Trust in Government and Lockdown Compliance in Sub-Saharan Africa

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Abstract

In the fight against COVID-19, Sub-Saharan Africa has performed much better (in terms of total cases and deaths) than Europe, where higher trust in national governments has been associated with greater initial compliance with coronavirus-related lockdowns. This investigation fills a gap in the literature by examining that same relationship but in Sub-Saharan Africa. Using an OLS methodology with country fixed effects, this study surprisingly finds that higher trust in government was associated with *lower* initial compliance with such lockdowns in the region, as measured by the percent change in human movement one week before vs. one week after each lockdown began. These findings are robust to different specifications. However, the countries and national subregions in this study's data are not necessarily representative of the entire region.

Keywords: COVID-19, Africa, political trust, compliance, shelter-in-place
JEL codes: E71, I12, H12, I18

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1 Introduction

The COVID-19 pandemic has greatly impacted life on every corner of the planet. As of this writing, there have been over 70 million cases of the virus—20 million of them active—and it has killed 1.6 million people, at a current rate of over 10,000 deaths per day (Worldometers). It has posed not only a tremendous public health burden on the world, but also an economic one: global GDP is projected to have fallen 3.7% in 2020 (Fitch).

Yet despite the region's history of deadly disease outbreaks, Sub-Saharan Africa has been relatively spared by the virus—a pleasant surprise for experts who predicted much worse. As of November 23, 2020, the region has seen over two million cases and 48,000 deaths, which is less than 4% of the global total (DW News). This is particularly impressive, considering that Sub-Saharan Africa is home to more than 1.1 billion people but shares similar case and death totals with European countries such as France and Russia (DW News).

Still, there is room for concern. Despite the fact that over 10.5 million tests have been administered, case numbers in the region are likely underestimated (DW News). For example, Tanzania has not reported case numbers or deaths at all since April, when President Magufuli declared the country free of the virus (Dahir). Furthermore, the World Health Organization warns that the continent is headed towards a second wave of infections, as 20 of the region's countries have experienced a dramatic spike in cases in the last month, and even more are expected due to the public gatherings associated with upcoming national elections (DW News). The virus has already made life exceptionally difficult for the region's inhabitants: pregnant mothers have been unable to give birth at medical centers, students have been forced to continue their classes online despite many lacking in-home internet, and public health policies implemented in response to the virus have threatened the survival of countless people who are no longer able to earn income.

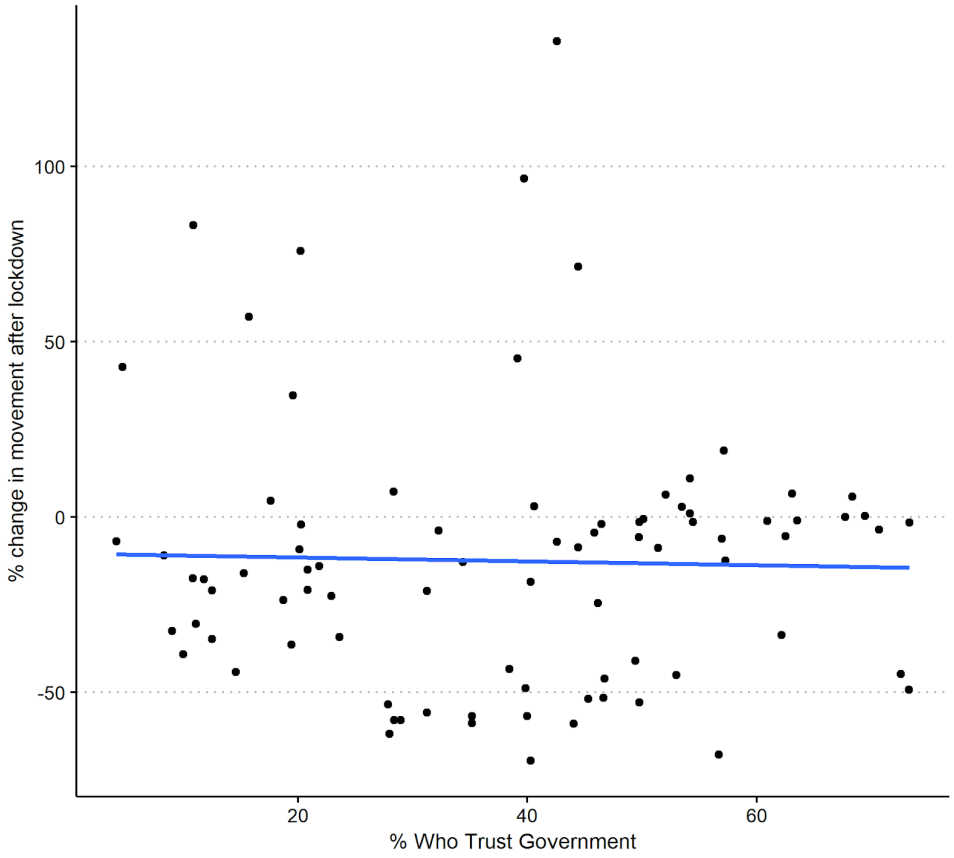
These policies include border closures, mass testing, contact tracing, mandatory isolation for positive cases, and, most importantly, shelter-in-place orders. When cases of the virus began appearing in Africa in March of 2020, 26 of the region's 47 countries swiftly enacted such lockdowns, outlawing gatherings in public settings and workplaces (France 24). According to the WHO, compliance with lockdowns has been "quite good," and surveys have indicated that people in urban areas have understood the need for such measures, despite the difficulties they impose (France 24). However, the region has not experienced perfect compliance: there has been immense variation in the extent to which people wear masks and practice social distancing, and many countries—including South Africa and Nigeria—have seen massive protests against lockdown measures and the enforcement of them by police.

