Disease, disaster, and disengagement:
Ebola and political participation in Sierra Leone*

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Abstract

How do widespread public health crises affect political behavior? This article examines the impact of the 2014 West African Ebola outbreak on political participation in Sierra Leone. In addition to the effects observed following conflict and natural disasters, I present evidence that hardship brought on by the outbreak of Ebola virus disease (EVD) substantially decreased participation in civic affairs, measured in self-reported political activity using data from an Afrobarometer survey conducted near the end of the outbreak. To account for selection and endogeneity concerns, I undertake falsification and coefficient stability approaches in addition to controlling for levels of political activity in the 2012 national election. The negative effect seems driven in part by a reduction in trust and perceived performance of traditional institutions and not from an increase in economic insecurity, highlighting the role of external efficacy rather than resource-based mechanism in mediating the relationship between exposure to the disease and participation.

Keywords: Ebola, Political Participation, Civic Engagement, External Efficacy

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Introduction

How do widespread public health crises affect individual attitudes and political behavior? Infectious diseases are ubiquitous in many countries in sub-Saharan Africa, and the intensity and frequency of outbreaks are increasing (Smith et al., 2014) and expected to continue to increase in the face of climate change (Altizer, Ostfeld, Johnson, Kutz, & Harvell, 2013), rising antibacterial resistance (Jones et al., 2008), and deforestation (Wolfe, Daszak, Kilpatrick, & Burke, 2005). In the case of Ebola virus disease (EVD), these outbreaks are becoming more deadly (Diehl et al., 2016). While the negative consequences of persistent disease burden on economic outcomes is well known, as in the case of malaria (Sachs & Malaney, 2002) or HIV/AIDS (Whiteside, 2002), the consequences of disease crises on political development is less clear. In this article, I explore the relationship between Ebola exposure in the West African Ebola outbreak and civic participation using individual responses from Afrobarometer Round 6 (2015) survey data in Sierra Leone.

This work joins a growing body of literature examining the consequences of exposure to large-scale crises and traumatic events on political participation, collective action, cooperation, and a variety of prosocial preferences. The majority of this literature identifies a consistent, positive, and arguably causal link between the two. In a recent overview and meta-analysis of post-conflict scenarios, Bauer, Blattman, Chytilová, Henrich, Miguel, and Mitts (2016) find that individuals and communities more affected by wartime exposure to violence consistently exhibit higher levels of cooperation and altruism. These results hold across a variety of settings, whether the outcome measures come from survey data as in the case of Bellows and Miguel (2009) or from experimental games as in Voors et al. (2012), and across varying types of violence. Blattman (2009) provides evidence that this increase in prosociality can sometimes be observed in its effects on political participation.

Similar effects are also observed in the aftermath of natural disasters. Rodriguez, Trainor & Quarantelli (2006) report an increase in prosociality and coordination in Louisiana in the weeks following Hurricane Katrina in 2005. Blocker, Rochford, & Sherkat (1991) identify an increase in political participation, in the form of local collective action, petitions, and protest behavior, following a large flood. Similarly, Cassar, Healy, & von Kessler (2017) find that villages affected to a greater extent by a tsunami in Thailand were more trusting than those less affected, and Fair, Kuhn, Malhotra, & Shapiro (2017) identify an increase in political knowledge and turnout as a result of the 2010-2011 floods in Pakistan.

However, in conflicts and during natural disasters experiences of traumatic events are not the only experiences that survivors share. Disasters also induce hardship even among those not directly exposed. Moreover, while the government may not be blamed for `acts of god' like earthquakes or typhoons, the performance of the state in its responses to such a crisis give citizens additional information on the quality and capacity of institutions and political actors (Ashworth, Bueno de Mesquita, and Friedberg, 2018; Fair, et al., 2017). These experiences of hardship may cause individuals to downgrade their expectations of performance and consequently diminish participation in institutions which failed them.

I test these predictions in the context of the 2014 West African Ebola Outbreak in Sierra Leone. In line with theories of post-traumatic growth, I find that direct exposure to the disease (having a friend or family member be infected with or die from Ebola virus disease) is associated with an increase in civic participation, though this relationship is not statistically significant in many specifications. However, while approximately a third of respondents reported direct exposure (trauma) many more experienced hardship as a result of the outbreak. I find that an increase in

experiences of hardship during the crisis is consistently and significantly associated with a decrease participation and interest in local civic affairs, in line with theories emphasizing the role institutional performance. This relationship appears to be mediated in part by a measure of trust and perceived performance of traditional and local leaders which are particularly relevant to democratic practice in the context of Sierra Leone.

In the following section, I briefly discuss the Ebola Outbreak and the Sierra Leonean political context before turning to the literature on the determinants of participation, and on the consequences of traumatic events and crises on individual behavior. I then introduce the data used for this analysis, discuss variable construction, and propose my empirical strategy for determining the effects of the crisis on participation in civic affairs. I present these main effects, several robustness checks, and the preliminary mediation analysis before concluding with implications for the study of traumatic events, crises, and political behavior.

The legacy of the West African Ebola outbreak

In December 2013, the West African outbreak began in Guéckédou Prefecture, Guinea. Before its final containment in mid-2016, more than 28,616 individuals from 10 countries would be infected with Ebola virus. Of these reported cases, the majority occurred in three countries: Liberia, Guinea, and Sierra Leone (World Health Organization, 2016). Nearly half (14,000) occurred in Sierra Leone. Accompanying this widespread loss of life was substantial economic disruption, which included reduced agricultural yields, diminished tourism, and stagnant foreign investment (Bowles, Hjort, Melvin, & Werker, 2016; Thomas et al., 2015).

Underlying these gross macroeconomic consequences are the traumatic experiences of victims, survivors, communities, and health workers. The immediate psychological costs of these experiences have been relatively well documented. In a small sample of survivors, Hugo et al. (2015) find that each of the 74 respondents had lost a family member to Ebola, with a majority witnessing their deaths. A full 20% reported "clinically important post-traumatic reactions between three- and four-weeks post discharge." Yadav and Rawal (2015) also highlight the challenges of survivors in overcoming these experiences, describing survivors as being in "a state of fear, grief, stress, and shame" while the outbreak was still ongoing.

Of course, these reactions were not limited to survivors and their families. Health-care workers, primary caregivers, and other members of affected communities have also been identified as secondary victims of the crisis (Reardon, 2015). Van Bortel et al. (2016) expand beyond those immediately exposed – survivors, contacts, and carers – to identify the potential for Ebola to disrupt local communities through the deaths of community leaders, disruptions in the local economy, community fracturing, and the disruption of social and health services, each of which could have consequences for psychosocial health over the long term. The international community was cognizant of potential challenges related to physical and mental health. Beyond stemming the outbreak, there was consistent concern among international and domestic health researchers and practitioners surrounding the potential mental health challenges that would linger after transmission of the virus had been stopped (Shultz, Baingana, & Neria, 2015; Boscarino & Adams, 2015). By late 2015, the World Bank had already set aside more than $3 million to provide psychosocial support services in Liberia alone (Reardon, 2015).

Moreover, as I will argue here, the ability of local community leaders to respond to the crisis shapes how they are viewed by community members. In Sierra Leone, local chiefs have long played

an important role in mediating the relationship between constituencies and the state. Widespread crises such as that presented by the Ebola outbreak can provide an opportunity for individuals to learn about the capacity and efficacy of different political institutions and, therefore, the benefit of engaging with or participating in those institutions (Finkel, 1985; Mattes and Bratton, 2007).

Literature review and conceptual framework

Through which mechanisms should we expect exposure to the Ebola crisis to have an impact on involvement in civic affairs? I begin by briefly reviewing the literature on the determinants of political participation, pulling from examples in the West as well as from less developed countries. I then contrast the potential effects of Ebola or other epidemiological shocks to those experienced during civil conflict or natural disasters, highlighting similarities and differences between the three. First, crises can impact individual resource endowments including economic status, as well as physical and mental health diminishing the ability to participate in local affairs. Second, events like the Ebola outbreak as well as other natural disasters and civil war expose individuals to traumatic events which may influence prosociality and prosocial behaviors like participation in civic affairs. Finally, I highlight how experiences of hardship during crisis can shape perceptions of external efficacy, thereby reducing participation in the same.

Crises and individual determinants of political participation

What determines political participation at the individual level?[1] Seminal work on participation in the United States by Brady, Verba, & Schlozman (1995) emphasizes three main dynamics that could diminish an individual's participation in politics: "because they can't, because they don't want to, or because nobody asked" (p.271). The first emphasizes the role of resources in the form of time, money, and social capital, arguing that individuals with fewer of these resources will be less likely to participate in political affairs and that the distribution of these resources within individuals will impact the manner by which they participate. The second is linked to psychological interest or engagement in politics, while the third highlights the role of social networks and community-level factors. Additionally, political efficacy, or the degree to which a political institution is viewed as being able to bring about social change influences the perceived costs and benefits of participation.[2]

Clearly, an epidemiological disaster of the scale seen in the West African Ebola outbreak will likely have economic implications and alter the resource endowments of individuals who are directly and indirectly affected by the disease. Indeed, there are accounts of farmers abandoning fields and others leaving employment to escape the crisis, giving us initial reason to believe the disaster would have some impact on individual incomes in addition to country-wide changes in the economy (BBC, 2014). Early work on poverty and political participation by Huntington & Nelson (1976) highlights the challenges faced by individuals in poverty in engaging in public affairs.

Some resource-based factors are likely unaffected by Ebola, at least in the short term. For example, education appears to be a driver of civic participation in many contexts (Galston, 2004; Kam &

[1]Note that while much of the literature uses the terms "political participation" and "political engagement" interchangeably, I distinguish between the two here. Conceptually, I refer to *participation* as actual behaviors (e.g. voting, attending community meetings) and use *engagement* to refer to self-reported interest in political and public affairs.

[2] This particular definition corresponds to external efficacy rather than internal efficacy or the degree to which an individual feels that he or she is able to influence social change through participation in existing institutions. For an overview, see Craig and Maggiotto (1982).

Palmer, 2008; Berinsky & Lenz, 2011). However, levels of educations among the individuals surveyed here are unlikely to have changed in the short time frame between the outbreak and survey response.3 Similarly, the trauma of exposure to extreme illness and death are likely to reduce physical and mental health resources. One intuitive effect is that exposure to trauma would lead to an increase in post-traumatic stress disorder (PTSD) and/or depression. This dynamic has been documented in adolescents following Hurricane Mitch in Nicaragua (Goenjian et al., 2000) and as a result of the negative health consequences of disease, as is observed in survivors of Legionnaire's disease (Lettinga et al., 2002). Moreover, Ojeda (2015) demonstrates that, in the United States, depression is associated with diminished political participation. As we will see below, however, while the crisis appears to be strongly associated with economic insecurity, this decrease does not mediate the relationship between hardship and participation in civic affairs, suggesting that the effects we observe are not fully due to changes in the resource endowments of individuals.

