)	−0.014*** (0.002)	−0.014*** (0.001)	−0.014*** (0.001)	−0.013*** (0.002)
Constant	0.878*** (0.038)	0.904*** (0.023)	0.823*** (0.002)	0.814*** (0.027)	0.812*** (0.028)	0.839*** (0.027)
Observations	10,573	10,573	6177	6519	6370	6188
Adjusted R <sup>2</sup>	0.939	0.939	0.951	0.952	0.951	0.950
Wald statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000

Note: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. Robust standard errors are in parentheses.

$$\begin{aligned} \text{CORR}_{it} = & \alpha_0 + \alpha_1 \text{PolC(E\&FC)}_{it} + \alpha_2 \text{RL}_{it} + \alpha_3 \text{PolC(E\&FC)} * (\text{RL}_{it} - \mu_1) \\ & + \alpha_4 \text{LRGDPPC}_{it} + \alpha_5 \text{LEDU}_{it} + \alpha_6 \text{EDUQ}_{it}(\text{HQ}_{it}) + \varepsilon_{it} \end{aligned} \tag{3}$$

where  $\mu_1$  take values from 0 to 1. The coefficient  $\alpha_1$  measures the marginal effect of political crises on corruption when  $\mu_1$  takes the value from 0 to 1 for the rule of law index.<sup>16</sup> The results of the marginal effect of political and civil violence on corruption at various levels (0.00–1.00) of the rule of law using panel two-way fixed effects are reported in Table 4.

For a deeper perspective, we provide the names of the countries to which these levels correspond in Table 4. 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 approaches towards strong institutional quality. The threshold point is where 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 a decreasing magnitude of the coefficient. This suggests that the 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 strong institutions already exist in a country (say Denmark) then political violence can be managed in the process of combating corruption. However, in opposite cases, countries like Yemen and Afghanistan, political crises increase corruption level due to a very weak RL. The similar results are found when CL is used as a political crisis variable. These empirical findings appropriately describe the theoretical conjectures discussed in the introduction.

The marginal effects of VIO (CL) and RL are shown in Fig. 4. The X-axis and Y-axis in Fig. 4 measure the rule of law and the marginal effect of political crises on corruption, respectively. It is clear from the figures that the marginal effect line is downward sloping for both VIO and CL illustrating that the effect of VIO (CL) on corruption level decreases as institutional quality increases.

#### 4.1.2. Economic and financial crises

The estimation results of the effect of economic and financial crises on corruption are reported in Table 5. Six different crises variables are used in the estimation, viz, negative growth, economic shocks, banking crisis, currency crisis, inflation crisis and debt crisis. The individual effect of negative economic growth suggests that negative growth increases corruption if a country faces slowdown or recession, however the result is not significant. Likewise, economic shocks and slumps, inflation and currency crises increase corruption although the effect is not significant. But banking crisis significantly increases corruption. Interestingly, the individual effect of debt crisis lowers corruption significantly. This may be due to the possibility that when a country suffers a debt crisis, resources may not be available for rent-seeking purposes as debtors may impose strict conditionalities on the use of fiscal resources. On the other hand, the interaction effects between economic and financial crises and the rule of law suggest that strong institutions can control the level of corruption in case of negative economic growth and banking crisis but for the prolonged economic slumps, strong institutions work but the effect is not significant. However, inflation and debt crises do not have much impact on corruption. Evidence from the Global Financial Crisis in the West in 2008 suggests that strong institutions in the USA and the UK are able to control the level of corruption by implementing the banking and financial institution reforms put in place. But, for debt crises, existing institutions might not be effective to control the level of corruption, rather using weak institutions political leaders might extract rents (or, money laundering) as much as possible leading to an increase in the level of corruption. The evidence

**Table 6**

Marginal effect of economic and financial crisis on corruption on different levels of rule of law: Two-way fixed effect.

RL	Country	NGDPg	BC	DC
0.00	Yemen	0.028 (0.025)	0.058*** (0.011)	-0.040*** (0.009)
0.2	Bahrain	0.007 (0.019)	0.042*** (0.008)	-0.030*** (0.007)
0.4	Afganistan	-0.013 (0.015)	0.027*** (0.006)	-0.020*** (0.005)
0.6	Greece	-0.034** (0.015)	0.011*** (0.003)	-0.010* (0.005)
0.8	India	-0.055*** (0.017)	-0.004 (0.003)	0.001 (0.007)
1.00	Denmark	-0.075*** (0.022)	-0.019*** (0.005)	0.011 (0.009)

Note: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. Robust standard errors are in parentheses.

**Table 7**

Relationship between dependent and independent variables: Expected and actual signs.

