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Scarred by Nature: How Early Exposure to Natural Disasters Shapes Risk Attitudes

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Abstract

Can early-life experiences shape long-term risk attitudes? This paper examines the lasting effect of exposure to natural disasters during early adulthood on individual risk preferences. Using harmonized survey data linked to disaster records, we find that individuals exposed to natural disasters between the ages of 18 and 25 exhibit significantly greater risk aversion later in life. This effect is robust across a range of alternative specifications. We further explore the role of cultural transmission as a mechanism, showing that social connectedness moderates the observed behavioral shift. Our findings underscore the impressionable years as a critical window for the formation of individual preferences. The study offers new insights into how climate-related shocks can exert long-lasting behavioral effects, with implications for public policy, economic behavior, and climate adaptation.

Keywords: Natural Disasters, Risk Attitudes, Impressionable Exposure, Cultural Transmission

JEL Codes: D81, D91, Q5, Q54, Z10

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1 Introduction

As climate change accelerates the frequency and severity of natural disasters, understanding their long-term effects on individual behavior becomes increasingly urgent. Although the immediate economic and physical damages of disasters are widely studied, much less is known about their enduring psychological and behavioral consequences. In this paper, we investigate how exposure to natural disasters during early adulthood, a critical period for the formation of preferences, affects risk attitudes later in life.

Recent events in Europe illustrate the human toll and disruptive force of climate-related disasters. In Italy, a series of floods between 2023 and 2024 killed dozens, displaced thousands, and caused more than €8.5 billion in damage. In Spain, floods hit Valencia and Malaga in 2024, causing destruction and claiming more than 150 lives. In Luxembourg, repeated floods since 2021 have forced evacuations and prompted government investments in floodplain restoration. Similarly, the 7.6 magnitude earthquake in Japan generated a tsunami, flooding homes and prompting evacuations; notably, 40% of the resulting deaths were associated with emotional stress. These disasters not only inflict immediate harm, but often leave deep psychological scars, particularly for those experiencing such events during their formative years.

Drawing on harmonized data from the European Social Survey (ESS) and geocoded disaster records from the EM-DAT database, we investigate whether exposure to natural disasters during early adulthood–specifically between the ages of 18 and 25–induces persistent changes in individual risk attitudes observable later in life. This age window is widely regarded as the "impressionable years," during which preferences and beliefs are particularly malleable to external shocks. Unlike

most existing studies, which are typically confined to a single country or rely on short-term follow-ups, we explicitly test the impressionable years hypothesis in a multi-country framework. Our empirical strategy links cross-cohort variation in disaster exposure within countries to self-reported measures of risk attitudes. This cross-national design enables us to identify whether variation in disaster exposure during formative years explains within-cohort differences in later-life risk attitudes, while controlling for contemporaneous macroeconomic and institutional factors.

We find that individuals exposed to natural disasters during early adulthood exhibit significantly higher risk aversion later in life. This result is robust across a range of specifications and remains consistent when accounting for disaster severity, alternative measures of risk attitudes, and different age groups and samples. We further validate our findings using data from the Integrated Values Survey (IVS), which covers a broad set of countries. We also explore a potential key mechanism underlying our results: the cultural transmission of risk-averse norms via social networks.

Our findings contribute to a growing literature on the long-term behavioral effects of early life experiences. While previous studies have examined the legacy of economic crises or political regimes, we provide new evidence that environmental shocks–many of which are becoming more common under climate change–can also shape attitudes. In doing so, we underscore an important but underexplored link between climate crises, personal development, and risk behavior. The paper is novel in showing that exposure to natural disasters during early adulthood has lasting effects on shaping risk attitudes, with cultural transmission emerging as a key mechanism. It uniquely combines cross-national survey data with geocoded disaster records, offering new insights into the behavioral legacy of climate shocks.

These insights are not only of academic interest. As Europe and the world face increasingly

frequent climate-related disasters, understanding how such shocks shape behavior throughout the life course is critical for designing effective resilience strategies. If early exposure to natural disasters generates persistent shifts in risk attitudes, policymakers must consider how to rebuild not just physical infrastructure but also address long-term psychological and behavioral vulnerabilities. This resonates with recent calls by the European Central Bank (Mauderer and Stracca, 2025) to broaden the understanding of climate-related risks beyond their financial dimensions. As Lagarde emphasizes, "risk is not only a matter of probabilities and damages, but of perception and preparedness." In this light, the behavioral legacies of early-life exposure to disasters carry implications not only for individual welfare and social cohesion, but also for the efficacy of climate adaptation and economic policy. Designing robust institutional responses therefore requires incorporating the ways in which such experiences durably shape how individuals perceive, assess, and respond to future risks. This behavioral imprint may, in turn, influence aggregate demand patterns, financial risk-taking, and the social acceptability of green transitions.

The remainder of the paper is structured as follows. Section 2 reviews the related literature. Section 3 describes the data and outlines the empirical strategy. Section 4 presents the main results. Section 5 assesses their robustness. Section 6 explores a potential underlying mechanism. Section 7 concludes. A Supplementary Appendix provides a glossary of terms and additional tables.

2 Literature Review

A growing body of empirical research explores how major life experiences shape long-term individual preferences, particularly when such experiences occur during early adulthood–a period widely

referred to as the "impressionable years" (Krosnick and Alwin, 1989; Giuliano and Spilimbergo, 2025). According to this hypothesis, individuals are more susceptible to lasting changes in attitudes and beliefs during this developmental window, as core values and cognitive frameworks are still being formed. Within this framework, exogenous shocks such as economic recessions (Malmendier and Nagel, 2011), political regime changes (Alesina and Fuchs-Schündeln, 2007), and exposure to violence or war (Callen et al., 2014) have been shown to generate persistent effects on preferences related to risk tolerance, trust in institutions, savings behavior, and political ideology. Collectively, this literature underscores that preferences are not fully stable over the life course but can be durably shaped by salient macro-level events experienced at a critical age.

