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Trust a few: natural disasters and the formation of trust in Africa

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Abstract: Individuals are at their most mental plasticity in their impressionable years (ages 18–25 years) forming long-term attitudes and behaviours essential to functioning in a society, such as trust. In this paper we ask how exposure to natural disasters within the impressionable years may affect the formation of trust by matching data from over 1,000 disaster occurrences with data from 88,670 individuals across 36 African nations. Exploiting the frequency of disaster exposure across the impressionable years, we show that disaster exposure has a negative and significant association with generalized trust. Additionally, we show that disasters experienced during the impressionable years have an impact on other dimensions of interpersonal and institutional trust. Our findings are robust to a battery of tests and add to the evidence base on the lasting impacts of natural disasters on individuals and societies.

Key words: natural disasters, trust, impressionable years, Africa

JEL classification: Q54, D91, Z13, O55

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1 Introduction

Natural disasters shock societal structures, especially in communities in developing countries characterized with constrained resources and unreliable institutions. Such shocks are likely to influence the social fabric of a community, including the formation of trust in individuals (Dussaillant and Guzmán 2014; Stephane 2021).

Trust, as a tenet of social capital, works silently to move communities and institutions forwards towards shared goals and mutual reciprocity (Mattes and Moreno 2017). It is reliant on the symmetry and reciprocation of mutual interactions (Khodyakov 2007). Alesina and La Ferrara (2002) observe that one of the strongest factors linked to low levels of trust is a recent account of a traumatic experience. Natural disaster can be regarded as a traumatic experience, especially in developing regions such as those in many places across Africa where they lead to economic vulnerabilities, difficulty in accessing resources and poorly perceived institutional performance (Mackay et al. 2023). These conditions often result in increased competition for resources between groups of individuals (Choi and Bowles 2007), which, in turn, may contribute to the erosion of interpersonal trust.

In this paper we study whether and how disaster exposure during early adulthood, when individuals arguably go through the most impressionable stages of their lives, affects their trust. Using the 'impressionable years hypothesis' (Abdelzadeh and Lundberg 2016; Alwin and Krosnick 1991; Dinas 2013; Sears 1981), we test if exposure to disaster during the impressionable years (ages 18–25 years) is negatively associated with trust.

To study the relationship between natural disaster exposure and formation of trust, we merge geocoded disaster data available over the period 1960–2018 from the Geocoded Disasters Dataset (GDIS), with individual-level data from the Afrobarometer social survey conducted over the period 1999–2015. Based on the merged dataset, we are able to calculate the frequency that each individual has been exposed to a disaster over the eight impressionable years (18–25 years) and link it to a broad set of markers of trust in individuals and institutions available in the Afrobarometer. Our dataset covers 88,670 respondents in 36 countries across Africa between 1999 and 2015.

We show that there is a negative association between natural disasters exposure in the impressionable years and generalized trust in people, that is, that most people can be trusted. Similarly, we find that natural disaster exposure also has a negative association with other facets of interpersonal trust, including trust in specific groups of people such as neighbours, people of certain ethnicity or nationality, and familiar people. Natural disaster exposure in the impressionable years is also negatively associated with certain dimensions of institutional trust, including trust in the president, parliament, local assembly, ruling party, and the electoral commission. Our results withstand a wide range of checks that demonstrate the robustness of the results to omitted variable bias, definitions of disaster exposure and impressionable years, choices of samples, and estimation approach.

Our research provides several novel contributions to the literature on the impacts of natural disaster exposure on individuals and societies. Primarily, we extend the literature on the relationship between disaster exposure and the formation of trust in several important ways. First, studies on the relationship between disasters and trust are inconclusive with regard to the nature of their impact. There is evidence in a number of studies of a positive relationship between disaster occurrences and trust (Cisterna et al. 2022; Li et al. 2021; Malesic 2019; Toya and Skidmore 2014)

whereas in others the relationship is found to be negative (Akbar and Aldrich 2019; Albrecht 2017; Lee 2021; Rahman et al. 2020). This suggests that the relationship is likely to vary by contextual features, such as institutional quality, disaster response, and the existing social capital in the disaster zone. Moreover, most studies on the impact of disasters on tenants of social capital have been completed at the level of countries or with a focus on distinct contexts (Dussaillant and Guzmán 2014; Cisterna et al. 2022; Gualtieri et al. 2019; Jovita et al. 2019; Rahman et al. 2020). The evidence from cross-country study design is largely descriptive whereas the studies with specific country focus have limited potential in terms of reconciling the mixed evidence in the literature on the nature of the relationship between natural disaster exposure and trust. By conducting a detailed micro-level study of 88,670 respondents in 36 countries across Africa, we can overcome some of these key limitations in existing studies.

Second, we add to the growing body of literature on the impressionable years hypothesis. The literature has shown that economic or political context or shocks experienced during the period of great mental plasticity in early adulthood have long-term influences on preferences for redistribution (Roth and Wohlfart 2018), support for democracy (Pyle 2021), self-censoring (Etchegaray et al. 2019), risk tolerance (Aslam et al. 2021) and confidence in government administration (Aksoy et al. 2020; Chavez 2018), among others. The evidence on the consequences of exposure to natural disasters in the impressionable years is limited. In particular, Falco and Corbi (2023) use data across countries and within the United States to show that natural disasters experienced in the impressionable years are associated with pro-environmental attitudes. Cross-country studies by Aslam et al. (2021, 2022) on central bankers, on the other hand, show that natural disaster exposure in the impressionable years leads to more conservative behaviours in policy-making. Our paper adds to the emerging work on the exposure to natural disasters, as a specific type of shock, in the impressionable years and is the first to do so in the African context. We provide evidence that the natural disaster exposure in the impressionable years has other crucial consequences on individuals, not covered in existing studies.

Our paper outline is as follows. Section 2 discusses the background relevant to the study in more detail. Section 3 introduces our empirical approach, including the estimation model, data, and variables. Section 4 reports our results. We conclude in Section 5.

2 Background

2.1 Shocks and trust

Trust as an umbrella term can be viewed as a critical tenant that enables individuals to act cooperatively in the pursuit of shared objectives (Mattes and Moreno 2017; Putnam 2000; Toya and Skidmore 2014;). Interpersonal trust considers relational trust between the respondent and other people they may engage with and may be either experiential (subject to external influence) or cultural (a stable intergenerational trait) (Dawson 2019). Trust is considered to be one of the hallmarks of a cohesive and effective society, reducing the bandwidth taken to make complex sociological decisions (Ward et al. 2014). Fukuyama (1996: 151) argues that it would be 'difficult to conceive' operational modern life without the baselines of societal trust and that trust is critical to social order. Similarly, as it comes to economic exchange, Arrow (1972: 50) points out that 'virtually every commercial transaction has within itself an element of trust'.

Disasters, as a shock, threaten to overload the careful foundations on which trust is formed. Studies on interpersonal trust in response to natural disaster occurrence suggest that there is a clear impact; however, the evidence on the nature of that impact is inconclusive and appears to be

situationally dependent. A line of research suggests that natural disasters, by bringing communities together and requiring them to work collaboratively to address challenges, may actually lead to increase in trust (Ahmad and Younas 2021; Dussaillant and Guzmán 2014; Li et al. 2021; Schilpzand 2023; Yamamura et al. 2015). Toya and Skidmore (2014: 274) note that despite the measurable human and economic impacts, some of these disasters 'are positively correlated with changes in societal trust'. Similarly, Rayamajhee and Bohara (2021) find that mutual trust between peers is engendered by collective action following a disaster. However, other studies suggest that natural disaster occurrence is corrosive to the sustainability of trust, suggesting that interpersonal trust is a fragile ecosystem of mutually beneficial relations (Albrecht 2017; Stephane 2021). Rahman et al. (2020) identify a reduction in interpersonal trust in individuals exposed to flooding in Bangladesh. Fleming et al.'s (2014) research in Chile, while observing no definitive change in trust levels, finds reduced reciprocity among community members.

