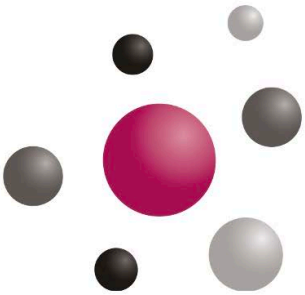

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How Lower Levels of Corruption in Democracies Prevented COVID Deaths

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Abstract

This paper allays concerns that the commitment to protect fundamental rights in democracies has made them less effective in combatting COVID-19 than non-democracies. Our findings show that democracies have prevented more deaths per capita from COVID-19, controlling for other factors, than non-democracies. We demonstrate that the extent of political corruption drives this relationship. All regime types adopted pandemic mitigation measures but in countries with hybrid regimes, and to a lesser extent authoritarian regimes, corruption by government officials and public sector employees undermined mitigation efforts hindering infection control and treatment and thus contributing to deaths. Democracies have the lowest levels of corruption, and this helped them save lives. These conclusions are based on global statistical analyses and three mini-case studies. Theoretically, we advance the study of regime types' impact by demonstrating how policy (non)implementation, not only policymaking, shapes societal outcomes.

The intrinsic benefits of democracy, including government accountability and personal freedoms, are widely acknowledged in most countries. Yet, average citizens, as well as local and global democracy advocates, also seek evidence that democracy results in positive health, economic, environmental, and security outcomes. Such evidence is currently even more in demand because public satisfaction with democracy has reached an all-time low globally, and authoritarian regimes offer foreign democracies and hybrid regimes a tempting alternative model (Foa et al., 2020; Weyland, 2017). At the top of the list of questions about democracy's impact is, does greater democracy prevent deaths from COVID-19? The COVID-19 pandemic is the most tragic *worldwide* event in memory for most everyone alive today, surpassed only by World War II for those old enough to recall living through it. From the outset of the pandemic, public intellectuals and journalists raised concerns that the commitment to protect fundamental rights in democracies could result in the adoption of fewer, less comprehensive mitigation measures than in non-democracies (Berengaut, 2020; Diamond, 2020; Kleinfeld, 2020; Schmemann, 2020; Niblett and Vinjamuri, 2020). Yet, we do not have a compelling answer to the question of democracy's impact because of low-quality data and inadequate causal exploration. Research has found higher death rates in democracies because studies have relied on data that underreported deaths in non-democratic countries. Most studies examining political influences on COVID deaths have only speculated on relationships between the two without offering their own theoretical arguments or providing evidence to support them. This is not surprising considering that this work has primarily been published in business and medical journals. With the pandemic approaching its fifth year, valid death measures are now available, allowing us to assess democracy's impact accurately and to harness not only medical, but also political science, insights to provide a theoretically grounded, empirically supported explanation.

Using the valid data, we show that democracies have prevented more deaths per capita from COVID-19, controlling for other factors, than non-democracies. Unlike other studies, we also distinguish among non-democracies, demonstrating that countries with hybrid regimes, on average, have experienced the greatest number of deaths with authoritarian regimes' death rates falling in between democracies' and hybrid regimes'—a curvilinear relationship. Hybrid regimes are regimes with a mix of democratic and authoritarian elements (Diamond, 2002); on a democracy scale, ranging from no democracy to a high level of democracy, they exhibit a modest level of democracy. Authoritarian regimes have little or no democracy. Our finding about hybrid regimes is important

because they are the most common regime type in the world today. More than half the world's population lives under hybrid regimes.[1]

We demonstrate that the extent of political corruption drives this relationship between level of democracy and COVID deaths. Corruption by government officials and public sector employees undermines government pandemic mitigation efforts hindering infection control and treatment and thus contributing to deaths. All regime types adopted pandemic mitigation measures, but in countries with hybrid regimes, and to a lesser extent authoritarian regimes, political corruption rendered them less effective. Democracies have the lowest levels of corruption, which helped them save lives.

These conclusions are based on global statistical analyses we conducted using pandemic data from the World Health Organization and democracy and corruption data from Varieties of Democracy (V-Dem). Mini-case studies we completed of pandemic mitigation efforts in El Salvador, Indonesia, and South Africa also support our claims.

Our paper makes four empirical and theoretical contributions. Empirically, it provides a more valid answer to the question, "Does democracy, relative to other regime types, prevent deaths from COVID-19?" It also illuminates the impact of the most common regime type, hybrid regimes, on pandemic mitigation. Furthermore, the paper contributes to the body of work about the negative impact of corruption on public health and society in general. Theoretically, our paper advances the debate about the tradeoffs between democracy and non-democracy in combatting the pandemic and more, generally, societal problems. We show that it is important that regimes' impacts on implementation, not only on policymaking, be examined. Different levels of democracy produce different levels of corruption, and corruption can undermine the implementation of even the most effective policies.

Existing Research

Nearly all research on regime types and pandemic deaths has relied on inaccurate death counts, as data validation studies have shown. More valid death data are now available but have yet to be used to analyze this topic rigorously in published work. Other research, sometimes overlapping, has

[1] This statement is based on V-Dem's Regimes of the World indicator and total population data from the World Bank's World Development Indicators (WDI, 2022), available for 174 of 179 V-Dem countries. The Regimes of the World indicator categorizes countries by level of democracy into one of four groups: closed autocracy, electoral autocracy, electoral democracy, and liberal democracy. We combine the middle categories, electoral autocracy and electoral democracy, into our single category of hybrid regimes. In 2019, the countries had a total population of approximately 7.6 billion; approximately 4.7 billion people (62%) lived in hybrid regimes.

examined the impact of corruption on pandemic deaths. These investigations have found positive associations but do not offer detailed theoretical arguments supported with evidence to explain how corruption results in deaths.

Most research on regime types and pandemic deaths erroneously has found that higher levels of democracy were associated with higher death rates (Cepaluni et al., 2021; Chang et al., 2022; Pablos-Mendez et al., 2022; Vadlamannati et al., 2021; Wagschal, 2022). These studies all used confirmed COVID deaths, understandably because that was all that was available at the time. Countries have different standards for attributing deaths to COVID (Leon et al., 2020; Neumayer and Plümper, 2022; WHO, 2022c), which has provided countries leeway to underreport COVID deaths—something non-democracies have taken advantage of. Studies found that, on average, non-democratic governments underreport COVID deaths, thus explaining why initial research found higher death rates in democracies (Annaka, 2021; Cassan and Steenvort, 2021; Neumayer and Plümper, 2022). Leaders of non-democratic regimes have a greater incentive to underreport COVID deaths than leaders of democracies because the legitimacy of non-democratic regimes relies more on their performance. Poor performance can result in mass protests or political elite dissent that can threaten or even end their rule (Hollyer et al., 2015). Because citizens fear death more than infection, there is a greater incentive to underreport mortality (Neumayer and Plümper, 2022). By contrast, leaders of democracies are also legitimized by the procedures that selected them for office, so they have less incentive to misreport performance data, such as pandemic death statistics.

Two studies accounted for the underreporting problem but suffered from other limitations. Cepaluni et al. (2021) ran tests using country-level information about data transparency, but the authors examined pandemic deaths only through April 9, 2020. Because the virus spread disproportionately to democratic countries at the outset of the pandemic,[2] when health officials knew the least about preventing and treating the disease it causes, democracies exhibited higher death rates early on, as Cepaluni et al. found. Later in the pandemic the virus' presence was evenly distributed across regime types. The COVID-19 National Preparedness Collaborators (2022) adjusted for poor reporting quality in their estimates of the infection-fatality ratio, which captures deaths given the infection rate. They found no relationship between democracy and the infection-fatality ratio, though

[2] For example, of the countries which faced COVID earliest, nearly 50 percent were democratic: Of 24 countries that had their first case on or before January 31, 2020, 11 were democracies. Of 60 countries that had their first case on or before February 29, 2020, 25 were democratic. Yet, only 19 percent of countries of the world were democratic. Regime type frequency is calculated from V-Dem's Regimes of the World indicator.

only a linear relationship was tested. Our findings show a curvilinear relationship, with countries with modest levels of democracy exhibiting the highest death rates.

Despite their limitations, the Cepaluni et al. and COVID-19 National Preparedness Collaborators studies made valuable contributions by identifying possible influences on pandemic deaths other than regime type. Moreover, initial studies developed techniques for addressing the geographic spread of the virus and other complications in studying this topic.

Now a more valid measure of COVID-deaths is available. Excess deaths (or "excess mortality") is a measure of both the direct and indirect effects of the pandemic. The measure is defined by the World Health Organization (WHO, 2022a) as "the difference between the total number of deaths that have occurred and the number of deaths that would have been expected in the absence of the pandemic i.e. a no-COVID-19 scenario." A direct death is one attributable to the virus; indirect deaths include deaths due to people with emergencies avoiding hospitals and people skipping routine medical care because they fear becoming infected. Countries have now made efforts to report total deaths, from all causes, for 2020 and 2021, making excess deaths possible to calculate. There is no ambiguity in counting total deaths, as there is in counting COVID deaths (Neumayer and Plümper, 2022). Moreover, evidence suggests that non-democracies have not underreported total deaths to attempt to hide COVID deaths. As Neumayer and Plümper (2022) explain, "This may well be because governments learned too late into the pandemic that total mortality figures can be used to estimate excess mortality which can be employed to check on the accuracy of officially reported Covid-19 mortality." Besides mitigating the problem of underreporting by non-democracies, excess death data has the advantage of capturing both direct and indirect deaths from the pandemic. These data provide a more accurate picture of how effectively governments mitigate the pandemic's human costs.

As far as we can tell, only Jain et al. (2022) have published a study examining the impact of the level of democracy on excess deaths, finding that the higher the level of democracy, the fewer excess deaths. However, their study examines only 78 countries, excluding more than 100 countries due to missing data—likely non-democracies—and tests for only a linear relationship. By contrast, we examine as many as 172, depending on the indicators included in the model, and find a curvilinear relationship.

To explain this relationship, we build on existing research about political corruption and pandemic deaths. The empirical results themselves are not particularly helpful to this investigation because all (Barros et al., 2020; Chaudhry et al., 2020; Farzanegan, 2021; Oki, 2020) but two studies use the less valid COVID death data, understandably because of earlier data limitations. Wang et al.

(2022) calculated their own excess deaths data but examine only 46 countries due to limited data needed for their particular research topic. The COVID-19 National Preparedness Collaborators (2022) adjusted for poor reporting quality in their estimates of the infection-fatality ratio and found no relationship between corruption and pandemic deaths, contributing to the mixed results found in the other published studies. The divergent findings of all the investigations are attributable to the studies' varied geographic coverage, ranging from 46 countries to 177, with small numbers excluding a large portion of countries with high levels of political corruption. The mixed results are also due to varied time coverage, ranging from as early as April 2020 to as late as September 2021, with earlier periods not capturing the spread of the virus to a proportionate number of non-democracies, particularly hybrid regimes, where high corruption levels are typical. Our study's broader geographic and time coverage increases confidence that our findings about corruption are valid.

These other studies speculate about how political corruption impacts pandemic deaths but do not theorize about causal mechanisms or offer evidence for them. This is not surprising considering this work has been published almost exclusively in business and medical journals.[3] Speculations in these works and analysis in other studies that do not focus primarily on corruption, however, do suggest three causal pathways to examine. First, corruption, particularly by public sector officials, may include underreporting of deaths to prevent political instability (Khan et al., 2022). The excess deaths measure we use controls for underreporting, but we also directly test other proxies for underreporting. Logically we find no evidence for this causal pathway once we control for underreporting. Second, prevalent political corruption may reduce public trust in government officials and thus discourage citizen compliance with pandemic mitigation measures, such as masking (Alfano et al., 2022; Chan et al., 2020; Wang et al., 2022). We test for this using two measures of public compliance. We find little support for this pathway. Third, political corruption reduces resources necessary to combat the pandemic and enforcement of mitigation measures (Knutsen and Kolvani, 2022; Vadlamannati et al., 2021; Wang et al., 2022). In other words, government officials and public sector employees do not comply with policies the government adopts to combat the pandemic and instead line their pockets. Our theoretical argument, described in the next section, builds on this third pathway, mentioned in, but not the focus of, other works. Findings from our statistical analyses and mini-case studies support this third pathway.

[3] The topic of corruption, or regime types, and COVID deaths has not been the focus of articles in political science journals, as far as we can tell. (See Appendix Note A1.)

Argument

When government officials and employees use their offices for private gain, they undermine pandemic mitigation efforts, including infection control, treatment, and social assistance. Inadequate infection control, treatment, and social assistance increase deaths. Countries with only modest levels of democracy provide the most opportunities for corruption and thus experience greater numbers of COVID deaths. Countries with no democracy provide fewer opportunities for corruption and thus suffer fewer deaths. Countries with high levels of democracy provide the fewest opportunities for corruption and thus experience the lowest number of deaths.