Our study contributes to this line of research by focusing on natural disasters as a source of large-scale, exogenous environmental shocks. Natural disasters are particularly well-suited for studying the formation of preferences because they are plausibly orthogonal to individual characteristics and often occur with little or no warning, thereby mimicking the properties of a natural experiment. While much of the existing literature emphasizes the immediate or short-run psychological and behavioral effects of disasters–such as increased stress, financial disruption, or changes in consumption patterns–we shift the focus to the long-term consequences of such shocks on individual risk attitudes. Specifically, we examine whether exposure to natural disasters during early adulthood, regardless of when in historical time such exposure occurred, generates persistent shifts in risk preferences observable later in life. This historical perspective enables us to disentangle temporary emotional responses from more deeply rooted behavioral adaptations, thereby offering a clearer understanding of the extent to which early-life environmental shocks contribute to the shaping of individual-level economic preferences.

There is mounting empirical evidence that current or recent exposure to natural disasters can

influence individual attitudes toward risk, particularly in the short run. For example, Cameron and Shah (2015), using lab-in-the-field experiments in Indonesia, find that individuals who have recently experienced flooding or earthquakes exhibit significantly greater risk aversion compared to those not recently exposed. Their findings suggest that even relatively localized and time-bound disaster experiences can recalibrate individuals' willingness to engage in risky activities. Similarly, Kim and Lee (2014), studying survey data from South Korea, document that individuals residing in regions affected by typhoons report heightened risk aversion, especially in cases where the disasters resulted in substantial human casualties or economic damage. These studies collectively indicate that the psychological salience of natural disasters can induce observable changes in behavior in the aftermath of the event, even if such effects may diminish over time. Importantly, they highlight that disaster exposure, even in the absence of direct personal loss, can influence perceptions of vulnerability and risk, thereby altering decision-making in both economic and non-economic domains.

Other strands of the literature emphasize that the behavioral effects of disaster exposure are heterogeneous and often shaped by the broader socioeconomic and institutional context. Eckel et al. (2009), analyzing data from individuals displaced by Hurricane Katrina, find that while some evacuees became more risk-averse, others displayed heightened risk-seeking behavior–suggesting that post-disaster responses are not uniform but mediated by pre-existing vulnerabilities, coping capacity, and the nature of support systems available in the aftermath. These heterogeneous effects may reflect differences in perceived control, psychological resilience, or differential access to recovery resources. Goebel et al. (2015), using data from Germany, France, and the UK, examine the transnational impact of the Fukushima nuclear accident and document increases in both environmental concern and risk aversion, even among individuals who were geographically distant

from the disaster. Their findings underscore the role of information exposure and media framing in amplifying or attenuating behavioral responses to environmental shocks. Together, these studies reveal that the psychological and behavioral consequences of disasters are not only shaped by the nature of the shock but also by the institutional, cultural, and informational environments in which individuals are embedded.

In contrast to these contemporaneous studies, a smaller but growing literature has begun to investigate the long-term behavioral legacy of natural disasters. Ingwersen et al. (2023), using longitudinal survey data from Indonesia, show that exposure to major disasters leads to sustained increases in risk aversion for at least five years, though the effect diminishes gradually over time. Similarly, Hu et al. (2025) demonstrate that past exposure to natural disasters in China significantly reduces participation in risky financial markets, suggesting that such events alter not only psychological dispositions but also economically consequential behaviors. These contributions underscore the notion that disaster-related experiences may imprint enduring perceptions of vulnerability, uncertainty, and loss, thereby reshaping preferences beyond the immediate crisis period. Falco and Corbi (2023) go further by explicitly testing the impressionable years hypothesis in the context of natural disasters. They show that individuals exposed to such events between the ages of 18 and 25 exhibit systematically develop more pro-environmental attitudes in adulthood. To our knowledge, only Falco and Corbi (2023) directly examine the long-term consequences of disaster exposure during early adulthood–a formative period in which core beliefs and preferences are particularly susceptible to external shocks.

Our study complements recent contributions by Giuliano and Nunn (2021) and Gavresi and Litina (2023), who emphasize the formative role of early adulthood in shaping political and cultural attitudes in the wake of macroeconomic or political upheavals. By focusing on natural disasters–an

exogenous and increasingly relevant class of shocks–we offer new evidence on when such events are most behaviorally consequential and how their imprint is sustained over time.

We further contribute to the literature on the intergenerational transmission and persistence of preferences by exploring cultural transmission as a key mechanism through which early-life exposure to disasters shapes long-term risk attitudes. Building on the theoretical framework of Bisin and Verdier (2001), we posit that attitudes formed during the impressionable years are not only internalized by individuals but can also be reinforced through repeated interactions within family and peer networks. Social norms and behavioral expectations that evolve in response to collective experiences–such as repeated or salient natural disasters–may become embedded in community-level belief systems and transmitted across cohorts. This transmission is particularly potent when individuals remain embedded in the same geographic or cultural environments, where localized narratives about vulnerability, caution, or preparedness become institutionalized. By empirically examining the interaction between disaster exposure and proxies for social connectedness, such as frequency of interaction with friends and relatives, we provide suggestive evidence that cultural reinforcement plays a central role in sustaining the behavioral imprint of early-life shocks. This perspective aligns with recent findings in cultural economics that emphasize the durability of preferences shaped by shared historical experiences and the critical role of social structures in maintaining them.