Limited evidence from Africa suggests that intra-ethnic and inter-ethnic trust in East African countries is positively affected by droughts (De Juan and Hänze 2021). This relationship, however, wanes with increase in intergroup inequality. Mackay et al.'s (2023) research based on a large sample of African countries suggests that individuals exposed to a disaster are more likely to contact leaders as a group and take part in community meetings—evidence that is consistent with collective action attempts by individuals in the aftermath of a disaster. However, their paper does not consider the changes in trust and neither does it offer insights on whether individuals succeed in acting collectively or whether collective interactions rather lead to conflict and mistrust.

As noted earlier, the influence on trust caused by a natural disaster is situationally dependent (Bejarano et al. 2021; Carlin et al. 2014; Castillo and Carter 2011; Dussaillant and Guzmán 2014; Kang and Skidmore 2018). The pre-existing state of social capital in the affected area is likely to play a role in how much trust depreciates (Dussaillant and Guzmán 2014). Effective disaster recovery and capable state institutions may further mitigate trust erosion (Carlin et al. 2014; Kang and Skidmore 2018). A shock's influence is additionally dependent on the size of that shock, or the level of economic or societal inequality caused by the shock (Bejarano et al. 2021; Castillo and Carter, 2011).

In addition to natural disasters, the literature has considered the impact of other societal shocks (economic, health, political unrest, ecosystem) on social capital and interpersonal trust. Negative macroeconomic shocks have been found to have detrimental effects on interpersonal trust (Iglic 2014; Jetter and Kristoffersen 2018; Navarro-Carrillo et al. 2018). While interpersonal trust fell, familial closer relational trust increased (Iglic 2014; Navarro-Carrillo et al. 2018). Observations in Latin America on financial recessions find that the more recessions endured, the greater the likelihood that the individual will place trust in their fellow citizens (Searing 2013).

Health crises may also influence interpersonal trust levels, despite trust itself playing a significant role in individual well-being throughout times of health crisis (Jovanović et al. 2023). During the COVID-19 pandemic, research in 2020 found marginal increases in interpersonal trust in European countries where the idea of a 'common fate' resulted in a more shared experience (Ellena et al. 2021; Esaiasson et al. 2020). In comparison, Fang et al.'s (2023) study in China finds that exposure to COVID-19 significantly reduced interpersonal trust in the individuals' parents and neighbours.

Political and civil unrest can shake social foundations and disrupt the formation of interpersonal relationships, resulting in lower levels of trust (Bai and Wu 2020; De Juan and Pierskalla 2016). Rohner et al.'s (2013) work considers the impact of civil conflict on trust in Uganda using the Afrobarometer survey. The authors find that exposure to conflict decreases trust towards other

Ugandans but boosts the respondent's ethnic identity. Nunn and Wantchekon (2011) also report lower trust levels in sub-Saharan Africa among communities that have a history of enslavement.

Environmental crises differ from natural disasters as they are often caused or linked to human activity (Chong and Srebot 2022). The causal association to human involvement can undermine pillars of social capital, including trust (Gong et al. 2017). Sauri et al. (2003) considers a toxic spill in Spain and find that any increase in interpersonal trust because of the disaster was fleeting and likely a result of the pursuit of shared goals (compensation).

2.2 Shocks in impressionable years

Research suggests that an individual's impressionable years (between the ages of 18 and 25 years) are a time of great mental malleability and that individuals are highly susceptible to taking on new and lasting ideas, attitudes, and beliefs (Krosnick and Alwin 1989). Abdelzadeh and Lundberg's (2016) research on trust in Sweden lends credence to the impressionable years hypothesis finding that values of social trust tend to solidify in the years of early adulthood.

Relevant to our research are the studies that use the impressionable years hypothesis to form an empirical hypothesis on how adult outcomes are affected by exposure to shocks during this time. To our knowledge, there are only a few studies on the consequences of exposure to natural disasters in impressionable years. The study by Falco and Corbi (2023) looks at natural disaster exposure in the impressionable years, linking it to pro-environmental attitudes in adulthood. Aslam et al. (2021, 2022) study the policy-making behaviour of central bankers, showing that their exposure to natural disasters in the impressionable years is associated with acting conservatively.

Research on other shocks such as macroeconomic, political, or health (pandemic) shocks, further confirms that the impressionable years are highly susceptible to influence. Negative or adverse macroeconomic conditions within an individual's impressionable years can change individual attitudes, such as preferences for redistribution (Carreri and Teso 2023; Hansen and Stutzer 2021) or political party affiliation (Gavresi and Litina 2023). A study in Argentina conducted by González and Simes (2023) found that individuals exposed to a severe macroeconomic crisis in their impressionable years had notably lower levels of institutional trust and greater perception of corruption. Similar findings for recession (Malmendier and Nagel 2011; Oreopoulos et al. 2012), inequality (Roth and Wohlfart 2018), immigration (Laaker 2023; McLaren et al. 2021), political attitudes (Ladreit 2023), and simulated tax dilemmas (Deglaire et al. 2021) show that macroeconomic instability influences long-term attitudes, and this suggests that experiences in these years may provide a baseline for what individuals deem as acceptable.

Research has also been done into political stability and war during an individual's impressionable years. Political repression is suggested to affect an individual's obedience and participation (Castro Stanley 2021; Etchegaray et al. 2019; Pyle 2021). Exposure to war or oppression as one comes of age is also shown to reduce trust in government institutions (Chavez 2018), reduce political participation (Akbulut-Yuksel et al. 2019), and to increase favour in national defence forces (Farzanegan and Gholipour, 2021). Conversely, eras of political irregularity may generate positive political engagement and improved social values (Dinas 2013; Nteta and Greenlee 2013). Exposure to pandemics or epidemics throughout the impressionable years also produces observable changes in individual traits such as risk tolerance (Aslam and Farvaque 2022), scientific trust (Eichengreen et al. 2021), and confidence in political leaders (Aksoy et al. 2020).

3 Empirical approach

3.1 Empirical model

To study the relationship between the frequency of exposure to natural disasters during an individual's impressionable years and their individual reports of trust, we estimate the following equation:

$$Y_{ijlt} = \alpha + \beta\, disaster\_frequency_{l,impyears} + \boldsymbol{\gamma X}'_{it} + \rho_j + \delta_l + \theta_t + \varepsilon_{ijlt} \qquad (1)$$

where Y_{ijlt} is trust outcome for individual i of age cohort j residing in location l and interviewed in year t. Our primary variable of interest is the frequency of natural disaster exposure during the impressionable years $disater\_frequency_{l,impyears}$. As control variables, we also consider vector of exogenous individual-level variables including gender and urban residence, denoted as $\boldsymbol{X}_{it}$, birth-year dummies, ρ_j, sub-national region dummies, δ_l, and year of interview dummies, θ_t. ε_{ijlt} denotes idiosyncratic error terms. For simplicity, we estimate linear probability models, clustering the standard errors at the round and primary sampling unit (PSU) level identified within Afrobarometer.