Post-Traumatic Growth

However, additional studies also suggest that trauma, such as the loss of a loved one or other challenging life events, can result in positive outcomes such as optimism and increased extraversion, in a theory dubbed "post-traumatic growth" (Tedeschi & Calhoun, 2004). The literature on conflict and disasters finds moderate support for this theory when looking at prosociality in general (Bauer et al., 2016). Whether this increase in prosociality translates into parallel shifts in political participation appears to be context specific. For instance, Blattman (2009), exploiting quasi-random abduction into violent groups, finds strong evidence that ex-combatants have higher levels of political involvement than non-combatant peers. Similarly, Bateson (2012) finds that crime victimization at the individual level leads to increased political participation across numerous contexts. However, other studies that also identify an increase in prosociality as a result of violence find little evidence of changes in political behavior (Voors et al., 2012; Cassar et al., 2011).

A parallel literature identifies similar effects from natural disasters such as hurricanes (Rodriguez et al., 2006), floods (Blocker et al., 1991; Fair et al., 2017), tsunamis (Cassar et al., 2017), and earthquakes (Boittin et al., 2017). The implication of this theory of post-traumatic growth is that to the extent that exposure to Ebola is a comparable trauma to wartime exposure to violence or natural disasters, we should observe an increase in prosociality as proxied by political engagement. Exposure to death or near-death experiences brought on by Ebola may have similar consequences.

A third, related effect that has been observed is the tendency of individuals to rally around some political institution when facing foreign-policy crises or militarized interstate disputes. Studies considering American foreign policy crises find modest increases in presidential approval following crises when there is major coverage in leading news outlets (Oneal & Bryan, 1995; Baker & Oneal, 2001). While it would be difficult to observe a country-wide shift (as opposed to individual level variance) in participation with the cross-sectional data employed here, this effect has also been documented following the 2015 earthquake in Nepal. Boittin, Mo, and Utych (2017) exploit differences in public opinion surveys conducted immediately before and after the earthquake and find that respondents report higher levels of support for political institutions after the disaster. Together, these dynamics –post-traumatic growth, and "rally 'round the flag" – suggest divergent that direct exposure will increase political engagement through post-traumatic growth or a "rally 'round the flag" effect. The implications of these hypotheses also result in varying predictions for the net effect of Ebola on political participation. If we expect political engagement to be strongly and positively correlated with participation, post-traumatic growth would increase participation.

[3] Although it would not be surprising to observe changes in educational choices of individuals moving forward.

Crises and External Efficacy

Of course, wartime violence, natural disasters, and epidemiological disasters also vary in their effects on political institutions and perceptions of those institutions. War can fundamentally change existing political institutions, leading to new opportunities and new opportunities for participation (Bermeo, 2007). While natural disasters and epidemiological disasters rarely fundamentally change political institutions, they can have lasting impacts on how they are viewed and those views matter for participation. Ashworth et al. (2018) demonstrate that crises serve as opportunities for constituents to learn about the quality of incumbent politicians. Thus, the observed electoral consequences that politicians face after natural disasters outside their control can be rational. This logic may also apply to participation within particular institutions and is consistent with the literature on external efficacy and political participation. For instance, de Moor (2016) argues that the ability (in addition to willingness) of states to respond to citizen demands will increase participation. de Moor provides evidence for this proposition using survey data from Belgium and finds that while perceived ability of the state decrease participation in state institutions it has no effect on participation in non-state venues suggesting differential effects with regard to relevant institutions. This argument is broadly consistent with survey evidence across many African contexts; Mattes and Bratton (2007) demonstrate that evaluations of government performance are positively correlated with demand for democracy.

Empirical investigations of other natural disasters provide some evidence for this mechanism. Carlin et al. (2013) find that Chilean individuals who were affected by an earthquake and subsequent tsunami in 2010 reduced their evaluations of the performance of democratic institutions.[4] Cole et al. (2012) similarly find that the responsive of the Indian state to adverse rainfall shocks can diminish the electoral punishment incumbents receive for bad weather. These dynamics are also consistent with evidence from other countries which were also hit by the crisis. In the Liberian front of the 2014/2015 Ebola outbreak, Blair et al. (2016) highlight how experiences of hardship can shape trust in the government. They find that individuals who experienced hardship due to the outbreak have lower evaluations of government performance. What remains to be seen is whether or not these reductions in perception of government as a consequence of the crisis can shape political behavior and if so, how. Maffioli (2018) finds evidence that the behavioral the consequences of the Ebola crisis are contingent on state response. In Liberia, she finds that the government strategically allocated counter-Ebola resources to swing electoral districts and that this response led to differential outcomes in regard to vote choice and turnout in the subsequent senatorial election. However, there is also reason to believe that crises such as the Ebola outbreak under study may impact not just vote choice, but how and whether individuals engage in political and civic affairs at all.

In Sierra Leone, local community institutions have historically played an important role in managing democracy (Baldwin, 2016). However, the Ebola crisis presented a fundamental challenge to local organizations. Though interaction with these groups appears to have been important in managing the spread of the disease (Wilkinson et al., 2016), it was simply beyond the capability of these groups to protect their communities without additional resources from the national government, international organizations, and NGOs. Moreover, other practices associated with traditional institutions were implicated in the spread of EVD -in particular, burial customs and bushmeat consumption (Frieden et al., 2014). Managing the spread of the disease necessitated presenting new

[4] However, this does not appear to translate into reduced participation as they also find that exposure to the earthquake was associated with an increase in similar measures of participation to those I employ here. These divergent findings may be due to the fact that the proxy they use to measure exposure is likely correlated with traumatic experiences as well as hardship.

information in conflict with several local norms and practices, and further highlighted the inability of local community institutions to deliver safety and security. Thus, we should expect that additional hardship resulting from the crisis should cause individuals to update their beliefs about the capability of different institutions.

This appears to have been the case in Sierra Leone. According to Afrobarometer surveys (rounds 5 and 6) from 2012 to 2015 the percentage of respondents expressing disapproval of the performance of their local councilor jumped from 54.6% to 68.4%. Of those, individuals expressing strong disapproval nearly doubled from 18.7% to 36.9%. When asked about how effectively they believed different institutions managed the Ebola crisis, evaluations varied substantially as can be seen in figure. The majority of individuals rated the National Government and International Organizations as performing very well. In contrast, fewer than 40% believed their local government was effective in bringing the crisis under control. Out of over 1,000 respondents, only 7 individuals rated the local government as the most effective in controlling the outbreak.

[FIGURE 1 HERE]

Through this logic, then, we should expect that heightened levels of hardship due to crisis should lead to lower perceptions of the efficacy and capacity of local and traditional institutions and therefore result in a decrease in engagement with those institutions. This logic is also substantively different than what we would expect from exposure to violence and different in degree to what we might expect from other forms of natural disasters. In civil conflict, government performance on the battlefield is orthogonal to an individual's participation in civic affairs. Whether or not state forces defeat insurgents does not have strong bearing on beliefs regarding government performance in general. As discussed above, natural disasters in contrast provide an opportunity for citizens to learn about the capacity of governing institutions. However, in the case of natural disasters, earthquakes, floods, and droughts are often thought of as `acts of god' and the state is judged on response after the fact. With a viral outbreak, there may be greater belief that the government is to blame if it is unable to stop the spread. In essence, an earthquake is a random event, but if one's family member becomes infected with a deadly disease during an outbreak, the government may be perceived to be at least partially to blame or simply not up to the task of providing services.

[FIGURE 2 HERE]

I summarize the expectations of each of these two primary pathways in Figure 2. In brief, crises expose individuals to the experience of traumatic events. This trauma may lead to an increase in prosociality and participation in public affairs through post-traumatic growth. Additionally, crises may induce hardship thereby leading individuals to re-evaluate their perceptions of the performance of leaders or institutions and thereby reduce the benefit of participation with those institutions (external efficacy). The net effect of the former is hypothesized to be positive while the net effect of the latter is hypothesized to be negative. In the following section, I discuss the data used to operationalize these concepts.

Overview of the data

The individual-level data used in the analysis are from the Afrobarometer Round 6 (2015) survey in Sierra Leone. Responses were collected between 22 May and 10 June, 2015, several months after the peak of the outbreak, though incidents of the disease were recorded after this time (Shultz, Espinel, Espinola, & Rechkemmer, 2016). This is a nationally representative survey of 1,191 individuals and

covers 14 districts, 90 chiefdoms, and 150 local enumeration areas, which are typically a single town or neighborhood and used as the Primary Sampling Unit (PSU).

The timing of this data collection has important implications for interpreting results and how they fit in with the existing literature. Most extant studies of trauma on political or civic engagement consider effects well after the trauma has ended. As can be seen in Figure 3, survey responses were collected while new cases were still being reported and while containment and eradication efforts were still ongoing. Consequently, one might expect that given the proximity to the peak of the crisis and the ongoing transmission and containment efforts, there has not yet been time for individuals to grow after the trauma. Similarly, one might expect a reduction in participation may be linked to the lack of available means of participation and not a reduction in *interest* in participation. I address these concerns in more detail later.

[FIGURE 3 HERE]

Variable construction

The Round 6 survey asks several questions related to civic participation. These include interest in public affairs; frequency of discussing politics; membership in community and religious groups; willingness to attend community meetings, join together with others to raise an issue, attend a demonstration or protest march, and refuse to pay tax; and contact with members of the community, including government officials at local levels. The survey also asks a number of questions related to political participation in the 2012 national elections, which I use as outcome measures in a falsification test and control for in other specifications. A full list of questions can be found in the Sierra Leone Afrobarometer Round 6 (2015) Questionnaire.

The survey also asks respondents six questions about their exposure to Ebola. For a majority of respondents, we know whether or not a family member or close friend was either infected or killed by EVD and how it impacted their lives across a number of domains. These include whether, due to Ebola, the respondent was unable to attend school, to work or earn income, to attend social gatherings, or to get medical care measured via likert-type responses. The first two variables (whether or not a friend or family member was infected or killed with the disease) proxy for direct exposure to EVD, analogous to direct victimization or exposure to trauma in previously mentioned studies on the impact of violence on political engagement. I construct a variable to measure direct exposure to EVD which takes the value of 1 if a friend or family member was either infected or died from the disease and 0 otherwise. Average responses by chiefdom for having a close friend or relative infected with Ebola is positively correlated with the number of laboratory-confirmed and suspected cases of EVD by chiefdom.[5] The latter four variables are used to construct an index of hardship due to Ebola using the first component of a principal component analysis (PCA). The factor loadings used to construct this measure can be found in the appendix. There are divergent theoretical expectations for the effects of direct exposure and hardship: positive for post-traumatic growth and negative for experiences of hardship. Note that this variable construction differs from Blair et al. (2016) who include the witnessing of dead bodies or knowing a victim of EVD in their measure of hardship whereas they are separated here.