Governments are central to pandemic mitigation, so it makes sense to examine the impact of one of their key characteristics, how democratic they are. The various levels and members of a government play different roles in mitigation. According to the World Health Organization, for a successful pandemic response, national governments must coordinate "[a]uthorities, experts and response teams" so as "to ensure that all those resources and partners are working effectively together to control the outbreak" ("Managing epidemics," 2018, p. 32, 34). National executives play the central role in coordinating the mitigation efforts (Madhav et al., 2018). The national executive provides direction to authorities at the national level, such as ministers of health and social affairs, and, with the assistance of subordinates, to those at subnational levels, such as governors and mayors. The national executive and the executive's subordinates also coordinate experts, including epidemiologists, logistics professionals, and response teams, comprising public sector employees and non-governmental actors, such as private hospitals and pharmaceutical companies.

To successfully address the pandemic, members of the legislature and judiciary must facilitate and monitor the efforts of the national executive. Even democratic constitutions have typically guaranteed national executives emergency powers prior to the outbreak of crises (Stelzenmüller, 2020). Legislators can further facilitate the work of the executives by approving spending beyond what the emergency powers allow the executive to approve independently. Members of the judiciary can interpret the emergency power articles to give the executive leeway to act effectively. However, the legislatures and judiciaries must also monitor executives' actions (Rose-Ackerman, 1996). Members of legislatures and judiciaries need to ensure executives' actions are focused on preventing illness and saving lives, rather than using emergency powers to consolidate their political positions or reap personal material gains (Edgell et al., 2021).

Implementing the mitigation measures is the responsibility of primarily public sector employees,[4] especially local health department employees, but also the police. The measures include disseminating information about risk and protective steps; conducting infection surveillance; collecting data about interventions; developing, mandating, and enforcing public and personal infection control efforts (e.g., school closures); and administering or organizing the administration of vaccines (Koonin, 2011; Madhav et al., 2018; "Managing epidemics," 2018; Roos and Schnirring, 2007).[5]

Governments that exhibit modest levels of democracy are less successful in mitigating the pandemic than those that are fully democratic or not democratic at all because of high levels of government corruption. It is well established in the literature that modest levels of democracy are associated with high levels of corruption, no democracy is associated with moderate levels of corruption, and democracy is associated with low levels of corruption (Bäck and Hadenius, 2008; Charron and Lapuente, 2010; McMann et al., 2019). This can be visualized as a J-curve with corruption on the y-axis and democracy on the x-axis, each ranging from none to high levels.[6]

Components of democracy impact corruption levels differently. Collectively, they form this inverted curvilinear relationship with corruption (McMann et al., 2019). Judicial and legislative constraints on the executive and the quality of elections diminish corruption the stronger they are—a negative linear relationship (e.g., Adserá, et al., 2003; Ferejohn, 1986; Rose-Ackerman, 1996). The constraints on the executive and high-quality elections hold the executive accountable. Also, the executive finds it more challenging to collaborate with legislators and judiciary members in corruption, which often involves different government offices (Kolstad and Wiig, 2016). By contrast, the mere existence of elections, independent of their quality, boosts corruption—a positive linear relationship (Golden 2003, p. 104; Kapur and Vaisnav, 2011; Mironov and Zhuravskaya, 2016). Holding elections shortens leaders' time horizons and thus encourages them to engage in corrupt acts: even when the leader rigs electoral outcomes, elections are an opportunity for opposition mobilization and can threaten the regime's stability (Knutsen et al., 2017; Magaloni, 2008, p. 728; Schedler, 2015). Moderate levels of freedom of expression and association facilitate corruption, whereas high levels of these freedoms or their absence hinder corruption—inverted curves. Moderate levels of these freedoms

[4] "Public sector employees" excludes elected and appointed officials, such as presidents, ministers, legislators, and judges in our use of the term.

[5] Governments also implement measures to mitigate the economic effects of epidemics, which is not our focus.

[6] A few studies have also found a U-curve where corruption is equally low in countries with high levels of democracy or no democracy. It is important to note that in either case countries with modest levels of democracy have the highest level of corruption and statistically both relationships are the same, having a significant squared term (McMann et al., 2019).

facilitate the hatching of corruption schemes but are not strong enough to serve as accountability mechanisms that prevent them. The absence of these freedoms makes it more difficult to develop corruption schemes, and high levels of these freedoms reduce corruption by helping to hold government officials accountable to the public (McMann et al., 2019). Countries with modest levels of democracy tend to exhibit some or all characteristics that facilitate corruption, such as weaknesses in judicial or legislative constraints, the presence of elections of middling quality, and moderate levels of freedom of expression and association. By contrast, countries with no democracy have weak or no freedoms of expression and association and, in some cases, no elections, so they have fewer characteristics that enable corruption. Democracies, which have strong judicial and legislative constraints, free and fair elections, and abundant free expression and association, have mostly characteristics that deter, rather than facilitate, corruption (McMann et al., 2019). From this scholarship, we hypothesize:

H1: Countries with…

- modest levels of democracy have the highest deaths,
- no democracy have lower deaths,
- high levels of democracy have the lowest deaths

H2: The higher the level of corruption is in a country, the higher is the number of deaths.

Corruption by government officials and public sector employees undermines pandemic mitigation efforts. Ministers in the executive branch and local health department employees have significant opportunities to engage in corruption during pandemics because they are responsible for negotiating contracts for and providing goods essential to infection control, treatment, and social assistance. These goods include personal protective equipment (PPE), such as face masks; emergency transport; hospitals; and food aid. Ministers and local health department employees have opportunities to accept bribes, kickbacks, and other material benefits in exchange for agreeing to contracts with inflated prices or for poor-quality goods. Inflated prices waste government funds and exacerbate shortages of essential goods. Poor quality goods reduce the effectiveness of infection control and treatment efforts. Government officials and public sector employees also sell, rather than publicly distribute these goods, particularly PPE and food, for personal profit. Partners in these

corrupt exchanges then resell the goods at higher prices. Goods do not reach those most in need because they are no longer available for free from the government and distributed through designated channels or they are no longer available at a lower price. Consequently, infection control and treatment efforts are less effective.

Other government officials and public sector employees have fewer opportunities to engage in corruption that hinders pandemic mitigation. Nonetheless, they can also undermine efforts to combat the pandemic. Legislators do not typically negotiate contracts and provide goods, but they can collude with or influence ministers and local health department officials so that they can receive bribes, kickbacks, or other material benefits for contracts with inflated prices for poor-quality goods or they can sell the goods for personal gain. Judges can accept bribes and other material benefits in exchange for dismissing cases against or acquitting ministers, legislators, and local health officials accused of corrupt acts. By not serving as a check on other branches of government, judges facilitate the corruption that undermines infection control and treatment. Public sector employees, such as health department doctors, can pocket money by charging for pandemic services that are supposed to be free. Police officers can accept bribes in exchange for not enforcing stay-at-home orders, undercutting infection control efforts.

Weaker infection control, treatment, and social assistance increase deaths. Poor infection control and inadequate treatment contribute directly to deaths from COVID-19 (Fuller et al., 2021; Guy et al., 2021). Inadequate social assistance can also contribute to deaths from COVID as poor nutrition weakens immunity, making individuals more susceptible to the virus (Zhang et al., 2022). Insufficient social assistance also contributes to excess deaths as inadequate nutrition worsens existing health conditions and increases risks of new ailments (Barazzoni et al., 2022). As infections and deaths increase, medical facilities limit access to health care for other needs. Also, potential patients postpone care for fear of being exposed to the virus at medical facilities (Dang et al., 2022; French et al., 2021). From this discussion, we hypothesize,

H3: The higher the level of executive corruption in a country the higher the number of deaths.

H4: The higher the level of legislative corruption in a country the higher the number of deaths.

H5: The higher the level of judicial corruption in a country the higher the number of deaths.

H6: The higher the level of public sector corruption in a country the higher the number of deaths.

Figure 1 summarizes this argument in the form of causal chains. Countries with modest levels of democracy exhibit weaknesses in particular democratic institutions and practices, as described above. These weaknesses facilitate corruption by members of the executive branch, legislature, and judiciary and public sector employees. These corrupt acts undermine pandemic mitigation efforts, including infection control and treatment. Insufficient infection control and treatment increase deaths. By contrast, the absence or near absence of some democratic political institutions and practices deters corruption and of others facilitates corruption in countries with no democracy resulting in only moderate undermining of mitigation efforts and consequently moderate numbers of deaths. Strong democratic political institutions and practices deter corruption in democracies and thus support mitigation efforts and consequently prevent deaths.

Figure 1. Causal Chains: How Levels of Democracy Impacts COVID Death Rates

Modest Level of Democracy	>>>	Exhibits Weaknesses in Most Democratic Institutions and Practices	>>>	Facilitate Corrupt Acts	>>>	Undermine Pandemic Mitigation Efforts Substantially	>>>	High Number of Deaths
No Democracy	>>>	Exhibits (Near) Absence of Democratic Institutions and Practices	>>>	Facilitates and Deters Corrupt Acts	>>>	Undermine Pandemic Mitigation Efforts Moderately	>>>	Moderate Number of Deaths
High Level of Democracy	>>>	Exhibits Strengths in Democratic Institutions and Practices	>>>	Deter Corrupt Acts	>>>	Supports Pandemic Mitigation Efforts	>>>	Low Number of Deaths

Data and Models

To test our argument, we measure *Excess deaths* using the WHO's country-level estimates of excess deaths associated with the COVID pandemic per 100,000 population for the period 2020-2021 (2022b). For robustness testing, we also use the Institute of Health Metrics and Evaluation (IHME) estimates of excess COVID pandemic mortality per 100,000 population (2022), which measure the same period as the WHO's data.

To measure *Democracy*, we use the Liberal Democracy Index, an interval measure of regime type ranging from no democracy to a high level of democracy from the Varieties of Democracy (V-Dem) dataset (Coppedge et al., 2021a, b, c; Pemstein et al., 2021). The index has values from zero to one.

To measure political corruption, we use multiple indicators from V-Dem. To measure *Corruption*, we use V-Dem's Political Corruption Index. *Executive corruption* measures the extent to which members of the executive branch or their agents routinely exchange favors for bribes, kickbacks, or other material inducements, using V-Dem's Executive bribery and corrupt exchanges indicator. *Legislative corruption* is V-Dem's Legislature corrupt activities indicator, a measure of the extent to which members of the legislature abuse their positions for personal financial gain. For *Judicial corruption*, we use V-Dem's Judicial corruption decision indicator, which captures the extent to which individuals or businesses pay bribes to influence the speed or decisions of the judicial process. For corruption among public sector employees, *Public sector corruption,* we use V-Dem's Public sector corruption index, which measures the frequency of employees exchanging favors for bribes and stealing public funds or other state resources for personal or family use.[7] *Corruption* and *Public sector corruption* are interval measures on a scale of 0 to 1, with higher values indicating higher levels of corruption. Each of the other indicators from V-Dem was originally an interval-scale measure with a possible range of approximately -5 to 5, with higher values indicating a lower level of corruption. To facilitate interpretation and consistency across all corruption measures, our analysis inverted these other indicators so their scales are all in the same direction. Throughout the analyses, we use data from 2019, a one-year lag from the start of our dependent variable measure, for these democracy and corruption indicators.

A variety of other factors besides democracy could potentially influence the number of deaths in a country: the spread of the pandemic, population susceptibility to the pandemic, government

[7] This index averages two V-Dem indicators: *Public sector corrupt exchange and Public sector theft*.

capacity, governments' pandemic mitigation efforts, and population receptiveness to those efforts. Some of these factors are taken into account in the calculation of the *Excess deaths* measure. Indirectly the excess deaths measure captures population susceptibility to the pandemic and government capacity because those conditions are reflected in the pre-pandemic death numbers. For example, a country had an older average population and was poor both before and during the pandemic. Directly the excess deaths measure captures many of these factors because it includes data about them to help estimate all-cause mortality numbers for countries that are missing information. Because of poor reporting capacity, exacerbated by the pandemic, some countries are late or unable to provide all-cause mortality data to the WHO (Knutson et al. 2022, p. 3-4).[8] It is important to note that the WHO does not include any political data, such as level of democracy or corruption, in its calculations of excess deaths ("Excess mortality associated with COVID-19 (April 6, 2022)," 2022).[9] In our analysis, we include indicators similar or, in one case, identical to the WHO's because they are logical controls and their inclusion makes confirming our hypotheses more difficult: we would expect these indicators to have substantial impacts on excess deaths since they or ones similar to them are used in calculating those data. This should eliminate or weaken the impact of democracy and corruption. Finding that levels of democracy and corruption, nonetheless, affect excess deaths, increases confidence in our results. We also conduct numerous analyses to further investigate the effect of the WHO's data estimation methods on our results.

