DOI: 10.1111/issj.12418

ARTICLE

COVID-19 lockdown policy and national elections: A quasi-experimental analysis of Ghana's 2020 Election

Rebecca Nana Yaa Ayifah[1,3] | **Emmanuel Ayifah**[2,3]

[1]Department of Economics, University of Ghana, Accra, Ghana

[2]SEND GHANA, Accra, Ghana

[3]African Institute of Development Research and Evaluation (AIDRE), Accra, Ghana

Correspondence
Rebecca Nana Yaa Ayifah, Department of Economics, University of Ghana, Accra, Ghana.
Email: naabecklin@gmail.com

Funding information
William and Flora Hewlett Foundation

Abstract
The COVID-19 pandemic has undoubtedly had a significant adverse effect on world democracies, especially elections scheduled in 2020. Per constitutional requirements, Ghana's presidential and parliamentary elections were held on 7 December 2020. Using longitudinal national election data, we investigate the effect of the COVID-19 lockdown policy on the number of registered voters, voter turnout and vote shares of the incumbent and main opposition parties. We took advantage of the partial lockdown that was imposed in some parts of the country and employed the difference-in-difference quasi-experimental method. The results show that the COVID-19 lockdown had a positive effect on the number of registered voters and a negative effect on voter turnout. In addition, we did not find any incumbency advantage or disadvantage resulting from the COVID-19 lockdown but the COVID-19 lockdown had a positive effect on the vote share of the opposition party. These results suggest the need for other voting methods such as early voting, increasing the number of polling stations/voting centres, electronic voting and vote-by-mail which involve lesser social interaction and hence may encourage electoral participation during health pandemics.

1 | INTRODUCTION

The COVID-19 pandemic has undoubtedly had a significant adverse effect on world democracies, especially elections scheduled in 2020. To protect the general public from spreading the virus during electioneering activities, there were calls for countries to either reschedule initially planned elections or consider alternative voting processes and procedures. Although some countries did postpone their elections, others, including Ghana, Tanzania, the USA and Malawi, went ahead with their elections.

Per constitutional requirements, Ghana's general elections (presidential and parliamentary) were held on 7 December 2020. Just like all other democracies, this is the first time in the twentieth century that a general election was held in a pandemic situation. Ghana's general election is usually preceded by the registration of first-time voters and those who have lost their Voter ID Cards (VIC). However,

 © 2023 John Wiley & Sons Ltd.

Ghana's Electoral Commission (EC) compiled an entirely new voter register for the 2020 elections, and this exercise requires all citizens 18 years and above to register.

There were varied opinions among the citizenry as to whether the EC should cancel or postpone the voter registration exercise, and subsequently the entire election, due to fear of exposing peopl to the COVID-19 virus. This is because political party campaigns in most African countries including Ghana are characterized by large rallies with person-to-person contacts and, thus, raising concerns about the likelihood of COVID-19 cases increasing due to election-related activities (voters and election officials are at high risk of exposure to COVID-19). Again, and more importantly, there were concerns that even if the EC goes ahead with the voter registration and subsequently the elections, registration and voter turnouts were going to be low because of the pandemic.

Ghana confirmed its first two cases of COVID-19 on 12 March 2022. To halt the spread of the pandemic, the government banned all public gatherings, including churches, funerals, weddings and other social events on 15 March 2020 when the number of confirmed cases of COVID-19 was six. In addition, all schools, both public and private, as well as the country's borders, were closed. Despite these containment measures, the number of cases continued to increase; hence, on 30 March 2020, the government imposed a partial lockdown and restrictions on the movements of persons in the Greater Accra and Greater Kumasi metropolises of the country. These densely populated places experienced lockdown because they were at the time the epicentres or areas with higher COVID-19 cases and fatalities relative to other areas of the country. The imposition of the partial lockdown and the growing number of COVID-19 cases led to the postponement of the compilation of the new voter register from 18 April 2020 to 30 June 2020.

Elections are central to multiparty democracy as it ensures that all citizens, regardless of their social and economic resources, wield equal influence in the selection of their leaders (Cancela and Geys, 2016). An individual's participation in an electoral process may be explained by the calculus of voting model (Riker and Ordeshook, 1968; Downs, 1957). The model assumes that an individual considers the net benefit of an electoral activity before deciding to participate in it or not. This net benefit is the difference between the expected benefit of voting (satisfaction associated with the preferred candidate times the probability of being the decisive vote plus the satisfaction of voting that is independent of election outcomes) and the cost of voting which includes the costs associated with preparing to vote and the action of voting (Mueller, 2003). The COVID-19 pandemic imposes an additional cost on voters due to the high possibility of infection during voting and the cost associated with being infected (Noury et al., 2021). This increase in the cost of voting resulting from the pandemic is likely to reduce participation in electoral activities.

Earlier studies have found factors such as transportation cost, weather on the date of the election, number of simultaneous ballots, day of the week, holiday period and available voting technology and voting processes to have significant effects on electoral participation (Dubois and Lakhdar, 2007; Fauvelle-Aymar et al., 2018; Fujiwara, 2015; Fujiwara et al., 2016; Mattila, 2003). A review of the few studies on the COVID-19 pandemic and elections seems to suggest inconclusive results. Although some studies show that the pandemic impacted negatively on voter turnout (Chirwa et al., 2022; Noury et al., 2021), other studies indicated that the pandemic had a negative effect on the incumbent but a positive effect on the opposition (Baccini et al., 2021).

In this current paper, we extend the literature on COVID-19 and electoral participation by examining the effect of the COVID-19 lockdown policy on the number of registered voters, voter turnout and the vote shares of the incumbent and main opposition parties in Ghana. Owing to the non-availability of constituency-level data for COVID-19 case/death rates, we use a binary indicator of undergoing a partial lockdown early in 2020 (months before the election) to proxy for higher COVID-19 incidence. Thus, we use the imposition of the lockdown to measure the fear of contracting the virus instead of the actual COVID-19 infections and deaths, because the imposition of the lockdown was based on the number of confirmed COVID-19 cases. This is because the Greater Accra and the Greater Kumasi Metropolitan Areas and contiguous districts of the country that experienced the lockdown had the highest COVID-19 infections and fatality rates at that time. In fact, these two places continued to have the highest COVID-19 infections and fatalities even after the lifting of the lockdown restriction.

Generally, this paper is related to the literature on health shocks and electoral participation. Studies in this area have focused on the effect of health pandemics such as Ebola (Campante et al., 2020) and HIV (Mansour et al., 2020) and recently the COVID-19 pandemic. The emergence of the COVID-19 pandemic has led to growing literature on the pandemic and citizens' participation in electioneering activities. Most of these few studies are found in developed countries, particularly the United States (Baccini et al., 2021; Hart, J., 2021; Morris and Miller, 2021; Scheller, 2021; Warshaw et al., 2020; Yoder et al., 2020) and France (Adam-Troian et al., 2022; Giommoni and Loumeau, 2020). Morris and Miller (2021) analysed the effect of polling station consolidation due to the COVID-19 pandemic on voting behaviour in Milwaukee, Wisconsin. They found that the consolidation of polling stations led to lower voter turnout with the largest effect occurring among the Black population.