Dependent variable: corruption	Expected sign	Regression results
Political crisis	Positive	Positive
Economic and financial crisis	Positive	Positive/ Negative
Rule of law	Negative	Negative
Political crisis* rule of law	Negative	Negative
Economic and financial crisis* rule of law	Negative	Negative/ Positive
Log GDP per capita	Negative	Negative
Education attainment	Negative/ positive	Positive
Education equality	Negative	Negative
Health equality	Negative	Negative

from Greece supports our findings. Featherstone (2011) and Koulovianios and Tsoukalas (2015) argue that corruption in Greek politics imposes constraints on domestic reform which oppose the Eurozone summit deal as the heavy debt servicing led parties to invent extreme ways to respond to super-austerity and to strongly oppose direct reforms that challenge existing clientelism. Overall, for economic and financial crises, institutions can be efficient in combating corruption for negative economic growth and banking crisis.

The marginal effect of economic and financial crises shows some heterogeneous effects (Table 6). The effect of negative economic growth on corruption at various levels of the rule of law demonstrates that RL lowers corruption significantly once past the threshold point (i.e., between 0.2 and 0.4). However, the marginal effect of banking crisis illustrates that BC increases corruption significantly except at a very higher level of RL (Table 6). Also, it is important to note that the effect of BC in raising the corruption level becomes feeble as the level of RL increases, with a shrinking magnitude of the coefficient indicating that the rule of law is an antidote for corruption, but only at a specific environment. However, the rule of law is not effective in combating corruption when a crisis is generated from a debt default. As discussed earlier, for debt crisis, there is a strong demand for economic reform, which is more challenging if the political system is heavily corrupted. The current Sri Lankan economic and related debt crisis is a fine example of it.

#### 4.1.3. Period robustness check

This is to note here that, the number of observations has decreased significantly when control variables are incorporated due to the 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, economic and financial crises are

<sup>16</sup> For details see Wooldridge (2006, pp. 204–206).

**Table 8**

The effects of political and economic and financial crisis, rule of law and their interactions on corruption: OECD countries.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rule of Law (RL)	-0.503*** (0.026)	-0.555*** (0.025)	-0.609*** (0.080)	-0.608*** (0.023)	-0.570*** (0.026)	-0.601*** (0.030)	-0.602*** (0.013)	-0.557*** (0.027)
Physical violence (VIO)	0.203*** (0.035)							
Political civil liberties (CL)		0.114*** (0.036)						
VIO*RL	-0.222** (0.037)							
CL*RL		-0.135** (0.039)						
Negative growth rate (NGDPg)			-0.022 (0.064)					
Economic shocks/slumps (ES)				-0.008 (0.038)				
Banking crisis (BC)					0.014 (0.015)			
Currency crisis (CC)						-0.009 (0.014)		
Inflation crisis (IC)							-0.012 (0.018)	
Debt crisis (DC)								0.037*** (0.011)
GDPg*RL			-0.007 (0.074)					
ES*RL				0.011 (0.041)				
BC*RL					0.001 (0.016)			
CC*RL						0.022 (0.016)		
IC*RL							0.035* (0.021)	
DC*RL								-0.027** (0.016)
Constant	0.535*** (0.032)	0.589*** (0.026)	0.668*** (0.068)	0.615*** (0.021)	0.541*** (0.027)	0.585*** (0.024)	0.541*** (0.025)	0.506*** (0.028)
Observations	3482	3473	3540	3490	2933	3194	3051	2900
Countries	34	34	34	34	32	32	32	32
Adjusted R <sup>2</sup>	0.929	0.928	0.929	0.930	0.937	0.937	0.932	0.942
Wald statistics (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fixed effect	Both	Both	Both	Both	Period	Both	Both	Both

Note: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. Robust standard errors are in parentheses. All regressions include control variables, however not reported here.

less in enhancing corruption with strong institutional quality. However, the results are not reported here due to the space<sup>17</sup> Finally, the overall results of political crisis on corruption including the control variables are consistent with our expectations based on the literature. However, economic and financial crisis illustrates some exceptions (see Table 7).

4.1.4. Crises and corruption in OECD countries

Economic development can play crucial role on the impact of the extent of the crisis. To explore this possibility, we disaggregate the sample for the Organisation for Economic Co-operation and Development (OECD) countries which are regarded as the advanced economies in terms of economic development. The estimation results show that, although VIO and CL significantly increase the level of corruption, however, the presence of strong institutional quality can mitigate the adverse effect of political crises and the results are similar to the all-country case (columns 1 and 2, Table 8). However, the magnitude of the coefficients is much larger compared to all-country case demonstrating that the strong and advanced institutions in OECD countries can control corruption in a greater and efficient way during political and civil violence. The result is consistent with Kar et al. (2019), which find that institutional quality is a profound determinant of economic growth.

