Misery and Prosociality: the Long-run Impact of Early-life Adversity on Prosocial Behavior in China's 1959-1961 Great Famine*

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Abstract

We study the early origins of prosocial behavior by using exogenous exposure to the Great Chinese Famine during early childhood. Using a cohort-based difference-in-differences approach, we find that individuals exposed to the famine between ages 1 and 3 years at its onset exhibit significantly higher charitable donations six decades later. This effect is especially strong for individuals who had siblings during the famine. We provide suggestive evidence that the increase in prosociality is driven by enhanced intra-household interactions during the famine, rather than by income or religiosity effects. These findings highlight the role of family interactions in fostering social altruism, especially in the context of early-life adversity.

Keywords: Early-life Intervention, Famine, Prosocial Behaviors, Intra-household interactions
JEL codes: D64, J13, J24

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1 Introduction

Individuals may behave prosocially out of genuine concern for others' well-being, even at a personal cost. Such prosocial behavior reflects a balance between personal welfare and the welfare of others, shaped by underlying differences in preference parameters or beliefs that influence how much weight individuals place on others' welfare. These differences play a central role in theories of pure altruism, in which individuals care directly about others' utility (e.g., Becker, 1976; Bénabou and Tirole, 2006; Tonin and Vlassopoulos, 2010). However, little is known about the origins of these differences, despite their fundamental importance to economic theories of altruism and their rich implications for designing effective public policies and fundraising mechanisms (Ottoni-Wilhelm, Vesterlund and Xie, 2017).

In this paper, we investigate the early origins of prosocial behavior by examining how early-life adversity influences charitable donations in adulthood. The theoretical effects of early-life adversity on charitable giving are ambiguous. On the one hand, individuals who have experienced adversity may develop heightened empathy towards others who have suffered, due to a perceived sense of shared experience, potentially leading to increased charitable giving (Andries, Bursztyn, Chaney and Djourelova, 2024; Fong and Luttmer, 2009). On the other hand, the long-term socioeconomic disadvantages associated with the adversity and the potential rise in antisocial tendencies driven by financial scarcity may reduce their capacity and willingness to give (Prediger, Vollan and Herrmann, 2013).

Estimating the effect of early-life adversity has proven difficult because of the possibility of unmeasured individual or family-level attributes that influence both an individual's prosocial behavior and their childhood environment. The Great Chinese Famine provides a unique opportunity to study this impact. The famine struck unexpectedly in late 1958 and lasted until early 1962, with catastrophic consequences. During this period, over 16.5 million people died, making it the deadliest famine in human history (Chen and Zhou, 2007). Most individuals born during and shortly before the famine were exposed to severe food shortages in their early lives, with the intensity of exposure varying by their residences. Moreover, strict Hukou regulations restricted migration, preventing people from leaving famine-stricken regions in search of food. These restrictions led to significant regional variations in famine severity, creating a natural opportunity to examine its long-term effects.

We use provincial excess death rates across cohorts to measure local exposure to the famine. The death rate, we argue, captures the exogenous severity of the famine, allowing our utilization of geographic variation to estimate within-cohort differences in early-life exposure to the famine. Our sample consists of individuals born between 1950 and 1967, with charitable donation information recorded in the 2018 wave of the China Family Panel Studies (CFPS). Among these cohorts, those born in and before 1961 experienced the famine, while individuals born between 1962 and 1967 serve as the reference group. The comprehensive data thus allow a difference-in-differences (DID) assessment of whether early-life famine exposure affects prosocial behaviors in adulthood, specifically charitable giving.

We provide new evidence on how adverse early-life experiences influence charitable giving in adulthood. Our results show that individuals born between 1956 and 1958 who experienced more

severe famine conditions as children donated significantly more to charity, even nearly 60 years after the famine. Specifically, a one standard deviation increase in famine intensity raised the probability of charitable giving by 20.7% and increased the donation amounts by 18.9%. These results suggest that early-life adversity may have a lasting impact on individuals' behavior by shaping their preferences and beliefs in pure altruism.

A key identification challenge is the potential measurement error in famine intensity, which could bias our estimates. To address this issue, we construct two sets of instrumental variables (IVs) based on the primary causes of the famine: human errors and natural disasters. Specifically, the first set of IVs includes three variables that capture extreme weather conditions during the famine period: extreme high temperatures, extreme low temperatures, and extreme rainfall. The second set of IVs reflects the extent of exaggerations in grain harvest reports. After correcting for measurement errors, our IV estimates produce slightly larger but robust coefficients compared to OLS estimates. The IV estimates thus reinforce the validity of our findings.