3.2 Data sources and sample

To study the relationship between natural disaster exposure and trust following Equation 1 we create a dataset leveraging the GDIS and Afrobarometer survey, both of which include longitude and latitude information that is used for merging the two datasets. GDIS has been used in several relevant studies (Kageyama and Sawada 2022; Zeng and Bertsimas 2023) and includes information on the year and location (longitude, latitude) of natural disasters globally between 1960 and 2018 (Rosvold and Buhaug 2021). GDIS is built on information from the Emergency Events Database (EM-DAT) and provides us with spatial information on 1,080 disaster occurrences in 1,565 locations across the African continent. GDIS records droughts, floods, storms, mass movement, volcanic activity, extreme temperatures, and wildfires. Research has shown that some global disaster datasets, including EM-DAT, suffer from missing data and, while important to consider, our analysis uses disaster frequency as our main treatment and thus it is likely that this means our results could be marginally underestimated (Jones et al. 2023).

We take our individual-level data from the Afrobarometer survey. Afrobarometer is a nationally representative repeated cross-sectional survey conducted in up to 39 countries in Africa since 1999 (Afrobarometer 2023). It provides a comprehensive dataset on a suite of attitudes, preferences, behaviours, and background characteristics. Rounds 1, 3, 4, and 5 of the survey contain several questions about trust that have been leveraged by previous studies on trust (De Juan and Hänze 2021; Rohner et al. 2013). Our study utilizes data from Rounds 1, 3, 4, and 5 (1999–2015) of Afrobarometer covering 36 African countries.[1]

Our sample contains 128,594 observations. We impose several restrictions on the sample. We restrict it to individuals in their post-impressionable years (i.e. aged 26 years or older), dropping

[1] Rounds 2, 6, and 7 do not ask questions on interpersonal trust. Round 8 data were not yet released at the time of conducting this research. Countries include Algeria, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Cote D'Ivoire, Egypt, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, and Zimbabwe.

33,449 individuals below the age of 26 years—an approach also taken in other studies (e.g., Roth and Wohlfart 2018). We further restrict our sample to individuals born after 1942 as GDIS only provides disaster data from 1960 onwards. This results in 6,475 individuals dropped out of the sample. The final dataset used in our research, therefore, provides information on 88,670 individuals exposed to over 1,000 disasters in around 9,500 locations across 36 African countries.[2] Sample sizes used across different regression models vary depending on the number of shared observations across the variables in each model.

3.3 Defining disaster exposure

Critical to our approach is linking occurrences of disaster to individual-level data, considering the spatial and temporal dimensions of exposure. In terms of spatial exposure, we consider the disasters occurring within the 30-km radius relative to the individual's PSU location at the first instance. In doing so, we follow the previous research on the impacts of disaster exposure (Mackay et al. 2023); however, we also conduct robustness checks using radii of 10, 20, 40, and 50 km in definition of exposure.

In terms of temporal exposure, we retrospectively assign the disasters that occurred within the 30-km radius of each individual's current location while they were aged 18–25 years. Admittedly, it is possible that individuals may have moved and by following this approach we would be assigning them a disaster that they may have not been in fact exposed to. However, Borderon et al. (2019) suggest that migration in Africa is not directly related to environmental change and is rather a response to socio-economic contexts. Another study in South Africa (Posel and Casale 2021) shows that in times of crisis (COVID-19), adults may be inclined to move, but it is more likely to be to the household of a kin or social network within the same or neighbouring community. Nevertheless, acknowledging the possibility of the move across locations, we introduce a robustness check whereby we restrict the sample to individuals under the age of 35 years and assume that their migratory movements would have been more limited since concluding their impressionable years.

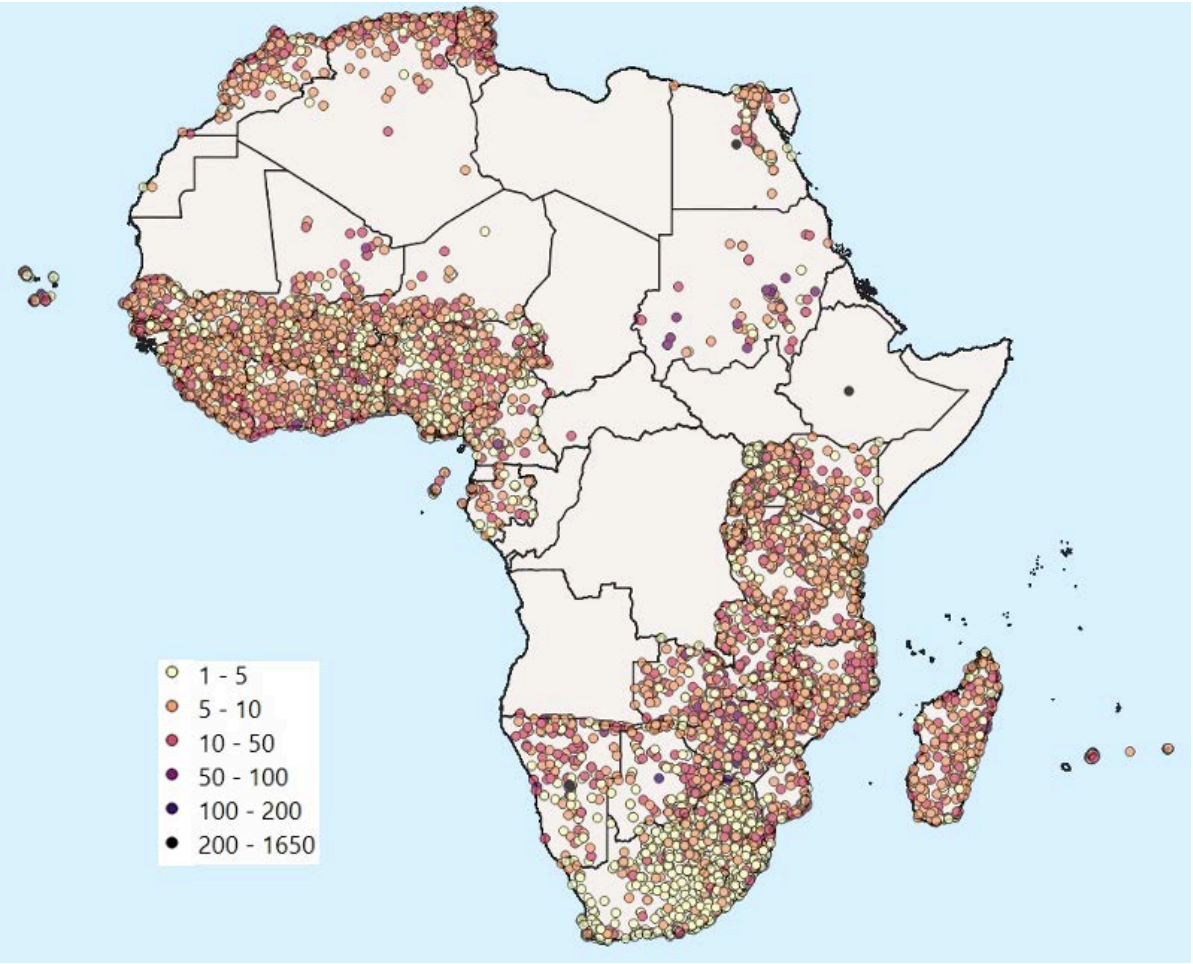
The variable *disaster_frequency* is a count variable that takes values between 0 (no exposure) and 10 (10 or more instances of disaster exposure) corresponding to the number of instances of disaster exposure within the enforced 30-km radius within their impressionable years.[3] The use of this compounded measure of disaster exposure presents an improvement over many existing studies that consider disasters as singular events (Akbar and Aldrich 2017; Dusaillant and Guzmán 2014).