Similarly, Yoder et al. (2020) studied the effect of absentee voting due to COVID-19 on Texas's 14 July primary runoff, and their results show that though absentee voting increased it did not affect voter turnout. Again, in the United States, Scheller (2021) finds that older voters living in counties with higher rates of COVID-19 cases were more likely to not vote on Election Day compared to younger voters and/or voters in counties with fewer cases of COVID-19. In France, Giommoni and Loumeau (2020) and Noury et al. (2021) examined the effect of the COVID-19 pandemic on the country's local elections, whereas Giommoni and Loumeau (2020) found that lockdown measures led citizens to rally around the local incumbent politicians; the results of Noury et al. (2021) showed that COVID-19 decreased participation in the French municipal elections.

Other studies have focused on the effect of the pandemic on the vote shares of incumbent candidates. Hart, J. (2021) examined the effect of COVID-19 on Trump's support in the 2020 election and showed that the pandemic lowered Trump's support among Democrats and marginally increased his support among independent voters. Moreover, controlling for several other relevant factors, Clarke et al. (2021) showed that US voters reacted very negatively to Trump's handling of the pandemic, and the reactions affected voting for Trump and exerted a significant impact on the election outcome. Similarly, Warshaw et al. (2020) found that the pandemic had a substantial negative effect on Trump and Republican candidates, as areas with higher levels of COVID-19 fatalities were less likely to support President Trump and Republican candidates for House and Senate. Again, Shino and Smith (2021) found that one's COVID-19 health concerns depressed support for the sitting president in the United States, even among Republicans. The authors report that individuals who were very concerned about contracting COVID-19 and who were more concerned about the COVID-19 virus's impact on public health than the economy were less likely to support the re-election of Donald J. Trump.

However, other studies have shown evidence of support for the incumbent due to the pandemic (Bol et al., 2021; de Vries et al., 2021). For the French local elections, Noury et al. (2021) found that the incumbent's vote was higher in localities with more stringent COVID-19 lockdown restrictions. In Brazil, Constantino et al. (2021) reported that a higher COVID-19 incidence near the time of the election decreases voter turnout, whereas incidence farther from the election increases voter turnout. In Africa, Famous Nwankwo (2021) found a negative association between the perceived risk of COVID-19 and the probability of voting in Nigeria. A similar negative correlation between the risk of contracting COVID-19 and the propensity to vote was found in Malawi (Chirwa et al., 2022; Boniface et al., 2021).

This current study extends the growing literature on COVID-19 and elections in several ways. First, this is the first study that uses actual national election data to assess the effect of the COVID-19 lockdown on electioneering activities in Africa. A Nigerian study by Famous Nwankwo (2021) and a study in Malawi by Chirwa et al. (2022) are somewhat similar to the current paper. It is worth noting, however, that both studies looked at the perceived risk of COVID-19 and the propensity to vote (probability of voting) with pre-election survey data, whereas, in our current paper, we use actual elections data.

In this paper, we estimate the impact of the COVID-19 lockdown on the number of registered voters, voter turnout and the vote shares of the incumbent and main opposition political parties in Ghana using actual election data. Second, this study is the first to assess the effect of the COVID-19 lockdown on

the number of registered voters, to the best of our knowledge. Voter registration is the first step toward participation in voting. The effect of the COVID-19 lockdown on the number of registered voters cannot be underestimated, especially in Africa when voter register compilation is done manually. Most electoral disputes in the continent stem from the fact that people feel disenfranchised because they could not register or are prevented from voting after registering. Similar to voting, people weigh the benefits of voter registration against the cost; hence, the higher the cost, the lower the participation rate (Ansolabehere and Konisky, 2006).

The rest of the paper is organised as follows: Section 2 looks at Ghana's COVID-19 cases and government measures to contain the spread of COVID-19, as well as the 2020 election calendar. In Section 3, we present the methodology which looks at the data and estimation strategy. We then present and discuss the results in Section 4. Section 5 concludes the study.

2 | COVID-19 PANDEMIC AND NATIONAL ELECTION

2.1 | COVID-19 and government measures to contain the spread

From the initial two confirmed cases of COVID-19, the number increased to six just 3 days after the first reported cases. As of 21 September 2021, confirmed COVID-19 cases stood at 125,565, with 4296 active cases, and 120,145 recoveries, as well as 1125 deaths. As a first response, the government imposed a ban on all public gatherings exceeding 25 people on 15 March 2020. Thus, public events such as religious activities, funerals and weddings were banned. Moreover, all primary, secondary and tertiary educational institutions were closed. The citizens were advised to strictly adhere to all COVID-19 protocols such as wearing face masks and regular washing of hands. Furthermore, the country closed all of its international borders on 22 March 2020 when the number of confirmed cases rose to 23. However, the closure of borders did not affect the transportation of goods, supplies and cargo (Asante and Mills, 2020).

Despite these measures, the number of cases continued to rise; hence, exactly a week after the closure of the country's borders, the government imposed a lockdown in some parts of the country. In particular, a 3-week partial lockdown was imposed on the Greater Accra and Greater Kumasi Metropolitan Areas and contiguous districts of the country as these metropolises had become the 'epicentres' of the pandemic in Ghana. The 3-weeks lockdown began on 30 March 2020 and ended on 20 April 2020. During these periods, residents of the lockdown areas were required to stay at home and were only allowed to go out for essential items such as food, drugs and water, as well as undertake banking transactions.

In addition, all passenger travels between the restricted areas and other parts of the country were prohibited. However, individuals involved in the production, distribution and marketing of essential goods and services such as food, beverages, pharmaceuticals, medicine, paper and plastic packages, were exempted from the partial lockdown. To ensure strict adherence to the lockdown restriction, personnel of the Ghana Police Service and Ghana Armed Forces were deployed to enforce the lockdown (Asante and Mills, 2020). Although the partial lockdown was lifted on 20 April 2020, the closure of all schools and the country's borders, as well as the ban on all public gatherings, were extended throughout the month of May.

The month of June 2020 saw the relaxation of some of the restrictive measures imposed earlier. Public gatherings of a maximum of 100 persons were allowed with the mandatory wearing of face masks and strict adherence to the COVID-19 safety protocols. In addition, all final year students in secondary schools and universities were allowed to return to their schools so they could prepare for their final examinations. The limit on the number of persons at public gatherings was lifted on 1 August 2020. Moreover, tourist sites were opened but beaches, pubs, cinemas and nightclubs remained closed. The ban on international flights was lifted on 1 September 2020, though the country's land and sea borders were still closed at that time.

2.2 | Election calendar and COVID-19

Every citizen of Ghana of 18 years of age and above, and of sound mind, has the right to vote and is entitled to be registered as a voter for the purposes of public elections and referenda (Ghana's 1992 constitution, right to vote). Per Ghana's 1992 Constitution, both presidential and parliament elections are held every 4 years to elect a new president and members of the legislature. Hence, despite health concerns about the COVID-19 pandemic, Ghana's national election was held on 7 December 2020.

The EC of Ghana usually comes out with an election calendar for each election year. Per Article 45 (a) of Ghana's 1992 Constitution, the EC is vested with the authority to compile a register of voters and/or revise the register of voters for purposes of public elections (presidential, parliamentary, district assembly). Each election year begins with the registration of new voters or existing voters who have lost their VIC or the compilation of a new voters' register. The voter registration process consists of four stages: (1) the collection of biographic data of eligible persons; the name, age, sex and residential address; (2) the compilation of data into a provisional register of voters; (3) the public display of the provisional register for purposes of affording persons who successfully applied for registration the opportunity to make sure that their names have been included and that their personal details are correct and (4) the production of the final voters register as the official list of persons qualified to vote in elections. At the end of registration, voters are issued VIC which must be produced by them on Election Day.