Taken together, our study integrates insights from behavioral economics, disaster economics, and the economics of culture to contribute to a more comprehensive understanding of how exogenous environmental shocks influence preference formation over the life cycle. By demonstrating that natural disasters are not merely episodic events with temporary consequences, but also formative psychological experiences with long-run behavioral implications, we expand the scope of

disaster research beyond its traditional focus on physical damages and short-term coping strategies. In doing so, we underscore the importance of accounting for the persistent, and potentially intergenerational, consequences of climate-related shocks on human behavior. This perspective has important implications for public policy, particularly in the domains of climate adaptation, disaster preparedness, and social resilience. As the frequency and intensity of natural disasters are expected to rise due to climate change, understanding how such events shape fundamental economic preferences is critical for designing interventions that account not only for material losses but also for long-term shifts in risk perception and decision-making.

3 Data and Empirical Identification

To explore the persistent effect of natural disasters on shaping current risk attitudes, we employ data from nine consecutive rounds of the European Social Survey (ESS), covering the period from 2002 to 2019. The ESS is a biennial, cross-national survey administered across 33 countries [1] using repeated cross-sectional samples. The ESS offers detailed information on individuals' self-reported risk preferences and a wide array of sociodemographic characteristics, including country and year of birth, gender, age, race, economic situation, education, family status, and self-reported health.

Our analysis employs two proxy measures of risk attitudes drawn from the ESS, both based on respondents' self-assessments of value orientations related to risk-taking. Specifically, the survey includes two questions designed to capture individuals' willingness to take risks in life. The first asks respondents: *"Please listen to each description and tell me how much each person is or is*

[1] The sample includes respondents from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kosovo, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, and the United Kingdom.

not like you. Use this card for your answer. She/he looks for adventures and likes to take risks. She/he wants to have an exciting life." The second states: *"Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer. She/he likes surprises and is always looking for new things to do. She/he thinks it is important to do many different things in life."* Both questions are measured on a six-point scale, where 1 corresponds to "Very much like me" (very risk-prone) and 6 to "Not like me at all" (very risk-averse).

Our main explanatory variable is early exposure to natural disasters, incorporating various events (e.g., floods, storms, droughts, epidemics, earthquakes, volcanic activity, heatwaves) experienced during an individual's impressionable years (between 18 and 25 years of age). Data on natural disasters are drawn from the International Disaster Database (EM-DAT), which catalogs more than 26,000 global disasters from 1900 to the present. We construct the impressionable exposure to natural disasters variable by associating each natural disaster to each individual in our sample and summing the occurrences of natural disasters during each individual's age range of 18-25, weighted by the years relevant to each age within this range.[2] Notably, some individuals experienced less than eight years of exposure to natural disasters due to participating in the survey before reaching age 25. For these respondents, we do not account for disasters occurring after their survey participation, ensuring that only disasters experienced within their impressionable years influence their reported risk attitudes.[3]

In addition to our main explanatory variable, the analysis controls for a rich set of *individual characteristics* commonly associated with risk attitudes in the literature. These include gender, marital status, education, subjective health, race, presence of children in the household, sources of

[2]For example, an individual who experienced 80 disasters from ages 18 to 25 has a disaster exposure variable of $80/8 = 10$.

[3]For instance, a 22-year-old who experienced 20 disasters from ages 18 to 22 would have an exposure variable of $20/5 = 4$.

income, satisfaction with the country's economy, economic situation, confidence in parliament, and confidence in other people. The remaining controls capture *aggregate socio-economic dynamics* at the country level. They are derived from the World Development Indicators (WDI) and include the natural logarithm of GDP per capita in PPP terms and population growth. These variables capture the stage of development of a country and they also can have an effect on individuals' attitudes. Table A.1 presents descriptive statistics for all variables described above and used in the analysis.

Initially, we implement an OLS regression model to estimate how exposure to natural disasters during impressionable years (ages 18-25) formulates current risk attitudes. The model is specified here:

$$y_{i,c,t} = \alpha_0 + \alpha_1 \, \textit{Natural Disasters Exposure}_{i,c,t} + \alpha_2 W_i + \alpha_3 Z_c + \eta_a + \kappa_c + \lambda_t + \mu_j + \kappa_c \times age + v_{i,c,t}, \quad (1)$$

where $y_{i,c,t}$ captures the risk attitudes of individual i in country c in the ESS year t. *Natural Disasters Exposure*$_{i,c,t}$ measures individual's i exposure to disaster during the ages of 18-25. W_i includes individual-level controls, while Z_c represents country-level controls. η_a, κ_c, λ_t, and μ_j denote fixed effects for age, country and ESS year. $\kappa_c \times age$ represents country-specific age fixed effects. Standard errors are robust, clustered by country×birth-year cohort, and sample weights are applied. [4] Throughout the analysis, first- and second-generation immigrants are excluded.

The inclusion of country, age, and year fixed effects ensures that our analysis is within a

[4] We cluster the standard errors at the country×birth-year cohort, as our sample includes individuals lived in the same country, born in the same year (or same 5-year cohort) and they were exposed to the same natural disaster. This clustering structure better captures shared treatment exposure and latent historical influences, following the design-based rationale outlined by Abadie et al. (2023). We group individuals into nineteen 5-year cohorts. In the robustness section, we also cluster the standard errors at the country level.

consistent framework, comparing individuals of the same age across different countries and varying experiences of natural disasters over time. To isolate the variation in risk attitudes for a specific age group, we adopt the most stringent specification, incorporating $\kappa_c \times age$ fixed effects. This removes any variation arising from comparisons with other age groups within the same country and the same age group across different countries, capturing changes in risk attitudes within the given age group.

Figure 1 presents the evolution of natural disasters that occurred during the years covered by the EM-DAT. The figure reveals an increasing number of natural disasters since 1980.