Across 88,670 observations, the average exposure is at 0.423 (sample means are reported in regression tables). Figure 1 shows the locations of individuals exposed to disasters throughout their impressionable years.

[2] Appendix Table A1 indicates the distribution of individuals across rounds and countries for generalized trust and other dimensions of interpersonal trust.

[3] There were 165 individuals exposed to over 10 disasters and subject to the cap. The total exposure frequency is capped at 10 to limit the influence of outliers. We also tested our model without the cap and the results are robust.

Figure 1: Locations of individuals exposed to disasters throughout their impressionable years



Note: Circles indicate the primary sampling units (PSU) in the Afrobarometer. The colour tones (captured in the legend) indicate the number of individuals in that PSU exposed to a disaster during their impressionable years.

Source: authors' creation using Afrobarometer and GDIS data. The map was created using QGIS, an open source system under the Creative Commons license CC BY-SA.

3.4 Defining trust

Following existing studies, we first focus on generalized trust (e.g., Bai and Wu 2020; Nunn and Wantchekon 2011). We then expand the set of trust variables to consider additional markers of interpersonal as well as institutional trust in robustness checks. Definitions of the trust variables used across our analysis are presented in Appendix Table A2. Sample means are reported in regression tables, and sample sizes vary by type of trust and the overlap in the number observations across the variables used in each model.

To measure generalized trust, we use the following Afrobarometer question: *Let's turn to your views on your fellow citizens. Generally speaking, would you say that most people can be trusted or that you must be very careful in dealing with people?* Answers take the values of 0 for 'must be very careful' and 1 for 'most people can be trusted'.

This question, or akin wording, has been extensively used across surveys (e.g., the General Social Survey, World Values Survey) and in the literature looking at generalized trust globally (Bai and Wu 2020; Fehr et al. 2002; Rosenberg 1956; Sapienza et al., 2013; Sturgis and Smith 2010) as well as in Africa (Monyake 2012; Nunn and Wantchekon 2011; Wegenast et al. 2022). In our baseline

sample, 81 per cent of respondents indicate that one must be very careful around people, indicating an already low baseline level of generalized trust.

Individuals' interpretations of trust questions may vary depending on whether they consider people in general or only consider individuals known to them (Sturgis and Smith 2010). To mitigate this issue as well as to form a holistic view of interpersonal trust, we additionally use variables that measure trust in relatives, neighbours, people of the same ethnic group, people of a different ethnic group, people of the same nationality, and other people the individual may know (Buzasi 2015; De Juan and Hänze 2021; Nunn and Wantchekon 2011; Robinson 2020). These variables are measured on a Likert scale from 0 (no trust at all) to 3 (trusting a lot), and we use the original survey response categories in the analysis. Additionally, mimicking the approach of Adhvaryu and Fenske (2023), we produce an index of interpersonal trust. This index is constructed as the mean of response values on trust questions on which answers are available. For example, if an individual provided responses on three different dimensions of trust (giving responses of 0, 1, 2, and 3 on a Likert scale), we use the mean of their responses as their index (1.667).

In addition to studying the interpersonal dimensions of trust, which is the focus of the current paper, we also look at the institutional dimension of trust. Doing so is important, given that some instances of literature suggest that the evaluations of government performance and perceptions of trust in government fall in response to disaster exposure (Akbar and Aldrich 2019; Lee 2021; Mackay et al. 2023; Thoresen et al. 2018). Not only may the deterioration in the quality of institutions post-disaster have implications for trust in institutions, but it may also exacerbate the conditions of despair and competition over scarce resources, that in turn are likely to bring down trust in individuals. Afrobarometer affords the possibility to look at a wide range of markers of institutional trust, including trust in the president, parliament, electoral commission, tax department, local assembly, ruling party, opposition party, police, army, courts, and traditional leaders—all of which have been used in previous studies (Addai et al. 2011; Chu and Shen 2017; Dreier and Lake 2019; Diop and Asongu 2023; Egger et al. 2023; Godefroidt et al. 2017; Hutchison 2011; Isani and Schlipphak 2022; Ishiyama et al. 2018; Lavallée et al. 2008). Additionally, we construct an index of institutional trust following the same approach used to construct our index of interpersonal trust.

4 Results

4.1 Baseline results

Our baseline model estimates the association between exposure to natural disasters during an individual's impressionable years and the influence this has on the formation of generalized trust. Table 1 presents our results with Model 1 estimating Equation 1, our baseline specification; Model 2 introducing controls for exposure in earlier years to Equation 1; Model 3 adding controls for education, employment, and self-reported living conditions to Equation 1; and Model 4 adding a control for the respondents share of ethnicity in their region and religion fixed effects to Equation 1. Our baseline estimation is reported in Model 1 and suggests a negative association between exposure to trust in impressionable years and generalized trust with a unit increase in disaster exposure leading to a 0.4-percentage point reduction in trust. But are these results robust to potentially important sources of unobserved heterogeneity?

First, we ask whether this finding is exclusive to the impressionable years or tied to exposure throughout other developmental periods of one's childhood. We test the robustness of the results to controlling for disaster exposure at formative years (ages 0–8 years)[4] and the periods between the formative and impressionable years (ages 9–17 years) in Model 2. The results show that the coefficient on our variable of interest (i.e. disaster exposure in impressionable years) is robust to this change in model specification. Moreover, exposure in earlier periods does not appear to be significantly correlated with generalized trust. This is the case even when omitting the exposure in impressionable years from the regression, which strengthens the justification of using the impressionable years rather than other periods of an individual's developmental trajectory as our reference point in this research.

In our baseline model reported in Model 1, we only control for exogenous background characteristics of individuals (i.e. their age and gender). In Model 3 of Table 1 we additionally consider the robustness of the results to omitted socio-economic variables including education, employment, and self-reported living conditions (admittedly, some of these may be endogenous to disaster exposure in the impressionable years and hence are excluded from the baseline specification). The results reported in Model 3 of Table 1 show that our central result is not affected by the inclusion of these controls. We also find that educated people have lower trust compared with those not educated, which is consistent with findings in the literature (Frederiksen et al. 2016; Güemes and Herreros 2019; Wu 2021). Similarly, for subjective perceptions of living conditions, we see that compared with people with very good self-reported living conditions, those who are worse off are less likely to exhibit trust in people (Barone and Mocetti 2016; Jacobs 2022). Additionally, compared with individuals not in the labour force, employed and unemployed individuals are at a lower likelihood of trusting others. Literature suggests that labour market insecurity has a persistent negative effect on generalized trust, and it is possible this extends to labour market retention, whereas those outside the labour force are more sheltered from these stresses (Laurence 2015; Nguyen 2017).

Although socio-economic conditions often shape interpersonal relations, individual beliefs and values are also tied to cultural background. Individuals who are part of an ethnic or cultural minority may face more societal constraints and be less trusting of others (Nunn and Wantchekon 2011). In the estimates reported in Model 4 we control for individuals' cultural background, by including the share of the region's population that is of the same ethnicity as the respondent and religious denomination dummies. The results show that the negative association between exposure to natural disasters in the impressionable years and generalized trust is robust to controlling for individuals' cultural background. Moreover, we find that a higher share of own ethnicity in the population is associated with higher levels of generalized trust.