The main outcome variable in this analysis is participation in civic affairs. For the purposes of this analysis, I model participation as a latent variable, for which we can generate a proxy by measuring the covariation that is shared among the survey items conceptually linked to participation (attendance

[5] This is based on chiefdom-level incidence date pulled from Fang et al. (2016) replication data.

of community meetings, membership in community and religious groups, and reaching out to local and national politicians and political groups). I note that these measures emphasize participation in local civic affairs and therefore may not apply to national politics more broadly. However, in Sierra Leone these local, traditional civic institutions are the means by which many citizens engage in political activity (Baldwin, 2016). To generate this measure, I again use principal component analysis and employ the first principal component for the group of variables as an index. For the main individual-level analysis, I also present results that replace – in the case of outcome indices – the dependent variable with each constituent of an index in turn to ascertain whether, and to what extent, an individual response is driving the observed relationship. I perform similar checks on the main independent variable by specifying the same regression with each of the four Ebola Hardship questions as the treatment. Appendix A includes the factor loadings for each index used in this analysis.

For use in a falsification exercise and to control for pre-disaster participation, I also construct a similar index using responses to questions about activities undertaken during the 2012 national elections. These include whether the respondent voted, attended a campaign rally, met with a candidate or campaign staff, tried to persuade others to vote for a certain presidential or legislative candidate or political party, or worked for a candidate or party. This is an imperfect proxy as it measures participation in national level politics, however it is highly correlated with the contemporary index of participation. A simple bivariate regression between the two finds that a one unit increase in the pre-Ebola measure is associated with a .49 unit increase in the post-Ebola measure ($P < 0.000$).

To operationalize the mediators used in this analysis, I similarly construct indices to measure economic insecurity and trust in and perceptions of the relevant institutions. For the former, I use survey items on lived poverty (see Mattes, 2008) to construct an index of economic insecurity. The items ask whether or not respondents went without food, clean water, medicine, cooking fuel, or cash income. This variable proxies for changes in resources brought on by the Ebola outbreak. To measure perceptions of external efficacy of the relevant institutions and leaders, I use a similar approach to capture the covariation shared among survey items asking respondents to share how much they trust their local government councilor, their traditional leader, and religious leaders; how they rate the performance of their local councilor and traditional leader (they did not ask this question of religious leaders); and how effective their local government was in ending the Ebola crisis. I use these items as they most directly relate to the institutions in which we measure participation and are of particular relevance to politics in Sierra Leone.

In each of the primary regressions, I include several control variables to account for potential confounding factors. The majority of these are pre-treatment measures, such as age, gender, and ethnicity, which are, for practical purposes, time invariant. Other controls, such as sector of employment, roof material of housing, are theoretically time variant, though it is unlikely that these responses would change very much in the short period of time between the end of the outbreak and collection of survey responses.

The survey enumerators also collect several Primary Sampling Unit (PSU) or Enumeration Area (EA) characteristics. These include measures such as whether the PSU has access to the electricity grid, has piped water and sewerage, and receives cell-phone service, and whether banks, police stations, schools, and post offices exist within the sampling area. For the purposes of this analysis, these variables are combined using the same principal components method I describe above. The motivation here is to reduce the degrees of freedom in the estimations while capturing a potential important confounder, local capacity.

Empirical analysis

My empirical strategy considers the proposed relationships in three steps. First, I employ naive OLS regressions to identify the correlation between Ebola hardship and the outcomes of interest. Second, I employ three approaches – falsification, controlling for previous political participation, and coefficient stability – to present suggestive evidence that this relationship is causal and not an artifact of pre-disaster characteristics of individuals and political geography. Finally, I undertake a simple mediation exercise to disentangle the relationship between the identified impacts of the Ebola crisis and the proposed theoretical pathways.

I begin with the OLS regressions testing whether individuals with greater direct exposure to Ebola or who experienced higher levels of hardship as a consequence of the crisis exhibit higher levels of civic participation as estimated by equation (1):

$$Y_i = \beta_0 + \beta_1 Direct\_Exposure_i + \beta_2 Ebola\_Hardship_i + \boldsymbol{X_i'\beta} + \boldsymbol{X_d'\beta} + \epsilon_i \quad (1)$$

where Y_i represents the index of civic participation; $Direct\ Exposure_i$ is a binary variable taking the value 1 if a respondent's friend or family member was infected or died as a consequence of Ebola; $Ebola\_Hardship_i$ is the hardship index; $\boldsymbol{X_i'}$ is a vector of individual socio-demographic controls including age, age-squared, gender, education, and a series of occupation, religion, sector (of employment), and ethnicity dummies; and $\boldsymbol{X_d'}$ is a vector of PSU characteristics that measure local state capacity. The OLS regressions presented here are survey-weighted to account for sampling design and employ robust standard errors, clustered by PSU.[6]

As can be seen in Columns (1) through (4) of Table 2, I find a positive association between the measure of direct exposure and civic participation, in line with theories of post-traumatic growth. However, this relationship is quite noisy and is not statistically significant in most specifications. The correlation between the hardship index and the measure of civic participation is consistently, significantly, and negatively correlated with participation in civic affairs. This relationship is observed in the raw correlation, and when controlling for individual characteristics, and is robust to the inclusion of PSU fixed effects.[7]

[TABLE 2 HERE]

To test for robustness to index composition, Figure 4(a) presents the Ebola exposure coefficient for the same regression specification with the outcome variable in each case replaced with a subcomponent of the participation index. In all cases, the observed relationship between hardship and participation is negative. Of these, only one is not significant by standard levels of statistical significance (attendance of community meetings).

[FIGURE 4 HERE]

[6] Regressions without survey weights and alternative standard errors are also presented in the appendix (Table B.3), though the results are qualitatively similar throughout; directionality and magnitude are consistent to approximately two decimal points in most regressions.

[7] It might be concerning that the inclusion of PSU fixed effects does not do more to diminish the coefficient, given that one might assume that levels of Ebola exposure are likely to be highly collinear within PSU. However, even within villages there was significant variation in exposure to the disease.

An additional concern is that the results are being driven by the composition of the main independent variable, Ebola Hardship. Table B.1 in the appendix presents the results of estimations that replace our main independent variable with each of the components of the index. Results are negative and significant for all four components. As an additional robustness check, I also regress political participation against the ecological level of Ebola, testing whether individuals in chiefdoms with higher numbers of confirmed and suspected Ebola cases are less active in civic affairs than those with fewer. Table B.9 in the appendix presents these specifications with robust, clustered, and survey-weighted standard errors. This finding is consistent with the following. Even if traumatic experiences encourage growth and prosociality at the individual level, these effects may be dominated by additional, countervailing effects of crises when these alternatives, such as hardship, are experienced more broadly. In the context of the Ebola outbreak, many more had their lives disrupted than were individually exposed to the disease through having a friend or family member become infected with the disease.

It is perhaps unsurprising that having one's social and economic life disrupted by a viral outbreak – or any other disaster – would have a negative effect on political and community engagement in the short term, especially as components in both the treatment and outcome indices ostensibly measure disruption in social participation.[8] However, I present a few arguments that suggest this is not driving the results. First, while some of the outcome variables are framed as "in the past year," several measures include concurrent membership in religious and community groups and should be less affected by the year framing. Indeed, the opposite appears to be true; out of all of our outcome variables, reported attendance at community meetings has the lowest observed correlation with Ebola hardship, and the confidence interval includes positive values. Further, replacing our main dependent variable with a measure self-reported interest in public affairs (excluded from the index as it measures attitudes rather than behavior) is also negatively and significantly correlated with Ebola hardship. This suggests that our main finding is at least in part a consequence of diminished interest in engaging in political activity not simply the lack of an ability or outlet to do so.

Assessing causality

The associational evidence presented in the preceding section is consistent with the relationships posed in Figure 2. However, to consider these relationships causal, selection into Ebola exposure must be exogenous, or conditionally unconfounded by unobservable characteristics. There are a number of reasons one might suspect that involvement in local political affairs could be driving exposure to Ebola. First, knowledge of a family member or close friend who is infected will be positively correlated with the size of a respondent's social network. As the set of people an individual is close friends with increases, mechanically, so does the likelihood of knowing someone who contracted or died from Ebola. Second, in many cases, local organizations responded to the crisis on their own or supported humanitarian efforts. Membership in these organizations could therefore increase exposure to Ebola. Both pathways would generate a positive bias, with selection into Ebola exposure causing an increase in the observed relationships between Ebola measures and participation. Alternatively, one could also argue that communities with effective local institutions would be better able to prevent the spread of Ebola into their communities, driving the observed correlation between Ebola hardship and political participation downward.

[8] Of course, we have relatively little literature to which we can compare; much of the existing literature examines outcomes several years or even decades after the initial shock. Bauer et al. (2016) find that the effects of conflict exposure on measures of altruism appear to be increasing over time, but their meta-analysis includes only two studies that are within two years of the initial conflict.

[TABLE 3 HERE]

Table 3 presents simple balance diagnostics for the two principal measures of exposure to the crisis using Welch's (1947) T-tests. The hardship measure is dichotomized to being above and below the mean value of the index and the means of each group are compared. The table presents the overall sample mean of several demographic characteristics, group means, and the p-values from these T-tests. There is some imbalance across both sets of groups. Looking at the hardship measure, individuals who score above average on the index are slightly younger, more likely to own a metal roof, more likely to be self-employed, have different ethnic compositions, and have lower levels of state capacity within their PSU. Importantly, our measure of pre-Ebola participation is balanced across low and high levels of hardship.

While I control for these variables in the baseline specification, the imbalance on observable characteristics suggests that there may be additional, unobserved characteristics which are correlated with both participation and hardship. I take three main approaches to rule out or test the sensitivity of the primary results to this potentiality. First, I use the measure of political participation in the 2012 national election as an additional control. Similarly, I use this variable and its individual components as outcomes in a falsification exercise, which I discuss in more detail below. Finally, I use a coefficient stability approach to assess how strong selection on unobservable characteristics must be to reduce our estimated effect size to zero.[9]

Falsification and controlling for previous political activity

First, I use the measure of political activity on the right-hand side of the estimating equation, as in equation (2), where $Y^*_{i,t-1}$ is the index of political activity in 2012.

$$Y_i = \beta_0 + \beta_1 Direct\_Exposure_i + \beta_2 Ebola\_Hardship_i + \beta_2 Y^*_{i,t-1} + \boldsymbol{X_i'\beta} + \boldsymbol{X_d'\beta} + \epsilon_i \qquad (2)$$

The logic behind this approach is similar to that employed by lagged dependent variable estimators – that in the absence of some other, causal impact, the lag of a variable should account for a very large portion of the variation in the same measure in the following period. What we see in Columns (5) and (6) of Table 2 is that this index is indeed very highly correlated with contemporaneous political participation and that the inclusion of this parameter dramatically improves the amount of variance in the outcome that we capture (R^2) while moving the coefficient of Ebola hardship very little. It substantially reduces the estimated effect of direct exposure, however, suggesting that previous levels of participation are positively correlated with direct exposure. What this again implies is that the negative effect of Ebola on political participation is unlikely to be the result of imbalanced exposure to Ebola on pre-disaster levels of participation.