The EC has since the beginning of multiparty democracy in 1992 used the Optical Mark Recognition (OMR) process to register eligible voters. Before every election, the EC gives opportunities to eligible voters who have not registered to do so. For the OMR process, the register of voters was computerized, but the registration process did not include the collection of biometric details of the prospective voter. An eligible voter was required to present him/herself at a registration centre where the OMR scannable form was completed with personal information. The completed forms were used to compile a computerized voters' list for specific polling stations. These voter registers were plagued by incidences of double registration, registration of unqualified voters (minors – under 18 years old and non-citizens), and the retention of names of deceased voters.

As a way of finding a solution to these problems, the EC introduced the biometric voter registration system in 2012. Thus, the EC organized a nationwide mass registration of eligible voters to compile a new voters' register using biometric technology, from 24 March to 5 May 2012, for the 2012 elections. The 2012 voters' register was updated and used for the 2016 election but in 2020, the Election Commission compiled a new voters' register. The election calendar for 2020 was adversely affected by the pandemic. Compilation of the new voters' register which was scheduled to begin on 18 April 2020 was postponed due to the partial lockdown that was imposed from 30 March 2020 to 20 April 2020. The new voters' register was compiled from 30 June to 6 August after the relaxation of some of the COVID-19 restriction measures. The voters' registration exercise was marked with little adherence to physical distance and the wearing of face masks.

Despite the COVID-19 pandemic, political campaigning for the 2020 election was very competitive and intense. The campaign consisted of very few major rallies, many smaller outdoor events such as 'health walks', and more frequent door-to-door canvassing of votes (Agbele and Saibu, 2021). Ghana experienced its first wave of the pandemic around late June to mid-July when the highest numbers of cases were recorded, and it was around the time of the compilation of the new voter register, and intensive political party campaigning started. Thus, the first wave of COVID-19 in Ghana may be partly due to the compilation of the new voters' register and the campaigning activities undertaken by political aspirants.

Similar to previous elections, the polling day was 7 December 2020. Voting for a new president and the 275 Members of Parliament occurred in 38,622 polling stations across the country. As part of measures to halt the spread of COVID-19 during the voting process, the EC instituted some COVID-19 safety protocol measures such as the washing of hands with soap and water, wearing of face masks, hand sanitization and checking of voters' temperatures; as well as the setting up of polling centres in

TABLE 1 Average constituency characteristics for lockdown and non-lockdown groups

	Pre-COVID-19 era			COVID-19 era (2020)		
	Non-lockdown	**Lockdown**	**Diff**	**Non-lockdown**	**Lockdown**	**Diff**
Voter turnout	71.41	69.59	1.82	81.51	76.68	4.83**
Registered voters	44,662	78,968	−34,306**	53,935	97,249	−43,314**
Share of voters[4]	107.42	111.28	−3.86	104.26	113.98	−9.72
Population (18+)	44,600	79,335	−34,735**	54,264	96,525	−42,261**
Flashpoints	12	14	−2	31	51	−20**
Parliament candidates	4	4	0	3	3	0
Incumbent vote share	48.47	60.22	−11.75	48.48	58.96	−10.48**
Opposition vote share	49.29	38.93	10.36**	50.15	43.62	6.53**

Note: All variables for the pre-COVID-19 era are for the year 2016 except the number of registered voters and share of registered voters which are for the year 2012. Moreover, there are 275 constituencies in Ghana so the sample size for each period is 275 (constituencies). "**" means the difference is statistically significant at 5%.
Source: Authors' Calculation from Electoral Commission Data.

open spaces, and increasing the number of polling centres. According to a report from the Coalition of Domestic Election Observer (CODEO, Ghana), these COVID-19 protocols were largely adhered to[1]. Hence, the number of new cases of COVID-19 did not rise immediately after the election. Similar to the rest of the world, the country experienced its second wave of COVID-19 around mid-February and mid-March 2021.

3 | METHODOLOGY

3.1 | Data

The data for this study come from the EC of Ghana. Specifically, we use data from the last three elections in the country, namely 2012, 2016 and 2020. This dataset covers all 275 constituencies in Ghana. It contains the number of registered voters per constituency, total votes cast, per constituency voter turnouts and the number of election flashpoints/hotspots[2] in each constituency. Other information such as the estimated total voting population (persons aged 18 years and above) per constituency, regional location of a constituency and so forth was sourced from the Ghana Statistical Service. Using the lockdown restriction imposed in some parts of the country, the 275 constituencies were grouped into lockdown and non-lockdown constituencies; and 51 and 224 constituencies fell into the former and latter groups, respectively.

3.2 | Descriptive statistics

According to the EC, the total numbers of registered voters in the last three elections in Ghana were 14,031,793; 15,712,505 and 17,027,941 for 2012, 2016 and 2020 election periods, respectively. The upward trend in the number of registered voters in the last three elections is also observed among lockdown and non-lockdown constituencies as indicated in Table 1[3]. Overall, the average number of registered voters in lockdown constituencies was statistically more than that of non-lockdown constituencies in both pre-COVID-19 (2012) and COVID-19 (2020) periods. This is not surprising as

lockdown areas are densely populated as shown by the voting population of the two groups in Table 1. It is also evident in Table 1 that the number of registered voters in the pre-COVID-19 era (2012) was lower than that of the COVID-19 era (2020) for both lockdown and non-lockdown areas.

Surprisingly, the average voter turnout rates in the lockdown constituencies are lower than that of the non-lockdown constituencies in both pre-COVID-19 (2016) and COVID-19 (2020) periods. For instance, although per constituency voter turnout in the COVID-19 election period (2020 election) was 81.5% in the non-lockdown group, that of the lockdown group was 76.7% in the same period. Similar to the number of registered voters, the voting population and the number of election flashpoints or hotspots for both lockdown and non-lockdown areas increased between the two periods. However, lockdown constituencies have more flashpoints than non-lockdown constituencies for both pre-COVID-19 and COVID-19 periods. Lastly, although the incumbent's vote share in lockdown areas reduced from 60.22% in 2016 to 58.96% in 2020, that of the main opposition party increased from 38.93% in 2016 to 43.62% in 2020.

3.3 | Model specification and estimation technique

Theoretically, we based this study on the calculus of voting model and assume that voters are rational individuals who consider the costs and benefits of any electoral activity before deciding whether to participate in it or not. Moreover, we assume that a voter's perception of the possibility of contracting the COVID-19 virus while participating in an electoral activity is positively influenced by the lockdown restriction. We use the geographical variation in the implementation of the COVID-19 lockdown policy to group constituencies into lockdown (treated) and non-lockdown (control) constituencies and hypothesized that constituencies that were affected by lockdown experienced a lower number of registered voters and turnouts in the 2020 election in comparison to constituencies that were not affected by the lockdown.