Thus, our analysis includes indicators for the spread of the pandemic, population susceptibility to the pandemic, government capacity, governments' pandemic mitigation efforts, population receptiveness to those efforts, as well as government data transparency. All our statistical models also include variables for geographic regions. Countries could learn from neighbors' experiences in combating the COVID pandemic. Similarly, perceptions of the risk of spread from neighboring countries could influence government actions and thus pandemic deaths. Data concerning governments' COVID mitigation efforts are from 2020. Data for each other measure are from 2019, or the next-most recent year if no data for 2019 are available, so that each measure precedes *Excess deaths* in time. To account for high correlation between indicators, we tested indicators separately first,

[8] Although more countries will have reported all-cause mortality data for prior years as time passes, we opted not to wait for these data because non-democracies may begin underreporting all-cause mortality data as they realize the data can used by others to reveal COVID death numbers.

[9] Our alternative measure from IHME also does not. The excess deaths measure published by *The Economist* does, so we do not test that as an alternative (*The Economist* and Solstad, 2021).

identifying those with the most explanatory power to include in later models. We tested a total of 51 controls. Variable details are available in Appendix Note A2 and Table A1.

Excess deaths and levels of democracy each vary considerably across countries making our research question worthwhile to examine and our hypotheses plausible. Levels of corruption also vary, suggesting that those may explain the relationship between levels of democracy and deaths. Evidence of this variation appears in Appendix Note A3.

Analysis

Statistical analyses support our argument that countries with modest levels of democracy have higher excess deaths per capita, countries with no or little democracy have lower deaths, and countries with high levels of democracy have the lowest. Additional statistical analysis and individual country evidence suggest that our causal explanation about levels of corruption driving the relationship between levels of democracy and numbers of excess deaths is accurate. Our findings show that the higher the level of corruption in a country the higher the excess deaths. High levels of executive, public sector, legislative, and judicial corruption are associated with higher death rates, and individual country evidence shows how different types of corruption undermine mitigation efforts, contributing to more deaths.

Democracy and Excess Deaths

Regression analyses in Table 1 demonstrate that countries with modest levels of democracy have higher excess deaths per capita than countries with high levels of democracy or low or no democracy. In Model 1 the positive coefficient for *Democracy* and negative coefficient for the squared *Democracy* term demonstrate this inverted curvilinear relationship between level of democracy and excess deaths. The coefficients are statistically significant at the .01 level, indicating that there is less than a one percent chance of obtaining the result when no relationship exists.

Table 1. Democracy and Excess Deaths

VARIABLES	(1) Excess Deaths	(2) Excess Deaths – No-Data Countries Excluded	(3) Excess Deaths	(4) Excess Deaths – IHME	(5) Excess Deaths	(6) Excess Deaths	(7) Excess Deaths	(8) Excess Deaths
Democracy	312.081***	388.217**	243.786**	384.957**	218.729**	212.568**	263.012**	236.836**
	[91.509]	[156.466]	[100.595]	[167.839]	[108.789]	[101.745]	[110.803]	[112.216]
Democracy (squared)	-362.836***	-453.516***	-352.788***	-576.494***	-333.010***	-337.062***	-388.862***	-352.170***
	[111.376]	[171.948]	[116.391]	[193.785]	[125.812]	[116.053]	[126.312]	[127.304]
Policy stringency			-0.721**	-0.785*	-0.724**	-0.570*	-1.173***	-0.872***
			[0.284]	[0.474]	[0.291]	[0.297]	[0.376]	[0.314]
Populist party			25.523**	23.799	27.756**	25.181**	22.041*	22.816*
			[11.366]	[18.957]	[11.671]	[11.297]	[12.152]	[12.286]
Respiratory disease			28.176**	51.233***	28.170**	27.863**	26.431**	24.402*
			[11.751]	[19.420]	[12.719]	[11.678]	[12.412]	[12.571]
Tropical climate			-0.597***	-1.332***	-0.536***	-0.576***	-0.599***	-0.584***
			[0.175]	[0.292]	[0.184]	[0.175]	[0.190]	[0.192]
Distance from Beijing			0.010***	0.017***	0.011***	0.010***	0.010***	0.011***
			[0.003]	[0.006]	[0.004]	[0.003]	[0.004]	[0.004]
Country wealth					1.042			
					[7.485]			
Public health capacity						0.774		
						[0.470]		
Mobility							-0.738	
							[0.484]	
Masking								25.353
								[36.746]
Observations	172	101	148	148	142	148	138	138
R-squared	0.496	0.484	0.563	0.452	0.569	0.571	0.570	0.563

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

The relationship between democracy and excess deaths holds for a variety of different specifications. First, to test for the impact of WHO estimating data for some countries, we removed those countries that had no data prior to WHO estimates and found that *Democracy* maintains an inverted curvilinear relationship with *Excess Deaths* (Model 2, Table 1). Second, the level of democracy continues to be important when control variables are added, as Model 3, our main model, shows. Five control variables, representing government mitigation efforts, government's willingness to combat the virus, the population's susceptibility to the virus, and the spread of the pandemic, were consistently influential across a variety of models. The controls are *Policy stringency*, *Populist party*, *Respiratory disease*, *Tropical climate*, and *Distance from Beijing* (Model 3). Of the controls in Model 3, only *Policy stringency* overlaps with data WHO uses to calculate excess deaths. When we remove this indicator, our democracy findings hold. The results for remaining controls in the model do not change. (See Appendix Table A2. For our interpretation of why these factors impact COVID deaths, see Appendix Note A4.). Third, democracy exhibits the same inverted-U curve relationship when excess deaths are measured with the Institute of Health Metrics and Evaluation's indicator (Model 4). Four of the controls, *Policy stringency*, *Respiratory disease*, *Tropical climate*, and *Distance from Beijing*, maintain the same signs and remain statistically significant. Fourth, the relationship between democracy and excess deaths also holds when outliers are removed. To test this, we identified observations that did not fit the model well by calculating residuals for each observation in Model 3 and ranking them by absolute value. We identified 11 observations with large residuals relative to the other observations and cumulatively excluded them from Model 3, starting with the largest. *Democracy* remained significant, indicating that observations which poorly fit the model do not drive the results (not shown).

The level of democracy has a greater impact on excess deaths than any of the controls. Comparing standardized coefficients is one method to evaluate magnitude of effect. Using Model 3, we find substantially larger (absolute values of) standardized coefficients for the *Democracy* terms (linear 0.71, squared -0.95) than for the controls (*Policy stringency* -0.17, *Populist party* 0.14, *Respiratory disease* 0.2, *Tropical climate* -0.29, and *Distance from Beijing* 0.41). This indicates that *Democracy* has a larger impact on *Excess deaths* than the controls do.

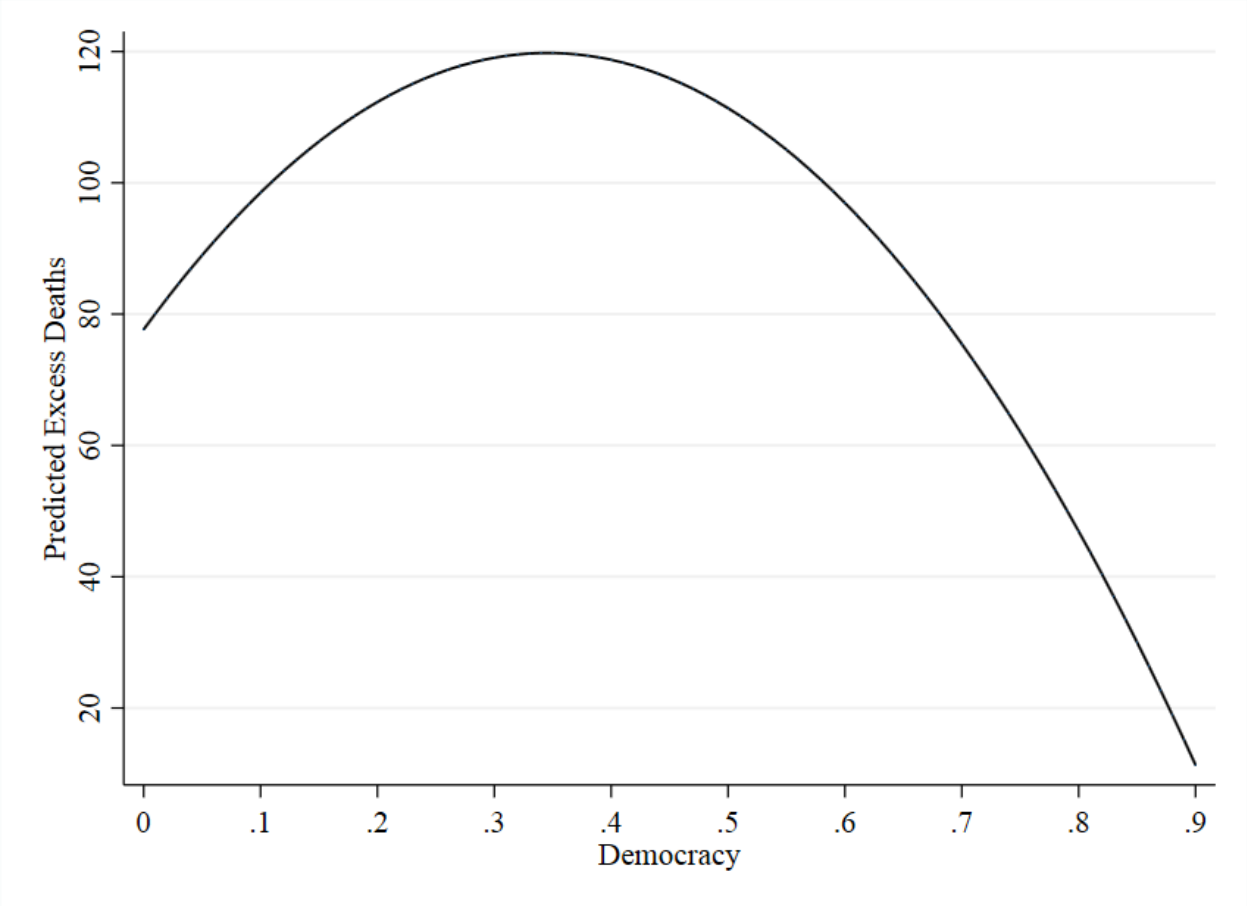
The impact of level of democracy was also greater than that of some other controls that we might expect to have a substantial impact. None of the indicators of government capacity to combat the pandemic was statistically significant. This includes the general capacity measure *Country wealth* and the more specific health one, *Public health capacity*, as shown in Models 5 and 6. Our argument about corruption suggests that government funding and systems to avoid, detect, report, respond to,

and treat health problems will not prevent deaths when government officials and public employees instead use these resources for personal gain. The analyses also suggested that measures of compliance, *Mobility* and *Masking*, were not influential (Models 7 and 8). Our evidence of corrupt pandemic practices suggests that a common scheme was for government officials and public sector employees to purchase poor-quality masks at lower prices from companies not experienced or equipped to produce effective masks and to receive kickbacks in return. Even in countries where many individuals wore masks, they were not necessarily protected from the virus. Mobility might also not be a valid measure of protection from the virus because one can move safely outside one's home by wearing an effective mask, maintaining distance from others, and ventilating indoor spaces well. And, one could remain "immobile" and unsafe by not taking the measures when members of one's household are infected. Finally, it is important to note that even a completely valid compliance measure captures only prevention efforts, not treatment, which also affects death levels. Government capacity and compliance do prevent deaths: they are just not as influential as level of democracy and the other factors in our model (Model 3). Although we test these and many other possible influences, it is likely that there are other factors epidemiologists have not yet uncovered and characteristics specific to countries that affect death rates. The R-squared of our main regression, 0.563, which means that we are explaining only about half of the variance in COVID death rates across countries, demonstrates this.

Whereas the regression analysis showed that deaths are greatest with modest levels of democracy, a predictive margins graph of Model 3 (Figure 2) shows also that deaths are lower with no or little democracy and lowest with high levels of democracy, thus confirming all parts of our first hypothesis. The graph shows the average excess deaths predicted from the model calculated at *Democracy* values from the lowest possible value of 0 to 0.9, the range which encompasses all countries' *Democracy* scores. Average predicted excess deaths are highest in the middle of the scale, representing regimes with only modest levels of democracy, lower when no or little democracy, and lowest when high levels of democracy. Notably, democracies save the most lives.

The advantage of a high level of democracy is also evident when examining percentiles. At the 90th-percentile *Democracy* value, 0.811, the average predicted excess deaths are approximately 44 excess deaths per 100,000. At the *Democracy* value of 0.096, the 10th percentile, the average predicted excess deaths are about 98 per 100,000 people. At the median *Democracy* value, 0.411, the average predicted excess deaths are about 119 per 100,000.

Figure 2. Predictive Margins, *Democracy* and *Excess Deaths* (Model 3)



Note: Countries' *Democracy* values in 2019 ranged from 0.01 to 0.882. Predicted excess deaths are not displayed for *Democracy* scores greater than 0.9 because no countries exceed that level.