Figure 1: The evolution of natural disasters

4 Results

This section reports the empirical findings of our benchmark analysis. Table 1 documents the effect of impressionable exposure to natural disasters on shaping the current risk behavior in European

countries. In columns 1 and 2 we include the full set of the controls and fixed effects, restricting the sample to individuals born in the country and with at least one parent (either father or mother) also born in the country. This specification allows us to check whether our benchmark findings are driven by the inertia of attitudes expressed by first- and second-generation immigrants. In our analysis, we use the beta coefficients[5] to quantify the effect. The results reveal that individuals exposed to natural disasters during their formative years are more risk-averse; specifically, a one-standard deviation increase in disaster exposure is associated with a 0.013 increase in aversion to risk-taking and a 0.017 standard deviation increase in reluctance to try new things, both significant at the 1% level. [6]

Our main specification relies on an intensity-weighted average of disasters experienced between the ages of 18-25. To ensure that results are not sensitive to this weighting approach, Table 2 replicates the benchmark specification while accounting for the extensive margin of natural disasters. Specifically, we construct an alternative measure that counts the total number of natural disasters each individual experienced between the ages of 18 and 25. This alternative is consistent with previous work by Kim and Lee (2014) and Bourdeau-Brien and Kryzanowski (2020), who emphasize the cumulative nature of traumatic environmental shocks. The results remain consistent with those in Table 1, suggesting that individuals with greater cumulative exposure to natural disasters during their formative years are less likely to take risks later in life. More importantly, the findings indicate that it is not only the intensity of disasters that matters, but also their frequency.

[5]Beta coefficients are derived from standardized independent variables, indicating the change in standard deviations of the dependent variable per one standard deviation increase in the predictor.

[6]These results remain consistent when we include first- and second- generation immigrants, and they are robust to alternative clustering of standard errors (see Tables A.2 and A.3 in the Supplementary Appendix). In both cases, the effects are significant at the 1% level and quantitatively notable.

Table 1: Benchmark Specification: Natural Disasters Exposure and Risk Attitudes during Impressionable Years

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Natural Disaster Exposure	.013***	.017***
	[.007]	[.000]
R-squared	.18	.10
Sample	257,147	257,283
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: The analysis controls for individual characteristics such as age, gender, education, economic situation, marital status, race, satisfaction with the economy, subjective health, trust parliament, trust people, number of children in household and aggregate socio-economic dynamics such as the logged GDP per capita in PPP and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values. *** p<0.01, ** p<0.05, * p<0.10.

Table 2: The Extensive Margin of Natural Disasters Exposure on Risk Attitudes during Impressionable Years

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Number of Natural Disasters	.007*	.013***
	[.099]	[.002]
R-squared	.18	.10
Sample	257,147	257,283
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: The analysis controls for individual characteristics such as age, gender, education, economic situation, marital status, race, satisfaction with the economy, subjective health, trust parliament, trust people, number of children in household and aggregate socio-economic dynamics such as the logged GDP per capita in PPP and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values. *** p<0.01, ** p<0.05, * p<0.10.

5 Robustness

The robustness section evaluates the sensitivity of our benchmark analysis across a range of alternative specifications. First, we test whether our results hold when using individuals' feelings about the future of the world as the outcome variable. Second, we split the sample into young (18-59) vs. old individuals (60 or older) to explore whether the impact of exposure to natural disasters on risk attitudes differs by age group. Third, we assess the influence of exposure to natural disasters by focusing on European Union countries, allowing us to take into account the common policies adopted by EU institutions that aim to manage climatic crises through financial support to affected areas. Fourth, we replicate our analysis using alternative measures of risk attitudes derived from the Integrated Values Survey (IVS), covering a global sample of countries and the years 1981 to 2020. These proxies evaluate individuals' preferences for major life changes and their affinity for adventure and risk, with lower scores indicating greater risk aversion. Fifth, we account for exposure not only to natural disasters but also to total disaster-related deaths, total economic damages caused by disasters, and per capita losses. Sixth, we explore exposure to natural disasters across different age ranges; specifically, we consider exposure during four age groups–26-33, 34-41, 42-49, and 50-57–to examine whether impressionable exposure has a stronger and more persistent impact on risk attitudes. Finally, we examine whether the effect of early-life exposure to natural disasters on risk attitudes varies systematically with individual-level economic insecurity.

5.1 Alternative Measurement of Risk Aversion: Hopeless for the Future

To further examine the long-term effect of exposure to natural disasters on risk attitudes, we broaden our analysis by considering an alternative proxy that approximates individual risk preferences: respondents' beliefs about the future state of the world. Specifically, we employ a survey-based measure of future sentiment derived from the ESS, which asks: *"Using this card, please say to what extent you agree or disagree with each of the following statements. The way things are now, I find it hard to be hopeful about the future of the world"*, with responses recorded on a 5-point Likert scale ranging from 1 ("Disagree strongly") to 5 ("Agree strongly"). This item captures pessimism regarding global prospects and, following established findings in behavioral economics, serves as a proxy for risk aversion, insofar as diminished optimism has been associated with lower propensity for risk-taking (Dohmen et al., 2023).

Re-estimating our baseline model with this alternative outcome (see Table A.4 in the Supplementary Appendix), we find that early-life exposure to natural disasters significantly increases pessimistic beliefs about the future. That is, affected individuals are more likely to agree that they find it hard to be hopeful about the future of the world, indicating a shift towards heightened risk aversion and diminished forward-looking optimism.

5.2 Heterogeneity by Age Groups

To investigate age-specific heterogeneity in the relationship between early-life disaster exposure and risk attitudes, we divide the sample into two age groups: individuals below 60 and those aged

60 or older. This stratification reflects documented differences in risk-taking behavior across the life course, with older adults generally exhibiting greater risk aversion (Bonsang and Dohmen, 2015). Cognitive aging may amplify the salience of early-life experiences, leading to more persistent behavioral patterns in later adulthood. Our results, reported in Table A.5, reveal that the association between disaster exposure during impressionable years and risk aversion is significantly stronger among older individuals. This finding is consistent with the impressionable years hypothesis (Krosnick and Alwin, 1989; Gavresi and Litina, 2023) and suggests that attitudes crystallized in early adulthood become more entrenched over time, particularly as cognitive flexibility declines with age.