[4] Although we have disaster data available for the formative years of individuals in the Afrobarometer, the data quality in Africa was not as comprehensive during the earlier years and as such, some disaster occurrences may be omitted (Rosvold and Buhaug 2021). Individuals may be assigned an exposure value of 0 when they could have been exposed to a disaster that was not documented.

Table 1: Disaster exposure and generalized trust: baseline results and robustness to omitted variables

Dependent variable	(1) Trust: generalized	(2) Trust: generalized	(3) Trust: generalized	(4) Trust: generalized
	Baseline specification	Controlling for exposure at other life stages	Controlling for socio-economic background	Controlling for cultural background
Disaster frequency	−0.004***	−0.004***	−0.003***	−0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Disaster frequency (formative years: ages 0–8 years)		−0.001		
		(0.002)		
Disaster frequency (youth: ages 9–17 years)		−0.001		
		(0.002)		
Primary education			−0.036***	
			(0.005)	
Secondary education			−0.049***	
			(0.006)	
Tertiary education			−0.044***	
			(0.007)	
Unemployed (looking)			−0.019***	
			(0.005)	
Employed			−0.017***	
			(0.005)	
Living conditions (very bad)			−0.051***	
			(0.011)	
Living conditions (fairly bad)			−0.034***	
			(0.010)	
Living conditions (neither bad nor good)			−0.014	
			(0.010)	
Living conditions (fairly good)			−0.029***	
			(0.010)	
Share of own ethnicity				0.026***
				(0.010)
Religion fixed effects				Y
Mean of dependent variable	0.189	0.189	0.188	0.190
Mean of disaster frequency	0.534	0.534	0.535	0.483
Mean of disaster frequency (formative years: ages 0–8 years)		0.129		
Mean of disaster frequency (youth: ages 9–17 years)		0.275		
Sample size	52,916	52,916	52,459	45,729
R-squared	0.121	0.121	0.125	0.120

Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors, clustered at the PSU and survey wave level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region, and year fixed effects. Models 1–4 are based on Afrobarometer Rounds 3 and 5 as the generalized trust information is not available in other waves of the survey. Model 3 includes additional controls for education, employment, and self-reported living condition dummies. Omitted categories are no education, unemployed (not looking), and living conditions (very good). Model 4 includes a control for the share of the region's population that is of the same ethnicity as the respondent and religion fixed effects. The definition of dependent variable is provided in Appendix Table A2.

Source: authors' construction based on study results.

While we demonstrate that our results are robust to inclusion of additional controls in Table 1, we cannot control for all sources of unobserved heterogeneity. As an additional test we follow the approach proposed by Oster (2019) to assess how large the selection on unobservables needs to be, compared with the selection on observables, to explain away the entire causal effect of disaster frequency presented in Model 1 of Table 1. Formally, we evaluate the bias-adjusted coefficient in Oster (2019) as follows:

$$\beta^* \approx \tilde{\beta} - \delta[\dot{\beta} - \tilde{\beta}]\frac{R_{max}-\tilde{R}}{\tilde{R}-\dot{R}} \quad (2)$$

where $\dot{\beta}$ and $\dot{R}$ are the coefficient and the *R*-squared from a regression with the treatment only, $\tilde{\beta}$ and $\tilde{R}$ are the coefficients and the *R*-squared from a regression with the treatment and the observed controls, δ is the relative importance of observables to unobservables, and R_{max} is the *R*-squared from a hypothetical regression with observable and unobservable controls. Following Oster (2019), the estimated effect of disaster ranges from $\tilde{\beta}$ to β^* assuming $\delta = 1$ and setting $R_{max} = \min\{1.3\tilde{R}, 1\}$. Table 2 presents our results that show that $\delta > 1$ and $[\tilde{\beta}, \beta^*]$ excludes zero. This provides further support to the robustness of our baseline results presented in Model 1 of Table 1.

Table 2: Oster test for omitted variable bias

	Proportionality		Identified set	
	$\delta_{R_{max}=\min\{1.3\tilde{R},1\}}$	$\lvert\delta\rvert > 1$	$[\tilde{\beta}, \beta^*_{(R_{max}=\min\{1.3\tilde{R},1\},\delta=1)}]$	Excludes 0?
	2.266	Yes	[−0.002, −0.004]	Yes
Baseline controls			Yes	
Sample size			52,916	

Note: the dependent variable is trust: generalized. δ indicates the value of selection of unobservables to observables assuming the maximum value of *R*-squared is R_{max}. Coefficient bounds are calculated assuming $\delta = 1$ and $\delta R_{max} = \min\{1.3R, 1\}$.

Source: authors' construction based on study results.

4.2 Disasters and other dimensions of trust

Disaster exposure is negatively associated with generalized trust, but is it also associated with other markers of interpersonal trust? To continue our assessment of the link between disaster exposure and trust, we re-run our baseline model using other dimensions of interpersonal trust as the dependent variable. The results reported in Table 3 show that the negative and significant association between disaster exposure and interpersonal trust holds when looking at other markers of interpersonal trust. An important exception is the positive coefficient of trust in (own) relatives, which despite the insignificance, suggests that trust in an individual's own family is resilient to disaster exposure.

On the other hand, based on the results presented in Table 3, there is a significant reduction in the level of trust in an individual's neighbours (Model 2) when exposed to disaster throughout the impressionable years. Results for ethnic inter-group (Model 3) and intra-group (Model 4) trust also show a negative association with disaster exposure, although only the coefficient in the model of intra-group trust is significant. Trust in people of the same nationality (Model 5) is negatively and significantly affected by disaster exposure, as is the measure for trust in other people the individual may know (Model 6). Finally, we run our baseline model using an index of interpersonal trust constructed following the approach described in Section 3. Namely, our index of interpersonal trust uses the mean of response values to questions on trust in relatives, neighbours, the same ethnicity, other ethnicities, the same nationality, and other people the respondent may know. The

results reported in Model 7 of Table 3 confirm our earlier findings and suggest that exposure to natural disasters throughout the impressionable years has a significant impact on the interpersonal trust overall, affecting the formation of both generalized and specialized dimensions of interpersonal trust.

Our analysis of the relationship between disaster exposure and trust is not exclusive to interpersonal trust. We additionally re-estimate our baseline model, using markers of institutional trust. Variables concerning institutional trust were also included in Afrobarometer Rounds 2 and 6 and as such we are able to expand our baseline sample to include these waves in this analysis of institutional trust. As such, the sample sizes are larger in this part of the analysis. The results presented in Table 4 suggest that the negative consequences of natural disaster exposure in the impressionable years are not limited to interpersonal trust. We document negative and significant associations between disaster exposure and trust in the president (Model 1) and the electoral commission (Model 3). However, we do not find statistically significant coefficients in models that apply trust in specific authorities such as the parliament, local assembly, ruling party, police, army, or the courts. Similarly, the models that apply trust in the tax department and trust in traditional leaders yield insignificant coefficients on disaster frequency. We do observe a significant and positive effect on trust in the opposition party, which supports the idea that individuals may hold those currently in power as accountable for disaster effects and recovery (Uslaner 2016). Overall, the results suggest that disaster exposure in the impressionable years can have a negative impact on institutional trust, although limited to trust in the ruling powers.