We use the national election data to estimate the effect of the COVID-19 lockdown on the number of registered voters, voter turnout rate and the vote shares of the incumbent and opposition parties. As indicated earlier, we use the imposition of the lockdown early in 2020 (months before the election) to proxy for higher COVID-19 incidence throughout 2020. First, we estimate an ordinary least squares (OLS) regression using the following equation:

$$E_i = \delta_1 + \delta_2 Lockdown_i + \delta_3 D_i + \varepsilon_i \tag{1}$$

where E_i is the outcome variable (number of registered voters and voter turnout rate) for constituency i. $Lockdown_i$ is the treatment variable which is 1 if a constituency was affected by the lockdown and 0 if otherwise. D_i is a vector of variables such as the voting population, number of flashpoints or hotspots in a constituency and the number of parliamentary candidates.

Taking advantage of the panel structure of the election data, we estimate difference-in-difference (DID) models with the following equations:

$$E_{it} = \delta_1 + \delta_2 Time_t + \delta_3 Lockdown_i + \delta_4 Time_t \times Lockdown_i + \delta_5 D_{it} + \varepsilon_{it} \tag{2}$$

$$E_{it} = \delta_1 + \delta_2 Time_t + \delta_3 Lockdown_i + \delta_4 Time_t \times Lockdown_i + \delta_5 D_{it} + C_{it} + \varepsilon_{it} \tag{3}$$

where E_{it} is the outcome variable (number of registered voters and voter turnout rate) for constituency i at time t. $Time$ is the trend dummy which is 1 for the year 2020 (COVID-19 period) and 0 for the pre-COVID-19 period. $Lockdown_i$ is the treatment variable which is 1 if a constituency was affected by the lockdown and 0 if otherwise. The coefficient (δ_4) of the interaction term measures the effect of the COVID-19 lockdown on the outcome variables. D_{it} is a vector of variables such as the voting

population, number of flashpoints or hotspots in a constituency and the number of parliamentary candidates. These factors are likely to affect electoral participation. Descriptive statistics on these variables can be found in Table A1. In addition, we include constituency fixed effect C_{it} to control for unobserved heterogeneity, and this gives us Equation (3). ε_{it} is the error term. Three outcome variables are considered. These are the number of registered voters per constituency in the 2012[5] and 2020 election periods; voter turnout rates per constituency in the 2016 and 2020 election periods and the vote shares of political parties (incumbent and main opposition party) in 2016 and 2020. The number of registered voters is given by the total number of persons aged 18 years and above who registered to vote in a constituency, whereas voter turnout is the total number of votes cast divided by the total number of registered voters.

Lastly, we investigate the effect of the COVID-19 lockdown on vote shares of the incumbent party (New Patriotic Party [NPP]) and the main opposition party (National Democratic Congress [NDC]) with the following equations:

$$P_{jit} = \delta_1 + \delta_2 Time_t + \delta_3 Lockdown_i + \delta_4 Time_t \times Lockdown_i + \delta_5 D_{it} + \varepsilon_{it} \quad (4)$$

$$P_{jit} = \delta_1 + \delta_2 Time_t + \delta_3 Lockdown_i + \delta_4 Time_t \times Lockdown_i + \delta_5 D_{it} + C_{it} + \varepsilon_{it} \quad (5)$$

where P_{jit} is the vote share of party j in constituency i at time t. The vote share of a party is measured as the total number of valid votes obtained by the party in a constituency divided by the total number of valid votes cast in that constituency multiple by 100. All other variables are as defined above. We, first estimate Equations (1)–(4) with the OLS method with the 2020 data, and then we use the DID method and, finally, we include constituency fixed effects in the latter estimation. In interpreting the results, the parameter of interest is the coefficient of the interaction term, 'LockTime (Interaction)', which measures the effects of the COVID-19 lockdown on the outcome variables (number of registered voters, voter turnout and vote shares of the incumbent and the main opposition party).

We test the parallel trend assumption underlying the DID estimation method with pre-COVID-19 election data (i.e. 2012 and 2016 election data), and the results could be found in Table A2. As indicated in columns 2 and 3 of Table A2, we found a negative trend in voter turnout rate and a positive trend in the number of registered voters between 2012 and 2016. However, the coefficient of interaction term shows that there is no statistically significant difference in the pre-COVID-19 lockdown trends between constituencies that were affected by the lockdown and those that were not affected. This evidence means that we could plausibly assume that the parallel trend assumption holds.

4 | ESTIMATION RESULTS[6]

4.1 | Number of registered voters

The results of the effect of COVID-19 lockdown on the number of registered voters are shown in Table 2. Columns 1 and 3 show the results without control variables, whilst columns 2 and 4 show the results when controls are included in the estimation (see Table A6 in the appendix for the full results). Column 5 is similar to column 4 but it also includes constituency fixed effect. We also estimated Equations (1)–(3) using the share of registered voters as our dependent variable, and the results are similar to the ones found for the number of registered voters (see Table A3).

Contrary to our expectations, the result shows that the COVID-19 lockdown had a positive effect on the number of registered voters for the 2020 election. Thus, the number of registered voters in constituencies that were affected by the lockdown was statistically more than those in the non-lockdown constituencies. The same positive effect is obtained even after controlling for confounding factors such as voting population, number of flashpoints, number of parliamentary candidates and constituency fixed effect. Focusing on the DID results, overall, the number of registered voters in lockdown

TABLE 2 Effect of the COVID-19 lockdown on number of registered voters (2012 and 2020)

	OLS		DID		Fixed effect
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Lockdown	43,314***	21,660***	34,306***	17,567***	
	(4964)	(5188)	(3626)	(3635)	
LockTime (interaction)			9008**	10,307**	9192**
			(4146)	(4132)	(4144)
Time			9273***	11,322***	10,165***
			(926.0)	(1457)	(1354)
Constant	53,936***	24,496***	51,025***	43,757***	42,655***
	(1561)	(3867)	(531.7)	(3376)	(3514)
Observations	275	275	550	550	550
R^2	0.304	0.547	0.300	0.314	0.324
Controls	No	Yes	No	No	Yes
Constituency fixed effect	No	No	No	No	Yes

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviations: OLS, ordinary least squares; DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

constituencies was about 9000 more than that of non-lockdown constituencies. This increased to about 10,300 when we included control variables.

This result may be driven by the fact that the voter registration exercise served as a form of social gathering for persons whose movements were restricted due to the imposition of the COVID-19 lockdown. Thus, with the removal of the lockdown restrictions, people in the lockdown areas were naturally eager to go out and interact as they had been camped at homes for long periods. It was observed that large crowds gathered at the various registration centres during the early days of the voter registration exercise in the lockdown constituencies. Moreover, most Ghanaians use VIC as forms of identification for banking, insurance and other transactions. This is because, until recently[7] the country did not have a national ID card, and thus, passports, driving licenses and VIC were generally accepted forms of identification for these transactions nationwide. Because of the cumbersome and/or bureaucratic processes involved in acquiring passports and driving licenses, most Ghanaians, especially the uneducated and/or those from lower socio-economic backgrounds, opt for VIC which are relatively easy and cheaper to acquire (free because there is no charges/money involved). Consequently, there was a huge incentive to go out and register and have access to VIC. Hence, despite the high risk of contracting the COVID-19 virus, most people participated in voter registration as the benefits of using a Voter ID not just for voting but for other important transactions outweigh the costs of being infected with COVID-19.