However, except in the case of a debt crisis, the individual effect of economic and financial crises on corruption shows an insignificant

effect. As discussed earlier, the corruption level has increased significantly during the debt crisis in Greece in 2010. However, as opposed to the all-country case, a strong institution can deter corruption in advanced countries (see column 8, Table 8). The results suggest that strong institutions matter for combatting corruption emanating from political and debt crises. Evidence from advanced countries further supports our hypothesis that strong institutional quality can act as a mechanism for corruption control.

5. Conclusion

A substantial literature exists on the effect of political crisis on growth. However, there is scant literature on how institutions and economic and political crises can jointly affect corruption. This study examines the effect of political, economic and financial crises on corruption and if institutional quality can influence the crises-corruption relationship. A long historical panel dataset over one hundred countries for the period 1800–2020 is used to examine the relationship. We estimate the association between political, economic and financial crises and corruption using various panel estimation techniques, including two-way fixed effects and two-stage least squares. Different measures of political, economic and financial crises are employed. Our results reveal some heterogeneous effect of institutions on corruption during crises. The level of impact varies depending on the type of crises. The finding suggests that on average, the effect of political crises in terms of political and civil violence on corruption is less harmful in countries with strong

<sup>17</sup> The results are available upon request from the authors.

institutions. However, institutions become weak during political crises like democracy breakdowns, coups, armed conflict and civil war, and it has less or no effect in controlling corruption.

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

This study examines the effect of political, economic and financial crises on corruption empirically and the data analysis has been performed based on the data availability. For future research, it is possible to model theoretically how each crisis influence corruption and their channels more explicitly. Such an analysis can enable us to understand the specific mechanisms by which institutions mediate the effect of

crises on corruption and why we see heterogeneity in the role of institutions in combating corruption.

The findings have important policy implications for the control of corruption when countries are experiencing large scale political and economic crises. While such crises are likely to increase corruption, strong legal 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 on economic development, it is important to prioritise the strengthening of legal institutions such as strong, accountable, and independent judicial systems, rigorous and impartial public administration, and transparent laws with predictable enforcement.

**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
Std. Dev.	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

**Table A2**  
Correlation coefficients

	CORR	VIO	CL	RL	LRGDPPC	LEDU	EDUEQ	HQ
CORR	1.000							
VIO	-0.096	1.000						
CL	-0.016	0.790	1.000					
RL	-0.907	0.068	-0.017	1.000				
LRGDPPC	-0.508	0.049	0.025	0.557	1.000			
LEDU	-0.323	0.015	-0.028	0.393	0.743	1.000		
EDUEQ	-0.544	0.080	-0.010	0.549	0.661	0.526	1.000	
HQ	-0.582	0.128	0.040	0.605	0.605	0.537	0.731	1.000

**Table A3**  
List of 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
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Table A4

First-stage regression results with two-way fixed effects

	Dependent variable: LRGDPPC		Dependent variable: RULE		Dependent variable: Political crisis	
Judicial constraints on the executive (JUCON)	0.182*** (0.012)	0.170*** (0.011)	0.021*** (0.006)	0.017*** (0.006)	0.009 (0.006)	0.013* (0.008)
VIO (-5)	-0.034** (0.013)		-0.041*** (0.004)		0.654*** (0.013)	
CL (-5)		-0.062*** (0.016)		-0.042*** (0.005)		0.647*** (0.016)
Life expectancy	0.013*** (0.001)	0.013*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)
LEDU	-0.313*** (0.018)	-0.312*** (0.018)	-0.044*** (0.001)	-0.046*** (0.003)	0.009* (0.003)	0.016*** (0.004)
EDUQ	0.069** (0.007)	0.067*** (0.007)	0.034*** (0.001)	0.033*** (0.001) (0.001)	0.010*** (0.003)	0.006*** (0.002)
Constant	8.025** (0.050)	8.054*** (0.052)	0.481*** (0.019)	0.507*** (0.019)	0.229*** (0.017)	0.248*** (0.018)
Observations	9515	9423	11,498	11,431	11,491	11,327
Countries	129	129	133	133	133	133
Adjusted R <sup>2</sup>	0.917	0.917	0.845	0.847	0.777	0.750
F-statistics	420.78	421.06	247.67	248.32	157.56	134.51

Note: \*\*\*, \*\*, \* indicate significance level at the 1%, 5% and 10%, respectively. Robust standard errors are in parentheses. We have also run the above models including the lagged interaction terms and the results are very similar to the above table and not reported here and the results are available from the authors from the authors.

Table A5

Hausman test for endogeneity: The residual coefficient of the endogenous variable from the first-stage regression

	RESLRGDPPC	RESCL	RESRL
t-statistics	-8.578	-3.518	-47.203
p-value	0.000	0.000	0.000

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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