4.3 Robustness to alternative definitions of disaster exposure

Our baseline measure of disaster exposure is based on a simple count of the disasters that occurred in an individual's impressionable years. However, some of these disasters may have been in the individual's immediate proximity whereas others may have taken place further away. We account for this in our definition of frequency of disaster exposure by re-calculating a weighted frequency measure where the weight is based on an individual's relative distance to the disaster event.[5] The closer the individual is to the disaster, the higher their weights and higher exposure value. We report the results of re-estimating our baseline model using this distance-weighted measure of disaster exposure in Model 1 of Table 5. The results are the same as before, showing a significant negative association between this (distance-weighted) frequency measure of disaster exposure and generalized trust.

Not only does the distance to disaster matter, but its severity should matter too. Next, we modify the weighted measure of disaster exposure, where instead of using an incidence-based frequency measure of disasters, we use a measure of severity of disasters. Although there are many ways to measure disaster severity (based on economic cost, damage, displacement), following the approach in the literature (Boustan et al. 2020; Caldera et al. 2016; Caldera and Wirasinghe 2022; Wirasinghe et al. 2013) and based on our own data availability, we use the fatality count as our measure of severity. Effectively, our exposure measure is the relative distance-weighted sum of the fatalities caused by the disasters that occurred throughout an individual's impressionable years. Model 2 provides the results based on this severity-based measure of disaster exposure that shows that our baseline results are robust to using a fatality count as a basis of our measure of disaster exposure.

[5] The relative distance is the distance from the disaster divided by the enforced exposure radius, that is 30 km.

Table 3: Disaster exposure and other dimensions of interpersonal trust

Dependent variables	(1) Trust: relatives	(2) Trust: neighbours	(3) Trust: people of the same ethnicity	(4) Trust: people of a different ethnicity	(5) Trust: people of the same nationality	(6) Trust: other people you know	(7) Interpersonal trust index
Disaster frequency	0.004	−0.006**	−0.014	−0.019*	−0.017**	−0.012***	−0.005**
	(0.003)	(0.003)	(0.011)	(0.011)	(0.008)	(0.003)	(0.002)
Mean of dependent variable	2.370	1.800	1.710	1.413	1.355	1.481	1.842
Mean of disaster frequency	0.495	0.532	0.278	0.278	0.389	0.541	0.495
Sample size	72,355	53,811	14,875	14,733	18,290	56,484	72,498
R-squared	0.154	0.205	0.202	0.175	0.158	0.171	0.192

Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors, clustered at the PSU and round level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region, and year fixed effects. Model 1 is based on Rounds 3, 4, and 5. Model 2 is based on Rounds 3 and 5. Models 3 and 4 are based on Round 3. Model 5 is based on Round 4. Model 6 is based on Rounds 1, 4, and 5. Model 7 is based on Rounds 1, 3, 4, and 5. The choice of models is related to the presence of questions on specific dimensions of trust in different waves (see Appendix Table A2 for definitions).

Source: authors' compilation based on study results.

Table 4: Disaster exposure and institutional trust

Dependent variables	(1) Trust: president	(2) Trust: parliament	(3) Trust: electoral commission	(4) Trust: tax department	(5) Trust: local assembly	(6) Trust: ruling party	(7) Trust: opposition party	(8) Trust: police	(9) Trust: army	(10) Trust: courts	(11) Trust: traditional leaders	(12) Institutional trust index
Disaster frequency	−0.006**	−0.002	−0.007**	0.004	−0.000	−0.004	0.005*	−0.003	−0.003	−0.001	0.001	−0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.002)
Mean of dependent variable	1.845	1.623	1.628	1.452	1.537	1.572	1.212	1.580	1.970	1.749	1.923	1.645
Mean of disaster frequency	0.562	0.583	0.582	0.685	0.562	0.554	0.556	0.577	0.611	0.579	0.598	0.573
Sample size	107,495	104,245	100,219	69,305	104,631	103,608	102,392	109,584	90,072	106,870	49,634	111,204
R-squared	0.164	0.146	0.143	0.136	0.139	0.157	0.078	0.158	0.175	0.138	0.166	0.195

Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors, clustered at the PSU and round level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region, and year fixed effects. The sample includes Afrobarometer Rounds 1, 2, 3, 4, 5, and 6. Models 1, 3, 8, 10, and 12 are based on Rounds 1, 2, 3, 4, 5, and 6. Models 2, 5, 6, and 7 are based on Rounds 2, 3, 4, 5, and 6. Model 4 is based on Rounds 5 and 6. Model 9 is based on Rounds 1, 2, 3, 5, and 6. Model 11 is based on Rounds 2, 4, and 6. The choice of models is related to the presence of questions on specific dimensions of trust in different waves (see Appendix Table A2 for definitions).

Source: authors' compilation based on study results.

Table 5: Disaster exposure and generalized trust: alternative measures of exposure

	(1)	(2)	(3)	(4)	(5)
Dependent variables	Trust: generalized	Trust: generalized	Trust: generalized	Trust: generalized	Trust: generalized
Disaster frequency, distance-weighted	−0.006***				
	(0.006)				
Disaster severity, distance-weighted		−0.002**			
		(0.001)			
Disaster frequency dummy (1–3)			−0.001		
			(0.005)		
Disaster frequency dummy (4+)			−0.020**		
			(0.009)		
Disaster placebo (randomized)				0.001	
				(0.001)	
Disaster placebo (shuffled)					−0.001
					(0.001)
Mean of dependent variable	0.189	0.189	0.189	0.189	0.189
Mean of disaster weight	0.293				
Mean of disaster severity		0.194			
Mean of disaster dummy (1–3)			0.177		
Mean of disaster dummy (4+)			0.043		
Mean of disaster placebo				5.001	0.488
Sample size	52,916	52,916	52,916	52,916	52,916
R-squared	0.121	0.121	0.121	0.121	0.121

Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors, clustered at the PSU and round level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region, and year fixed effects. Models 1–3 are based on Afrobarometer Rounds 3 and 5 since the generalized trust information is not available in other waves of the survey. Disaster frequency, distance-weighted (Model 1), calculates exposure using a weighted measure of disaster frequency where the weight is the relative distance to the recorded epicentre of the disaster divided by the exposure radius (i.e. 30 km). Disaster severity, distance-weighted (Model 2), presents the relative distance-weighted sum of the fatalities caused by the disasters. Omitted category in Model 3 is 'not exposed to disaster'. Model 4 randomly assigns individuals a disaster exposure value between 0 and 10 as a randomization placebo test. Model 5 randomly shuffles existing disaster exposure values as a shuffled placebo test.

Source: authors' compilation based on study results.

Much of our paper focuses on disaster frequency, using a disaster frequency measure that ranges from 0 to 10. But the relationship between the frequency of disaster exposure and trust may not necessarily be linear, and one way to engage with this is to distinguish between individuals with no exposure (omitted), relatively infrequent exposure (1–3 times), and relatively frequent exposure (4+ times). Model 3 of Table 5 presents the results. The coefficient estimates on both infrequent and frequent exposure are negative, suggesting that individuals with exposure to natural disasters in the impressionable years exhibit lower levels of generalized trust than those with no exposure. However, our model estimates indicate statistical significance only for the measure of frequent (4+ times) exposure.