Corruption and Excess Deaths

Additional statistical analyses suggest that corruption is the connection between levels of democracy and levels of excess deaths globally. When we replace the *Democracy* terms in Model 3 with *Corruption* we find a statistically significant positive relationship, indicating that higher levels of corruption are associated with higher excess deaths, even when taking into account the impact of factors representing government mitigation efforts, government's willingness to combat the virus, the population's susceptibility to the virus, and the spread of the pandemic (Model 9). This finding confirms our second hypothesis. Statistically significant positive relationships also exist when we replace the *Democracy* terms with indicators of specific types of corruption. We test each type of

corruption in a separate model because the types of corruption are highly correlated. (See Table A4 in the Appendix.) Models 10 through 13 demonstrate that a higher level of executive, legislative, judicial, and public sector corruption is each associated with higher excess deaths, confirming our third through sixth hypotheses.

Table 2. Corruption and Excess Deaths

VARIABLES	(9) Excess Deaths	(10) Excess Deaths	(11) Excess Deaths	(12) Excess Deaths	(13) Excess Deaths
Corruption	53.012**				
	[23.536]				
Executive corruption		8.172*			
		[4.682]			
Legislative corruption			12.628***		
			[4.779]		
Judicial corruption				12.387***	
				[4.673]	
Public sector corruption					50.733**
					[24.274]
Policy stringency	-0.548*	-0.535*	-0.559**	-0.558**	-0.565**
	[0.282]	[0.285]	[0.282]	[0.280]	[0.283]
Populist party	27.387**	27.230**	25.746**	28.536**	26.826**
	[11.324]	[11.466]	[11.290]	[11.277]	[11.332]
Respiratory disease	27.087**	27.227**	26.286**	28.463**	29.057**
	[11.976]	[12.066]	[11.993]	[11.912]	[12.058]
Tropical climate	-0.546***	-0.529***	-0.573***	-0.541***	-0.522***
	[0.178]	[0.179]	[0.180]	[0.175]	[0.177]
Distance from Beijing	0.011***	0.011***	0.011***	0.011***	0.011***
	[0.003]	[0.003]	[0.003]	[0.003]	[0.003]
Observations	148	148	146	148	148
R-squared	0.542	0.535	0.547	0.548	0.540

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Our statistical analysis suggests that corruption links level of democracy and number of excess deaths. The statistical results showing the influence of different forms of corruption support the third causal pathway from the literature that, to enrich themselves, government officials and public sector employees do not comply with policies the government adopts to combat the pandemic. Below,

additional statistical tests and evidence from three mini-case studies provide additional support for this causal explanation.

We find little and no evidence, respectively, to support the first and second corruption causal pathways from the literature. To test whether underreporting accounts for the relationship, we replaced Corruption in Model 9 with *Economic data transparency* and *Health data reporting*, one at a time. *Economic data transparency* has a statistically significant positive relationship with *Excess deaths* meaning that greater transparency in economic data is associated with greater deaths. However, this indicator is a distant proxy for accuracy in COVID death reporting. The more relevant *Health data reporting* indicator exhibits no relationship with *Excess deaths*. Conducting the analogous test, we find no influence of *Masking* or *Mobility* suggesting that it is not through citizen non-compliance that corruption boosts excess deaths (See Appendix Table A5).

Consistent with the third pathway, is the finding that the V-Dem indicator *Rigorous and impartial public administration*, a proxy for control of corruption, has a negative linear relationship with COVID deaths. The more rigorous and impartial public administration is the lower COVID deaths (See Table A5). Knutsen and Kolvani (2022) reached the same conclusion about the impact of this indicator in their working paper examining the impact of democracy and state capacity on COVID deaths.

From the mini-case studies we find direct evidence of corrupt acts disrupting pandemic mitigation efforts for countries with modest levels of democracy, which is one link in the causal chain (Figure 1). From published works, we know that weaknesses in most democratic institutions and practices enable greater corruption and that undermined pandemic mitigation efforts result in higher excess deaths—the other parts of the causal chain. We also present indirect evidence of these from our three cases.

We selected El Salvador, Indonesia, and South Africa as our cases because they have modest levels of democracy and thus we thought that they might reveal how high levels of corruption contribute to excess deaths. Many countries, regardless of baseline corruption, experienced one or more pandemic-related acts of corruption. However, countries with higher levels of baseline corruption, such as these three, likely experienced more corruption, making them better cases for uncovering causal mechanisms.

With the exceptions of their modest levels of democracy and high levels of corruption, El Salvador, Indonesia, and South Africa have numerous differences, including differences in other influences on excess deaths, as identified by our statistical analysis. These differences help us control for these other influences, isolate the potential impact of modest levels of democracy on excess deaths,

and make our findings more generalizable. To investigate possible connections between corruption and excess deaths, we relied on articles from local and foreign news sources and investigations from international nonprofit organizations and foreign government agencies, reporting on the period January 1, 2020 to December 31, 2021, the time our excess death measure covers. For details about the countries' levels of democracy and pre-pandemic corruption, their values for other influences on excess deaths, and our sources, see Appendix Note A5.

From our analysis of the three countries, it is evident how corruption can undermine pandemic mitigation efforts. In the three countries, members of the executive and legislature and public sector employees have accepted bribes, kickbacks, and other material benefits in exchange for problematic contracts. These contracts never delivered goods, delivered only defective goods, charged inflated prices, or some combination of the three. These goods include pandemic food assistance, public service announcements, and PPE. The different types of problematic contracts each deprive the public of pandemic assistance necessary to prevent and treat coronavirus illness and thus these contracts increase deaths. Public sector employees who have little influence on contract negotiations, like police officers, have found other corruption opportunities, such as bribes for not enforcing stay-at-home orders, that have contributed to the spread of infection and consequently higher deaths.

As examples of undelivered goods, consider cases from Indonesia and South Africa. In Indonesia, Social Affairs Minister Juliari Batubara received 32.4 billion rupiah (2.25 million USD) in kickbacks in 2020 for a contract for food and other pandemic assistance for poor families hardest hit by the pandemic. He also took a portion of the funds to be used for each aid package, so part of the assistance was never delivered. Batubara used the money for personal expenditures (DaCosta, 2021; Diela, 2020; Pramana and Ferdinan, 2020; Suparman, 2021). The undelivered food resulted in poorer nutrition and likely excess deaths. In South Africa, Digital Vibes, a company run by those close to then Minister of Health Dr. Zweli Mkhize, received an approximately 10 million USD contract to assist the National Health Department with COVID messaging (Fihlani, 2021). The contract was double the bid of a competitor, who was "irregularly disqualified" (James, 2021), and Mkhize's acquaintances used some of the money to repair Mkhize's personal property, purchase a car for the minister's son, and give the son 20,000 USD (Fihlani, 2021). The misdirection of funds reduced the government's COVID-19 messaging and decreased public trust in the government's public health campaign by associating it with corruption (Cotterill, 2021). As one journalist wrote, "The [missing broadcast] time that could be spent demystifying scientific studies or vaccine information, will instead be a reminder of why government messaging is little trusted in the first place." (Cotterill, 2021). As a

result, South Africans may have been less adherent to pandemic safety protocols, contributing to the country's death toll. Also, on a smaller scale in South Africa, a public sector employee engaged in corruption that resulted in undelivered goods. The principal of Southwest TVET College, a public school in Gauteng Province, granted PPE contracts in 2020 to friends and relatives, who, in turn, never provided the PPE (Mothibi, 2021, p. 46). As a result, those at the college were not effectively protected and might have experienced higher death levels.

Inflated prices were a problem in many contracts. When prices are inflated, the government purchases fewer goods and services, shortages are exacerbated, and insufficient goods and services reach the public. In El Salvador a company in which Minister of Finance José Alejandro Zelaya is a partner secured a 750,000 USD contract for face shields at more than twice the price per unit charged by its competitors (Fonseca, 2020). By summer 2021 millions of dollars in inflated contracts for pandemic-related goods and services had been awarded and provided kickbacks to the president's advisors and other Salvadoran government officials (U.S. Department of Treasury, 2021). Doctors Without Borders reported that some individuals in San Salvador avoided going to the hospital because they could not afford protective face coverings and this contributed to an increase in excess deaths. Not seeking medical care resulted in a threefold increase in deaths at home, from COVID and chronic diseases, compared to pre-pandemic numbers (Doctors Without Borders, 2020). In South Africa the husband of Khusela Diko, the president's spokesperson, received a government contract for approximately 7 million USD in 2020 for sanitizers, masks, and medical waste bags at inflated prices compared to his competitors. Some of the money was intended for a friend running for mayor of Johannesburg to buy votes (Rampedi, 2020). In these cases, inflated prices deprived Salvadorans and South Africans of necessary quantities of PPE, likely contributing to increased deaths.

Government officials have also resold goods intended to mitigate the pandemic. In El Salvador the president's chief of staff, Martha Carolina Recinos de Bernal, and other administration officials resold donated PPE and other medical aid "at significant markups for their personal benefits" (U.S. Department of Treasury, 2021). Medical professionals in El Salvador have reported a lack of PPE in their country, indicating that they have had to reuse surgical masks for a week or even a month and work without gloves (Lozano, 2020). Also, in El Salvador from September to November 2020, the Bureau of Prisons Director Osiris Luna Meza, in collaboration with Minister of Local Development María Chichilco and Public Health Emergency Program (PES) administrator Franklin Alberto Castro Rodríguez, directed from the PES to a third-party merchant 1.6 million USD of food intended for those affected by the pandemic. The merchant, charged previously with contraband

smuggling, sold the food and shared the profits with the government officials. Luna did the same thing with 80,000 baskets of food, worth 3 million USD, intended for inmates' families struggling the most during the pandemic (Lemus and Martínez, 2021). When government officials resell goods those most in need cannot obtain them because the goods are no longer available for free from the government and distributed through designated channels or are no longer available at a lower price. When these are medical goods, infection control and treatment efforts are less effective and COVID deaths increase. When these are food assistance, nutrition suffers contributing to weakened immunity, worsening existing health conditions, and new ailments—all of which can increase excess deaths.

To benefit their own businesses or to receive bribes or kickbacks, government officials will contract with companies that have no experience producing the required goods and services and consequently produce defective ones. In El Salvador approximately a quarter of the 800,000 surgical masks the Ministry of Health purchased were defective (Rauda and Alvarado, 2020). The contract for 344,000 USD in March 2020 was with Grupo GME Inversiones, a company owned by a National Assembly Deputy René Gustavo Escalante Zelaya and his brother. The company is primarily an information technology firm and had never manufactured medical supplies (Labrador and Rauda, 2020). The defective masks were too small, missing pleats, or missing seams (Rauda and Alvarado, 2020). Pleats allow the mask to expand to fit the shape of one's face, permitting air to flow through the fabric instead of leaking in and out through the gaps in the sides of an unpleated mask (Godoy, 2020). Seams help the mask maintain its shape. Defective pandemic goods and services can contribute to increased deaths by reducing the effectiveness of infection control and treatment efforts.

Public sector employees who are far removed from contract-negotiating rely on other corruption opportunities. They pocket money by selling pandemic services that the government mandates are free. For example, Dr. Kristinus Saragih of Indonesia's North Sumatra Provincial Health Office earned nearly 6000 USD by charging individuals for vaccinations that were designated by the government as free and by using doses that were left over from campaigns and should have been returned to the provincial health office (Ferdinan and Hadhiningtyas, 2021). The amount Dr. Saragih pocketed is nearly twice the average annual income for Indonesians (World Bank, 2023).[10] Schemes that charge for free pandemic services can increase infections and thus contribute to higher excess deaths. Public sector employees, particularly police, also earn money by not enforcing movement restrictions. In South Africa, police at the roadblocks intended to restrict movement during the

[10] This estimate is based on the World Bank's adjusted net national income per capita for 2020, the latest data available.

pandemic demanded bribes or stole from individuals in exchange for letting them illegally pass ("Police Corruption is Becoming a Pandemic Too," 2020). South African police also have been involved in black market liquor sales, by moving bottles in government vehicles and burglarizing liquor stores. The national government banned alcohol sales during lockdown to discourage gatherings and thus the spread of the virus (Knoetze, 2020). Indirectly, by enabling access to alcohol, this police corruption promoted violation of lockdowns. Freer movement of South Africans likely facilitated the spread of the virus and thus increased deaths.

We did not find evidence in these countries of judges facilitating corruption that undermines infection control and treatment. Conceivably, judges can accept bribes and other material benefits in exchange for dismissing cases against or acquitting ministers, legislators, and public sector employees accused of corrupt acts. This would undermine one deterrent to corruption. We suspect that it is too early to find published accounts of this judicial behavior as corruption cases are now working their way through judicial systems. This is a topic for future research.