To explore the underlying mechanism, we first examine the role of sibling interactions during the famine in shaping altruistic behavior. Our data includes information on siblings, allowing us to estimate heterogeneous effects based on the sibling status of our sample. We find that the estimated donation effect is driven mainly by individuals who had siblings during the famine, while the effects are either insignificant or negative for those who were only children at the time. These results underscore the potential role of sibling interactions during hardship in fostering prosocial behaviors later in life. This finding is also consistent with psychological research showing that sibling interactions shape emotional understanding (Kramer, 2014) and sharing behaviors (Xiao, Shen and Harris, 2022), both of which can promote altruism and increase charitable giving.

To further explore the role of family interactions in shaping charitable giving in response to the famine, we analyze the effects of famine exposure on parental absence during early childhood (ages 0–3). Using unique data on the duration respondents lived apart from their parents, we find suggestive evidence that the famine reduced parental absence for individuals with siblings, while the effect is insignificant for only children. This finding supports the proposed mechanism that early-life adversity fosters prosocial behavior in adulthood by increasing opportunities for parental interaction during childhood. Although data limitations prevent a more detailed analysis of specific within-household interactions, our results advance the literature by highlighting the role of intrahousehold interactions in shaping altruism, particularly in response to adverse life events. Finally, we also explore alternative explanations, including income effects and religiosity. Overall, we find little evidence to substantiate these channels.

We conduct several robustness tests to demonstrate that our main results are not sensitive to within-province variation, identifying assumptions, omitted variables, or sample selection. First, to account for within-province variation, we construct an alternative measure of famine intensity at the prefecture level using data from China's 1982 Population Census. Second, we test the key identification assumption that cohort trends in charitable giving are unrelated to famine intensity. Third, we control for county-level clan density to account for potential confounding effects of clan culture. Fourth, we address the concern of mortality selection by examining the likelihood of early death. Our results remain robust across these tests.

We contribute to three distinct strands of literature. First, we contribute to the growing literature

that examines the origins of charitable giving. Recent studies have identified economic factors and information as important drivers of donations (e.g., Null, 2011; DellaVigna, List and Malmendier, 2012; Krasteva and Yildirim, 2013; Andreoni and Serra-Garcia, 2021; Kotsadam and Somville, 2024). We extend this literature by examining the early origins of charitable giving with a focus on early-life adversity. While a growing body of psychological literature emphasizes the importance of early-life experiences, much of the evidence comes from experiments with relatively small randomized samples (e.g., Svetlova, Nichols and Brownell, 2010; Kärtner, Keller and Chaudhary, 2010; Layous, Nelson, Oberle, Schonert-Reichl and Lyubomirsky, 2012; House, Henrich, Brosnan and Silk, 2012; Ottoni-Wilhelm, Vesterlund and Xie, 2017; Flook, Zahn-Waxler and Davidson, 2019). Instead, we exploit exogenous variation in early-life experiences caused by famine to estimate the impact of early-life exposure to the Great Chinese Famine on prosocial behaviors in adulthood.

Second, we contribute to a vast body of literature on the formation of non-cognitive skills, with a particular focus on the formation of prosociality (e.g., Heckman, 2006; Li, Rosenzweig and Zhang, 2010; Gould, Lavy and Paserman, 2011; Gong, Lu and Song, 2018; Li, Lu, Song and Xie, 2019; Gong, Lu and Song, 2021; Chen, Li and Xiao, 2022; Bharti and Roy, 2023; Guo, Gao and Liang, 2024). Prosociality is an important skill affecting health, well-being, and labor market success, as extensively documented in the literature (e.g., Heckman, 2006; Dohmen, Falk, Huffman and Sunde, 2009; Carpenter and Seki, 2011; Becker, Deckers, Dohmen, Falk and Kosse, 2012; Deming, 2017). We extend this literature by linking early-life adversity to the formation of prosociality. Our results show that the increase in charitable giving is concentrated among individuals who had siblings during the famine, and that the famine reduces fatherhood absence at early ages. These findings highlight the role of intrahousehold interactions in shaping altruism, particularly in response to adverse life events.

Third, we contribute to the literature on the long-term consequences of early-life environments. Previous studies have analyzed the short-term effects of adversity, with a focus on traumatic events occurring in adulthood (e.g., Bauer, Blattman, Chytilová, Henrich, Miguel and Mitts, 2016; Bietenbeck, Sunde and Thiemann, 2025). Instead, we examine the lasting consequences of early-life adversities on prosocial behavior, motivated by the fact that early childhood is a critical and vulnerable period with significant implications for long-term life outcomes (e.g., Heckman, Liu, Lu and Zhou, 2020; Heckman and Zhou, Forthcoming; Chen, Fan, Gu and Zhou, 2020; Gao, Song, Timmins and Xia, 2023). Prosocial behavior, such as charitable giving and volunteering plays a key role in fostering trust, cooperation, and social support systems. Thus, understanding how early adversity influences these behaviors has important implications for addressing the issue of social fragmentation and strengthening community ties.