4.2 | Voter turnout

Table 3 presents the results of the effect of COVID-19 lockdown on voter turnout in Ghana. Columns 1 and 2 show the OLS results without and with covariates respectively. For the Difference-in-Difference results, columns 3 and 4 show the results without and with covariates; whilst column 5 shows this result with both covariates and constituency fixed effect (see Table A6 in the appendix for the full result).

TABLE 3 Effect of the COVID-19 lockdown on voter turnout (2016 and 2020)

	OLS		DID		Fixed effect
Variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Lockdown	−4.826***	−4.179**	−1.822***	−1.28***	
	(1.203)	(1.515)	(0.425)	(0.864)	
LockTime (Interaction)			−3.004**	−3.60**	−4.017**
			(0.089)	(0.160)	(1.650)
Time			10.09***	9.465***	8.661***
			(0.689)	(0.189)	(1.011)
Constant	81.51***	82.13***	71.08***	72.94***	60.12***
	(0.472)	(0.673)	(0.182)	(1.152)	(1.320)
Observations	275	275	550	550	550
R^2	0.034	0.044	0.479	0.482	0.482
Controls	No	Yes	No	Yes	Yes
Constituency fixed effect	No	No	No	No	Yes

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviations: OLS, ordinary least squares; DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

Though the OLS estimates were bigger than the DID estimates, overall, we observed a significant drop in voter turnout rates. Relative to the 2016 election, the voter turnout rate in the 2020 election was 3 percentage points lower for constituencies that were affected by the COVID-19 lockdown. The average drop in voter turnout increased to about 3.6 percentage points when we included control variables in the estimations. The perceived risk of becoming infected while voting caused a reduction in voter turnout. There was a gradual increase in COVID-19 cases around the time the voter registration exercise went on, and when intensive political party campaigning started. Hence, coupled with the fact that many people were just interested in acquiring voter IDs for reasons other than voting as explained earlier, a reduction in voter turnout may be explained by the perceived risk of becoming infected while voting because of the higher reported COVID-19 cases in the lockdown constituencies relative to the non-lockdown constituencies. This result is in-line with our expectations and the calculus of voting theory. Similar results have been found in France (Leromain and Vannoorenberghe, 2021; Noury et al., 2021) and the USA (Morris and Miller, 2021).

4.3 | Vote shares of the incumbent and the main opposition party

COVID-19 is likely to have different effects on the vote shares of different political parties, particularly the incumbent. The incumbent may benefit from the pandemic if the 'rally around the flag hypothesis' holds (Giommoni and Loumeau, 2020). Thus, the imposition of the lockdown and other COVID-19 measures may increase voters' trust in the incumbent because these measures improve their welfare. On the other hand, the pandemic may cause a drop in the incumbent's vote share if voters are not in favour of the latter's COVID-19 measures. Similarly, opposition parties may gain or lose votes depending on how they respond to the COVID-19 pandemic.

Table 4 shows the effect of the COVID-19 lockdown on the vote shares of the incumbent, the NPP and the main opposition party, the NDC. We found no evidence of incumbency advantage or

TABLE 4 Effect of the COVID-19 lockdown on parties' vote shares (2016 and 2020)

	Incumbent			Opposition		
Variables	**DID**		**Fixed effect**	**DID**		**Fixed Effect**
Lockdown	11.74***	9.511***		−10.36***	−10.55**	
	(0.0931)	(0.667)		(0.015)	(0.241)	
LockTime (interaction)	−0.2641	−0.703	−1.276	3.825***	3.497***	3.315***
	−0.9131	(0.851)	−1.069	(0.0082)	(1.251)	(0.612)
Time	0.0092***	−0.903	−0.125	0.864***	1.127	−0.409
	(0.0004)	(0.965)	(1.051)	(0.0108)	(0.804)	(1.005)
Constant	50.65***	41.97***	41.97***	47.37***	46.33***	47.11***
	(0.0751)	(1.116)	(8.717)	(0.241)	(3.197)	(9.351)
Observations	550	550	550	550	550	550
R^2	0.21	0.221	0.214	0.21	0.221	0.214
Controls	No	Yes	Yes	No	Yes	Yes
Constituency fixed effect	No	No	Yes	No	No	Yes

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviation: DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

disadvantage due to the COVID-19 lockdown[8]. However, the results show that the main opposition party benefited from the COVID-19 pandemic. Specifically, the opposition party's vote share increased by about 3.8 percentagepoints due to the lockdown. This increase in the vote share of the opposition party was reduced to 3.5 percentage points when we controlled for confounding factors that are likely to affect its vote share (see Table A7 in the appendix for the full result). A plausible explanation for this result could be the fact that the main opposition party constituted a COVID-19 technical team[9], who were seen providing various suggestions to the government on how to halt the spread of the coronavirus in the country. Our results contradict findings in France when there was an increase in the incumbent's vote share (Giommoni and Loumeau, 2020) and in the USA where the pandemic led to a drop in the incumbent's vote share (Baccini et al., 2021).

4.4 | Robustness of the results

To assess the robustness of these results, we conducted two main sensitivity analyses. First, we excluded constituencies in the Accra Metropolitan Assembly (AMA) and Kumasi Metropolitan Assembly (KMA) areas from our observations, and the estimation results are shown in Table A4. The AMA and KMA constitute about 40% of the areas that were affected by the lockdown, hence, to ensure that our results are not driven by these metropolises we excluded them. From Table A4, the COVID-19 lockdown had a negative and a positive effects on voter turnout and the number of registered voters in the 2020 election, respectively. The addition of covariates and constituency fixed effects did not change these results.

Second, we use a propensity score matching combined with a DID method to evaluate the effect of the COVID-19 lockdown on the number of registered voters and voter turnout. This technique is done in two stages. The first stage involves using a propensity score matching method (specifically, we used a biweight kernel propensity score matching) to find a subset of non-lockdown

constituencies whose propensity scores are similar to those of the lockdown constituencies. In the second stage, a DID estimation is performed on these 'matched constituencies' to determine the impact of the COVID-19 lockdown. The imposition of the region of common support for the propensity score matching reduced the sample size marginally. The results obtained from the matching combined with DID are similar to the main results as indicated in Table A5. The COVID-19 lockdown had a negative effect on voter turnout and a positive effect on the number of registered voters.

5 | CONCLUSIONS AND RECOMMENDATIONS

The COVID-19 pandemic has undoubtedly had a significant adverse effect on world democracies, especially elections scheduled in 2020. Per constitutional requirements, Ghana's general elections (presidential and parliamentary) were held on 7 December 2020. Just like all other democracies, this was the first time in the twentieth century that a general election has been held in a pandemic situation. We provide evidence of the effect of the COVID-19 lockdown policy on national elections using Ghana as a case study. We took advantage of the partial lockdown policy that was implemented in the Greater Accra and Greater Kumasi Metropolises of Ghana to divide the 275 constituencies in the country into treated (lockdown) and control (non-lockdown) groups. We applied the DD estimation method to estimate the effect of the COVID-19 lockdown on the number of registered voters, voter turnout and the vote shares of the incumbent and the main opposition party.