Evidence suggests that the three countries' high levels of corruption contributed to high levels of excess deaths. El Salvador, Indonesia, and South Africa witnessed some of the highest levels of excess deaths in the world. They placed 129th, 146th, and 148th out of 172 countries ranked from least to most excess deaths in our dataset. This is indirect evidence that their high levels of corruption contributed to high levels of excess deaths. A study of health care worker deaths provides somewhat more direct evidence because corruption often deprived medical personnel of PPE. Among 78 mostly middle- and high-income countries, El Salvador, Indonesia, and South Africa ranked 1st, 11th, and 34th, respectively, in numbers of health care worker deaths per capita (calculated from Amnesty International [2020] and population data from V-Dem [Coppedge et al., 2021a, b, c; Pemstein et al., 2021]).

In sum, the statistical evidence supports our argument that countries with modest levels of democracy have higher excess deaths per capita, countries with no or little democracy have lower deaths, and countries with high levels of democracy have the lowest. It also shows that level of democracy has a greater impact on deaths than other potential influences. The statistical and case evidence suggest that the level of corruption explains the associations between level of democracy and level of deaths. Additional statistical analysis shows that two corruption pathways, including government underreporting of deaths and citizen non-compliance, have no or little explanatory power. Rather, as the case studies reveal state interference with mitigation policies seems to be the causal

mechanism: to enrich themselves, government officials and public sector employees undermine pandemic mitigation measures the government adopts and this contributes to higher deaths.

Conclusion

This paper provides an answer to the question does greater democracy prevent deaths from COVID-19. The use of valid data gives us more confidence in the results. The good news from this research is that democracy has saved lives during the pandemic This is important news particularly now, when public satisfaction with democracy has reached an all-time low globally and authoritarian regimes offer a tempting alternative model. However, the bad news is that non-democracies, particularly hybrid regimes or those with only modest levels of democracies, have experienced relatively higher numbers of deaths. This is especially troubling because most of the world's population live under these hybrid regimes.

The results from this paper also suggest that corruption could be the underlying reason for worse outcomes under hybrid regimes, contributing to earlier findings about the negative impact of corruption on society. Prior to the pandemic, studies of public health showed that corruption consumes government spending meant for health care, reduces access to health care, and worsens health outcomes, as measured by mortality rates, life expectancy, and immunization rates. (e.g., Factor and Kang, 2015; Li et al., 2018; Transparency International, 2006). The impact of corruption extends far beyond public health. Corruption increases economic and political inequalities, creates economic inefficiencies, and weakens the legitimacy of political regimes (Miller et al., 2001, pp. 11-13; Roniger, 2005, p. 354; Rose-Ackerman, 1999, p. 2, 3, 12, 14, 16, 26; Uslaner, 2008, p. 17).

Our findings also advance the theoretical debate about the tradeoffs between democracy and non-democracy in combatting the pandemic. We show that the tradeoff is most impactful at the implementation, rather than the policymaking, phase. From the outset of the pandemic, the debate has focused on whether different levels of protection for fundamental rights—which vary with the level of democracy—affect policy stringency. Our results show a greater influence of the level of democracy than policy stringency on COVID deaths and suggest that it is the different levels of corruption associated with different levels of democracy that provide an explanation. By using public office for private gain, officials and public sector employees erode COVID mitigation policies, and this contributes to greater deaths.

More generally, the paper illustrates how societal problem-solving can be derailed at the implementation rather than the policymaking phase. This is a corrective to much of the literature on

regime types' impact, which has theorized about government officials' motivations to provide public goods without careful consideration of whether the goods reach the needy public. The paper underscores that the level of democracy influences the quality of implementation. The constellation of varied levels of components of democracy affects how successfully policies are implemented. Democracy involves not only access to power (Rothstein 2011), but also the exercise of that power.

While the exercise of power for private gain—or corruption—is not an easy problem to address, there have been successful anti-corruption efforts in the past in a variety of spheres in numerous countries (Chêne, 2015; Johnston, 2002, pp. 14-26). This provides hope that, even if democracy overall does not expand and strengthen in countries with hybrid regimes, targeted anti-corruption programs might help produce better societal outcomes.

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Appendix: Table of Contents (Model numbers refer to models in paper.)

Note A1. Summary of COVID-19 Pandemic Coverage in Political Science Journals

Instead of examining the impact of regime type or corruption on COVID deaths, articles about the pandemic published in political science journals have investigated other topics. We reached this conclusion after reviewing articles with empirical results related to COVID published in 2021, 2022, and the first quarter of 2023 in the following journals: *American Journal of Political Science*, *American Political Science Review, Annals of the American Academy of Political and Social Science*, *Annual Review of Political Science*, *British Journal of Political Science*, *Comparative Political Studies*, *Comparative Politics*, *Democratization*, *European Political Science Review*, *International Organization*, *International Studies Quarterly, Journal of Politics*, *Perspectives on Politics*, *Political Analysis*, *Political Research Quarterly, Politics & Society, Studies in Comparative International Development*, and *World Politics.* Most articles, 18 of 27, examined the impact of some aspect of the pandemic on an economic, medical, or political outcome. Articles that sought to explain a pandemic outcome were nearly evenly distributed in explaining policy decisions, compliance with policies, attitudes toward policies, and virus spread. One article examined an aspect of the pandemic as both the independent and dependent variable. Only seven of the articles focused beyond the U.S. To the extent public policy is classified as part of political science, one political science article was relevant to our work: Vadlamannati et al. (2021), cited in our paper, was published in the *Journal of Public Policy*.

Note A2. Description of Controls

In our analysis, we include indicators for the spread of the pandemic, population susceptibility to the pandemic, government capacity, governments' pandemic mitigation efforts, population receptiveness to those efforts, and government data transparency. We use several measures that help capture the spread of the pandemic globally and within countries. A country which experienced the pandemic later than others (*Days from country's first case to China's*) or was farther away from China (*Distance from Beijing*) could experience fewer deaths, in part because its government would have opportunities to learn about the disease and how to contain the virus from the experiences of countries affected earlier. Greater connections to other countries facilitate the spread of the virus (Farzanegan et al., 2021; Sigler et al., 2021) and could influence officials' decisions about containment measures like restricting international travel, so we include several measures of globalization (*Inbound study-abroad students, International tourist arrivals, International tourist departures, Migrants, Outbound study-abroad students,*

Trade in merchandise, Trade in services). We also consider geographic characteristics that could influence the spread of COVID to a country (*Island*) or within a country (*Tropical climate;* e.g. Khan et al., 2022).

We consider several possible measures of the susceptibility of populations to the pandemic, which could cause more deaths within a country. Higher levels of *Population density* and *Urbanization* could put people at greater risk of illness (e.g., González-Val and Sanz-Gracia, 2022). We also consider several population health characteristics and proxy measures of health (*Air pollution, Chronic disease, Obesity, Life expectancy, Population age,* and *Respiratory disease*). Population health can influence the number of COVID deaths; for example, higher exposure to air pollution (Pozzer et al., 2020; Wu et al., 2020) and higher age (Hauser et al., 2020) have been associated with higher COVID mortality. Additionally, we consider the number of internally displaced people within a country (*Displaced*), who could be vulnerable to virus spread and have limited access to healthcare.

Government capacity, both for healthcare and in general, is another possible influence on excess deaths. Greater state capacity could help governments more effectively respond to the pandemic and minimize deaths. We include measures of country health system strength and experience with previous, similar epidemics (*Public health capacity, Public health expenditure,* and *SARS/MERS experience*). Additionally, we consider related factors which could influence overall state capacity and, thus, pandemic health outcomes. Several studies have identified relationships between political or fiscal decentralization and improved public health outcomes in different contexts (e.g., Cavalieri and Ferrante, 2016; Kang et al., 2012; Kumar and Prakash, 2017; Robalino et al., 2001), so we test three alternative measures of decentralization (*Decentralization, Federalism,* and *Regional authority*). High oil rents (*Natural resource dependency*) could discourage leaders of such countries from redistributing that wealth away from themselves and toward public health (de Soysa and Gizelis, 2013), which could hinder pandemic response. Economic inequality (*Gini*) could influence pandemic health outcomes in multiple ways: lower access to healthcare and increased likelihood of illness for poorer individuals, as well as possibly slowing the collective public health response needed to contain a pandemic (Bosancianu et al., 2021). *Ethnic fractionalization* could limit public health responses due to decreased compliance with government recommendations from marginalized groups (e.g., Arriola and Grossman, 2021). In addition to these factors, we consider general country characteristics that could affect state capacity (*Country wealth, Country size,* and *Territorial control*), as well as two measures of control over the economy (*Government enterprises and investment* and *State ownership of economy*). We also examine features of government that are speculated to make government more responsive to population health challenges (*PR electoral system,* e.g., Selway, 2020; *Women in executive branch leadership*; e.g. Taub, 2020) or

less responsive (*Political polarization* and three alternative measures of populism: *Populist government, Populist party,* and *Populist party (major)*). Strong political polarization could weaken public health responses if supporters of the group not in power distrust official guidance and are less likely to comply with health measures, while populist leaders can exacerbate cultural divisions and encourage skepticism of expertise, which can limit the government's ability to respond to a health crisis (Bosancianu et al., 2021).

Additionally, we test measures of governments' pandemic mitigation efforts. All but one of these indicators were derived from the Oxford COVID-19 Government Response Tracker (Hale et al., 2021a), which measures government policy stringency for a range of containment and health policies, such as closing public transport or operating contact tracing programs. We consider the time elapsed between a country's first case of COVID and the first measured policy response to the pandemic (*Response speed*), since a longer time to respond to the pandemic could lead to more deaths (e.g., Fuller et al., 2021; Stockenhuber, 2020). We also test overall policy stringency for containment and health system measures at two alternative points in time for each country: four weeks after a country's first case of COVID (*Policy stringency*) or the day a country first had 1,000 or more confirmed COVID cases (*Policy stringency 1000 case*). A stronger policy response early in the pandemic could lead to fewer deaths in both the short term and through later waves of the disease (e.g., Hale et al. 2021b). Our final measure of pandemic mitigation, the share of a country's population who have received at least one COVID vaccine dose as of the end of 2021 (*People vaccinated per hundred*), uses data from national health authorities compiled by Mathieu et al. (2021).

Population receptiveness to mitigation measures may also vary across countries, which could lead to different pandemic health outcomes. Higher levels of interpersonal trust and trust in government could encourage greater public compliance with pandemic containment measures, which could limit disease spread and deaths (e.g., Charron et al., 2022; Siegrist and Bearth, 2021). We experimented with the measure *Interpersonal trus*t and two measures of trust in government (*Trust in government I and Trust in government II*) but found that *Interpersonal trust* reduces the number of countries significantly, from 172 to 108, and the trust in government measures disproportionately reduced the number of countries with the lowest levels of democracy and disproportionately increased those with the highest levels. We also include two measures of population compliance with containment measures: the share of population who says they always wear a mask in public (*Masking*) and the mean percent change in a population's visits to public places and others' homes from a pre-pandemic baseline (*Mobility*). To capture compliance as the pandemic progressed, these measures take the

average mask use and mobility change from two points in time: four weeks after a country's first case of COVID, and four weeks after WHO declared the Delta variant of the virus a "variant of interest."

While indicators of excess deaths, which we use, are more valid than reported deaths measures (e.g., Annaka, 2021; Cassan and Steenvoort, 2021; Neumayer and Plümper, 2022), we, nonetheless, test two different proxy measures of data transparency. We use an index measure of the extent to which a national government reports economic data to the World Bank's World Development Indicators (*Economic data transparency*) as a general measure. For health data specifically, we use a binary measure of whether a country has a public policy for sharing data and specimens with international organizations or other countries (*Health data reporting*).

All our statistical models also include dummy variables for geographic regions. Countries could learn from neighbors' experiences in combating the COVID pandemic. Similarly, perceptions of the risk of spread from neighboring countries could influence government actions and thus pandemic deaths. The dummy variables cover six regional categories V-Dem uses: Eastern Europe and Central Asia, Latin America and the Caribbean, the Middle East and Northern Africa, Sub-Saharan Africa, Western Europe and North America, and Asia and the Pacific (the reference category).

Table A1. List of Variables

Dependent Variable

Excess deaths. This variable measures country-level estimates of excess deaths associated with the COVID-19 pandemic per 100,000 population for the period 2020-2021. It measures "the difference between the total number of deaths that have occurred and the number of deaths that would have been expected in the absence of the pandemic i.e., a no-COVID-19 scenario" (WHO, 2022a). Source: WHO (2022b). *excessmean*

Independent Variables of Interest

Democracy. This index measures the extent to which a country achieves the ideal of liberal democracy, protecting individual and minority rights with free elections, rule of law, civil liberties, and checks and balances on the executive. Data are from 2019. Interval scale, range 0 (lowest) to 1 (highest). Source: V-Dem (Coppedge et al. 2021a, b, c; Pemstein et al. 2021). *v2x_libdem*

Corruption. This index measures the pervasiveness of political corruption within a country and includes measures of both "petty" and "grand" corruption involving different branches of government. Data are from 2019. Interval scale, range 0 (lowest) to 1 (highest). Source: V-Dem. *v2x_corr*.