[FIGURE 4 HERE]

As an additional falsification exercise, I conduct a similar analysis with the index of political participation taken from an individual's actions in the 2012 national elections on the left hand side of the estimation, as in equation (3).

$$Y^*_{i,t-1} = \beta_0 + \beta_1 Direct\_Exposure_i + \beta_2 Ebola\_Hardship_i + \boldsymbol{X_i'\beta} + \boldsymbol{X_d'\beta} + \epsilon_i \qquad (3)$$

[9] I also employ a Coarsened Exact Matching (CEM) approach (Iacus et al., 2012) using the package provided by Blackwell et al. (2009). These results are found in Table B.11. However measured, hardship remains statistically and negatively related to participation even in a sample matched on the relevant demographic characteristics.

Figure 4(b) present the coefficients for the relationship between Ebola exposure and the 2012 political participation index and its constituent parts – whether or not they attended a rally, attended a meeting with a candidate or campaign, attempted to persuade others, or worked for a candidate or political party. For each of these measures, Ebola hardship is associated with a substantively meaningless and statistically insignificant effect. While due to data limitations, these measure somewhat different outcomes, it seems likely that political activity of one variety during the election season – barring some mediating event in the intervening period – would be somewhat correlated with political engagement along other domains later. The consistent null results in each case offer reassurance that the correlation we observe between Ebola exposure and post-outbreak political participation is not simply statistical artifact.

Coefficient stability approaches

To further test the sensitivity of the baseline results to selection into Ebola hardship based on unobservable characteristics, I employ strategies developed in Altonji, Elder, & Taber (2005) and Oster (2016) and presented in González and Miguel (2015). The intuition presented in these articles is that we can get a sense of the potential selection into treatment from omitted variables based on the nature of selection on observed covariates. To operationalize this intuition, we first estimate the coefficient of Ebola exposure on our outcome of interest in an uncontrolled regression and the coefficient for fully controlled regressions, as in equation (1). Then, with the assumption that unobservable variables share the same level of explanatory power with observable characteristics, the following equation is a consistent estimator of the effect of Ebola on *Y*:

$$\hat{\tilde{\beta}} = \hat{\beta}^* - \left(\hat{\beta} - \hat{\beta}^*\right) \times \frac{R_{max} - R^*}{R^* - R} \quad (4)$$

This estimator, taken from González and Miguel (2015) and based on the work of Oster (2016), considers changes in the coefficient of interest from the uncontrolled regression ($\hat{\beta}$) to the controlled regression ($\hat{\beta}^*$) and the changes in R-squared from the same regressions ($R^*$and R). The adjusted coefficient from this estimator ($\hat{\tilde{\beta}}$) yields an upper (or lower) bound for an identified set of potential coefficients. The coefficient from the OLS regression acts as the other bound. If the estimated bounds exclude zero, this suggests an effect robust to the exclusion of omitted variables. The difficulty in implementing this procedure is identifying an appropriate level of $R_{\max}$, or the theoretical upper bound of explanatory power.

[TABLE 4 HERE]

Panel A in Table 4 presents the results of this analysis using the specification in equation (1) as the control regression. Panel B replicates this analysis with the inclusion of the index of political activity in the 2012 election. The first two columns provide the coefficients, standard errors, and R^2 values for these regressions, while the final three columns present stable bounds for the coefficient of Ebola exposure on political participation at varying levels of R^2 derived using values of R_{max} from the methods suggested by Altonji et al. (2005) and Oster (2016) – $2R^*$and $2.2R^*$respectively. For these values, the directionality of all coefficients in the identified set for political participation remains the same.

[FIGURE 5 HERE]

Even in the most conservative case, where we assume that we can perfectly capture the variance in civic participation (R_{max} =1), the set of coefficients is wholly below zero, though I note that this is

itself an unrealistic assumption. The difficulties in collecting survey data in West Africa in terms of measurement error, sample sizes, geographic coverage, etc. increase statistical noise in the estimation of socioeconomic outcomes. As mentioned in González and Miguel (2015), McKenzie (2012) considers autocorrelation of many outcomes – including income, expenditures, math test scores, and language test scores – between two periods and across numerous countries and finds that they are "typically lower than 0.50 with many around 0.30." The Altonji et al. and Oster methods suggest that a reasonable upper bound on R^2 would be approximately 0.35 or 0.45, respectively, in the case of the basic controls, or 0.56 and 0.70 when also including pre-disaster political activity as a control. The bounds from these estimates, coupled with strong evidence of null effects in the falsification test, suggest that the relationships we observe here are indeed causal and not an artifact of bias from selection on unobservable characteristics.

Additional robustness checks

Inability versus Disinterest: A major concern is that both the dependent and independent variable measure the ability to attend or engage with civic institutions. Thus, a negative association may be unsurprising. Respondents who found their lives more disrupted may simply be less able to attend events or engage with institutions even if they wanted to. For this reason, I also regress two measures of interest in public affairs on the main independent variables. Coefficients from these estimates are presented at the bottom of Figure 4(a). In addition to reducing participation in public affairs, experiences of hardship brought on by the Ebola Crisis also reduced self-reported *interest* in public affairs and how often respondents spoke with their family about political matters. Note that these measures are not part of the main index used for analysis.

Evaluating response bias: One concern that I discuss briefly in the previous section is response bias. If it is the case that individuals who are less likely to participate in civic affairs respond in a systematically different way to questions regarding exposure to Ebola – if they were deliberately overstating the degree to which Ebola affected their lives, for example – the estimates presented here would be biased. A simple way to evaluate the likelihood of this bias is to shift the main treatment variable (Ebola exposure) to the left-hand side of the equation. Table B.2 in the appendix presents two additional specifications that regress the vector of control variables against Ebola exposure. In each case, F-statistics are fairly low,10 suggesting little evidence of systematic bias in responses. This can also be viewed as a type of selection and the coefficient stability and matching approaches attempt to account for this.

Weighting and standard error construction: An additional concern is that the results presented above are sensitive to either the weighting we place on them or the manner by which standard errors are calculated. Table B.3 presents specifications analogous to Column (4) of Table 2 without survey weighting, with and without clustered standard errors at the PSU chiefdom, and district levels, and using quantile regression evaluated at the median. Under no alternative weighting or standard error construction scheme would the inference drawn about hardship and participation change.

Multiple imputation: All surveys include some level of missingness or non-response. Table B.4 lists the percentages of missingness for the main variables used in this analysis. They range from 0% to 4.9%. To account for any potential impact this might have on the estimates presented above, I also replicate the specifications in Table 2 on data that have been multiply imputed. These results are presented in appendix Table B.5 and do not indicate that this potential source of bias would change our inference.

[10] $F = 2.23$ for the measure of direct exposure, and $F = 2.18$ for the measure of hardship.

Distributional robustness: To probe the robustness of the above findings to non-normality in the distribution of the outcome variable and potential outliers, I also present (in appendix Table B.6) the results of quantile regressions (Koenker & Bassett, 1978), evaluated at the 10th, 25th, 50th (median), 75th, and 90th percentiles. The observed relationship is negative and significant at all points in the outcome distribution, though larger at the higher end, suggesting hardship from Ebola had a larger negative effect on individuals who are generally more politically engaged.

Over-controlling: Achen (2005) argues against the inclusion of a large number of control variables in multivariate regressions in favor of more parsimonious specifications. Recently, Lenz and Sahn (2017) highlight that in many studies, statistical significance is achieved using covariate adjustment. To demonstrate that covariate manipulation is not driving the results here, Table B.7 presents the bivariate regression between political participation and Ebola exposure and sequentially adds additional covariates. In all specifications, the coefficient for our main treatment variable remains significant and between -0.25 and -0.23.

Evaluating potential mechanisms

In the preceding section, I demonstrate a strong, negative relationship between Ebola hardship and participation in civic affairs. Given the divergence between this finding and much of the literature on trauma, distinguishing the mechanism by which this particular type of crisis affects civic engagement becomes all the more important. In the conceptual framework, I highlight several potential pathways. Of these, two are both consistent with the observed net effect of Ebola hardship on participation and testable with the data at hand: resources (measured by economic security) and external efficacy (which I measure using an index of trust in local and political institutions).

To evaluate these mechanisms, I undertake a very simple mediation exercise testing 1) whether Ebola appears to influence the potential mediator *M,* as in equation (5), and 2) to what extent controlling for this variable mediates the relationship between Ebola exposure and political participation, as in equation (6).

$$M_i = \beta_0 + \beta_1 Direct\_Exposure_i + \beta_2 Ebola\_Hardship_i + \boldsymbol{X_i'\beta} + \boldsymbol{X_d'\beta} + \epsilon_i \quad (5)$$

$$Y_i = \beta_0 + \beta_1 Direct\_Exposure_i + \beta_2 Ebola\_Hardship_i + \beta_3 M_i + \boldsymbol{X_i'\beta} + \boldsymbol{X_d'\beta} + \epsilon_i \quad (6)$$

As can be seen in Table 5, Ebola hardship appears to be conditionally correlated with both of these mediators in the manners predicted by theory: Ebola hardship appears to increase economic insecurity, and to reduce trust in traditional institutions. However, controlling for these post-treatment indicators, we observe different results. While hardship is associated with increased economic insecurity, this does not appear to greatly reduce the observed relationship between Ebola and political participation. In contrast, adding in traditional index the reduces the coefficient of Ebola hardship by approximately 25% (down to -.19 from -.25). This index, composed of questions related to trust in and perceived performance of traditional, religious, and local leaders, is significantly and positively associated with participation. This finding offers suggestive evidence that of the two testable pathways, a decrease in a measure of the efficacy of the local and traditional institutions in which respondents engage appears to be driving some of the relationship between hardship and participation, though I note that there is still a large portion of the total effect for which we are unable to account.

[TABLE 5 HERE]

Table 5 also presents the results of a formal mediation analysis following Imai et al. (2010) in the lower panel. Using this approach finds analogous results. The measure of efficacy of the relevant institutions accounts for around 22% of the total effect of hardship. In contrast, economic insecurity accounts for around 6%. The benefit of using this approach is that it allows us to examine how sensitive these findings are to violations of the central identifying assumption; sequential ignorability. Figure 6 plots this analysis, presenting estimated Average Causal Mediation Effect (ACME) in the presence of such a violation, as quantified by correlation between the error terms from Equations (5) and (6). In the case of the external efficacy index, this correlation would have to be quite high and positive (.24) to reduce the estimated ACME to zero.