African governments will continue to need maximum compliance with public health regulations as they continue to battle the coronavirus, and understanding exactly which factors impact compliance will help them better respond to disease outbreaks, both now and in the future. Therefore, this paper will attempt to answer: *Is greater trust in government associated with higher lockdown compliance in Sub-Saharan Africa?*

Since the pandemic is far from over, we are unable to measure most of its true impacts on the region yet. We can, however, study the extent to which African citizens complied with the initial shelter-in-place orders, since in most countries, such events already happened in March or April. Compliance can be quantified in a number of ways, including the percent change in human movement in response to lockdowns. This can be measured using the COVID-19 Community Mobility Reports created by Google, which track movement trends among those who have enabled Google to collect anonymous location data from their smartphones (Google). Such data therefore is limited to those who have smartphones, but is arguably more accurate than

survey data or government statistics, both of which can overestimate compliance. In fact, as will be discussed in the next section of this analysis, this Google location data is the primary method through which lockdown compliance has been measured in recent literature on the subject.

Figure 1: Trust in Government and Lockdown Compliance



As shown in Figure 1 above, there already is a great amount of variation in both trust in government (as measured by Afrobarometer survey responses) and lockdown compliance (as measured by Google movement data) in the region. Each dot represents a distinct national subregion, and it is clear that this data is heteroskedastic and contains outliers. The line of best fit has a slightly *negative* slope, indicating that at face value, there appears to be a slightly *positive* relationship between trust and lockdown compliance. I argue that a greater *decline* in movement indicates greater compliance.

Accordingly, I hypothesize that the relationship between a population's trust in its government and lockdown compliance is positive. "Trust" is not defined in the Afrobarometer questionnaire, but it is likely positively correlated with one's perceptions of the legitimacy, competency, effectiveness, and general integrity of their government. Therefore, such positive perceptions of government likely are correlated with greater compliance with government orders in general, including shelter-in-place orders. However, it is also possible that higher trust in government has the opposite effect: that if one has greater trust in their government, they may fear lockdown enforcement measures *less*, and thus are less likely to comply if they believe the consequences for non-compliance are not as high. Finally, it is of course entirely possible that there is no significant relationship between trust in government and lockdown compliance, after controlling for confounding factors.

This paper is structured as follows: Section 2 discusses the relevant literature for this topic. Section 3 describes the empirical model and dataset used to answer this study's question. Section 4 presents and discusses the main results and robustness checks. Section 5 concludes the paper, followed by references.

2 Literature Review

A region's degree of trust in government is forged over time by many confounding factors, many of which have been identified in existing literature. With its complex history of colonialism, ethnic tension, and armed conflict, Sub-Saharan Africa has been of great interest to economists studying the determinants (and effects) of trust in government, and there is therefore a wealth of literature regarding such trust in this region. This section will discuss two such papers: "The Long-Term Effects of Africa's Slave Trades" by Nathan Nunn (2008) and "The

Legacy of Colonial Medicine in Central Africa" by Sara Lowes and Eduardo Montero (2018). It will also examine two recent papers which have explored the determinants of lockdown compliance in other regions of the world: "Poverty and Economic Dislocation Reduce Compliance with COVID-19 Shelter-in-Place Protocols" by Austin Wright, Jesse Driscoll, Konstantin Sonin, and Jarnickae Wilson (2020), and "Trust and Compliance to Public Health Policies in Times of COVID-19" by Olivier Bargain and Ulugbek Aminjonov (2020).

Nunn (2008) explores the impacts of Africa's slave trades on present-day economic performance by examining country-level variation in the number of slaves exported from 1400-1900. He finds that those countries that were more impacted by the slave trade have lower real GDP per capita today, likely due to slavery's negative impacts on ethnic division, community trust, and the development of political institutions (Nunn, 2008). This paper employs an OLS methodology and its results are confirmed by using each country's distance from sites of slave labor demand (spanning from the Americas to the Indian Ocean) as an instrument for slave exports. Therefore, Nunn (2008) is relevant here, as it establishes a likely determinant of each country's present-day level of trust in government: exposure to the slave trade. Additionally, it demonstrates how regional variation in trust, resulting from the slave trade, explains significant differences in present-day outcomes.