Executive corruption. This indicator measures the extent to which members of the executive branch or their agents exchange favors for bribes or kickbacks. Data are from 2019. Interval scale with approximate range of -5 to 5 and reversed direction from its original source so that, like corruption index measures, a larger value indicates more corruption. Source: V-Dem. *inv_v2exbribe*

Public sector corruption. This index averages two V-Dem indicators measuring the extent to which public sector employees exchange favors for bribes (Public sector corrupt exchanges) or steal public funds for personal or family use (Public sector theft). Data are from 2019. Interval scale, range 0 (low) to 1 (high). Source: V-Dem *v2x_pubcorr*

Legislative corruption. This indicator measures the extent to which members of the legislature abuse their position for financial gain through bribery, theft, obtaining government contracts for themselves or associates, or providing favors to firms in exchange for future employment. Data are from 2019. Interval scale with approximate range of -5 to 5 and reversed direction from its original source so that, like corruption index measures, a larger value indicates more corruption. Source: V-Dem. *inv_v2lgcrrpt*

Judicial corruption. This indicator measures the extent to which individuals or businesses make extra payments or bribes to affect the speed of the judicial process or to obtain a favorable decision. Data are from 2019. Interval scale with approximate range of -5 to 5 and reversed direction from its original source so that, like corruption index measures, a larger value indicates more corruption. Source: V-Dem. *inv_v2jucorrdc*

Rigorous and impartial public administration. This indicator measures the extent to which public officials perform their duties by following the law and treating like cases alike, without arbitrariness or bias. Data are from 2019. Interval scale with approximate range of -5 to 5, with a larger value indicating a greater extent of rigorous and impartial administration. Source: V-Dem. *v2clsrpct*

Additional Control Variables

Air pollution. This indicator measures population-weighted average annual exposure to PM2.5 air pollution, particles measuring less than 2.5 microns in aerodynamic diameter which are capable of penetrating deep into the respiratory tract and causing severe health damage. Data are from 2017. Interval scale. Source: World Development Indicators (WDI, The World Bank 2022). *Air_Pollution*

Chronic disease. Measures DALYs from chronic diseases per 100,000 population within a country. DALYs (disability-adjusted life years) are a measure of disease burden that counts lost years of healthy living, both years lost due to premature death from a disease and years lived while suffering from a chronic disease. Interval scale, with a higher number indicating a higher disease burden. Source: Global Burden of Disease Collaborative Network (2018); retrieved from Roser and Ritchie (2016). *DALYs_NCD*

Country size. Measures country land area in square kilometers, 2018. Interval scale, with larger value indicating larger size. Source: Haber and Menaldo (2011); Weidmann, Kuse, and Gleditsch (2010). Retrieved from V-Dem. *e_area*

Country wealth. Measured using the logarithm of GDP per capita (constant 2015 USD). Data are from 2019. Source: WDI. *logGDP_per_cap*

Days from country's first case to China's. Records the number of days between China's first reported COVID-19 case (Dec. 8, 2019) and a country's first confirmed case. Sources: Dong et al. (2020), retrieved from Mathieu et al. (2020); Harcourt et al. (2020); WHO (2020a, 2020c, 2020d, and 2020e) *China_Difference*

Decentralization. This is an aggregate index measure of local government decentralization within a country, including measures of the relative importance of local government in a country (% of general government expenditures), the security of existence of local governments, fiscal autonomy, level of self-government, and administrative authority over local government operations. Data are from 2005. Interval scale, with a larger value indicating a greater level of decentralization. Source: Ivanyna and Shah (2014). *Decentralization*

Displaced. This indicator measures the total number of internally displaced people in a country at the end of a given year. These are people who have been forced or obliged to leave their homes due to conflict or violence and have not crossed an international border. Data are from 2019. Source: WDI. *Total_Displaced*

Distance from Beijing. Measures the distance in kilometers from a country's capital to China's capital, Beijing. Source: Distances measured in Google Maps (2023). *Beijing_dist*

Economic data transparency. This index measures the extent to which a country's government reports economic data about the country to the World Bank World Development Indicators. Data are from 2010. Interval scale, with a higher number indicating greater transparency. Source: Hollyer, Rosendorff, and Vreeland (2014). *transparencyindex*

Ethnic fractionalization. This index measures, based on country population ethnicity data, the probability that two randomly selected individuals belong to different groups. Data cover 1946-2016. Interval scale, with a higher value indicating greater fractionalization. Source: Alesina et al. (2003); retrieved from QoG (Teorell et al. 2021). *al_ethnic2000*

Federalism. This index measures the level of federalism in a country based on five criteria: whether autonomous regions exist, whether municipal government is locally elected, whether state/provincial government is locally elected, whether state/provincial governments have taxing/spending/legislative authorities, and whether senators' constituencies are states/provinces. Interval scale, with a higher value indicating a greater degree of federalism. Source: Bosancianu et al. (2021), calculated using data from Cruz et al. (2018) *federal_ind*

Gini. The Gini index measures the extent to which the distribution of income within a country deviates from a perfectly equal distribution. Data are from the most recent year available for each country, 2015-2019. Interval scale, 0 (lowest) to 100 (highest), with a larger value indicating greater level of inequality. Source: WDI. *Gini*

Government enterprises and investment. This indicator measures government enterprises and investment as a share of total investment in a country. Data are from 2019. Interval scale. Source: Fraser Institute (2019). *Gov_Investment*

Health data reporting. This binary indicator is used as a proxy measure for public health data reporting. Data are from 2019. It has a value of 0 (no) or 1 (yes) in response to this question: "Is there a publicly available plan or policy for sharing genetic data, clinical specimens, and/ or isolated specimens (biological materials) along with the associated epidemiological data with international organizations and/or other countries that goes beyond influenza?" Source: Global Health Security Index (GHSI,"GHS Index Report and Model," 2019). *Data_Sharing*

Inbound study-abroad students. Number of students from abroad studying in a country, as a percentage of the total tertiary enrollment in that country. Data are from 2018, the most recent year with outbound data. Source: Education Statistics – All Indicators (2020). *Inbound_Students*

International tourist arrivals. International inbound tourists (overnight visitors) are the number of tourists who travel to a country other than that in which they usually reside, and outside their usual environment, for a period not exceeding 12 months and whose main purpose in visiting is other than an activity remunerated from within the country visited. When data on number of tourists are not available, the number of visitors, which includes tourists, same-day visitors, cruise passengers, and crew members, is shown instead. Data are from 2019. Source: WDI. *Tourist_Arrivals*

International tourist departures. International outbound tourists are the number of departures that people make from their country of usual residence to any other country for any purpose other than an activity remunerated in the country visited. Data are from 2019. Source: WDI. *Tourist_Departures*

Interpersonal trust. This indicator measures the percent of respondents who responded to a survey question about trust with "most people can be trusted" instead of the alternative, "you can't be too careful." Data are from 2014-2016. Sources: WVS and Afrobarometer, aggregated by and retrieved from Bosancianu et al. (2021). *trust_people*

Island. Categorial variable indicating whether a country is an island, coded either 0 (no) or 1 (yes). Source: Nations Online (2021). *Island*

Life expectancy. Measures life expectancy at birth for both males and females in years, 2019. Interval scale, with higher number indicating higher life expectancy within a country. Sources: V-Dem, originally from Gapminder (gapminder.org) and Clio Infra (clio-infra.eu). *e_pelifeex*

Masking. This indicator measures the percent of a country's population who say they always wear masks when leaving home. To capture compliance as the pandemic progressed, it takes the average mask use from two points in time: four weeks after a country's first case of COVID, and four weeks after WHO declared the Delta variant a "variant of interest." Interval scale. Source: Institute for Health Metrics and Evaluation (IHME, 2022). *Mask_Average*

Migrants. International migrant stock is the number of people born in a country other than that in which they live, including refugees. Data coded as % of total population, 2015. Source: WDI. *Migrants*

Mobility. This indicator measures the average percent change in population mobility from baseline. Interval scale. To capture compliance as the pandemic progressed, it takes the average mask use from two points in time: four weeks after a country's first case of COVID, and four weeks after WHO declared the Delta variant a "variant of interest." Source: IHME (2022). *Mobility_Average*

Natural resource dependency. This indicator measures oil rents in a country as a share of GDP. Data are from 2017. Interval scale, 0 (low) to 100 (high). Source: WDI, retrieved from Bosancianu et al. (2021). *oil*

Obesity. This indicator measures the percentage of adults aged 18 and above with a body-mass index of at least 30 as of 2016. Sources: Ritchie (2017), originally from Global Health Observatory (2020). *Obesity*

Outbound study-abroad students. Number of students from a given country studying abroad as a percentage of the total tertiary enrollment in that country. Data are from 2018, the most recent year with outbound data. Source: Education Statistics – All Indicators (2020). *Outbound_Students*

People vaccinated per hundred. This indicator measures the share of a country's population who have received at least one COVID vaccine dose as of the end of 2021. Source: Mathieu et al. (2021). p*eople_vaccinated_per_hundred*

Policy stringency. The Containment and Health Index from the Oxford COVID-19 Government Response Tracker (OxCGRT) is a summary measure of the number and scope of containment and health policy responses to COVID. The index reports average policy stringency in a country, calculated by standardizing then averaging policy stringency scores for OxCGRT's eight containment policy measures and six non-monetary health system measures to a 0-100 (low-high) scale. Data are from four weeks after each country's first COVID case. Interval scale, range 0 (low) to 100 (high). Source: OxCGRT (Hale et al. 2021a). *FourWeeks_CH_Index*

Policy stringency 1000 case. This variable records a country's OxCGRT Containment and Health Index score from the first day the country had 1,000 or more cumulative confirmed cases of COVID-19. Interval scale, range 0 (low) to 100 (high). Source: OxCGRT. *Thousand_CH_Index*

Political polarization. This indicator measures the extent to which society in a country is divided into antagonistic political camps. Data are from 2019. Interval scale, with a larger value indicating a greater degree of hostility across group lines. Source: V-Dem. *v2cacamps*

Population age. Measures the percent of a country's total population ages 65 and above in 2019. Interval scale, with larger value indicating higher share of population. Source: WDI. *Pop_Age*

Population density. Measures population per square kilometer of land area within countries, 2019. Source: WDI. *Pop_Density*

Populist government. This binary variable measures whether a country is "populist," meaning specifically that a leader who ran a populist campaign is democratically elected. It does not count leaders who turned to populism after being elected, nor does it count autocrats turning to populism to hold on to power. Data show countries with electoral populist governments as of 2019. Two possible values: yes (1) or no (0). Source: Kyle and Meyer (2020), retrieved from Bosancianu et al. (2021). *electoral_pop*

Populist party. This binary variable measures whether a country has any populist political parties competing in national elections. If a country has at least one political party which uses populist rhetoric, considers that populist rhetoric important, and received at least 10% of the votes in the last national legislative elections, it is coded 1. If no parties in a country meet these criteria, it is coded 0. Source: Norris (2020). *Populist_Party*

Populist party (major). This alternative measure uses a higher vote share threshold than Populist party. It is coded 1 if a country has at least one political party which uses populist rhetoric, considers that populist rhetoric important, and received at least 35% of the votes in the last national legislative elections; otherwise, it is coded 0. Source: Norris (2020). *Major_Populist_Party*

PR electoral system. This binary variable measures whether a country has a proportional electoral system, meaning that candidates are elected based on the share of votes their party receives. Two possible values: yes (1) or no (0). Data are from 2017. Source: Cruz et al. (2018), retrieved from Bosancianu et al. (2021). *pr*

Public health capacity. An index measure of public health capacity calculated using four of the six categories of the Global Health Security Index (GHSI) most relevant to pandemic response and not captured by other control measures: Prevention, Detection and reporting, Rapid response, and Health system. Each country's index score is a weighted sum of the category scores each multiplied by a category weight. This measure uses category weights proportional to each included category's

default weight in GHSI's original model. Interval scale, range 0 to 100, with a higher score representing more favorable health system conditions. Source: GHSI (2019). *PH_Capacity*

Public health expenditure. Measures domestic government expenditure on health as % of GDP, 2018. Interval scale, with larger value indicating higher share of GDP. Source: WHO's Global Health Expenditure Database (2021), retrieved from WDI. *PH_Spending*

Region. Six dummy variables corresponding to six geographic regions: Eastern Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, Sub-Saharan Africa, Western Europe and North America, and Asia and the Pacific. Asia and the Pacific was the reference category for the models presented in this paper. Source: QoG, retrieved from V-Dem. *EECA, LAC, MENA, SSA, WENA, AP*

Regional authority. This index is a measure of the relative authority of regional governments within a country. The indicators used to calculate the index measure two different concepts of authority: self-rule (a regional government's authority over people who live in the region) and shared rule (a regional government's or its representatives' authority in national matters). Data are from 2018. Ordinal scale, range 0 to 30, with a larger value indicating a greater level of authority. Source: Shair-Rosenfield et al. (2021). *RAI*