5.3 EU Subsample Analysis

In this robustness exercise, we restrict our sample to countries within the European Union (EU), thereby exploiting a more homogeneous institutional context. This approach allows us to account for the presence of common EU-level mechanisms aimed at mitigating the consequences of climate-related disasters, such as the EU Solidarity Fund, which provides financial assistance to member states affected by major natural catastrophes. By focusing exclusively on EU countries, we reduce cross-country variation in post-disaster government responses, particularly in terms of fiscal capacity and institutional preparedness. The fact that our baseline results remain robust within this subsample (Table A.6) suggests that the observed relationship between early-life disaster exposure and risk attitudes is not merely an artifact of country-specific disaster management strategies, but instead reflects deeper and longer-lasting shifts in individual behavioral preferences.

5.4 Alternative Survey Data: Integrated Values Survey

We further assess the robustness of our findings by replicating the analysis using data from the Integrated Values Survey (IVS), which offers conceptually comparable measures of individual attitudes toward risk and openness to change. This exercise allows us to move beyond the European focus of the ESS and leverage a broader, globally representative sample. Prior studies (Goebel et al., 2015; Ingwersen et al., 2023) have shown that the psychological legacy of natural disasters is detectable across diverse survey instruments and cultural settings, supporting the validity of using alternative data sources. The IVS includes two questions relevant to our framework. The first asks respondents to express their attitude toward major life changes, where responses range from 1 ("one should act boldly to achieve them") to 10 ("one should be cautious"). The second asks whether individuals identify with the statement, "It is important to have adventures and take risks," measured on a scale from 1 ("very much like me") to 6 ("not at all like me"). Re-estimating our baseline specification using these outcomes (see Table A.7), we find qualitatively similar results: individuals exposed to natural disasters early in life report greater caution and lower affinity for risk-taking. These results indicate that the estimated effect is not driven by survey-specific framing or regional characteristics of the ESS, but rather reflects a more generalizable behavioral response to early-life disaster exposure.

5.5 Disaster Severity: Losses and Economic Damages

In addition to measuring exposure to natural disasters, it is important to account for the severity of such events, which may amplify their long-term psychological and behavioral consequences. Prior

research suggests that more destructive disasters–those involving greater human and economic losses–can leave deeper emotional and cognitive imprints on affected populations (Brown et al., 2018; Falco and Corbi, 2023). To explore this dimension, we construct alternative measures of disaster intensity using data from the EM-DAT database, capturing both total and per capita fatalities and economic damages. This allows us to test whether the magnitude of losses associated with disaster exposure correlates with the degree of risk aversion later in life. As shown in Tables A.8 and A.9, we find that individuals exposed to more severe disasters exhibit significantly stronger risk-averse behavior. These results suggest that highly traumatic collective experiences–beyond mere exposure–generate more persistent shifts in risk preferences.

5.6 Exposure to Natural Disasters in Different Age Ranges

To further assess the validity of the impressionable years hypothesis, we extend our benchmark analysis by estimating the effect of disaster exposure across four additional age intervals beyond early adulthood: 26-33, 34-41, 42-49, and 50-57. This exercise allows us to assess whether the influence of early-life shocks diminishes as exposure occurs later in the life cycle. The results, presented in Table A.10, reveal that the estimated coefficients for these older age brackets are small in magnitude, statistically insignificant, and lack systematic patterns. These findings reinforce the theoretical proposition that early adulthood–particularly the ages between 18 and 25–constitutes a sensitive period during which external shocks exert a disproportionately strong and enduring influence on the formation of individual preferences (Giuliano and Spilimbergo, 2025; Gavresi and Litina, 2023). In contrast, exposures occurring after this formative window appear to have limited or no long-term effect on risk attitudes.

5.7 Does Economic Insecurity Matter?

In this subsection, we examine how the relationship between early-life exposure to natural disasters and risk attitudes is moderated by individual-level economic insecurity. Individuals from lower socio-economic backgrounds tend to be more vulnerable to the adverse consequences of climate shocks–such as job loss, income instability, and housing damage–which might intuitively be associated with greater risk aversion. Yet, a well-established strand of the literature documents the counterintuitive pattern that individuals experiencing heightened economic insecurity or exposed to severe shocks may instead exhibit increased risk tolerance. This behavioral response is attributed to a combination of psychological mechanisms (such as diminished loss aversion when facing subsistence constraints) and structural constraints (e.g., the need to engage in risky labor market or migration decisions). Empirical evidence from diverse contexts such as post-conflict Afghanistan, post-tsunami Indonesia, and post-Katrina New Orleans supports this view, showing that low-income individuals exposed to shocks often become more risk seeking (Callen et al., 2014; Eckel et al., 2009; Cameron and Shah, 2015).

To test this hypothesis empirically, we interact our measure of disaster exposure during the impressionable years with an individual-level index of economic insecurity. We construct this index using principal component analysis (PCA) based on two proxies: (i) whether the respondent was unemployed in the past three months, and (ii) whether they report having great difficulty living on their current income. The results, presented in the Supplementary Appendix (Table A.11), show that individuals who experienced natural disasters in early adulthood and currently face economic hardship are more likely to report risk-tolerant attitudes. This finding points to heterogeneity in behavioral responses to climate shocks, whereby vulnerable individuals adapt not by becoming

more cautious, but by taking on greater risks–potentially as a coping or recovery strategy.