Our results show that the COVID-19 lockdown policy had a positive effect on the number of registered voters. Thus, the number of registered voters in the lockdown constituencies was statistically more than those in the non-lockdown areas. Similar to studies in the United States and France, we find evidence of a drop in voter turnout due to the pandemic's lockdown. Thus, the 2020 national election witnessed a reduction in turnout rates of between 3 and 4 percentage points because of the COVID-19 lockdown. In terms of the vote shares of political parties, the results show that the COVID-19 lockdown had no effect on the incumbent's vote share; but it increased the vote share of the main opposition party by about 3 percentage points. Thus, our results suggest no incumbency advantage or disadvantage in the election because of the COVID-19 lockdown.

These results have important implications for the management of national elections during pandemics. The results suggest that there is a need for the implementation of other voting methods that do involve lesser social interactions. These voting methods include early voting, increasing the number of polling stations/voting centres, electronic voting and vote-by-mail. These voting methods are very important, especially in Africa where voting is mostly in person. For health pandemics like COVID-19 where social distancing and isolation are critical to contain their spread, the use of these methods will reduce the fear of the possibility of being infected and, thus, encourage more people to vote. In addition, these results suggest that responses by political parties to health pandemics such as COVID-19 are very important not only for the economic welfare of the citizens but also for the electoral fortune of these parties as the main opposition party's vote share increased due to the COVID-19 lockdown.

ACKNOWLEDGEMENTS

Funding for this study was provided by the Hewlett Foundation under the Evidence in Governance and Politics (EGAP) program of the University of California, Berkeley, USA. We thank EGAP researchers and affiliates for insightful comments on an earlier version of this paper. In addition, we thank the Electoral Commission of Ghana for granting us access to the electoral data for this study. Moreover, we thank the Ghana Health Service, the EC and all participants at the inception workshop for their insightful contributions.. Finally, our sincere thanks go to all participants of the 2022 Working Group on African Political Economy (WGAPE) Conference at Cornell University and the Centre for the Study of African Economies (CSAE), University of Oxford conference on Economic Development in Africa 2023 for their suggestions on an earlier version of the paper.

CONFLICT OF INTEREST STATEMENT

All authors declare that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

PEER REVIEW

The peer review history for this article is available at https://publons.com/publon/10.1111/issj.12418

ORCID

Rebecca Nana Yaa Ayifah https://orcid.org/0000-0003-1242-4612

ENDNOTES

[1] A report by Coalition of Domestic Election Observers, Ghana. Retrieved from https://www.codeoghana.org/assets/downloadables/CODEO%20End%20of%20Poll%20Press%20Release%20on%202020%20Elections_7%20December_2020.FINAL_doc.pdf.

[2] Election flashpoints/hotspots are areas that are very prone to chaos and violence on Election Day. In every election year, the Ghana Police Service furnishes the National Election Security Taskforce with the list of hotspot areas in all regions across the country. Identified hotspots are keenly monitored in order to prevent or foil any attempts to cause tension ahead, during and post-elections. In all, 4098 hotspots or flashpoints were identified in the 2020 election.

[3] Table 1 shows systematic differences between areas that experienced lockdown and those that did not, focusing on variables such as voting population, number of registered voters, number of flashpoints and voter turnout rates. Due to data limitations, we are unable to specifically include other information such as population density, political leaning (incumbent, main opposition, other), rural/urban divide, socio-economic status and among others. It is worth noting, however, that, some of these variables may not be relevant in this case. For instance, most of the lockdown areas are urban, whereas non-lockdown areas are a mixture of urban and rural areas.

[4] The share of registered voters is measured as the total number of registered voters divided by the voting population. The numbers of registered voters' datasets were obtained from Ghana Electoral Commission, whereas the voting population values (estimated voting population since the GSS used the 2010 census to estimate yearly population until the recent census in 2021) were obtained from the Ghana Statistical Service (GSS). We realized that for most constituencies, the number of registered voters was more than the voting population. Hence, the percentage share of registered voters was more than 100 in most constituencies, and the average shares of registered voters are over 100% can be seen in Table 1. Therefore, we used the number of registered voters instead of the share of registered voters in this study.

[5] We considered the number of registered voters in 2012 and 2020 election periods because these are the two most recent election periods where 'fresh voters' registers' have been compiled. The 2012 voters' register was updated and used for the 2016 election but a new register was compiled in 2020 for that year's election.

[6] Spatial correlation may affect the results if constituencies or voters within constituencies have certain geographical attributes that cause them to vote in a particular direction. However, spatial correlation may not be peculiar to a particular group (lockdown or non-lockdown constituencies).

[7] The national identification exercise that seeks to give national ID cards to all Ghanaians is still on-going.

[8] We do not have data on how incumbency and opposition parties vary spatially across the lockdown and non-lockdown areas. However, it is an open secret that out of the two lockdown areas, Kumasi is noted to be the stronghold of the incumbent NPP party, having huge winning margins in all presidential and parliamentary elections since the country started multiparty democracy in 1992, whereas Accra swings between the incumbent (NPP) and the main opposition (NDC) party.

[9] Although the incumbent NPP used the government machinery in discussing COVID-19 through the president's periodic addresses and the Ghana Health Service and Ministry of Information organised press conferences, in addition to the numerous measures to contain the outbreak, the opposition NDC also set up a COVID-19 technical team, where they were providing suggestions and critiquing the way government was handling the pandemic and general effect on the economy and also donated quantities of Personal Protective Equipment (PPE) to some hospitals like the Korle-Bu Cardiothoracic Centre to help fight the pandemic.

REFERENCES

Adam-Troian, J., E. Bonetto, F. Varet, T. Arciszewski, and T. Guiller. 2022. "Pathogen threat increases electoral success for conservative parties: Results from a natural experiment with COVID-19 in France." *Evolutionary Behavioral Sciences*. Advance online publication. https://doi/10.1037/ebs0000302

Agbele, F., and G. Saibu. 2021. Managing Elections under Covid-19 Pandemic Conditions: The Case of Ghana. www.electoralmanagement.com

Ansolabehere, S., and D. M. Konisky. 2006. "Society for Political Methodology The Introduction of Voter Registration and Its Effect on Turnout." *Source: Political Analysis* 14(1): 83–100. https://doi.org/10.1093/pan/mpi034

Anthony, Downs. 1957."An Economic Theory of Political Action ina Democracy". *Journal of Political Economy* 56(1): 23–34. https://www.jstor.org/stable/1827369

Asante, L. A., and R. O. Mills. 2020. "Exploring the Socio-Economic Impact of COVID-19 Pandemic in Marketplaces in Urban Ghana." *Africa Spectrum* 55(2): 170–81.

Baccini, L., A. Brodeur, and S. Weymouth. 2021. The COVID-19 Pandemic and the 2020 US Presidential Election. https://doi.org/10.1007/s00148-020-00820-3

Bol, D., M. Giani, A. Blais, and P. J. Loewen. 2021. "The Effect of COVID-19 Lockdowns on Political Support: Some Good News for Democracy?" *European Journal of Political Research* 60: 497–505. https://doi.org/10.1111/1475-6765.12401

Campante, F. R., E. Depetris-Chauvin, R. Durante, U. S. Filipe, and R. Campante. 2020. "The Virus of Fear: The Political Impact of Ebola in the US." https://www.c-span.org/video/?c4510790/user-clip-tillis-ebola&start=1567.