This result accords with other research on the consequences of the Ebola Crisis on political outcomes in Liberia, such as Blair et al. (2016) who find that experiences of hardship are negatively associated with trust in the government and Maffioli (2018) who demonstrates that government response to the crisis shapes how individuals respond politically in the context of vote choice and turnout. The present analysis builds on these articles by expanding to an additional country, Sierra Leone, and examining how changes in attitudes like trust extend to changes in observable behaviors like participation in local civic affairs. I also distinguish between the varied experiences of the crisis which range from daily hardship to traumatic events such as the loss of a loved one to the disease.

Conclusion

The negative impacts of disease burden on economic development are well documented. In the preceding sections, I have demonstrated that, in the case of the 2014/2015 West African Ebola outbreak, epidemiological disasters can also have detrimental effects on political development. Individual responses from approximately 1,000 Afrobarometer (2015) survey participants suggest that citizens who experienced greater hardship during the crisis are significantly less politically engaged – less likely to participate in community groups, undertake collective action with fellow citizens, and less likely to reach out to community and political leaders. Consistent with findings examining the consequences of traumatic events such as exposure to wartime violence or earthquakes, I find that direct exposure to a friend or family member either infected or killed by EVD is associated with an increase in participation but this relationship, while large, is not statistically significant.

I make the case that this observed reduction in participation is not a product of selection into hardship using several approaches including falsification, matching, and coefficient stability. I also demonstrate that this relationship is not solely a product of a lack of an ability to participate in public affairs as a consequence of the ongoing nature of the crisis; individuals who experienced greater degrees of hardship were also less likely to consider themselves interested in public affairs even controlling for previous levels of political activity. While hardship is positively associated with greater economic insecurity, it does not appear that this reduction in material resources mediated the relationship between the primary dependent and independent variables. In contrast, the path from hardship to participation does appear to be in part mediated by reduced evaluation of trust and performance of local and traditional leaders, suggesting that the Ebola crisis diminished perceptions of external efficacy and therefore the benefit of engaging with particular institutions in the views of those who experienced greater levels of hardship.

Overall, these findings suggest that in contrast to effects observed following exposure to conflict that epidemics and similar crisis may have additional, countervailing effects that are brought on by the political context of state response. While political institutions are either strengthened or replaced

following civil conflict, natural disasters and public health epidemics provide opportunities for states -- and institutions within the state – to reveal their capacity.

From these findings we can take away several lessons for the study of crises and political development. First, crises can have different causal pathways. The first highlighted by many studies of traumatic events during civil war or natural disasters such as floods, earthquakes, and hurricanes finds that such trauma can lead to growth and an increase in prosocial preferences and activity such as participation in community affairs (Bauer et al., 2016). Second, experiences of hardship, which are often experienced more broadly than direct, traumatic exposure, can shape perceptions of institutional capacity. If this revision is downward, it can reduce the incentive of engaging with that institution in the future. Elsewhere, poor performance of the state in response to natural disasters has been associated with changes in turnout or altered vote choice (Maffioli, 2018; Cole et al., 2012). In Sierra Leone, hardship brought on by the 2014/2015 Ebola outbreak diminished reported trust in and evaluated performance of historically important civic institutions which in turn reduced interest and participation in those same institutions.

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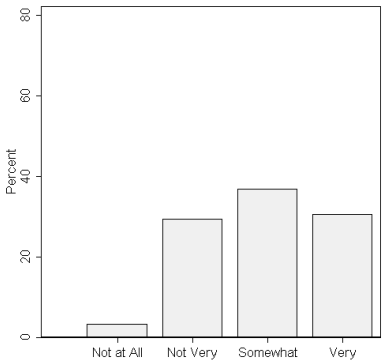
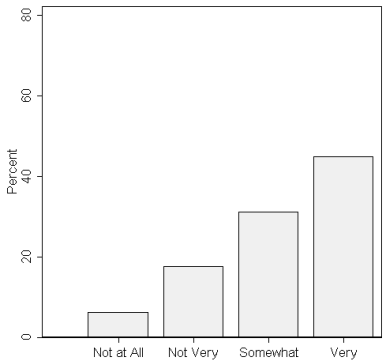
Tables and Figures

Figure 1: Effectiveness in Bringing Ebola Under Control

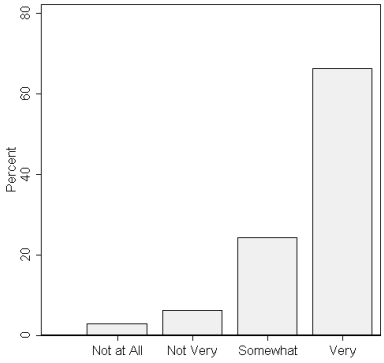
(a) Local Government



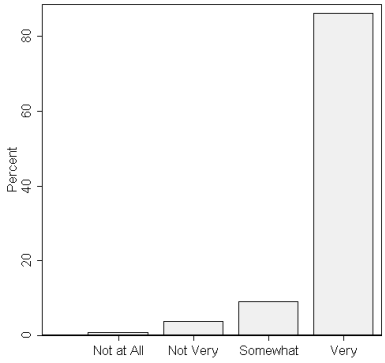
(b) Local NGO



(c) National Government

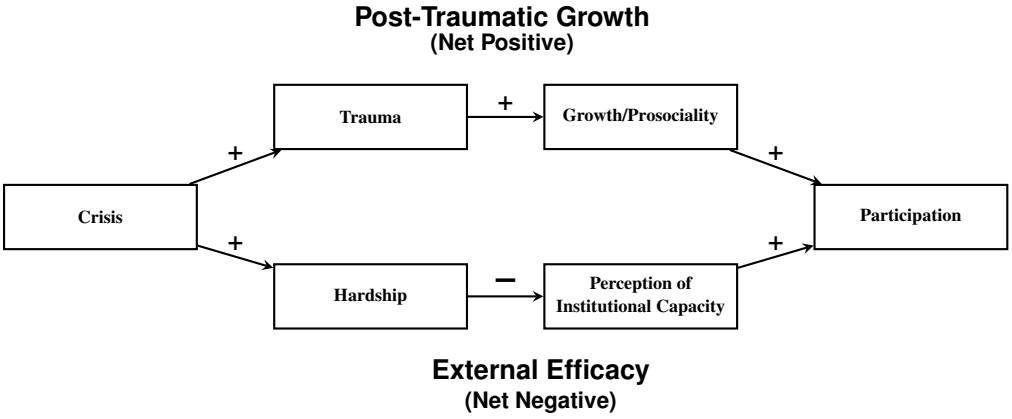


(d) International Organization



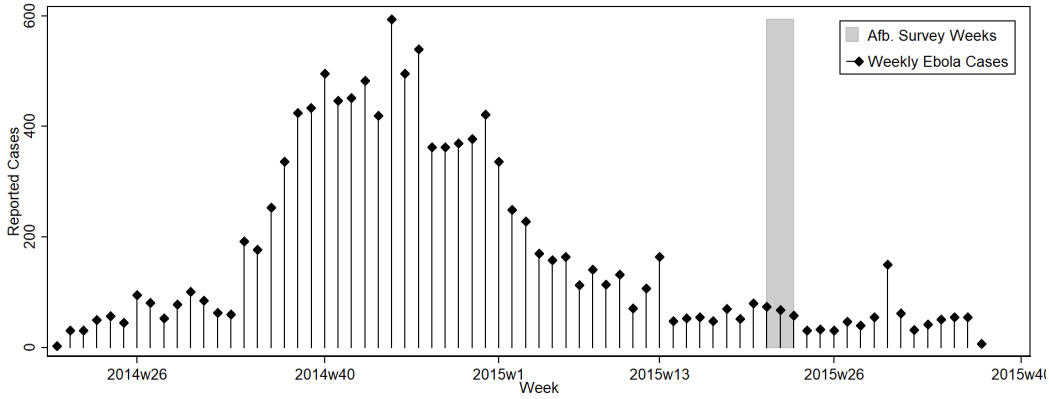
Note: Data from Afrobarometer Round 6 Survey Data. Don't know and missing responses are excluded (N = 1,029).

Figure 2: Theoretical Expectations



Note: (+) and (−) signs indicate the expected direction of effects between variables. Thus, net effects are multiplicative (by decreasing perceptions of state capacity, the expected effect of hardship, mediated through changes in state trust, is negative despite the positive effect of state capacity on participation).

Figure 3: Reported Cases of Ebola and Survey Timing



Note: Data on Ebola cases come from Fang *et al.* (2016). Data on survey timing from Afrobarometer.

Table 1: Direct Exposure and Hardship

		Hardship		
		Below Mean	Above Mean	Total
Direct Exposure	No	.23	.40	.63
	Yes	.10	.27	.37
Total	Total	.33	.67	1.00

Note: This table presents survey-weighted cell proportions and row and column totals for the two variables of interest for observations used in this analysis (N=1029).

Table 2: Ebola Exposure and Political Engagement

	Participation Index					
	(1)	(2)	(3)	(4)	(5)	(6)
Friend/Family w/ EVD	0.10		0.21	0.32*	0.18	0.16
	(0.15)		(0.15)	(0.16)	(0.14)	(0.14)
Ebola Hardship Index		-0.26***	-0.27***	-0.25***	-0.22***	-0.19***
		(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Pre-Ebola Participation Index					0.46***	0.48***
					(0.05)	(0.05)
Age				0.11***	0.10***	0.12***
				(0.02)	(0.02)	(0.02)
Age^2				-0.00*	-0.00*	-0.00***
				(0.00)	(0.00)	(0.00)
Sex (Male = 1)				0.46***	0.38**	0.31*
				(0.13)	(0.12)	(0.12)
Education				0.08*	0.06*	0.10**
				(0.03)	(0.03)	(0.03)
Metal Roof				-0.20	-0.25	-0.31
				(0.19)	(0.18)	(0.22)
State Capacity Index				-0.07*	-0.10**	-1.82***
				(0.04)	(0.04)	(0.20)
R^2	0.001	0.057	0.059	0.203	0.317	0.448
Sector FE				✓	✓	✓
Religion FE				✓	✓	✓
Ethnicity FE				✓	✓	✓
PSU FE						150
Observations	1029	1029	1029	1029	1029	1029

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: This table displays the observed relationships between direct exposure to Ebola and the first principal component index of Ebola Hardship on an index of Political Engagement. A higher value indicates being more engaged in civic affairs. Columns (1) and (2) are the raw correlation between these two measures. Column (3) regresses the outcome on both our measures of Ebola. Column (4) presents the baseline specification and adds in individual controls and a measure of local state capacity. Column (5) additionally controls for pre-Ebola individual levels of participation and the final column additionally adds in PSU fixed effects. is a multivariate regression of controls which does not include Ebola Exposure. Coefficients are survey-weighted with robust standard errors clustered at the PSU level.