Additionally, as a further validation of our measure of disaster exposure, we conduct two placebo tests. In Model 4 we use a randomized variable (randomly allocating each individual a value between 0 and 10) and the coefficient on this measure is insignificant. Model 5 uses a shuffled variable (reordering the values of our baseline treatment variable at random) and similarly, the estimated coefficient on this measure is insignificant. Based on this analysis, it is unlikely that the estimated coefficients on our disaster frequency measure are picking up the effects of some other things.

We also test the robustness of our results to our definition of spatial exposure, which is based on a 30-km radius from an individual's PSU. In Table 6 we use measures of exposure that are defined at 10-km increments in the 10–50 km range. Across all specifications, we estimate negative significant coefficients on disaster frequency although the significances wane at the lower and upper echelons.

Table 6: Disaster exposure and generalized trust: exposure defined at 10, 20, 30, 40, 50-km radii

	(1)	(2)	(3)	(4)	(5)
Exposure radius:	10 km	20 km	30 km	40 km	50 km
Trust: generalized					
Disaster frequency	−0.001	−0.004***	−0.004***	−0.002*	−0.001
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Mean of dependent variable	0.189	0.189	0.189	0.189	0.189
Mean of disaster frequency	0.158	0.339	0.534	0.754	1.039
Sample size	52,916	52,916	52,916	52,916	52,916
R-squared	0.121	0.121	0.121	0.121	0.121

Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors, clustered at the PSU and round level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region, and year fixed effects. Models 1–5 are based on Afrobarometer Rounds 3 and 5 since the generalized trust information is not available in other waves of the survey.

Source: authors' compilation based on study results.

In addition to testing the robustness of our results to the spatial dimension of our definition of exposure, we conduct robustness checks where we look at the temporal dimension of our definition. In particular, our definition of impressionable years is based on the ages 18–25 years following the definition in the literature (Eichengreen et al. 2021; Etchegaray et al. 2019; Farzanegan and Gholipour 2021; Nteta and Greenlee 2013). Moreover, in Model 2 of Table 1, we have shown that the coefficients on measures of exposure at earlier stages of individuals' lives are insignificant. In Appendix Table A3, we present tests for the robustness of our results to changes in our definition of impressionable years.

Following the approach of Bai and Wu (2020), we extend our impressionable years age bracket first to the ages of 8–22 years (Model 1) and second to the ages of 23–30 years (Model 2), showing that the results are robust to the former and with lost significance for the latter. The reduction for these results in both coefficient and significance compared with our baseline suggests that these extended age brackets dilute the influence of the actual impressionable years of ages 18–25 years. Additionally, instead of looking at the frequency of exposure in the impressionable years, in Model 2 of Appendix Table A3, we look at the frequency of exposure in the 5 years leading up to and including the year of interview. Model 3 provides the results showing that we retain a negative and significant coefficient on disaster frequency.

4.4 Other robustness checks

Finally, we test the robustness of our results to the choice of the estimation method and sample. Our baseline results are based on estimating a linear probability model; however, Appendix Table A4 provides results based on estimating a probit model. These are qualitatively interchangeable with our ordinary least-squares model.

Next, we ask whether there is a variation in our results by the characteristics of the respondent. In particular, a body of work suggests that climate events have gendered impacts (Arora-Jonsson 2011; Eastin 2018; Hailemariam et al. 2023). Hence, we explore the relationship between disaster frequency and trust in separate sub-samples of male and female individuals. In both sub-samples,

we estimate negative significant coefficients on disaster exposure. In fact, the coefficient is slightly larger in size in the male sub-sample.

When assessing exposure during an individual's impressionable years based on their current location of interview, we need to be aware of the potential for measurement error associated with migration. Rohner et al. (2013) suggest that migration associated with shocks in Africa is likely to be within the regions identified within Afrobarometer and using sub-national region fixed effects, as we do, should offset this risk. Despite this, we propose that individuals who have recently finished their impressionable year period are less likely to have already moved. Here we run an additional robustness check using a specific age sub-sample between 26 and 35 years. Given the recency of impressionable years for this age group, the concerns over migration may be less applicable here than in older age groups. The results in Model 3 based on this younger sub-sample are consistent with our baseline result and confirm the negative significant relationship between disaster exposure and trust.

As Figure 1 shows, disasters are prevalent across all countries of our study; however, some countries are affected much more than others. To assess whether our results are driven by countries affected the most by the disasters we follow the approach of Eichengreen et al. (2021) to exclude the five most-affected countries by disaster frequency from the sample. Model 4 of Appendix Table A4 reports our results based on a sub-sample that excludes Kenya, Madagascar, Mozambique, Algeria, and Malawi as the countries with the greatest frequency of disaster according to GDIS.[6] Once again, our results remain robust.

As discussed earlier, disasters and shocks create and further exacerbate existing vulnerabilities in societies, likely inducing heightened competition over resources and possibly conflict. Hence, conflict may be a mechanism in the context of our study, and possibly, the estimates on disasters may be picking up what could be attributed to conflict. However, conflict is an extreme manifestation of tensions in a society, and the link between natural disasters and trust does not necessarily have to be mediated or driven by conflict. To throw light on these issues, we need to incorporate a measure of conflict exposure in our analysis, which we do in the last part of Appendix Table A5. We use the geo-referenced Uppsala conflict dataset between 1989 and 2016, which means we restrict our sample to individuals born after 1971 to be able to construct a measure of conflict exposure in the impressionable years (Davies et al. 2023; Sundberg and Melander 2013). We follow a similar approach to defining a disaster exposure in constructing our measure of conflict exposure; that is, we take the count of conflicts having occurred within the 30-km radius of an individual's PSU over the course of their impressionable years (i.e. ages 18–25 years).

Given the use of a sub-sample for the purposes of this analysis, first, in Model 5 of Appendix Table A5 we ascertain that our baseline results hold within this sub-sample, and as can be seen, they do. In the final model of Appendix Table A5, we augment the regression with a measure of conflict exposure. Interestingly, the coefficient on this measure, though negative in sign, is statistically insignificant. Moreover, it leaves our central result largely unaffected. Hence, it is unlikely that the relationship between natural disaster exposure and trust is driven by exposure to conflict.

[6] In these five countries the mean disaster exposure across the baseline sample is 0.699, whereas in the remaining countries the mean disaster exposure is 0.367.

5 Conclusion

Shocks experienced throughout one's impressionable years have the potential to influence adult behaviours and attitudes in the long term. By matching data on over 1,000 natural disaster occurrences with individual-level data on 88,670 individuals across 36 African nations, we have shown that exposure to natural disasters during early adulthood is negatively associated with generalized trust. Additionally, individuals exposed to disaster in this period report significantly reduced trust levels in their neighbours, people of another ethnicity, people of the same nationality, and other people they may know. Not only do disasters affect interpersonal trust, but they also have negative implications for trust in key political institutions such as the president and the electoral commission. Our results are based on drawing comparisons between individuals of the same age cohort and living in the same sub-national region of a country and are robust to a battery of robustness checks.

Our results have important implications for the academic and policy discourse in development, and especially in the context of African countries. They suggest that natural disasters, which are likely to intensify amidst climate change, are likely to have profound consequences on societies through their long-term impacts on trust—a societal trait that is crucial for any form of exchange (Arrow 1972). Moreover, with implications for not only interpersonal but also institutional trust, natural disasters are likely to have a lasting impact on the stability and prosperity of the societies, given the critical role played by institutional trust for government legitimacy and individuals' willingness to support policies including those for sustainable future (Bargain and Aminjonov 2020; Brodeur et al. 2021; Fairbrother et al. 2019; Smith and Mayer 2018).