Cancela, J., and B. Geys. 2016. Explaining Voter Turnout: A Meta-Analysis of National and Subnational Elections. Electoral Studies. https://doi.org/10.1016/j.electstud.2016.03.005

Chirwa, G. C., B. Dulani, L. Sithole, J. J. Chunga, W. Alfonso, and J. Tengatenga. 2022. "Malawi at the Crossroads: Does the Fear of Contracting COVID-19 Affect the Propensity to Vote?" *The European Journal of Development Research* 34: 409–31. https://doi.org/10.1057/s41287-020-00353-1

Clarke, H., M.C. Stewart, and K. Ho. 2021. "Did Covid-19 Kill Trump Politically? The Pandemic and Voting inthe 2020 Presidential Election." *Social Science Quarterly* 102: 2194–2209. https://doi.org/10.1111/ssqu.12992

Constantino, S. M., A. D. Cooperman, and T. M. Q. Moreira. 2021. "Voting in a global pandemic:Assessing dueling influences of Covid-19 on turnout." *Social Science Quarterly* 102: 2210–2235. https://doi/10.1111/ssqu.13038

de Vries, C. E., B. N. Bakker, S. B. Hobolt, and K. Arceneaux. 2021. Crisis Signaling: How Italy's Coronavirus Lockdown Affected Incumbent Support in other European Countries. https://doi.org/10.1017/psrm.2021.6

Dubois, E., and C. B. Lakhdar. 2007. "More on the Seasonal Determinants of Turnout: Holidays and French Presidential Elections." *French Politics* 5: 144–59. https://doi.org/10.1057/palgrave.fp.8200123

Boniface, D., A. Harris, E. Lust, Karen Ferree,Kristen Kao, Cecilia Ahsan Jansson, and Erica Ann Metheney. 2021. " Election-sin the time of covid-19: the triple crises around Malawi's 2020 presidentialelections". *Journal of Elections, Public Opinion and Parties* 31(sup1): 56–68. https://doi/10.1080/17457289.2021.1924745

Famous Nwankwo, C. 2021. "COVID-19 Pandemic and Political Participation in Lagos, Nigeria." *SN Social Sciences* 1: 146. https://doi.org/10.1007/s43545-021-00161-2

Fauvelle-Aymar, C., and A. François. 2018. "Place of Registration and Place of Residence: The Non-Linear Detrimental Impact of Transportation Cost on Electoral Participation." *Public Choice* 176: 405–40. https://doi.org/10.1007/s11127-018-0561-1

Fujiwara, T. 2015. "Voting Technology, Political Responsiveness, and Infant Health: Evidence From Brazil." *Econometrica* 83(2): 423–64. https://doi.org/10.3982/ECTA11520

Fujiwara, T., K. Meng, and T. Vogl. 2016. "Habit formation in voting: Evidence from rainy elections." *American Economic Journal: Applied Economics* 8(4): 160–188. https://doi.org/10.1257/app.20140533

Giommoni, T., and G. Loumeau. 2020. "Lockdown and Voting Behaviour: A Natural Experiment on Postponed Elections during the COVID-19 Pandemic." *Covid Economics* 41: 69–99. https://doi.org/10.3929/ethz-b-000466704

Hart, J. 2021. Did the COVID-19 Pandemic Help or Hurt Donald Trump's Political Fortunes?. https://doi.org/10.1371/journal.pone.0247664

Ichino, N., and N. L. Nathan. 2013. "Crossing the Line: Local Ethnic Geography and Voting in Ghana." *American Political Science Review* 107(2): 344–61. https://doi.org/10.1017/S0003055412000664

Leromain, E., and G. Vannoorenberghe, 2022. "Voting under threat:evidence from the 2020 French local elections". *European Journal ofPolitical Economy, Wlsevier* 75. https://doi/10.1016/j.ejpoleco.2022.102204

Mansour, H., D. I. Rees, and J. M. Reeves. 2022. "Voting and Political Participation in the Aftermath of the HIV/AIDS Epidemic." *Journal of Human Resources*. https://doi/10.3368/jhr.0621-11716R1

Mattila, M. 2003. "Why Bother? Determinants of Turnout in the European Elections." *Electoral Studies* 22: 449–468. https://doi.org/10.1016/S0261-3794(01)00054-3

Morris, K., and P. Miller. 2021. "Voting in a Pandemic: COVID-19 and Primary Turnout in Milwaukee, Wisconsin." *Urban Affairs Review* 58: 597–613. https://doi.org/10.1177/10780874211005016

Mueller, D. C. 2003. *Public Choice III*. Cambridge, London, UK: Cambridge University Press.

Noury, A., A. François, O. Gergaud, and A. Garel. 2021. "How Does COVID-19 Affect Electoral Participation? Evidence from the French Municipal Elections." *PLoS One* 16(2). https://doi.org/10.1371/journal.pone.0247026

Riker, W. H., and P. C. Ordeshook. 1968. "A Theory of the Calculus of Voting." *The American Political Science Review* 62: 25–42

Scheller, D. S. 2021. "Pandemic primary: the interactive effects of COVID-19prevalence and age on voter turnout." *Journal of Elections, Public Opinion andParties* 31(sup1): 180–190. https://doi/10.1080/17457289.2021.1924728

Shino, Enrijeta, and D. A. Smith. 2021. "Pandemic politics: COVID-19, healthconcerns, and vote choice in the 2020 General Election." *Journal of Elections,Public Opinion and Parties* 31(1): 191–205. https://doi.org/10.1080/17457289.2021.1924734

Warshaw, C., L. Vavreck, and R. Baxter-King. 2020. "Fatalities from COVID-19 are Reducing Americans' Support for Republicans at Every Level of Federal Office." *Science Advances* 6: eabd8564. http://advances.sciencemag.org/

Yoder, J., C. Handan-Nader, A. Myers, T. Nowacki, D. M. Thompson, J. A. Wu, C. Yorgason, and A. B. Hall. 2020. Absentee Voting Is Popular During COVID-19 But Does Not Change Turnout or Partisan Rates of Voting. https://www.pewresearch.org/fact-tank/2020/07/20/as-covid-19-cases-increase-most-

How to cite this article: Ayifah, Rebecca Nana Yaa, and Emmanuel Ayifah. 2023. "COVID-19 lockdown policy and national elections: A quasi-experimental analysis of Ghana's 2020 Election." *International Social Science Journal* 1–20. https://doi.org/10.1111/issj.12418

APPENDIX

TABLE A1 Descriptive statistics

2020	**Obs.**	**Mean**	**Std. dev.**	**Min**	**Max**
Voter turnout	275	79.89	7.57	28.50	92.00
Registered voters	275	61,969	30,609	17,573	173,619
Share of registered voters	275	106.06	36.40	41.43	286.93
Voting population	275	62,102	33,039	13,498	231,371
Flashpoints	275	35	29	0	161
Parliamentary candidates	275	3	1	2	6
2016	Obs.	Mean	Std. dev.	Min	Max
Voter turnout	275	71.08	6.56	29.63	85.96
Registered voters	275	57,327	25,926	13,753	141,698
Share of registered voters	275	109.93	53.87	26.66	821.15
Voting population	275	56,463	30,039	12,272	210,362
Flashpoints	275	12	23	0	81
Parliamentary candidates	275	4	1	2	7
2012	Obs.	Mean	Std. dev.	Min	Max
Voter turnout	275	80.35	4.86	64.1734	98.11
Registered voters	275	51,025	23,702	12,082	126,659
Share of registered voters	275	108.14	53.95	24.41	806.54
Flashpoints	275	10	13	0	5
Voting population	275	51,042	27,155	11,094	190,167
Parliamentary candidates	275	4.77	1.38	2	9