Respiratory disease. This variable records the prevalence of upper and lower respiratory diseases in a country in 2017. Interval scale. Source: Global Burden of Disease Collaborative Network (2018), retrieved from Bosancianu et al. (2021). *resp_disease_prev*

Response speed. This variable measures the number of days that a country had confirmed cases of Covid-19 in a country but had not implemented any containment and closure or health system policies (as listed in the Covid-19 Government Response Tracker data set). Interval scale, with 0 indicating a country had implemented policies (at least one policy score greater than 0) on or before the day of its first confirmed case, and larger number indicating a longer delay in response. Manually corrected China, which had its first case before coverage in these sources begins, using the case timeline from Wu and McGoogan (2020). Sources: Hale et al. (2021a), Dong et al. (2020), Wu and McGoogan (2020). *Response_Speed*

SARS/MERS experience. A binary variable coded 1 if a country experienced at least 50 cases of SARS or MERS, 0 otherwise. Sources: WHO (2004) and WHO (2020b). *SARS_MERS_Exp*

State ownership of economy. This indicator measures the extent to which the state owns and controls capital (including land) in the industrial, agricultural, and service sectors. It is a measure of the government's direct control and/or ownership of the economy. Data are from 2019. Interval scale, converted from an ordinal scale of 0 (virtually all valuable capital owned/controlled by the state) to 4 (very little valuable capital owned/controlled by the state). Source: V-Dem. *v2clstown*

Territorial control. Measures the percent of territory over which the state has effective control in 2019. Interval scale, with larger value indicating greater control. Source: V-Dem. *v2svstterr*

Trade in merchandise. The sum of merchandise exports and imports divided by the value of a country's GDP, all in current U.S. dollars. Data are from 2019. Source: WDI. *Merchandise_Trade*

Trade in services. The sum of service exports and imports divided by the value of a country's GDP, all in current U.S. dollars. Data are from 2019. Source: WDI. *Services_Trade*

Tropical climate. This variable measures the percentage of a country's land area with tropical climate. Data are from 2012. Interval scale. Source: Nunn and Puga (2012), retrieved from QoG. *nunn_tropical*

Trust in government I. This variable measures the percent of survey respondents who answered "a lot" or "some" about the national government in response to this question: "How much do you trust each of the following: other people in your neighborhood; your national government; scientists; journalists; doctors and nurses; people who work at non-governmental or non-profit

organizations; healers? Do you trust them a lot, some, not much, or not at all?" Source: Wellcome Global Monitor (2018), aggregated and retrieved from Ortiz-Ospina and Roser (2016). *Gov_Trust*

Trust in government II. This is a summary metric of trust in one's government created using principal components analysis (PCA) from Gallup World Poll and World Values Survey data. The measure is centered and scaled around a mean of 0 such that the lowest values indicate countries with the lowest trust, and highest values indicate highest trust. Source: COVID-19 National Preparedness Collaborators (2022). *govt_trust_pca*

Urbanization. Measures the percent of a country's population who live in urban areas, as defined by national governments' statistical offices, as of 2019. Interval scale, with larger value indicating greater level of urbanization. Source: WDI. *Urbanization*

Women in executive branch leadership. This variable measures the % of women in ministerial positions in national governments as of January 1, 2019. Interval scale, 0 (low) to 100 (high). Source: Inter-Parliamentary Union (2019). *Women_Leaders*

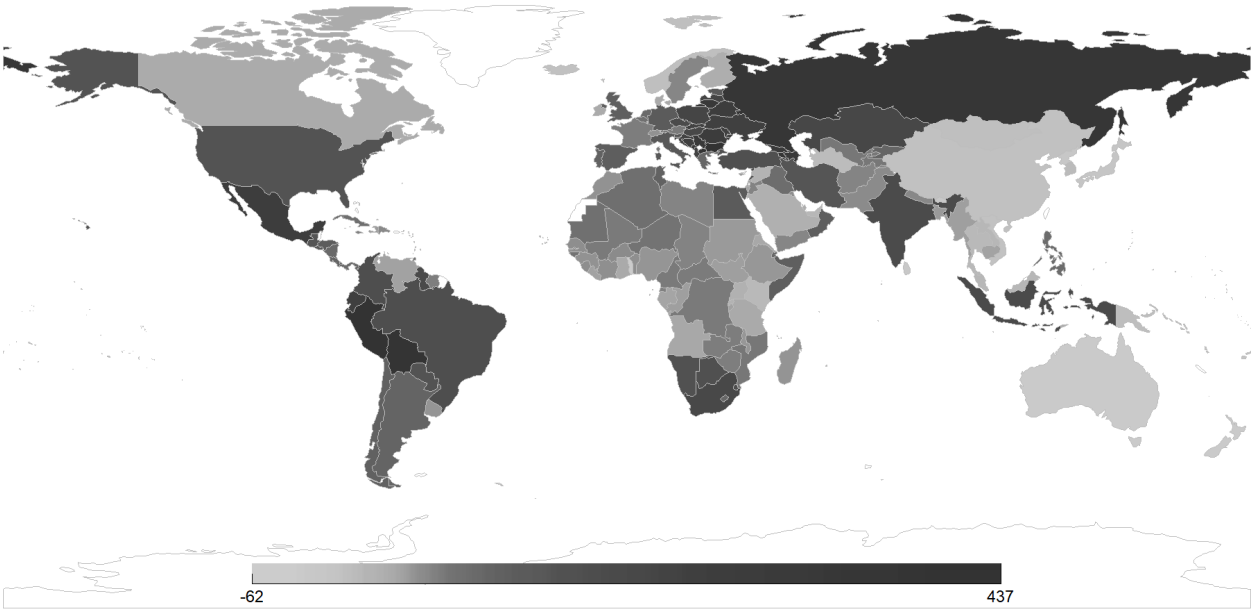
Variable names from the paper's dataset appear at the end of each entry.

Note A3: Patterns in Excess Deaths, Levels of Democracy, and Levels of Corruption

Excess deaths and levels of democracy each vary considerably across countries making our research question worthwhile to examine and our hypotheses plausible. Levels of corruption also vary, suggesting that those may explain the relationship between levels of democracy and deaths.

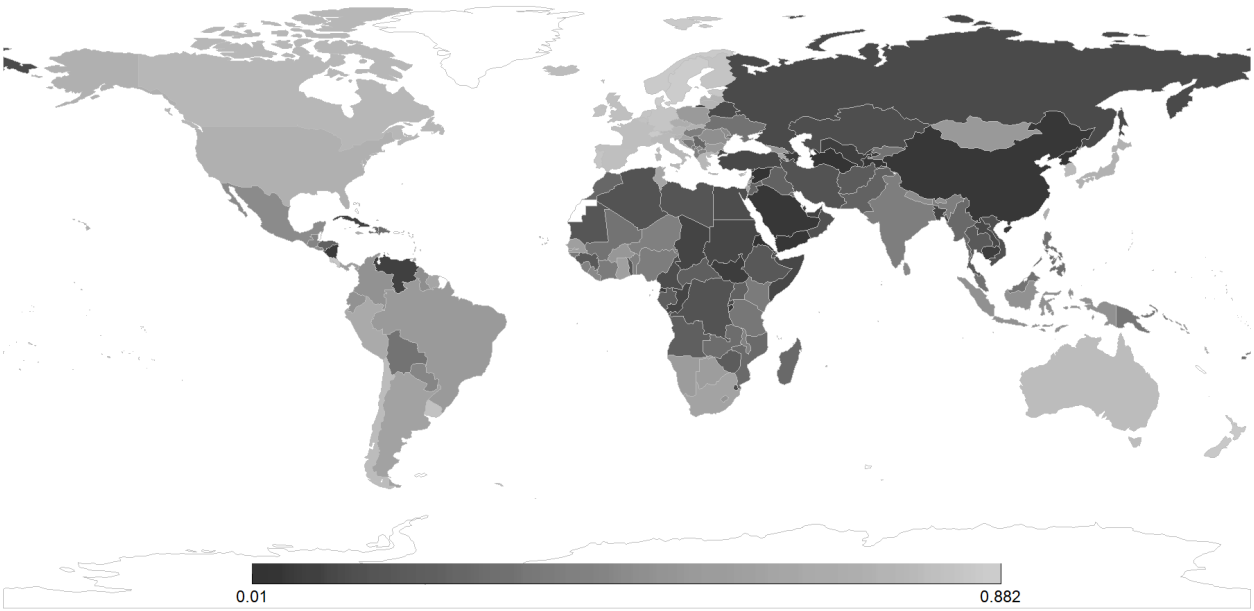
Excess deaths vary from -62 to 437, as Figure A3.1 demonstrates. Most countries experienced an increase in deaths in 2020-2021, greater than would be expected without the pandemic. Countries in Central Asia, Eastern Europe, North America, and South America had relatively high excess deaths. Some countries, including Australia, China, and New Zealand, have negative estimates of excess deaths, indicating that they had fewer deaths during these years than are typical. Pandemic mitigation measures, such as movement restrictions and masking, also reduce mortality from other potential causes of deaths, including traffic accidents and other communicable diseases like the flu.

Figure A3.1. Map of *Excess deaths* by country (2020-2021)



There is also substantial variation in *Democracy* around the world, as Figure A3.2 indicates. Central Asia, the Middle East, and North Africa all include several countries which fall at the low end of the scale; North America and Western Europe, in contrast, primarily contain highly democratic countries. Merely comparing the maps across countries does not suggest an obvious relationship between *Democracy* and *Excess deaths*, suggesting that other factors are also influential and requiring analysis that can take this into account.

Figure A3.2. Map of *Democracy* by country (2019)



Countries exhibit different levels of *Corruption* as well, as Figure A3.3 depicts. Multiple countries in Africa and Central Asia have relatively high levels of *Corruption*, while countries in Europe, especially Western Europe, have relatively low levels. This suggests that it is also worthwhile exploring whether corruption explains any relationship between levels of democracy and deaths. We investigate these possibilities in the analysis section of the paper.

Figure A3.3. Map of *Corruption* by country (2019)

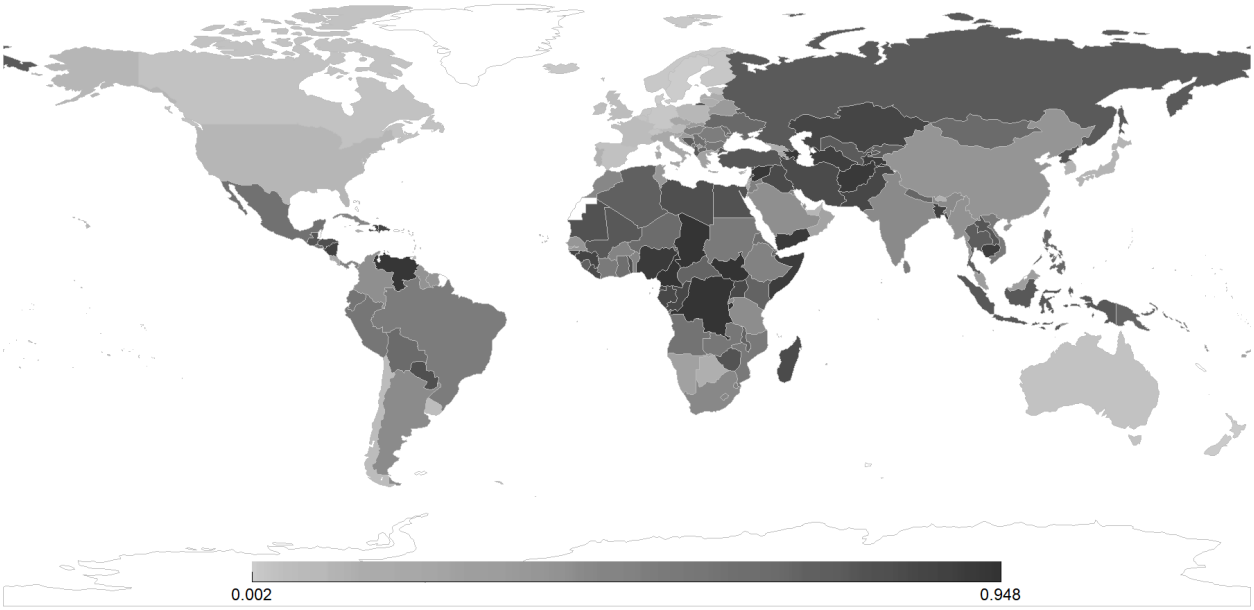


Table A2. Model 3, *Policy Stringency* Removed

VARIABLES	(3) Excess Deaths
Democracy	204.328**
	[97.413]
Democracy (squared)	-298.336***
	[113.922]
Populist party	21.647*
	[11.135]
Respiratory disease	27.327**
	[11.651]
Tropical climate	-0.569***
	[0.172]
Distance from Beijing	0.009***
	[0.003]
Observations	154
R-squared	0.551