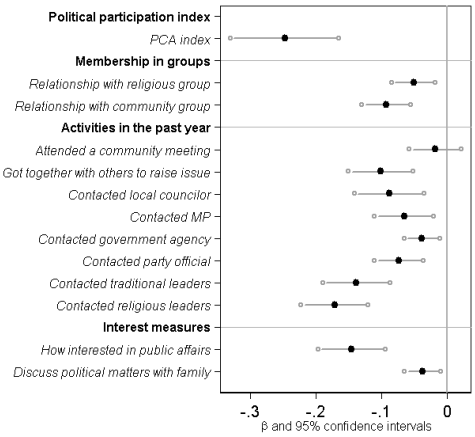
Table 3: Balance on Pre-Crisis Covariates

		Hardship			
	Sample Mean	Below Mean	Above Mean	Difference	(p-value)
Pre-Ebola Participation	0.05	0.09	0.02	0.06	0.54
Age	39.59	41.32	38.77	2.56	0.01
Gender	0.50	0.51	0.50	0.01	0.70
Education	3.50	3.49	3.51	-0.01	0.94
Metal Roof	0.78	0.68	0.83	-0.15	0.00
Sector: Self Employed	0.63	0.54	0.67	-0.14	0.00
Sector: Government	0.07	0.08	0.06	0.02	0.26
Ethnicity: Mende	0.34	0.48	0.28	0.20	0.00
Ethnicity: Temne	0.28	0.18	0.33	-0.16	0.00
Religion: Christian	0.24	0.23	0.24	-0.02	0.56
Religion: Muslim	0.76	0.77	0.76	0.02	0.52
State Capacity Index	-0.02	0.20	-0.13	0.33	0.01

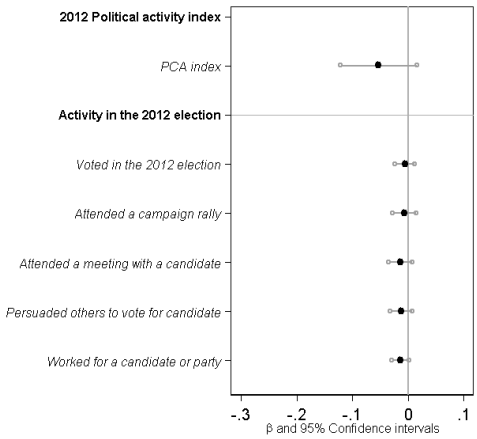
Note: Table displays full sample means and group means of pre-Ebola covariates of interest and p-values from Welch's T-Test of each. Groups are broken down by whether or not the respondent had a friend or family member infected or killed by Ebola (upper panel) or whether or not they score above mean on the hardship index (lower panel).

Figure 4: Ebola Hardship on Political Participation Sub-Components

(a) Political Participation Index



(b) 2012 Political Activity



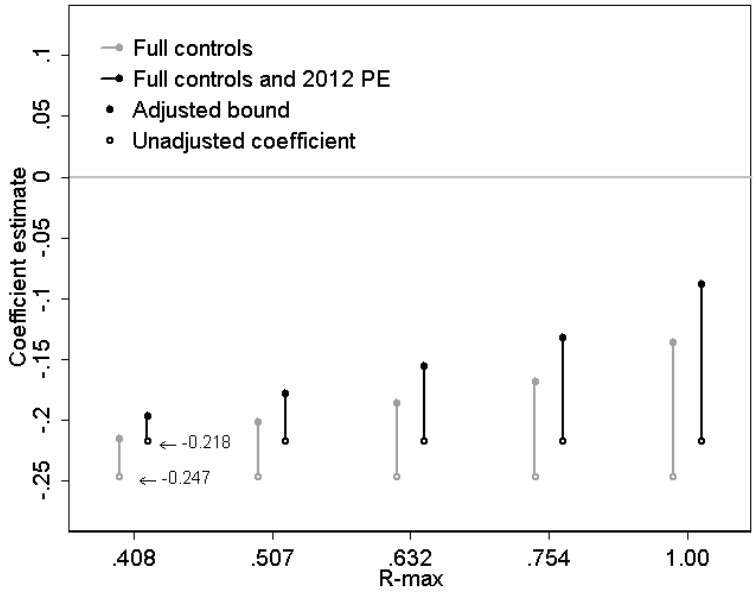
Note: Figure 4a plots the coefficients and 95% confidence intervals for Ebola Exposure taken from specifications following Eq. (1) with the index of political participation and each individual component of that index as the dependent variable. Figure 4b plots the coefficients and 95% confidence intervals for Ebola Exposure from Eq. (3) with the index of political activity in the 2012 national election and each individual component as the dependent variable.

Table 4: Selection Based on Unobservables

	OLS		Stability Bounds		
	β^R	β^F	Bellows & Miguel '15	Oster '16	Maximum
Panel A: Full Controls					
Ebola Exp.	-0.267***	-0.247***	[-0.227, -0.247]	[-0.213, -0.247]	[-0.136, -0.247]
	(0.041)	(0.042)			
R^2	0.059	0.203	.	.	.
R_{max}	.	.	0.346	0.446	1.000
Panel B: Full Controls and Political Activity in 2012					
Ebola Exp.	-0.267***	-0.218***	[-0.169, -0.218]	[-0.146, -0.218]	[-0.088, -0.218]
	(0.041)	(0.040)			
R^2	0.059	0.317	.	.	.
R_{max}	.	.	0.575	0.698	1.000

Note: The first two columns present the coefficients and standard errors for Ebola Hardship and Direct Exposure in first a regression with no controls, denoted B^R, and second, the full set of controls from equation (**??**). The following three columns present bounded estimates from $\hat{\beta}$ to $\hat{\beta}^*$ and the value used as the maximum achievable R-squared. Panel A uses the fully specified estimation from Eq. (1) to estimate β^F and the R^2 value while Panel B also includes the index of participation in the most recent national election.

Figure 5: Coefficient Stability Bounds



Note: Each pair of line displays the impact of Ebola Hardship on the index of participation under different levels of R_{max}, or "the maximum variation that can be explained in a regression of a dependent variable of interest…" (**?**). An R_{max} of 1.00 assumes that *all* the variation in political participation would be able to be captured by survey measures. The first line of each pair uses R^2 and $\hat{\beta}$ values from the specification in Eq. (1). The second, darker line takes these values from a similar specification which also includes measures of participation in the 2012 elections.

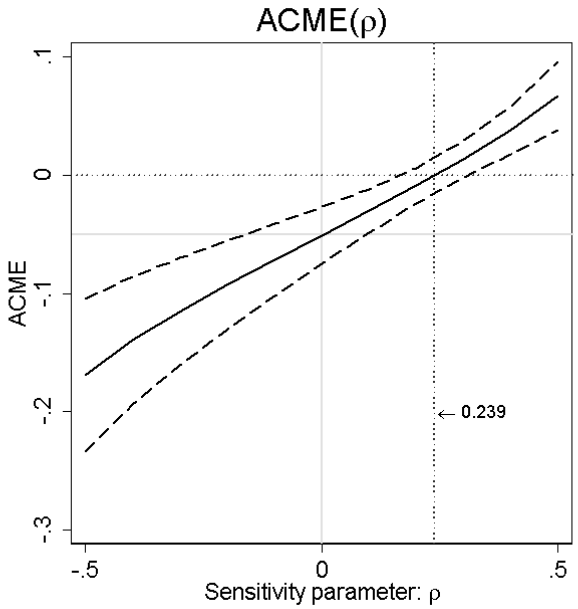
Table 5: Mediation Analysis

	Traditional Institutions	Political Participation	Economic Insecurity	Political Participation
	(1)	(2)	(3)	(4)
Friend/Family w/ EVD	0.06	0.43**	-0.36***	0.23
	(0.13)	(0.16)	(0.10)	(0.13)
Ebola Hardship Index	-0.16***	-0.19***	0.20***	-0.23***
	(0.03)	(0.05)	(0.03)	(0.04)
Traditional Index		0.32***		
		(0.06)		
Economic Ins.				-0.08
				(0.04)
R^2	0.086	0.240	0.153	0.208
Individual Controls	✓	✓	✓	✓
Sector FE	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Observations	755	755	1023	1023
		-.052		-.015
ACME	.	(-.077,-.029)	.	(-.031,-.000)
		-.185		-.233
Direct Effect	.	(-.266, -.107)	.	(-.300, -.168)
		-.236		-.248
Total Effect	.	(-.313, -.163)	.	(-.315, -.185)
		21.94%		06.15%
% Mediated	.	(16.43%, 31.73%)	.	(04.82%, 08.22%)

* p $<$ 0.05, ** p $<$ 0.01, *** p $<$ 0.001. Robust standard errors in parentheses.

Note: This table presents the results of a mediation exercise following Imai et al. (2010) using the Stata package presented in Hicks and Tingley (2011). Columns (1) and (2) present the results from the regressions used to estimate the Average Causal Mediation Effect of Traditional Institutions and Columns (3) and (4) do the same for a measure of economic insecurity. Columns (1) and (3) demonstrate that Hardship during the crisis was negatively associated with trust and perceptions of performance of local and traditional leaders and positively associated with economic insecurity respectively. The lower panel presents the results of the mediation exercise, decomposing the Average Causal Mediation Effect (ACME) of the potential mediator, the direct effect of the hardship measure, the total effect and what percentage of the total effect was mediated by the mediator.

Figure 6: Sensitivity Analysis for Mediation



Note: This figure plots the sensitivity of the results in Table 5 to potential violations of the sequential ignorability assumption required for valid mediation analysis. Namely, it tests the degree to which the error terms of the mediation regressions must be correlated to reduce the estimate of the ACME to zero.

Online Appendix: Disease, Disaster, and Disengagement

December 15, 2019

This appendix provides supplementary information to "Disease Disaster and Disengagement: Ebola and Political Participation in Sierra Leone." Summary statistics and principle components analysis for index construction can be found in section A. Section B presents full regressions tables for the main effects that are presented visually or in the body of the text in the article and presents the analysis for further robustness checks that are referred to in the paper.