Lowes and Montero (2018) address a similar question that is of even greater relevance to this investigation: the effect of French colonial medical campaigns in the region on present-day trust in medicine. Their study looks at five former French colonies in Central Africa where, from 1921-1956, villagers were forcibly used as test subjects in deadly French research on "sleeping sickness" (trypanosomiasis). The authors use both historical data on French visits to villages for medical testing and present-day data on civilians' willingness to consent to free, non-invasive

blood tests—a proxy for trust in medicine. They find that those who live near former sites of French medical campaigns have significantly lower trust in medicine, and that health-related World Bank projects have been less successful in these specific areas (Lowes & Montero, 2018). This provides evidence of intergenerational effects on trust that persist in the region today, especially in regards to medicine. Therefore, these authors identify a channel that could explain present-day variation in compliance with public health measures such as shelter-in-place orders.

Wright, Driscoll, Sonin, and Wilson (2020) contribute to the emerging research on coronavirus-related lockdowns by studying which factors have impacted lockdown compliance in the United States. The authors use cell phone location data from Google to measure changes in population movement, and thus compliance, and they exploit the staggered introduction of local coronavirus shelter-in-place orders in the U.S. to construct treatment and control groups in a difference-in-differences identification strategy. They find that there is lower compliance with shelter-in-place orders among lower-income households, even after controlling for a region's partisanship, population density, unemployment, exposure to recent trade disputes, and other factors (Wright et al., 2020). Although they examine the U.S. rather than Sub-Saharan Africa, their findings are nonetheless highly relevant to this investigation since they identify many factors that could explain lockdown compliance in Sub-Saharan African as well, which therefore should be controlled for in this investigation. Furthermore, their paper is among the first to use cell phone location data to measure coronavirus-related lockdown compliance, and it therefore serves as a valuable model for this investigation.

Finally, perhaps the most relevant literature for this investigation is that of Bargain and Aminjonov (2020). Similar to Wright et al. (2020), they examine factors that explain lockdown compliance (measured by cell phone location data), but their research focuses on Europe rather

than the U.S. and they focus on *trust*—measured by the European Social Survey—as their key explanatory factor. The authors find that regions (within countries) with higher trust in the national government decreased their mobility significantly more in response to lockdown orders than lower-trust regions (Bargain & Aminjonov, 2020). Furthermore, they find the effect of trust on compliance is non-linear and increases with the "stringency" of the government response, as classified by the Oxford Coronavirus Government Response Tracker (Bargain & Aminjonov, 2020). Their analysis serves as a model for this investigation for many reasons, including that it is at the sub-national level, it uses Google location data to measure compliance, and it controls for the stringency of a government's public health measures. The key difference between their analysis and this one is that they study Europe rather than Sub-Saharan Africa.

After examining the four most informative and relevant studies, it is clear that colonialism has had lasting effects on trust in Sub-Saharan Africa and that cross-country variation in trust can explain significant cross-country differences in outcomes today. It is also clear that trust in government, as well as other factors, can explain variations in lockdown compliance, at least in the United States and Europe. However, no published research has studied the relationship between trust in government and COVID-19 lockdown compliance in Sub-Saharan Africa, a region with history, culture, and institutions radically different from the regions previously examined in the literature.

3 Data and Methodology

3.1 Econometric Model

This analysis uses cross-sectional data, since it studies variation across entities—national subregions—at a single point in time: March and April 2020, when each subregion experienced a

coronavirus-related lockdown. To estimate the effect of trust in government on lockdown compliance, this analysis will use an ordinary least squares ("OLS") identification strategy. Since there is no unique "treatment" or intervention that a subset of observations experienced, the only other traditional econometric method applicable to this situation is two-stage least squares using an instrumental variable ("IV") for trust in government, since trust in government is an endogenous variable.

However, despite the existence of economic literature examining potentially exogenous determinants of—and therefore valid instruments for—trust, this paper will *not* use an IV approach, for multiple reasons: First, because the datasets that such papers (those that have discovered potential instruments for trust in government in the region) have constructed and used are nearly impossible to find, and their data is rarely indexed at the subnational level. The second problem is the difficulty of finding an instrument that is a) credibly exogenous, b) only impacts lockdown compliance through trust in government, and c) has easily-attainable data at the sub-national level that would enable the testing of its relevance. Most importantly, neither Wright et al. (2020) nor Bargain & Aminjonov (2020) use instruments for trust in government when studying this relationship in other regions, and they argue—as this analysis does—that the most likely confounding factors can be actually controlled for.

Using an OLS methodology with country fixed effects, this analysis will estimate the following equation (for each national subregion i in country j):

$$PctChange_{ij} = \alpha_j + \beta_1 Trust_{ij} + \beta_2 Stringency_{ij} + \beta_3 Income_{ij} + \beta_4 Informed_{ij} + \beta_5 Density_{ij} + \beta_6 Urban_{ij} + \beta_7 Cases_{ij} + \beta_8 Response_{ij} + e_{ij} \quad (1)$$

Table 1 below defines each variable in equation (1) and provides its hypothesized sign and data source.