6 Mechanism: Cultural Transmission

The finding that early-life exposure to natural disasters leads to heightened risk aversion in adulthood raises an important question of the channels through which this persistent effect operates. Identifying the underlying mechanisms is essential not only for explaining the formation of current preferences but also for assessing their broader behavioral and policy implications. To this end, we consider a complementary explanation grounded in the literature on cultural economics and behavioral responses to economic distress. This perspective emphasizes the role of cultural transmission through social networks in the formation and persistence of norms. Our aim is to shed light on the socio-psychological and economic foundations through which early disaster exposure translates into enduring risk preferences.

One key channel through which early exposure to natural disasters may persistently shape risk attitudes is cultural transmission. Drawing on the framework of Bisin and Verdier (2001) and Giuliano and Nunn (2021), the beliefs and preferences formed during impressionable years are often transmitted and reinforced through social networks and family interactions. In this sense, communities that experience repeated collective shocks, such as natural disasters, may develop cultural norms that emphasize caution, security, and risk avoidance. These norms are then socially transmitted across cohorts and social ties, creating a persistent culture of risk aversion. Because such networks are geographically and relationally dense, they are particularly powerful in reinforcing attitudes developed during early adulthood, even in the absence of continued exposure. This process is further amplified in contexts with strong social networks, where individuals remain

embedded in the same cultural environments in which their initial attitudes were formed. Frequent interaction with family and peers plays a vital role in reinforcing these transmitted values over time. Hence, the observed effect of early disaster exposure on adult risk aversion can be understood not merely as the psychological imprint of a shock, i.e., natural disasters, but as a sustained behavioral adaptation embedded in a culturally cohesive environment.

To further explore the mechanism of cultural transmission, we examine the interplay between early-life exposure to natural disasters and the strength of individuals' social networks, as proxied by the time spent with family and friends, on risk-aversion. The ESS includes a relevant variable capturing the frequency of social interactions or social connectedness, based on the question: *"On average a weekday, how often do you socialize with friends, relatives, family or colleagues?"* Responses are measured on a 7-point scale, ranging from 1 ("Never") to 7 ("Every day"). In Table A.12, we extend our baseline specification by incorporating both the current frequency of social interaction and its interaction with disaster exposure during the impressionable years. Our results show that: i) as before, early-life exposure to natural disasters increases risk aversion; ii) strong social bonds decrease risk averse attitudes; and iii) interestingly, the interaction term is negative and significant for our primary outcome–*not being adventurous and taking risks*–suggesting that individuals embedded in stronger social networks, through more frequent contact with family and friends, exhibit attenuated risk aversion following early-life disaster exposure.

7 Conclusion

This paper provides novel empirical evidence on the persistent behavioral imprint of early adulthood exposure to natural disasters. Leveraging harmonized individual-level data from the ESS

and geocoded records from the EM-DAT international disaster database, we identify a robust and significant association between natural disaster exposure between the ages of 18 and 25–a period commonly understood as the "impressionable years"–and heightened risk aversion later in life. This finding is robust to a battery of identification strategies, persists regardless of whether risk aversion is measured in terms of general cautiousness or openness to novelty and adventure, and is amplified among individuals who faced more intense disasters. Importantly, these patterns are not an artifact of contemporaneous shocks or compositional differences but rather reflect a durable imprint shaped during a formative life stage.

We interpret these findings through the lens of cultural transmission, whereby preferences formed during a psychologically malleable period are reinforced and perpetuated through repeated social interaction within cohesive networks. Specifically, we posit that natural disasters experienced in early adulthood trigger enduring shifts in risk preferences, which are subsequently embedded within localized cultural norms and sustained through familial and peer-based transmission channels. Empirical support for this mechanism is found in the observed moderating role of social connectedness: individuals with more frequent interaction with friends and relatives exhibit attenuated risk aversion following early-life disaster exposure. This suggests that while adverse shocks induce a precautionary behavioral response, the social environment plays a key role in either reinforcing or buffering this adaptation. Our study therefore contributes to the emerging literature at the intersection of behavioral economics, cultural transmission, and disaster economics by documenting how collective shocks during impressionable years leave lasting behavioral legacies, not only through direct psychological imprinting but also via the social reproduction of norms across time and cohorts.

Beyond its empirical contributions, this paper opens new avenues for the study of the latent,

non-economic consequences of climate change–particularly those that manifest through shifts in individual preferences and psychological traits. Our findings demonstrate that climate-related shocks are not only generators of physical destruction and economic disruption but also potent behavioral catalysts with enduring effects on risk attitudes. These results underscore the need for deeper interdisciplinary engagement between economists, psychologists, and climate scientists to fully capture the multifaceted consequences of environmental disasters. From a policy standpoint, recognizing the long-term behavioral legacy of climate shocks is crucial for designing more comprehensive resilience strategies. Policies focused solely on infrastructure rebuilding or short-term economic relief risk overlooking the deeper, and potentially more persistent, vulnerabilities rooted in individuals' altered decision-making frameworks. A more effective climate adaptation agenda should integrate psychological and behavioral dimensions, targeting the rebuilding of social cohesion, trust, and individual capacity to cope with uncertainty. In doing so, policymakers can better anticipate and mitigate the cumulative effects of climate change–not only on material outcomes but also on the human capital and decision environments that underlie economic performance and social stability.

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A Supplementary Appendix

A.1 Descriptive Statistics

Table A.1: Descriptive Statistics

	Obs	Mean	Min	Max
Not being adventurous and take risks	257,147	3.95	1	6
Not important to do different things in life	257,283	3.03	1	6
Natural Disaster Exposure	257,283	.73	0	10.75
Number of Natural Disaster Shocks	257,283	5.30	0	86
Men	257,283	1.53	1	2
Marital status	257,283	2.95	1	6
Educational attainment	257,283	3.19	1	5
Children at home	257,283	1.38	1	2
Ethic minority (Race)	257,283	1.96	1	2
Subjective health	257,283	2.24	1	5
Trust parliament	257,283	4.31	0	10
Trust people	257,283	4.99	0	10
Satisfaction with country's economy	257,283	4.36	0	10
Income difficulties	257,283	2.05	1	4
Income sources	257,283	1.89	1	7
GDP per capita in PPP	257,283	39,881.91	10,957.56	104,501.9
Population growth	257,283	.33	-2.25	2.89

Notes: The table reports the descriptive statistics of the variables used in benchmark of analysis.