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Note A4. Model 3, Interpretation of Significant Controls

Policy stringency, *Populist party*, *Respiratory disease*, *Tropical climate*, and *Distance from Beijing* were consistently influential across a variety of models (Table 1). A more stringent policy response to a country's first COVID infections is logically associated with fewer deaths (Cepaluni et al., 2021; Karabulut et al., 2021). Consistent with this explanation, our analysis shows a negative relationship between *Policy stringency*—the rigor of containment and health systems four weeks after a country's first case of COVID—and *Excess deaths*. A populist government is shown in our analysis to be positively associated with deaths; the skepticism of science and expertise to which populist politicians frequently appeal could incentivize them to make poor policy decisions or weaken public services like healthcare (Bosancianu et al., 2021; Cepaluni et al., 2021). Respiratory disease prevalence is both a relevant indicator of pre-pandemic population health (Edgell et al., 2021) and an underlying risk factor for COVID mortality (Bosancianu et al., 2021), so the positive relationship between *Respiratory disease* and *Excess deaths* is logical. Several studies have identified a negative association between temperature and humidity and COVID transmission (e.g., Smith et al., 2021; Wang et al., 2021); as such, it is understandable that *Tropical climate* is negatively associated with *Excess deaths*. The positive relationship between physical distance from the first COVID outbreak and excess deaths reflects higher deaths in Latin America and the Caribbean and sub-Saharan Africa. When we remove the Distance from Beijing from Model 3 statistically significant positive relationships appear between the regional indicators *Latin America and the Caribbean* and *sub-Saharan Africa* and *Excess Deaths*.[11] (See Table A3.) The higher excess deaths in these regions might reflect less government attentiveness to the pandemic initially due to their distance from the original outbreak. Most importantly for our analysis, when we remove *Distance from Beijing*, *Democracy* retains its statistically significant inverse curvilinear relationship with *Excess Deaths*. (See Table A3.) Only the regional indicator *Eastern Europe and Central Asia* is statistically significant, having a positive relationship with *Excess Deaths* in Model 3. (See Table A3.) Countries of Eastern Europe and Central Asia may share certain features not captured by any of the controls tested and thus show higher excess deaths.

[11] Consistent with this, we did find multicollinearity between Distance from Beijing and the regional indicators. Otherwise, there is not multicollinearity in Model 3. We evaluated the degree of multicollinearity in Model 3 by calculating the variance inflation factors (VIFs), which measure the extent to which the variation in one independent variable can be explained by the variation in the other independent variables.

Table A3. Model 3, *Distance from Beijing* Removed

VARIABLES	(3) Excess Deaths	(3) Excess Deaths
Eastern Europe and Central Asia	181.106***	160.792***
	[25.015]	[25.442]
Latin America and the Caribbean	119.050***	15.388
	[21.039]	[42.121]
Middle East and North Africa	24.982	-12.096
	[25.432]	[28.080]
Western Europe and North America	14.970	-20.977
	[28.467]	[30.557]
Sub-Saharan Africa	41.979**	-23.750
	[18.391]	[29.424]
Democracy	318.591***	243.786**
	[99.475]	[100.595]
Democracy (squared)	-411.685***	-352.788***
	[117.385]	[116.391]
Policy stringency	-0.732**	-0.721**
	[0.291]	[0.284]
Populist party	23.040**	25.523**
	[11.617]	[11.366]
Respiratory disease	28.641**	28.176**
	[12.046]	[11.751]
Tropical climate	-0.570***	-0.597***
	[0.180]	[0.175]
Distance from Beijing		0.010***
		[0.003]
Observations	148	148
R-squared	0.537	0.563

Standard errors in brackets

*** p<0.01, ** p<0.05, * p<0.1

Table A4. Correlations between Types of Corruption

	Corruption	Executive corruption	Public sector corruption	Legislative corruption	Judicial corruption
Corruption	1				
Executive corruption	0.924	1			
Public sector corruption	0.951	0.882	1		
Legislative corruption	0.89	0.823	0.8	1	
Judicial corruption	0.911	0.82	0.847	0.762	1

Table A5. Model 9, Corruption replaced with *Economic data transparency*, *Health data reporting*, *Masking, Mobility,* or *Rigorous and impartial public administration*

VARIABLES	**(9) Excess Deaths**	**(9) Excess Deaths**	**(9) Excess Deaths**	**(9) Excess Deaths**	**(9) Excess Deaths**
Economic data transparency	9.825**				
	[4.201]				
Health data reporting		9.050			
		[23.991]			
Masking			36.556		
			[37.672]		
Mobility				-0.444	
				[0.497]	
Rigorous and impartial public administration					-9.430*
					[4.802]
Policy stringency	-0.417	-0.538*	-0.739**	-0.885**	-0.563**
	[0.325]	[0.298]	[0.320]	[0.382]	[0.283]
Populist party	21.392	23.927**	20.219	20.807*	26.996**
	[13.256]	[11.422]	[12.302]	[12.241]	[11.378]
Respiratory disease	19.026	26.381**	21.254	23.057*	27.858**
	[13.816]	[12.217]	[12.942]	[12.892]	[12.041]
Tropical climate	-0.375*	-0.460**	-0.431**	-0.441**	-0.508***
	[0.194]	[0.181]	[0.192]	[0.192]	[0.176]
Distance from Beijing	0.009**	0.010***	0.010***	0.010***	0.011***
	[0.004]	[0.003]	[0.004]	[0.004]	[0.003]
Observations	112	148	138	138	148
R-squared	0.474	0.525	0.524	0.524	0.538

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Note A5: Case Selection

With the exceptions of their modest levels of democracy and high levels of corruption, El Salvador, Indonesia, and South Africa have numerous differences, including differences in other influences on excess deaths, as identified in our statistical analysis. El Salvador, Indonesia, and South Africa exhibit only modest levels of democracy: their *Democracy* values are 0.45, 0.47, and 0.61, respectively, in the 180-country dataset where values range from 0.01 to 0.882. In a ranking of the countries from no democracy to most democratic, they place 106th, 111th, and 132nd, respectively. The V-Dem Regimes of the World indicator labels all three countries electoral democracies, meaning they fall short of full, liberal democracies.[12]

Together the three countries vary on all but one of the other influences on excess deaths. Early in the pandemic El Salvador and South Africa took more aggressive approaches to pandemic mitigation than Indonesia. Their policy stringency scores were 74.40 and 77.38, respectively, compared to Indonesia's 38.69. (In the dataset scores ranged from zero to 85.71 on a 0-100, low-high, scale.) Nearly all of El Salvador's and Indonesia's territory is in a tropical climate, whereas only 0.18 percent of South Africa's is. El Salvador and South Africa are more than twice as far from Beijing as Indonesia is, as measured in kilometers between the capital cities. Indonesia and South Africa have more of a history of populist parties than El Salvador, which saw the recent rise of a populist party only with the creation of the party Nuevas Ideas by the populist president elected in 2019 (Meléndez-Sánchez, 2021; Norris, 2020). Each country is in a different world region, also helping to make our findings more generalizable. The countries do share similar levels of respiratory disease prevalence. Considering that COVID prevention and treatment influence respiratory disease prevalence's impact on excess deaths, we think that exploring regime types' and corruption's impact on prevention and treatment is worthwhile. (See Table A5.1.)

[12] V-Dem defines electoral democracy as having , "[d]e-facto free and fair multiparty elections and a minimum level of Dahl's institutional prerequisites for polyarchy as measured by V- Dem's Electoral Democracy Index (v2x_polyarchy) [which includes freedom of expression and alternative sources of information, freedom of association, suffrage, clean elections, and elected officials], but either access to justice, or transparent law enforcement, or liberal principles of respect for personal liberties, rule of law, and judicial as well as legislative constraints on the executive are not satisfied as measured by V-Dem's Liberal Component Index (v2x_liberal)" (Coppedge et al. 2021b, 283).

Table A5.1. Case Studies

	Democracy Measures				Alternative Explanations				
					Different Values				Similar Values
Country	**Democracy**	**Democracy Ranking**	**Regime Type**	**Policy Stringency**	**Tropical Climate**	**Distance from Beijing**	**Populist Party**	**Region**	**Respiratory Disease**
El Salvador	0.45	106th	Electoral Democracy	74.4	100	13487	Only since 2019	Latin America	3.49
Indonesia	0.47	111th	Electoral Democracy	38.69	99.83	5218	Yes	Asia	3.99
South Africa	0.61	132nd	Electoral Democracy	77.38	0.18	11654	Yes	Sub-Saharan Africa	3.5

Note: Values of alternative explanations that differ from the values of one or two of the other countries are underlined.

El Salvador, Indonesia, and South Africa exhibit levels of democracy in their political institutions and practices that past research indicates promote corruption. This provides evidence of the first item in the causal chain. The countries are weak in at least one accountability mechanism—judicial constraints on the executive, legislative constraints on the executives, or clean elections—that when weak enable corruption to flourish, according to the literature (e.g., Adserá, et al., 2003; Ferejohn, 1986; Rose-Ackerman, 1996). El Salvador is particularly weak on judicial constraints on the executive and clean elections, Indonesia on legislative constraints on the executive and clean elections, and South Africa on clean elections. This is shown in Table A5.2, which orders the components of democracy, as defined by the V-Dem Liberal Democracy Index, from lowest to highest values for each country. Each country also has relatively higher, meaning moderate, levels of freedom of expression and freedom of association, which the literature has shown promote corruption at moderate levels (McMann et al., 2019). Each country elects its officials, which past research has demonstrated boosts corruption, when considered independently from the quality of elections (Golden 2003, p. 104; Mironov and Zhuravskaya, 2016). Equality before the law and individual liberty is relatively low, especially in El Salvador and South Africa. The relatively low scores are due to El Salvador scoring very low on the constituent indicators rigorous and impartial public administration and transparent laws that are predictably enforced, as well as access to justice and South Africa scoring very low on the rigorous and impartial public administration. Because rigorous and impartial public administration and transparent laws that are predictably enforced are proxies for corruption, these scores are consistent with our argument. We do not focus on suffrage because it is common throughout the world and thus does not help explain variation in corruption.

Table A5.2. Components of *Democracy* Ranked from Lowest to Highest Values by Country

El Salvador	**Indonesia**	**South Africa**
Equality before the law and individual liberty	Legislative constraints on the executive	Clean elections
Judicial constraints on the executive	Clean elections	Equality before the law and individual liberty
Clean elections	Freedom of association	Freedom of expression
Freedom of expression	Equality before the law and individual liberty	Judicial constraints on the executive
Legislative constraints on the executive	Judicial constraints on the executive	Legislative constraints on the executive
Freedom of association	Freedom of expression	Freedom of expression
Elected officials & Suffrage	Elected officials & Suffrage	Elected officials & Suffrage

Note: Elected officials and Suffrage appear in the same cells because they have the same values.

El Salvador, Indonesia, and South Africa have significant amounts of corruption as their incomplete democracies would predict. This provides indirect evidence of the first link in the causal chain between weakness in most democratic institutions and practices and high levels of corruption. Their corruption scores, on a scale of 0 to 1 with a higher number indicating more corruption are 0.59, 0.76, and 0.42 respectively. Table A5.3 shows how the aggregate scores comprise varied levels of different types of corruption. Except for judicial corruption in South Africa, the values are all moderate to high. Some other countries have even more modest levels of democracy and higher levels of corruption, but we expect for even these levels of corruption to see connections between corruption and excess deaths.

Table A5.3. Level of Corruption in Case Study Countries, 2019

Country	Executive	Public Sector	Legislative	Judicial
El Salvador	0.42	0.6	0.67	0.61
Indonesia	0.84	0.8	0.96	0.56
South Africa	0.43	0.67	0.49	0.04

Note: For consistency across corruption measures, *Executive corruption, Legislative Corruption,* and *Judicial corruption* values for this table were normalized to a 0-1 (low-high) scale like *Public sector corruption*.

To investigate possible connections, we relied on a variety of sources reporting on the period January 1, 2020 to December 31, 2021, the time our excess death measure covers. These sources included articles from local and foreign news sources and reports from international nonprofit organizations and foreign government agencies. Examples include the Salvadoran internet newspaper *El Faro*, the *Financial Times*, Transparency International, and the U.S. Department of Treasury. We located these articles and reports by conducting Google, Google Scholar, and JSTOR searches, searching additional sources in those publications where we initially found relevant articles, finding examples of corruption in South Africa's Special Investigative Unit Reports and the Indonesian Corruption Eradication Commission's reports and then more details about them through the general searches. We reviewed materials in English for all countries and also in Spanish for El Salvador. Because English is one of South Africa's official languages, including for government work, and

Spanish is El Salvador's primary language we think this was sufficient for these countries. Details of corruption cases in Indonesia were more difficult to find because no one on our team is proficient in Bahasa Indonesia, resulting in fewer examples from Indonesia.

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