Table 1: Description of Variables

Name	Definition	Hyp. Sign	Source
PctChange	% change in movement in recreational and retail spaces, one week after vs. one week before the lockdown began (usually negative)	N/A	Google Community Mobility Reports (movement data) OxCGRT* (lockdown dates)
Trust	% of respondents who said they trust the national government "Somewhat" or "A lot" (constructed as the average of trust in the president, parliament, and ruling party)	-	Afrobarometer 2019 survey
Stringency	OxCGRT* Stringency Index (strictness of lockdown policies that restrict behaviours)	-	Our World in Data
Income	GDP per capita (PPP) in 2019	-	World Bank
Informed	% of residents who access any source of mass communication "every day" (television, radio, newspaper, internet, or social media)	-	Afrobarometer 2019 survey
Density	Population density (persons per km^2)	-	CityPopulation.de
Urban	% of population living in an urban area	-	Afrobarometer 2019 survey
Cases	Total number of confirmed COVID-19 cases in the country on the day the lockdown began	-	Our World in Data
Response	% of residents who say they can get medical care "Right away" or "After a short time"	+	Afrobarometer 2019 survey

*OxCGRT = Oxford Coronavirus Government Response Tracker

This model arguably accounts for potential omitted variable bias arising from the endogeneity of trust in government. Likely the single strongest covariate with trust in government—GDP per capita—is included in the model, and the stringency of the lockdown and access to mass communication—both of which are correlated with trust and compliance—are as well. Education, proxied by the fraction of residents with college degrees, has surprisingly very

little correlation with trust or compliance and its omission from the model has negligible impact on coefficient estimates, and therefore it is excluded. Simultaneous causality is likely not an issue because trust in government was measured in 2019 while lockdown compliance is observed here in 2020. Finally, measurement error (resulting from dishonest survey responses about trust in government) is like not an issue either since Afrobarometer respondents are informed their responses are anonymous and confidential (Afrobarometer). Accordingly, in the survey data, trust in government is neither correlated with fear of political intimidation nor beliefs that "laws must always be followed."

3.2 Description of Data and Sample Studied

Table 2 below provides summary statistics on the variables used to estimate equation (1).

Table 2: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Median	Max
PctChange	84	-12.59	37.91	-69.53	-12.63	135.71
Trust	84	38.21	18.93	4.17	40.14	73.33
Stringency	84	81.40	6.27	65.28	82.87	93.52
Income	84	8186.37	6235.55	1595.93	5135.50	22989.34
Informed	84	72.02	18.17	33.33	73.57	100.00
Density	84	637.51	1147.36	3.29	276.51	7010.97
Urban	84	50.28	31.74	0.00	48.12	100.00
Cases	84	136.06	202.95	4.00	97.00	709.00
Response	84	32.01	14.40	6.25	29.13	71.15

This analysis matched and merged five distinct datasets into one, and only 15 of Sub-Saharan Africa's 49 countries were represented in all five: Botswana, Burkina Faso, Cape Verde, Gabon, Ghana, Kenya, Mauritius, Namibia, Nigeria, Senegal, South Africa, Togo, Uganda, Zambia, and Zimbabwe. Furthermore, within those 15 countries, only 84 of their 192 first-level national subregions had usable movement data from Google and could therefore be used as observations. As seen in the following table, this creates selection bias since the countries and subregions represented in this study's dataset statistically are wealthier, more developed, more densely populated, and more urban than those that are absent.

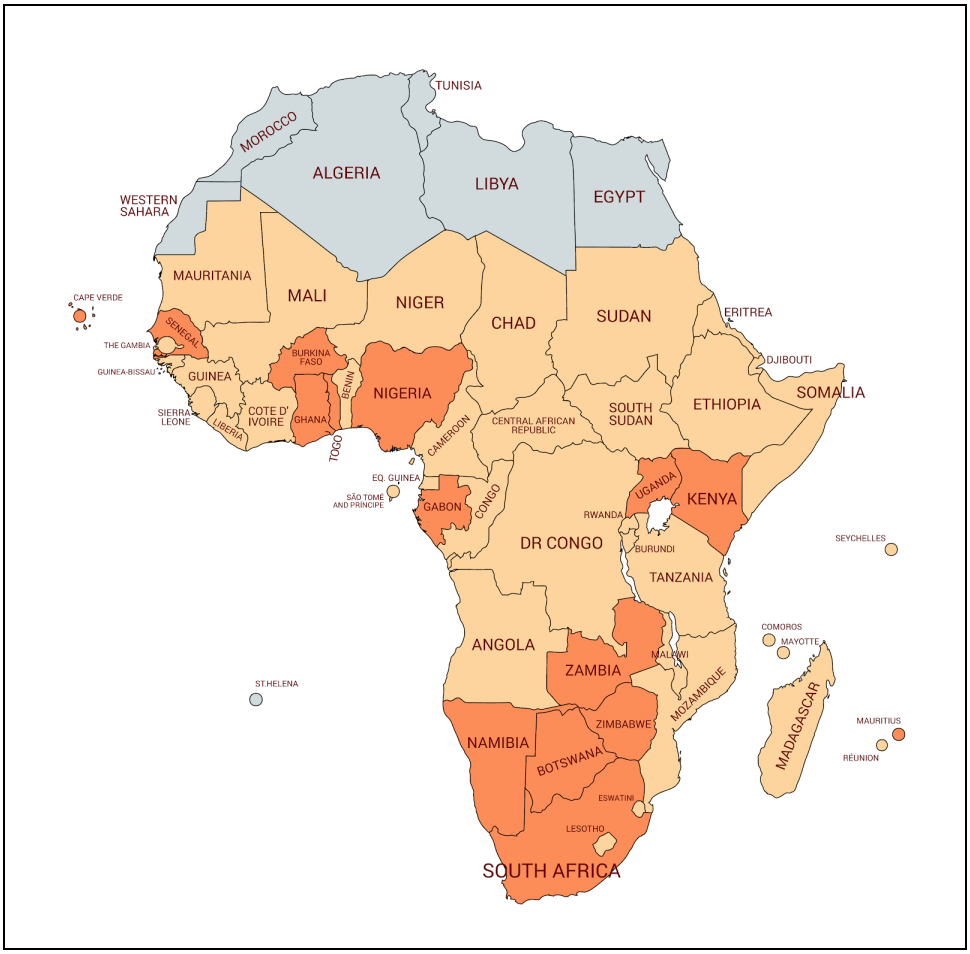
Table 3: Comparing Sample to the Entire Region