A.2 Robustness

Table A.2: Impressionable Exposure to Natural Disasters and Risk Attitudes - Alternative Clustering

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Natural Disaster Exposure	.013**	.017*
	[.047]	[.058]
R-squared	.18	.10
Sample	257,147	257,283
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of impressionable exposure to natural disasters on risk attitudes including all the individuals of the European Social Survey (ESS). We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country level. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.3: Impressionable Exposure to Natural Disasters and Risk Attitudes (Full Sample)

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Natural Disaster Exposure	.012***	.015***
	[.004]	[.000]
R-squared	.17	.09
Sample	308,421	308,636
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of impressionable exposure to natural disasters on risk attitudes including all the individuals of the European Social Survey (ESS). We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.4: Robustness: Alternative Measurement of Risk Aversion (Hopeless About the Future)

	Hopeless about the future
	(1)
Natural Disaster Exposure	.029***
	[.000]
Number of Natural Disasters	.030***
	[.000]
R-squared	.21
Sample	68,580
Individual Controls	Yes
Country-Level Controls	Yes
Country FE	Yes
Age FE	Yes
Country*Age FE	Yes
Year FE	Yes

Notes: This table reports the results of the effect of impressionable exposure to natural disasters on being hopeless about the future of the world. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country*×*age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.5: Robustness: Heterogeneity by Age Groups

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel A. Young (18-59 years) Individuals		
Natural Disaster Exposure	.003	.014***
	[.608]	[.002]
R-squared	.14	.08
Sample	176,990	177,179
	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel B. Old (60+ years) Individuals		
Natural Disaster Exposure	.025***	.018**
	[.002]	[.031]
R-squared	.09	.07
Sample	80,139	80,085
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of impressionable exposure to natural disasters on risk attitudes splitting the sample to old (60+ years) vs young individuals (18-59 years). We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.6: Robustness: EU Subsample Analysis

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Natural Disaster Exposure	.024***	.026***
	[.000]	[.000]
R-squared	.18	.10
Sample	203,199	203,260
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of impressionable exposure to natural disasters on risk attitudes in EU countries. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.7: Robustness: Alternative Survey Data (Integrated Values Survey)

	Cautious about major changes in life	Not important adventures and take risks
	(1)	(2)
Natural Disaster Exposure	-.022*	-.058***
	[.075]	[.009]
R-squared	.13	.19
Sample	39,154	58,711
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of impressionable exposure to natural disasters on risk attitudes using the Integrated Values Survey (IVS) dataset and the full sample of the countries. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.8: Robustness: Disaster Severity (Losses)

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel A.		
Logged Losses Exposures	.009*	.013**
	[.077]	[.046]
R-squared	.18	.10
Sample	257,147	257,283
	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel B.		
Logged per-capita Losses Exposure	.005*	.013*
	[.051]	[.057]
R-squared	.16	.09
Sample	235,414	235,574
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of impressionable exposure to losses due to natural disasters on risk attitudes. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.9: Robustness: Disaster Severity (Economic Damages)

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel A.		
Logged damages in US dollars Exposure	.014***	.022***
	[.004]	[.001]
R-squared	.18	.10
Sample	257,147	257,283
	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel B.		
Logged per-capita damages in US dollars Exposure	.010**	.020***
	[.046]	[.005]
R-squared	.16	.09
Sample	235,414	235,574
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of impressionable exposure to economic damages in US dollars due to natural disasters on risk attitudes. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.10: Robustness: Exposure to Natural Disasters in Different Age Ranges

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel A. 26-33 Years Exposure		
Natural Disaster Exposure	.001	.000
	[.737]	[.944]
R-squared	.18	.10
Sample	257,034	257,169
	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel B. 34-41 Years Exposure		
Natural Disaster Exposure	.007	.004
	[.102]	[.397]
R-squared	.16	.09
Sample	248,458	248,586
	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel C. 42-49 Years Exposure		
Natural Disaster Exposure	-.001	.001
	[.875]	[.942]
R-squared	.13	.08
Sample	224,102	224,184
	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Panel D. 50-57 Years Exposure		
Natural Disaster Exposure	.003	.002
	[.451]	[.573]
R-squared	.11	.07
Sample	192,018	192,084
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the effect of exposure to natural disasters during different age groups on risk attitudes. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.11: Robustness: The Interplay Between Natural Disaster Exposure and Economic Insecurity

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Natural Disaster Exposure	.014***	.020***
	[.005]	[.000]
x Economic Insecurity	-.007*	-.014***
	[.085]	[.002]
Economic Insecurity	-.011***	-.018***
	[.008]	[.000]
R-squared	.18	.10
Sample	256,284	256,427
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the interplay between impressionable exposure to natural disaster shock and economic insecurity on risk attitudes. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

Table A.12: Mechanism: Cultural Transmission Through Social Ties

	Not being adventurous and take risks	Not important to do different things in life
	(1)	(2)
Natural Disaster Exposure	.035***	.014*
	[.001]	[.060]
x Social Network	-.025**	.003
	[.018]	[.721]
Social Network	-.068***	-.091***
	[.000]	[.000]
R-squared	.18	.11
Sample	256,144	256,274
Individual Controls	Yes	Yes
Country-Level Controls	Yes	Yes
Country FE	Yes	Yes
Age FE	Yes	Yes
Country*Age FE	Yes	Yes
Year FE	Yes	Yes

Notes: This table reports the results of the interplay between impressionable exposure to natural disaster shock and social network on risk attitudes. We control for individual characteristics including gender, marital status, education, health, race, presence of children, sources of income, satisfaction with the economy, income difficulties, confidence in parliament, and interpersonal trust. Country-level controls include the logarithm of per capita GDP (PPP) and population growth. We also include country, age, year, and *country* × *age* fixed effects. Robust standard errors and clustered at the country×birth-year cohort. Parentheses indicate p-values; significance levels are denoted by *** for 1%, ** for 5%, and * for 10%.