Parallel trend assumption results

TABLE A2 Effect of COVID-19 on registered voters and voter turnout (2012 and 2016)

	Voter Turnout	Registration		
	(1)	(2)	(1)	(2)
Lockdown	0.351	1.508*	0.0386	0.228***
	(0.613)	(0.817)	(0.0715)	(0.616)
LockTime (interaction)	−2.173	−2.091	−0.00612	0.101
	(1.368)	(1.390)	(0.101)	(0.0863)
Time	−8.933***	−8.800***	0.0191	0.0980*
	(0.403)	(0.290)	(0.0531)	(0.0571)
Constant	80.35***	81.96***	1.074***	1.043***
	(0.121)	(1.011)	(0.0375)	(0.101)
Observations	550	550	550	550
R^2	0.393	0.404	0.341	0.578
Controls	No	Yes	No	Yes

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

Using share of registered voters

TABLE A3 Effect of the COVID-19 lockdown on share of registered voters

	OLS		DID		Fixed Effect
Variables	(1)	(2)	(3)	(4)	(5)
Lockdown	0.0972***	0.306***	0.0386***	−0.00794	
	(0.0052)	(0.0679)	(0.0071)	(0.0169)	
LockTime (interaction)			0.0587***	0.0851***	0.062***
			(0.0041)	(0.0006)	(0.0055)
Time			0.0316***	0.0143***	−0.0316***
			(0.0006)	(0.0020	(0.0007)
Constant	1.043***	1.287***	1.074***	0.883***	1.081***
	(0.0020)	(0.0439)	(0.0005)	(0.0329)	(0.0031)
Observations	275	275	550	550	550
R^2	0.304	0.547	0.300	0.314	0.324
Controls	No	Yes	No	Yes	Yes
Constituency fixed effect	No	No	No	No	Yes

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviations: OLS, ordinary least squares; DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

Exclusion of Accra Metropolitan Assembly and Kumasi Metropolitan Assembly

TABLE A4 Effect of the COVID-19 lockdown on registered voters and voter turnout

	Voter turnout			**Registered voters**		
	DID		**FE**	**DID**		**FE**
Lockdown	−2.355***	−1.64***		35,611***	17,525	
	(0.0071)	(0.028)		(4.47e − 10)	(3381)	
LockTime (interaction)	−3.157***	−3.944**	−4.232**	12,534***	8355***	10,303***
	(0.0031)	(1.581)	(1.877)	(3158)	(1465)	(2546)
Time	10.09***	9.159***	8.602***	9273***	7141***	7556***
	(0.0996)	(1.019)	(1.369)	(0.0001)	(2140)	(3071)
Constant	71.04***	74.25***	60.58***	44,662***	7443***	28,885***
	(0.313)	(2.334)	(6.909)	(7.11e − 11)	(2653)	(19,310)
Observations	532	532	532	532	532	532
R^2	0.474	0.478	0.478	0.344	0.606	0.348
Controls	No	Yes	Yes	No	Yes	Yes
Constituency fixed effect	No	No	Yes	Nn	No	Yes

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviation: DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

Matching with difference-in-difference

TABLE A5 Effect of the COVID-19 lockdown on registered voters and voter turnout

	Voter turnout			**Registered voters**		
	DID		**FE**	**DID**		**FE**
Lockdown	−2.355***	−1.64***		31,519***	16,553***	
	−0.0071	−0.028		(4142)	(3956)	
LockTime (interaction)	−3.16***	−3.944**	−4.232**	11,859***	9798***	9926***
	(0.0031)	(1.581)	(1.877)	(6164)	(5556)	(4098)
Time	10.09***	9.159***	8.602***	9273***	7319***	6292***
	(0.0996)	(1.019)	(1.369)	(1986)	(1962)	(2224)
Constant	71.04***	74.25***	60.58***	44,662***	3955	17,708
	(0.313)	(2.334)	(6.909)	(1227)	(3374)	(13,830)
Observations	530	530	530	526	526	526
R^2	0.474	0.478	0.478	0.294	0.588	0.351
Controls	No	Yes	Yes	No	Yes	Yes
Constituency fixed effect	No	No	Yes	No	No	Yes

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviation: DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

Full results

TABLE A6 Effect of the COVID-19 lockdown on registered voters and voter turnout

	Number of registered voters			Voter turnout		
Variables	**OLS**	**DID**	**FE**	**OLS**	**DID**	**FE**
Lockdown	21,660***	17,567***		−4.179**	−1.28***	
	(5,188)	(3,635)		(1.515)	(0.864)	
LockTime (interaction)		10,307**	9192**		−3.60**	−4.017**
		(4132)	(4144)		(0.160)	(1.650)
Time		11,322***	10,165***		9.465***	8.661***
		(1457)	(1354)		(0.189)	(1.011)
Voting population		0.40185	0.2665	0.0003	−4.16e − 05	0.000205
		(0.1780)	(0.3535)	(0.0053)	(2.23e − 05)	(0.00019)
Flashpoints	254.5***	243.9	64.24*	0.0235	0.0431*	0.0125
	(71.57)	(47.02)	(5.128)	(0.0177)	(0.00409)	(0.0124)
No. parliamentarians	254.5***	5789*	1589**	0.077***	0.107	−0.191
	(71.57)	(767.7)	(50.42)	(0.0038)	(0.932)	(0.490)
Constant	24,496***	43,757***	42,655***	82.13***	72.94***	60.12***
	(3867)	(3376)	(3514)	(0.673)	(1.152)	(1.320)
Observations	275	550	550	275	550	550
R^2	0.581	0.374	0.39	0.044	0.482	0.482

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviations: OLS, ordinary least squares; DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.

TABLE A7 Effect of the COVID-19 lockdown on political parties' vote share

	Incumbent		Opposition	
Variables	**DID**	**FE**	**DID**	**FE**
Lockdown	9.511***		−10.55**	
	(0.667)		(0.241)	
LockTime (interaction)	−0.703	−1.276	3.497***	3.315***
	(0.851)	(1.069)	(1.251)	(0.612)
Time	−0.903	−0.125	1.127	−0.409
	(0.965)	(1.051)	(0.804)	(1.005)
Voting population	7.04e − 05	0.0160	−4.92e − 05*	5.62e − 05
	(1.62e − 05)	(0.0333)	(7.68e − 06)	(0.000152)
Flashpoints	−0.0443	−0.0330	0.0300	0.0168*
	(0.0433)	(0.0110)	(0.0647)	(0.00141)
No. parliamentarians	−1.586**	0.0158	0.825	−0.749
	(0.0515)	(0.535)	(0.533)	(0.305)
Constant	41.97***	41.97***	46.33***	47.11***
	(1.116)	(8.717)	(3.197)	(9.351)
Observations	550	550	550	550
R^2	0.221	0.214	0.221	0.214

Note: Robust standard errors clustered at the treatment level in parentheses. Covariates include the number of flashpoints within a constituency, number of parliamentary candidates and voting population (number of persons aged 18 years and above).
Abbreviation: DID; difference-in-difference.
***$p < 0.01$.
**$p < 0.05$.
*$p < 0.1$.