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Appendix

Table A1: Breakdown of observations per country and round for generalize and interpersonal trust

	Afrobarometer round				
Country	**1**	**3**	**4**	**5**	**All**
Algeria	1326	0	0	891	2217
Benin	707	0	851	891	2449
Botswana	774	1602	789	791	3956
Burkina Faso	1430	0	824	932	3186
Burundi	732	0	0	888	1620
Cameroon	2007	0	0	793	2800
Cape Verde	1504	727	802	795	3828
Cote D'Ivoire	653	0	0	912	1565
Egypt	1665	0	0	924	2589
Ethiopia	0	0	0	1650	1650
Gabon	1425	0	0	0	1425
Ghana	815	832	806	1671	4124
Guinea	738	0	0	888	1626
Kenya	0	845	797	1760	3402
Lesotho	0	691	729	796	2216
Liberia	0	0	877	950	1827
Madagascar	0	1027	1056	908	2991
Malawi	0	734	826	1709	3269
Mali	0	882	932	920	2734
Mauritius	0	0	0	1016	1016
Morocco	0	0	0	892	892
Mozambique	0	801	678	1636	3115
Namibia	0	762	774	787	2323
Niger	0	0	0	962	962
Nigeria	0	1283	1406	1602	4291
Senegal	0	835	856	860	2551
Sierra Leone	0	0	0	967	967
South Africa	0	1696	1757	1715	5168
Sudan	0	0	0	810	810
Swaziland	0	0	0	848	848
Tanzania	0	976	900	1879	3755
Togo	0	0	0	803	803
Tunisia	0	0	0	961	961
Uganda	0	1491	1658	1771	4920
Zambia	0	851	817	784	2452
Zimbabwe	0	717	791	1849	3357
Total	**13776**	**16752**	**18926**	**39211**	**88665**

Source: authors' compilation based on Afrobarometer data.

Table A2: Variable definitions

Estimation topic	Variables	Definition	Rounds
Baseline measure of interpersonal trust	Trust: generalize	0-1 binary variable; equals 0 if the individual indicates you must be very careful in dealing with people and equals 1 if the individual indicates that most people can be trusted. We use the original survey response categories.	3, 5
Other measures of interpersonal trust	Trust: relatives	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	3, 4, 5
	Trust: neighbours	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	3, 5
	Trust: people of the same ethnic group	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	3
	Trust: people of a different ethnic group	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	3
	Trust: people of the same nationality	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	4
	Trust: other people you know	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	1, 4, 5
	Trust: index	Mean of response values on interpersonal trust questions on which answers are available.	1, 3, 4, 5
Measures of institutional trust	Trust: president	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	1, 2, 3, 4, 5, 6
	Trust: parliament	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	2, 3, 4, 5, 6
	Trust: electoral commission	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	1, 2, 3, 4, 5, 6
	Trust: tax department	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	5, 6

	Trust: local assembly	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	2, 3, 4, 5, 6
	Trust: ruling party	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	2, 3, 4, 5, 6
	Trust: opposition party	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	2, 3, 4, 5, 6
	Trust: police	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	1, 2, 3, 4, 5, 6
	Trust: army	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	1, 2, 3, 5, 6
	Trust: courts	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	1, 2, 3, 4, 5, 6
	Trust: traditional leaders	0-3 variable; equals 0 if the individual indicates they do not trust the entity at all, 1 if the individual indicates they trust the entity just a little, 2 if they trust them somewhat, 3 if they trust them a lot. We use the original survey response categories.	2, 4, 6
	Institutional trust index	Mean of response values on institutional trust questions on which answers are available.	1, 2, 3, 4, 5, 6

Source: authors' compilation based on Afrobarometer data and codebook.

Table A3: Disaster exposure and generalize trust: alternative definitions of exposure—additional tests

	(1)	*(2)*	*(3)*
Dependent variables	*Trust: generalized*	*Trust: generalized*	*Trust: generalized*
Disaster frequency (ages 8 – 22)	-0.002*		
	(0.001)		
Disaster frequency (ages 23 – 30)		-0.002	
		(0.001)	
Disaster frequency (past 5 years)			-0.003*
			(0.002)
Mean of dep variable	0.187	0.189	0.189
Mean of disaster frequency	0.638	0.741	0.783
Sample size	48,290	52,415	52,916
R-squared	0.122	0.122	0.121

Note: *** p <.01, **p <.05, * p <.1. Standard errors, clustered at the PSU and round level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region and year fixed effects. Models 1–3 are based on Afrobarometer rounds 3 and 5 since the generalize trust information is not available in other waves of the survey.

Source: authors' compilation based on study results.

Table A4: Disaster exposure and interpersonal trust: probit model estimates

	(1)	*(2)*
	Probit coefficient	Probit marginal effect
Dependent variables	*Trust: generalized*	*Trust: generalized*
Disaster frequency	-0.018***	-0.004***
	(0.006)	(0.001)
Sample size	52,551	
Pseudo R2	0.116	

Note: *** p <.01, **p <.05, * p <.1. Standard errors, clustered at the PSU and round level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region and year fixed effects. Model includes Afrobarometer rounds 3 and 5 since the generalize trust information is not available in other waves of the survey.

Source: authors' compilation based on study results.

Table A5: Disaster exposure and generalize trust: sub-samples

	(1)	*(2)*	*(3)*
Sub-sample:	*Females*	*Males*	*26–35 years old*
Dependent variables	*Trust: generalized*	*Trust: generalized*	*Trust: generalized*
Disaster frequency	-0.003*	-0.005***	-0.006***
	(0.002)	(0.002)	(0.02)
Mean of dep variable	0.188	0.190	0.175
Mean of disaster frequency	0.555	0.513	0.933
Sample size	25,801	27,115	22,311
R-squared	0.141	0.125	0.131
	(4)	*(5)*	*(6)*
Sub-sample:	*Without five most exposed countries*	*Born after 1970*	*Born after 1970*
Dependent variables	*Trust: generalized*	*Trust: generalized*	*Trust: generalized*
Disaster frequency	-0.004**	-0.004***	-0.004**
	(0.001)	(0.002)	(0.002)
Conflict frequency			-0.001
			0.001
Mean of dep variable	0.190	0.180	0.180
Mean of disaster frequency	0.462	0.816	0.816
Mean of conflict frequency			1.093
Sample size	43,286	28,266	28,266
R-squared	0.126	0.124	0.124

Note: *** p <.01, **p <.05, * p <.1. Standard errors, clustered at the PSU and round level, are in parentheses. All regressions include baseline controls (year of birth dummies, gender, and urban dummy), sub-national region and year fixed effects. The sample includes Afrobarometer rounds 3 and 5. Model 1 provides a sub-sample of female respondents. Model 2 provides a sub-sample of male respondents. Model 3 is restricted to 26–35 years old given the recency of impressionable years to mitigate the measurement error due to migration. Model 4 is based on a sub-sample without the five most disaster-exposed countries (Kenya, Madagascar, Mozambique, Algeria, and Malawi). In these 5 countries the mean disaster exposure across the baseline sample is 0.699, whereas in the remaining countries the mean disaster exposure is 0.367. Model 5 provides a sub-sample of individuals born after 1970, which we then use in Model 6 where we control for conflict exposure. Conflict exposure is calculated as a frequency count throughout the impressionable years in the 30km radius of individual's PSU.

Source: authors' compilation based on study results.