Variable	Sub-Saharan Africa	Sample Countries	Sample Subregions
Population	1,107,000,000	484,152,374	342,918,231
GDP per capita (PPP)	3,781.98	5,482.21	6,143.16
HDI	0.50	0.56	0.57
Life expectancy	61.27	60.27	59.07
Median age	19.00	19.66	20.02
Density (people / km^2)	50.76	152.26	637.34
Urban population %	40.71	46.50	48.75

Sources: World Bank, African Development Bank, CityPopulation.de, Our World in Data

Figure 2 below illustrates the geographic distribution of the countries in this study's data, with sample countries in dark orange and the rest of Sub-Saharan Africa in bright orange.

Figure 2: Map of the Region



This map reveals a number of interesting patterns: first and foremost, most of southern continental Africa is included. The five countries in this cluster all border each other, which may be no coincidence as they are all former colonies of—or have been indirectly controlled by—Britain. The same can be said for the two countries representing East Africa: Uganda and Kenya. Along the Gulf of Guinea, Gabon, Ghana, Togo, and Nigeria are represented. The latter is by far the most populous and well-represented country in the dataset, as Nigeria comprises 37 of the dataset's 84 national subregions. Finally, Burkina Faso and Senegal in West Africa are represented, as well as the island nations of Cape Verde and Mauritius.

Perhaps more relevant, though, is which countries are *not* included in the sample. There are noticeable gaps along the coast of West Africa and the Indian Ocean. More importantly, Central Africa—aside from Gabon—and the Sahel region straddling the Sahara Desert—aside for Burkina Faso—are not represented in this dataset. This makes a considerable difference as they are among the poorest and most sparsely-populated regions on the continent. This omission may explain why the sample countries are more developed and densely populated than the region as a whole.

The selection bias that occurs at the country level is further compounded at the national subregion level: the 84 subregions with usable movement data are also more developed and more densely-populated than the 15 countries as whole. Therefore, the following question arises: are the countries and subregions in this study's dataset representative of Sub-Saharan Africa?

This question has no simple answer. Ultimately, whether or not an area is included in this dataset was determined by whether or not both Afrobarometer *and* Google were able to collect data there. This explains the clear bias towards countries and subregions that are wealthier, more developed, and more urban, all of which likely are correlated with lockdown compliance as well. Additionally, there are key geographical patterns in the countries represented: they tend to be clustered together rather than being randomly spread out across the continent, and more than half were former British colonies. Nonetheless, these 15 countries represent 44% of Sub-Saharan Africa's population. The 84 subregions represent 71% of those countries' populations, and they feature immense variation in geography, history, and culture. Therefore, while selection bias may limit this study's findings to *local* effects for the more developed, urban, and densely-populated areas sampled, this analysis can still provide useful insight on the relationship between trust in government and lockdown compliance in Sub-Saharan Africa.

4 Results and Discussion

4.1 Main Results

Table 4: Main Regression Results

	Dependent variable:		
	Percent Change in Movement		
	(1)	(2)	(3)
Trust	-0.055	0.097	0.507***
	(0.221)	(0.136)	(0.127)
Stringency		-1.083**	-1.044***
		(0.486)	(0.288)
Income		0.003***	-0.001
		(0.001)	(0.010)
Informed		-0.008	0.135
		(0.192)	(0.189)
Density		0.005**	-0.002
		(0.002)	(0.002)
Urban		-0.518***	-0.098
		(0.093)	(0.092)
Cases		-0.066***	0.906**
		(0.015)	(0.439)
Response		0.114	-0.051
		(0.211)	(0.161)
Constant	-10.497	76.128*	
	(9.417)	(44.006)	
Country fixed effects?	No	No	Yes
Observations	84	84	84
R^2	0.001	0.732	0.894
Adjusted R^2	-0.011	0.703	0.860
Note:	*p<0.1; **p<0.05; ***p<0.01		

Table 4 above contains the main regression results of this analysis. As shown in column 1, the basic relationship between trust in government and change in movement is negative before adding any controls. The coefficient of -0.055 means that a one percentage-point increase in the fraction of a subregion's population that trusts the national government "somewhat" or "a lot"

was associated with a 0.055% *decline* in movement (relative to the mean) during the week after a lockdown was imposed. However, after the addition of controls in column 2, this coefficient becomes positive at 0.097.