The rest of this paper is organized as follows. Section 2 briefly describes the Great Chinese Famine. Section 3 introduces data, main variables, and empirical strategy. Section 4 presents our main empirical results. Section 5 discusses the mechanism. Section 6 concludes the paper.

2 The Great Chinese Famine

The Great Chinese Famine (1959–1961) was one of the most devastating famines in history. It began in late 1958 and lasted until early 1962. The causes of the famine are a topic of considerable debate.

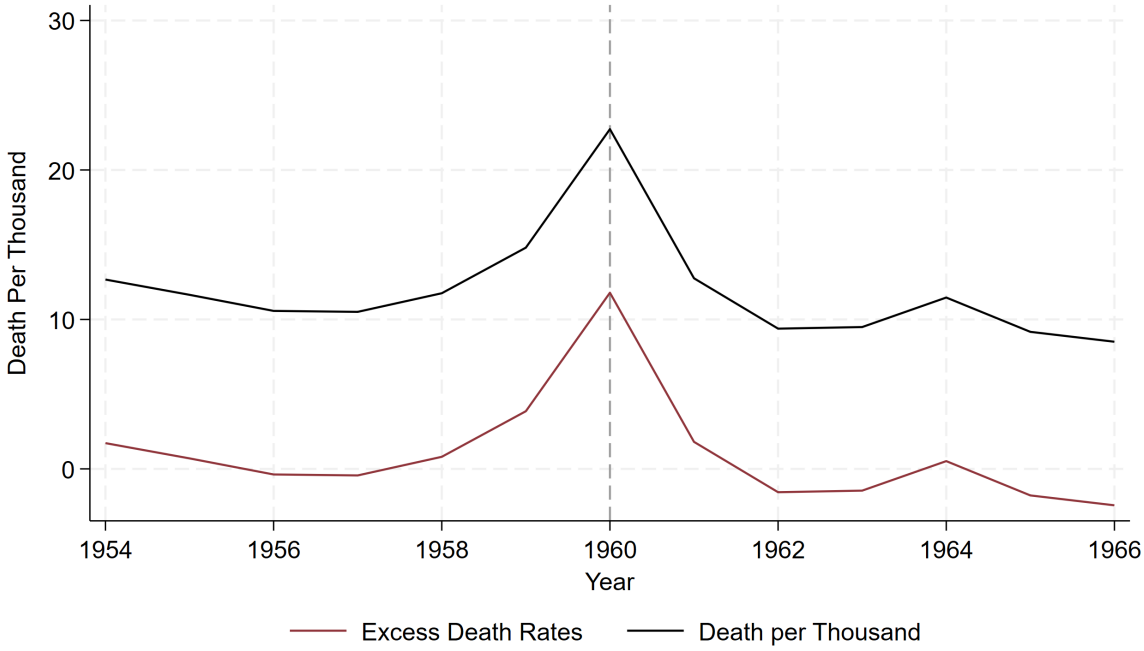


Figure 1: Province-level Mortality Rates across Years

Data source: National Statistical Bureau

A substantial body of research attributes the disaster to policy failures, including mismanagement of food production, procurement, and resource diversion for industrialization (Peng, 1987; Lin, 1990; Lin and Yang, 2000; Li and Yang, 2005). Others emphasize the role of natural disasters during this period (Houser, Sands and Xiao, 2009). While the precise causes continue to be contested, there is widespread agreement that the sharp decline in grain production significantly exacerbated the famine's severity.

The famine resulted in a massive loss of life, with estimated death toll ranging from 16.5 to 30 million (Chen and Zhou, 2007). Figure 1 displays province-level mortality rates over time. Before the famine, the death rate remained relatively stable at approximately 12 deaths per thousand. Beginning in 1958, however, the death rate rose sharply, reaching a peak in 1960 at levels significantly higher than the pre-famine baseline. By 1962, following the famine's end, the death rate declined and returned to its pre-crisis level of around 12 deaths per thousand.