A. Summary Statistics and Index Construction

Table A.1: Summary Statistics

	Mean	Std. Dev.	Min	Max	N
Panel A: Control Variables					
Age	39.71	14	18	99	1185
Sex (Male = 1)	0.49	.5	0	1	1191
Education	3.49	2.5	1	10	1188
Religiosity	5.46	1.8	1	7	1155
Metal Roof	0.79	.41	0	1	1191
State Capacity	-0.00	2	-3.9	4.2	1191
Panel B: Participation Outcomes					
Participation Index	-0.00	2	-3.4	6.5	1145
How Int. in Pub. Affairs?	1.55	1.2	0	3	1146
Discuss Pub. Affairs?	0.80	.73	0	2	1139
Rel. with Religious group	2.44	.89	1	4	1182
Rel. with community group	2.09	1.1	1	4	1180
Attended a community meeting	2.43	1.2	0	4	1179
Got together with others to raise an issue	2.13	1.3	0	4	1178
Past yr: Contacted Local gov. Councilor	0.68	1	0	3	1176
Past yr: Contacted MP	0.38	.84	0	3	1174
Past yr: Contacted Government Agency	0.22	.65	0	3	1177
Past yr: Contacted Party Official	0.35	.82	0	3	1175
Past yr: Contacted traditional leaders	1.39	1.3	0	3	1176
Past yr: Contacted Religous leaders	1.70	1.3	0	3	1182
Panel C: 2012 Political Activity					
Pre-Ebola Participation Index	0.00	1.5	-1.7	2.8	1175
2012: Voted in National Election	0.75	.43	0	1	1191
2012: Attend Campaign Rally	0.43	.49	0	1	1180
2012: Attend meeting with candidate	0.45	.5	0	1	1182
2012: Persuade others	0.37	.48	0	1	1177
2012: Work for Candidate or Party	0.19	.39	0	1	1181
Panel D: Ebola Exposure					
Friend/Family w/EVD	0.36	.48	0	1	1191
Ebola Hardship Index	-0.00	1.9	-3.3	1.7	1149
Close friend or relative died from Ebola	0.34	.47	0	1	1137
Close friend or relative infected with Ebola	0.36	.48	0	1	1142
Due to Ebola: unable to attend school	2.02	1.2	0	3	1151
Due to Ebola: unable to work/earn income	1.93	1.2	0	3	1161
Due to Ebola: unable to attend social gath.	2.04	1.2	0	3	1162
Due to Ebola: unable to get medical care	1.95	1.2	0	3	1160

Note: The summary statistics presented here are only for continuous and ordinal variables. While I discuss several in the body of the text, for the full coding of ordinal variables, please refer to Afrobarometer round 6 codebook.

PCA Indices Construction

Table A.2: Participation PCA Index

Eigenvalue	(ρ)	Difference	Observations
4.176		2.497	1,145
Variable		Eigenvector	Unexplained
Rel. with religous group		0.303	0.62
Rel. with community group		0.325	0.56
Attended a community meeting		0.324	0.56
Got together with others to raise an issue		0.367	0.44
Past yr: Contacted Local gov. Councilor		0.311	0.59
Past yr: Contacted MP		0.302	0.62
Past yr: Contacted Government Agency		0.255	0.73
Past yr: Contacted Party Official		0.283	0.67
Past yr: Contacted traditional leaders		0.355	0.47
Past yr: Contacted Religous leaders		0.321	0.57

Note: This table displays summary characteristics of the Political Engagement Index including Eigenvalue, Rho, ρ, and Eigenvectors or factor loadings for each component as well as the unexplained variance for each.

Table A.3: Pre-Ebola Participation PCA Index

Eigenvalue	(ρ)	Difference	Observations
2.306		1.301	1,175
Variable		Eigenvector	Unexplained
2012: Voted in National Election		0.116	0.97
2012: Attend Campaign Rally		0.487	0.45
2012: Attend meeting with candidate		0.525	0.36
2012: Persuade others		0.492	0.44
2012: Work for Candidate or Party		0.480	0.47

Note: This table displays summary characteristics of the Pre-Ebola Engagement Index including Eigenvalue, Rho, ρ, and Eigenvectors or factor loadings for each component as well as the unexplained variance for each.

Table A.4: Ebola Hardship PCA Index

Eigenvalue	(ρ)	Difference	Observations
3.471		3.25	1,149
Variable		Eigenvector	Unexplained
Due to Ebola: unable to attend school		0.491	0.16
Due to Ebola: unable to work/earn income		0.505	0.11
Due to Ebola: unable to attend social gath.		0.508	0.10
Due to Ebola: unable to get medical care		0.496	0.15

Note: This table displays summary characteristics of the Ebola Exposure Index including Eigenvalue, Rho, ρ, and Eigenvectors or factor loadings for each component as well as the unexplained variance for each.

Table A.5: Economic Insecurity PCA Index

Eigenvalue	(ρ)	Difference	Observations
2.470	0.548	1.922	1,185
Variable		Eigenvector	Unexplained
Past yr: not enough food?		0.490	0.34
Past yr: not enough clean water for home use		0.463	0.41
Past yr: not enough medicines/treatment		0.499	0.32
Past yr: not enough fuel to cook		0.331	0.70
Past yr: not enough cash income		0.432	0.49

Note: This table displays summary characteristics of the Economic Insecurity Index including Eigenvalue, Rho, ρ, and Eigenvectors or factor loadings for each component as well as the unexplained variance for each.

Table A.6: Traditional Performance PCA Index

Eigenvalue	(ρ)	Difference	Observations
2.200	0.548	0.801	835
Variable		Eigenvector	Unexplained
Trust: Local Gov. Council		0.405	0.646
Trust: Traditional Leader		0.527	0.401
Trust: Religious Leader		0.446	0.571
Performance: Local Gov. Council		0.356	0.727
Performance: Traditional Leader		0.469	0.525
Effective: Local Government		0.110	0.974

Note: This table displays summary characteristics of the Traditional Performance Index including Eigenvalue, Rho, ρ, and Eigenvectors or factor loadings for each component as well as the unexplained variance for each.

B. Additional Robustness Tests

Table B.1: Hardship Index Sub-components

	Hardship	Due to Ebola Unable to:			
	Index	Attend School	Work	Attend Gath.	Get Med. Care
Friend/Family w/ EVD	0.18	0.16	0.17	0.17	0.17
	(0.143)	(0.146)	(0.140)	(0.140)	(0.143)
Hardship Measure	-0.22***	-0.30***	-0.33***	-0.31***	-0.31***
	(0.040)	(0.059)	(0.060)	(0.062)	(0.062)
Age	0.10***	0.10***	0.10***	0.10***	0.10***
	(0.022)	(0.022)	(0.023)	(0.023)	(0.022)
Age^2	-0.00*	-0.00*	-0.00*	-0.00*	-0.00*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Sex (Male $= 1$)	0.38**	0.35**	0.40***	0.39**	0.35**
	(0.116)	(0.115)	(0.117)	(0.116)	(0.117)
Education	0.06*	0.06*	0.05	0.06*	0.06*
	(0.029)	(0.029)	(0.028)	(0.028)	(0.029)
R^2	0.317	0.312	0.315	0.310	0.312
Sector FE	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓	✓
Observations	1029	1029	1029	1029	1029

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: This table displays the observed relationship between each of the subcomponents of the Ebola hardship index and participation. These regressions each include the vector of individual controls and Enumeration Area controls as defined above.

Table B.2: Evaluating Response Bias

	Direct Exposure	Hardship Index
	(1)	(2)
Age	-0.00	0.02
	(0.01)	(0.02)
Age^2	-0.00	-0.00
	(0.00)	(0.00)
Sex (Male = 1)	0.02	0.19
	(0.03)	(0.12)
Education	0.01	0.01
	(0.01)	(0.03)
Metal Roof	0.01	0.29
	(0.04)	(0.17)
State Capacity Index	-0.09	0.29
	(0.15)	(0.60)
R^2	0.296	0.291
F-Statistic	2.23	2.18
Sector FE	✓	✓
Religion FE	✓	✓
Ethnicity FE	✓	✓
Observations	1029	1029

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: Column (1) regresses the measure of direct exposure to Ebola on the individual level controls and measure of state capacity. Column (2) Does the same for the hardship index. Results suggest that there is relatively little selection into claiming exposure/hardship or not based on many observable covariates.

Table B.3: Robustness to Weighting and Standard Error Construction

	(1)	(2)	(3)	(4)	(5)	(6)
Friend/Family w/ EVD	0.32*	0.28*	0.28*	0.28	0.28	0.03
	(0.16)	(0.13)	(0.13)	(0.14)	(0.17)	(0.18)
Ebola Hardship Index	-0.25***	-0.25***	-0.25***	-0.25***	-0.25**	-0.22***
	(0.04)	(0.03)	(0.04)	(0.05)	(0.08)	(0.05)
Age	0.11***	0.12***	0.12***	0.12***	0.12**	0.16***
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Age^2	-0.00*	-0.00***	-0.00***	-0.00**	-0.00*	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sex (Male = 1)	0.46***	0.40***	0.40***	0.40**	0.40*	0.39*
	(0.13)	(0.12)	(0.11)	(0.14)	(0.15)	(0.18)
Education	0.08*	0.09**	0.09**	0.09*	0.09*	0.15***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)
Observations	1029	1029	1029	1029	1029	1029
R^2	0.203	0.203	0.203	0.203	0.203	
Individual Controls	✓	✓	✓	✓	✓	✓
Survey Weighting	✓					
Robust VCE	✓	✓	✓	✓	✓	✓
No. Clusters	150		150	90	14	
Quantile						.50

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: Column (1) presents the standard baseline specification presented throughout this article. Column (2) removes survey weighting and retains robust standard errors. Columns (3) through (5) cluster standard errors at the enumeration area, chiefdom, and district level respectively. Column (6) presents the results of a quantile regression evaluated at the median.

Table B.4: Missing Values

	Observations	Total	% Missing/Don't Know
Political Participation Index	1145	1191	4.2
Close friend or relative infected with Ebola	1142	1191	4.5
Close friend or relative died from Ebola	1137	1191	4.9
Due to Ebola: unable to attend school	1151	1191	3.7
Due to Ebola: unable to work/earn income	1161	1191	2.7
Due to Ebola: unable to attend social gath.	1162	1191	2.7
Due to Ebola: unable to get medical care	1160	1191	2.8
Age	1185	1191	.55
Sex (Male $= 1$)	1191	1191	0
Education	1188	1191	.27
Religiosity	1155	1191	3.3
Occupation	1184	1191	.64
Sector	1143	1191	4.4
Religion	1162	1191	2.7
Language	1191	1191	0
Ethnic Community/group/tribe	1190	1191	.092
State Capacity	1191	1191	0

Note: For each of the main variables in our analysis, this table presents the total number of not missing, refused or "don't know" responses and the percentage. Most of the missingness here stems from "don't know" responses, particularly for the Ebola Exposure Index. This likely reflects the fact that the outbreak was still winding down at the time of the survey.