Furthermore, to properly estimate equation (1), it is essential to include country-level fixed effects in order to control for unobservable characteristics that vary by country. As shown in column 3, including country fixed effects has an immense impact: the coefficient for trust in government becomes significant at the 1% level and increases from 0.097 to 0.511, meaning a one percentage-point increase in trust in government was associated with a 0.511% *increase* in movement (relative to the mean) after a lockdown began. In other words, a one percentage-point increase in trust was associated with a *reduction* in movement 0.511% *smaller* than average (which means *lower* compliance). This is surprising as it is the opposite sign that this analysis expected. In fact, only the coefficients on stringency, the number of confirmed COVID-19 cases, and medical response time have the signs predicted by this analysis, as both population and urbanization were associated with *more* movement after lockdowns began. However, stringency and confirmed cases are the only controls with significant coefficients in this specification.

4.2 Robustness Checks

Nonetheless, it is possible that the results in Table 4 are highly sensitive to *how* the relationship between trust in government and lockdown compliance is defined, as well as how the data is treated. Therefore, numerous robustness checks are conducted to test that if these findings hold for different specifications. Table 5 below contains the results of these robustness checks, with column 1 containing the results of column 3 in Table 4 for comparison.

Table 5: Robustness Checks

	Dependent variable:								
	Percent Change in Movement								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trust (government)	0.507***	0.414***				0.377***	-0.326	0.438*	0.490***
	(0.127)	(0.110)				(0.119)	(0.207)	(0.237)	(0.166)
Trust (president)			0.358***						
			(0.098)						
Trust (parliament)				0.573***					
				(0.165)					
Trust (ruling party)					0.446***				
					(0.117)				
Trust * Nigeria								0.092	
								(0.270)	
Trust * Populous									0.021
									(0.135)
Stringency	-1.044***	-0.915***	-0.982***	-1.052***	-1.004***	-0.957***	-0.621	-1.020***	-1.060***
	(0.288)	(0.237)	(0.290)	(0.298)	(0.289)	(0.270)	(0.538)	(0.298)	(0.307)
Income	-0.001	-0.0005	0.001	-0.001	-0.0001	0.003	0.007	-0.0004	-0.0001
	(0.010)	(0.008)	(0.010)	(0.010)	(0.010)	(0.009)	(0.019)	(0.010)	(0.011)
Informed	0.135	-0.077	0.082	0.080	0.118	-0.091	-0.282	0.152	0.141
	(0.189)	(0.164)	(0.189)	(0.191)	(0.190)	(0.177)	(0.307)	(0.197)	(0.195)
Density	-0.002	-0.001	-0.002	-0.002	-0.002	-0.002	-0.00000	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
Urban	-0.098	-0.051	-0.120	-0.101	-0.091	-0.071	-0.295*	-0.104	-0.098
	(0.092)	(0.091)	(0.093)	(0.095)	(0.093)	(0.086)	(0.149)	(0.094)	(0.093)
Cases	0.906**	1.035***	0.910**	1.052**	0.827*	0.695*	1.960**	0.914**	0.884*
	(0.439)	(0.360)	(0.445)	(0.449)	(0.444)	(0.411)	(0.774)	(0.442)	(0.465)
Response	-0.051	-0.058	-0.044	-0.067	0.011	-0.007	0.310	-0.060	-0.045
	(0.161)	(0.145)	(0.164)	(0.167)	(0.159)	(0.151)	(0.260)	(0.164)	(0.167)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Excludes Mauritius	No	Yes	No	No	No	No	No	No	No
Timeframe	1 week	1 week	1 week	1 week	1 week	2 weeks	1 day	1 week	1 week
Observations	84	75	84	84	84	84	79	84	84
R^2	0.894	0.898	0.890	0.888	0.892	0.908	0.644	0.894	0.894
Adjusted R^2	0.860	0.863	0.856	0.854	0.858	0.880	0.523	0.859	0.858

Note: *p<0.1; **p<0.05; ***p<0.01

Standard errors in parentheses.