A.3 Variables Description

Natural Disasters Variables

Natural disaster exposure. It is a continuous variable, taking the value 0 to 10.75, constructing the mean value of exposure to disasters for each period, i.e., we weight our variable by the range of years that is relevant for each range and each individual (18-25). The source of the data is the EM-DAT.

Number of natural disasters. It is a numerical variable, taking the value 0 to 86, summing up the number of natural disaster the individuals experienced. The source of the data is the EM-DAT.

Total losses. The reported total number of deaths includes confirmed fatalities directly imputed to the disaster plus missing people whose whereabouts since the disaster are unknown and so they are presumed dead based on official figures. The source of the data is the EM-DAT.

Total per-capita losses. The reported total number of deaths includes confirmed fatalities directly imputed to the disaster plus missing people whose whereabouts since the disaster are unknown and so they are presumed dead based on official figures divided by the number of total population. The source of the data is the EM-DAT.

Total damages. All economic damages are expressed in thousands of US dollars adjusted for inflation. The source of the data is the EM-DAT.

Total per-capita damages. All economic damages are expressed in thousands of US dollars adjusted for inflation divided by the number of total population. The source of the data is the EM-DAT.

Risk Attitudes Variables (ESS)

Not being adventurous and take risks. Individuals correspond to the question"Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer. She/he looks for adventures and likes to take risks. She/he wants to have an exciting life". 1 means very much like to take risks and do different things in life and 6 means not like it at all. The source of the data is the European Social Survey.

Not important to do new things in life. Individuals correspond to the question "Please listen to each description and tell me how much each person is or is not like you. Use this card for your answer. She/he likes surprises and is always looking for new things to do. She/he thinks it is important to do lots of different things in life." 1 means very much like to take risks and do different things in life and 6 means not like it at all. The source of the data is the European Social Survey.

Risk Attitudes Variables (IVS)

Cautious about major changes in life. Individuals express their attitudes about the major changes in life where 10 means that one should be cautious about major changes in life and 1 means one should act boldly to achieve. The source of the data is the Integrated Value Survey.

Not important adventure and take risks. Individuals express their attitudes about whether it is important adventure and take risks where 6 means that they not at all like it and 1 means that they very much like it. The source of the data is the Integrated Value Survey.

Individual Control Variables

Age. The age of the respondent. The source of the data is the European Social Survey.

Gender. The gender of the respondent. It is a dummy variable taking the value 1 for women and 2 for men. The source of the data is the European Social Survey.

Education level. Individuals correspond to the question "What is the highest level of educa-

tion you have achieved?". 1 means less than lower secondary education and 5 means that tertiary education is completed. The source of the data is the European Social Survey.

Income sources. It is associated with the question "What is the main source of income in your household?". 1 mean that household income is derived from wages and salaries and 7 indicates other sources. The source of the data is the European Social Survey.

Trust in parliament. "Trust in Parliament" corresponds to the question "Using this card, please tell me on a score of 0-10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust. Firstly [country]'s parliament?". The source of the data is the European Social Survey.

Trust on people. Individuals correspond to the question " Would you say that most people can be trusted, or that you can be too careful in dealing with people?". 0 means you can be too careful and 10 means that most people can be trusted.

Ethnic minority (race). Individuals correspond to the question "Do you belong to a minority ethnic group in [country]?". It is a dummy variable taking the value 1 whether individuals is belong to a minority group and 2 otherwise. The source of the data is the European Social Survey.

Income difficulties. It is associated with the question "Which of the descriptions on this card comes closest to how you feel about your household's income nowadays?". 1 means "Living comfortably on present income" and 4 means "Very difficult on present income". The source of the data is the European Social Survey.

Unemployment. Individuals correspond to the question "Have any of these periods been within the last 3 months?". It is a dummy variable that takes the values 1 if the answer is positive and 2 otherwise. The source of the data is the European Social Survey.

Income Scale. Individuals correspond to the question "On this card is an income scale on

which 1 indicates the lowest income group and 10 the highest income group in your country. We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions and other incomes that come in." 1 indicates the lowest income group and 12 indicates the highest income group.

Marital status. Individuals correspond to the question "Could I ask about your current legal marital status? Which of the descriptions on this card applies to you?". 1 means never married, and 6 means married. The source of the data is the European Social Survey.

Subjective health. Individuals correspond to the question "How is your health in general?". 1 means very good health, and 5 means very bad health. The source of the data is the European Social Survey.

Satisfaction with country's economy. Individuals correspond to the question "On the whole how satisfied are you with the present state of the economy in [country]?". 0 means extremely dissatisfied, and 10 means extremely satisfied. The source of the data is the European Social Survey.

Children at home. Individuals correspond to the question "Are there children living at home or not?". 1 means no, and 2 means yes. The source of the data is the European Social Survey.

How often meet friends and family. Individuals correspond to the question "On an average weekday, how often meet socially with friends, family or colleagues". 1 means never, and 7 every day.

Hopeless for the future. Individuals correspond to the question "Using this card, please say to what extent you agree or disagree with each of the following statements. The way things are now, I find it hard to be hopeful about the future of the world". 1 means disagree strongly and 5 means agree strongly.

Country Control Variables

GDP per capita in PPP. GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the country plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2017 international dollars. The source of the data is the World Development Indicators.

Population growth. Annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. The source of the data is the World Development Indicators.