Table B.5: Multiple Imputation Replication of Main Effects

	Participation Index					
	(1)	(2)	(3)	(4)	(5)	(6)
Friend/Family w/EVD	0.14		0.25	0.36*	0.22	0.25*
	(0.14)		(0.13)	(0.14)	(0.14)	(0.12)
Ebola Hardship Index		-0.24***	-0.24***	-0.23***	-0.21***	-0.20***
		(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Pre-Ebola Participation Index					0.45***	0.47***
					(0.05)	(0.05)
Age				0.11***	0.10***	0.11***
				(0.02)	(0.02)	(0.02)
Age^2				-0.00**	-0.00**	-0.00***
				(0.00)	(0.00)	(0.00)
Sex (Male = 1)				0.49***	0.40**	0.33*
				(0.13)	(0.12)	(0.13)
Education				0.09**	0.07*	0.11**
				(0.03)	(0.03)	(0.03)
Metal Roof				-0.21	-0.25	-0.23
				(0.18)	(0.16)	(0.20)
State Capacity				-0.08*	-0.09**	-1.43***
				(0.03)	(0.03)	(0.13)
R^2	.	.	.	.	.	.
Sector FE				✓	✓	✓
Religion FE				✓	✓	✓
Ethnicity FE				✓	✓	✓
PSU FE						150
Observations	1191	1191	1191	1185	1185	1185

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: This table replicates the main effects table after multiple imputation and displays the observed relationships between direct exposure to Ebola and the first principal component index of Ebola Hardship on an index of Political Engagement. A higher value indicates being more engaged in civic affairs. Columns (1) and (2) are the raw correlation between these two measures. Column (3) regresses the outcome on both our measures of Ebola. Column (4) presents the baseline specification and adds in individual controls and a measure of local state capacity. Column (5) additionally controls for pre-Ebola individual levels of participation and the final column additionally adds in PSU fixed effects. is a multivariate regression of controls which does not include Ebola Exposure. Coefficients are survey-weighted with robust standard errors clustered at the PSU level.

Table B.6: Quantile Regression Results

	Baseline	Quantile [Ebola Exp.] Evaluated				
	OLS	.10	.25	.5	.75	.90
Ebola Hardship Index	-0.25***	-0.14***	-0.16***	-0.22***	-0.33***	-0.36***
	(0.03)	(0.03)	(0.04)	(0.05)	(0.05)	(0.07)
Age	0.12***	0.02	0.10***	0.16***	0.14***	0.13**
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.05)
Age^2	-0.00***	0.00	-0.00*	-0.00***	-0.00**	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sex (Male $= 1$)	0.40***	0.12	0.55***	0.39*	0.32	0.51*
	(0.12)	(0.10)	(0.15)	(0.18)	(0.17)	(0.25)
Education	0.09**	0.03	0.02	0.15***	0.09*	0.10
	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.06)
Metal Roof	-0.37**	-0.68***	-0.71***	-0.34	-0.05	0.15
	(0.14)	(0.13)	(0.20)	(0.22)	(0.21)	(0.30)
State Capacity Index	-0.08**	-0.04	-0.04	-0.07	-0.06	-0.13*
	(0.03)	(0.02)	(0.04)	(0.04)	(0.04)	(0.06)
R^2	0.203					
Sector FE	✓	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓	✓	✓
Observations	1029	1029	1029	1029	1029	1029

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: This table presents the results of five quantile regressions and the unweighted OLS baseline regression for comparison. The last five columns estimate $Y_i = X_{i,d}^{'}\beta + \varepsilon_{i,d,\tau}, Q_\tau(Y_i|X_{i,d}) = X_{i,d}^{'}\beta, \tau \in (.10, .25, .50, .75, .90)$. These estimations evaluate the relationship between Ebola Exposure and Political Engagement at different quantiles of the political engagement index. Namely, the OLS regression overestimates the effect at the 10^{th} percentile and underestimates the relationship at the higher end of the distribution. However, the relationship is negative and significant at all levels.

Table B.7: Robustness to Over-Controlling

	(1)	(2)	(3)	(4)	(5)
Friend/Family w/ EVD	0.28	0.31	0.30	0.32*	0.34*
	(0.15)	(0.16)	(0.16)	(0.16)	(0.15)
Ebola Hardship Index	-0.24***	-0.24***	-0.25***	-0.25***	-0.23***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Age	0.10***	0.11***	0.11***	0.11***	0.13***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)
Age^2	-0.00*	-0.00*	-0.00*	-0.00*	-0.00***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sex (Male $= 1$)	0.50***	0.51***	0.47***	0.46***	0.41**
	(0.12)	(0.13)	(0.13)	(0.13)	(0.14)
Education	0.04	0.06	0.08*	0.08*	0.11**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Metal Roof	-0.25	-0.22	-0.18	-0.20	-0.27
	(0.18)	(0.18)	(0.18)	(0.19)	(0.23)
State Capacity Index	-0.08*	-0.09*	-0.08*	-0.07*	-1.59***
	(0.03)	(0.03)	(0.03)	(0.04)	(0.17)
Observations	1029	1029	1029	1029	1029
R^2	0.186	0.193	0.201	0.203	0.347
Sector FE		✓	✓	✓	✓
Religion FE			✓	✓	✓
Ethnicity FE				✓	✓
PSU FE					✓

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: Columns (1) through (8) in this table sequentially add additional covariates used in the baseline regression specification with the political engagement index as the outcome variable. Controlling for additional covariates slightly decreases the relationship between Ebola Exposure and Political Engagement, thought the significant, negative relationship is stable across all specifications.

Table B.8: Ebola Exposure and Economic Insecurity

	PCA	Components					Frequency
	Index	Food	Water	Medicine	Fuel	Cash	# Times
Friend/Family w/ EVD	-0.44***	-0.28**	-0.29**	-0.28**	-0.24**	-0.07	-0.32
	(0.12)	(0.10)	(0.09)	(0.09)	(0.08)	(0.09)	(0.19)
Ebola Hardship Index	0.19***	0.13***	0.11***	0.17***	0.02	0.07**	0.27***
	(0.04)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.05)
Age	-0.06**	-0.01	-0.06***	-0.04**	-0.02	-0.04**	-0.11**
	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.04)
Age^2	0.00**	0.00	0.00***	0.00**	0.00	0.00*	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Sex (Male $= 1$)	-0.00	0.06	-0.07	0.05	-0.08	0.03	0.06
	(0.09)	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)	(0.16)
Education	-0.12***	-0.11***	-0.05*	-0.07***	-0.02	-0.07**	-0.15***
	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.04)
R^2	0.156	0.141	0.111	0.166	0.053	0.095	0.130
Sector FE	✓	✓	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓	✓	✓	✓
Observations	1023	1025	1029	1029	1027	1029	956

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: This table displays estimates of Ebola Exposure on measures of economic insecurity. A first principal component index is the dependent variable in the first column; the following 5 columns replace each component as the outcome variable. Each component/question asks the respondent how often in the past year they have gone without a particular item. The final column regresses Ebola Exposure against an additional measure (excluded from the index) asking how frequently the respondent goes without the highest order (from left to right in this table) item.

Table B.9: Ecological Level of Ebola and Political Participation

	(1)	(2)	(3)	(4)
Total Cases	-0.00***	-0.00***	-0.00**	-0.00**
	(0.00)	(0.00)	(0.00)	(0.00)
Pre-Ebola Participation Index				0.49***
				(0.05)
Age	0.12***	0.12***	0.11***	0.10***
	(0.02)	(0.02)	(0.02)	(0.02)
Age^2	-0.00***	-0.00***	-0.00*	-0.00*
	(0.00)	(0.00)	(0.00)	(0.00)
Sex (Male = 1)	0.35**	0.35**	0.44***	0.34**
	(0.12)	(0.11)	(0.13)	(0.12)
Education	0.10**	0.10**	0.09*	0.07*
	(0.03)	(0.03)	(0.03)	(0.03)
Metal Roof	-0.41**	-0.41**	-0.24	-0.28
	(0.14)	(0.15)	(0.19)	(0.18)
State Capacity Index	-0.02	-0.02	-0.03	-0.06
	(0.03)	(0.04)	(0.04)	(0.04)
Sector FE	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓
Ethnicity FE	✓	✓	✓	✓
Observations	1029	1029	1029	1029

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: Column (1) includes robust standard errors, Column (2) clusters standard errors by 150 PSUs, and Column (3) includes survey weighting and clustered standard errors. Column (4) additionally controls for pre-Ebola participation.

Table B.10: Post-Matching Balance on Pre-Crisis Covariates

	Pre-Matching: Hardship				
	Sample Mean	Low Hardship	High Hardship	Difference	(p-value)
Pre-Ebola Participation	0.05	0.09	0.02	-0.06	0.53
Age	39.59	41.32	38.77	-2.56	0.01
Gender	0.50	0.51	0.50	-0.01	0.70
Education	3.50	3.49	3.51	0.01	0.93
Metal Roof	0.78	0.68	0.83	0.15	0.00
Sector: Self Employed	0.63	0.54	0.67	0.14	0.00
Sector: Government	0.07	0.08	0.06	-0.02	0.24
Ethnicity: Mende	0.34	0.48	0.28	-0.20	0.00
Ethnicity: Temne	0.28	0.18	0.33	0.16	0.00
Religion: Christian	0.24	0.23	0.24	0.02	0.56
Religion Muslim	0.76	0.77	0.76	-0.02	0.53
State Capacity	-0.02	0.20	-0.13	-0.33	0.01
	Post-Matching: Hardship				
	Sample Mean	Low Hardship	High Hardship	Difference	(p-value)
Pre-Ebola Participation	0.05	-0.11	-0.12	-0.01	0.95
Age	39.59	39.13	39.66	0.53	0.66
Gender	0.50	0.46	0.46	0.00	1.00
Education	3.50	2.75	2.69	-0.07	0.72
Metal Roof	0.78	0.82	0.82	-0.00	1.00
Sector: Self Employed	0.63	0.80	0.80	-0.00	1.00
Sector: Government	0.07	0.03	0.03	0.00	1.00
Ethnicity: Mende	0.34	0.32	0.32	-0.00	1.00
Ethnicity: Temne	0.28	0.30	0.30	0.00	1.00
Religion: Christian	0.24	0.13	0.13	-0.00	1.00
Religion: Muslim	0.76	0.87	0.87	0.00	1.00
State Capacity	-0.02	-0.28	-0.35	-0.08	0.65

Note: Table displays full sample means and group means of pre-Ebola covariates of interest and p-values from Welch's T-Test of each. Groups are broken down by whether or not they score above mean on the hardship index. The upper panel displays the full sample and the lower panel displays balance after coarsened exact matching where I match on all the variables listed above except pre-Ebola participation.

Table B.11: Estimates from Coarsened Exact Matching

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ebola Hardship Index	-0.26***		-0.24***		-0.20***		-0.22***	
	(0.04)		(0.04)		(0.04)		(0.04)	
Hardship {0,1}		-0.96***		-0.85***		-0.87***		-0.90***
		(0.18)		(0.18)		(0.17)		(0.17)
Full Controls			✓	✓			✓	✓
Matched Sample					✓	✓	✓	✓
Observations	1029	1029	1029	1029	535	535	535	535

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses.

Note: This table displays coefficients of interest for the Coarsened Exact Matching Exercise. Columns (1) and (2) report raw correlations for the unmatched sample, columns (3) and (4) additionally include the full set of controls. Columns (5) through (8) repeat these same specifications in the matched sample.