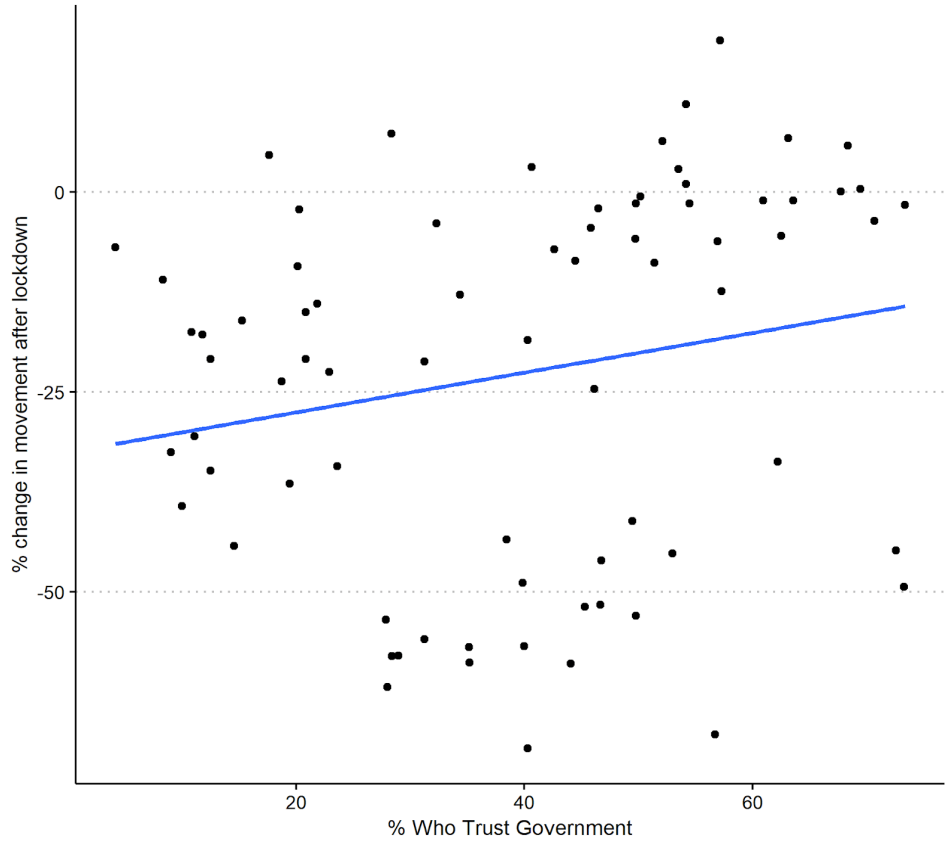
Trust in government = average of region's trust in president, parliament, and ruling party.

Nigeria = 1 for subregions in Nigeria.

Populous = 1 for the top 50% most populous subregions in the dataset.

Column 2 shows the effects of removing the subregions in Mauritius from this analysis. This is done because Mauritius is a statistical anomaly—it has by far the largest per capita GDP among the 15 countries sampled, and its subregions all had large *increases* in movement after lockdowns began. In fact, excluding Mauritius changes the basic correlation between trust in government and change in movement from slightly negative (in Figure 1) to clearly positive, as shown in Figure 3 below. Surprisingly, however, excluding its subregions does not actually increase the coefficient on trust; in fact, it actually *lowers* the coefficient slightly from 0.507 to 0.414 while retaining its significance. It does not change the signs of any coefficients, and stringency and confirmed cases retain their significance.

Figure 3: Trust in Government and Lockdown Compliance (Excluding Mauritius)



Columns 3-5 test if the entity of the national government (president, parliament, or ruling political party) through which trust is measured impacts the results. The results suggest this is not the case: all three methods of measuring a subregion's trust in the national government have positive and significant signs, ranging in magnitude from 0.358 to 0.573. The rest of the coefficients—including stringency and confirmed cases—retain their signs, further illustrating that *how* trust in government is measured does not meaningfully impact this study's findings. This makes sense because levels of trust in all of these entities are positively correlated with each other, as well as with the original trust in government variable (which is the average of the three).

Column 6 demonstrates how using a two-week rather than a one-week timeframe (i.e., comparing movement two weeks before a lockdown began vs. two weeks after) makes very little difference, as it changes neither the sign nor significance of the coefficients. It lowers the coefficient of trust in government slightly from 0.507 to 0.377, which is expected since increasing the timeframe makes the percentage changes in movement less extreme. Inversely, *reducing* the timeframe to only one day makes the change in movement *more* extreme, and column 7 shows the immense impact this has on the coefficients: trust in government becomes negative and loses all of its significance. Additionally, stringency loses its significance, urbanization's negative coefficient becomes significant at the 10% level, and the sign on the coefficient for medical response time flips from negative to positive.

The robustness checks in columns 8-9 attempt to address how some countries are oversampled in the dataset, based on how many of their subregions are included in it. Column 8 includes an interaction term which multiplies trust in government by a dummy variable for if a subregion is in Nigeria (whose subregions comprise 44% of the observations). This interaction term is not significant and its inclusion does not change the sign or significance of any of the

coefficients. Therefore, the findings of this study are *not* driven by the oversampling of Nigerian subregions, since trust in government has no significantly differential impact on compliance in Nigeria compared to other countries. Finally, column 9 checks if the relationship of interest varies by the population of a subregion by including a variable which interacts trust in government with a dummy for if a subregion is among the top 42 (out 84) subregions by population. This interaction term's coefficient is not significant either, and its inclusion changes neither the sign nor the significance of the other coefficients. Therefore, the estimated effect of trust in government likely does *not* vary by how populous a region is.

4.3 Discussion of Results

Column 3 in Table 4 (which is also column 1 in Table 5) should be interpreted as the primary findings of this investigation, because by including controls and country fixed effects, it estimates the relationship in equation (1) exactly as this study intended. Furthermore, every robustness check, except the one that uses a one-day timeframe, substantiates that specification's findings: the coefficient on trust in government is always positive and significant, ranging from 0.377 to 0.573. This means a one-percentage point increase in the fraction of a subregion that trusts the national government was associated with a 0.377% - 0.573% increase in movement (relative to the mean) after a lockdown began, or in other words, causes a *reduction* in movement 0.377% to 0.573% *smaller* than average. This is contradictory to the relationship this study hypothesized, since although lockdowns resulted in a net decrease in movement for the majority of subregions in the data (as expected), compliance was relatively *lower* in areas that trusted their national governments *more*. This phenomenon may be evidence that higher trust in government

results in less compliance with shelter-in-place orders because it means fewer citizens fear government enforcement of them.

As hypothesized, the coefficient on stringency is always negative and significant, ranging from -0.915 to -1.060. This means a one-unit increase in the OxCGRT Stringency Index for a country (out of 100) was associated with a 0.915% - 1.060% decrease in movement (relative to the mean), or a *reduction* in movement 0.915% - 1.060% *higher* than average. This intuitively makes sense, as the Stringency Index measures the extent to which each country's lockdown limited movement and interaction, so higher values likely mean that the national government is perceived as taking COVID-19 more seriously. This logically would result in greater compliance with related public health regulations.

Furthermore, the coefficient on confirmed cases is always significant and positive, ranging from 0.884 to 1.960. This means each additional confirmed case of COVID-19 a country had on the day its lockdown began had a marginal effect of 0.884% to 1.96% greater movement after the lockdown (relative to the mean), or in other words, was associated with a *reduction* in movement 0.884% to 1.96% *less* than average. This investigation initially predicted the opposite, since it presumed people were more likely to comply with lockdowns if the scale and threat of COVID-19 in their country was perceived to be greater. The consistently positive coefficient on confirmed cases is particularly puzzling because the confirmed cases variable is positively correlated with the stringency index, which makes sense since governments impose stricter measures if the presence of COVID-19 is greater. However, as previously discussed, stringency had the opposite effect on compliance.

The question remains: why did using a one-day timeframe alter the results so much, and how should this be interpreted? One possibility is that this specification (found in column 7 of

Table 5) actually estimated the *true* desired effect of this study, since one could argue that using a one-day (rather than a one- or two-week) timeframe better isolates the change in human movement that can be attributable directly to the imposition of a lockdown. However, this specification's findings should be largely disregarded since, by not aggregating changes in movement across seven-day periods, the calculated changes in movement before and after the initiation of each lockdown are misleadingly dramatic—they are at least in-part driven by natural fluctuations in human movement by day of the week.

Finally, it is important to restate a primary limitation of this study's findings: selection bias. As previously mentioned, due to data limitations, the countries and subregions represented in this study's dataset are more developed, densely-populated, and urbanized on average than those of Sub-Saharan Africa as a whole. Therefore, this study's findings necessarily can only be applied to such areas.

5 Conclusion

Although Sub-Saharan Africa has performed relatively well to date in the fight against COVID-19, the effectiveness of countries' efforts to contain the spread of the virus varies greatly. A review of the literature reveals that colonialism has had long-term effects on trust in political institutions and medicine in the region, which can explain present-day disparities in outcomes. The literature also provides evidence that many social and economic factors—including trust in the national government—have impacted compliance with COVID-19 lockdowns in the United States and Europe. This investigation adds to the literature by exploring the relationship between trust in the national government and compliance with such lockdowns

(as measured by their resulting changes in human movement) in Sub-Saharan Africa by combining recent survey data from Afrobarometer with movement data from Google.

This study's findings indicate that a one-percentage point increase in the fraction of a national subregion that trusts the government was associated with a 0.377% to 0.573% smaller reduction in movement than average in response to a lockdown, indicating higher trust was associated with *less* compliance with lockdowns in the region. Additionally, the stringency of a country's lockdown measures was associated with higher compliance, while the number of confirmed cases in each country on the day its lockdown began was associated with lower compliance. These findings are robust to nearly every specification used, except for when measuring compliance as the change in movement one *day* (rather than one week) before and after a lockdown began. Furthermore, these results may lack external validity because the 15 countries and 84 national subregions represented in this study's dataset are more developed, densely-populated, and urbanized than Sub-Saharan Africa as a whole.

Further research on COVID-19 in the region could use empirical data on mask usage and social distancing as alternative ways of measuring compliance with public health regulations. Additionally, the methodology of this study could be applied to study the effect of trust in government on lockdown compliance in other developing regions of the world, such as Latin America and South Asia. Finally, once more recent survey data is available, it might be useful for research to measure the reverse effect: how the efficacy of a country's COVID-19 response has impacted how much its citizens trust the national government.

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