The Great Famine impacted the entire nation, but with substantial regional disparities. Famine exposure varied across provinces due to differences in rural population sizes, availability of social support (Cao, Xu and Zhang, 2022), provincial responses to food shortages (Gooch, 2019), and inter-provincial grain distribution (Kasahara and Li, 2020). As shown in Figure 2, central and western interior regions experienced more severe famine impacts compared to other areas. This provincial disparity is large during the famine period but small in pre- or post-famine times, as shown in Figure 3. Additionally, famine intensity varied significantly between rural and urban areas, with rural regions facing more acute food shortages due largely to the state's preferential grain rationing for urban residents and its maintenance of stockpiles (Chen and Zhou, 2007).

While the Chinese famine led to a sharp decline in aggregate food production, it did not trigger

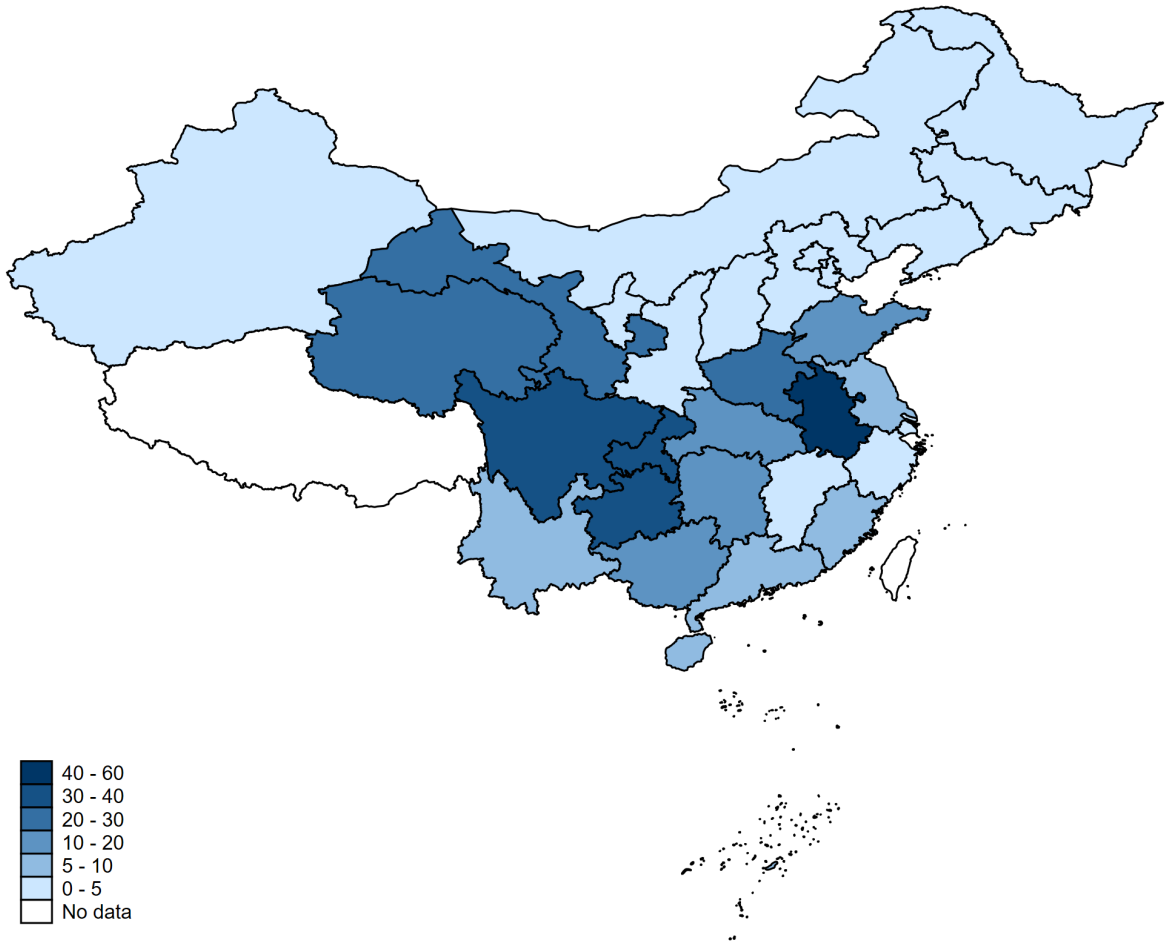


Figure 2: Excess death rates (deaths per thousand people) by provinces

Data source: National Statistical Bureau.

mass migration. This was primarily due to strict measures imposed by central and local governments to prevent people from leaving famine-stricken regions in search of food (Chen, Fan, Gu and Zhou, 2020). As a result, mortality rates in some areas were exacerbated by the direct reduction in local food supply. This lack of migration also implies that regional variation in excess death rates can serve as a proxy for differences in famine intensity across regions.

3 Data and Empirical Strategy

3.1 Sample Construction

We employ data from the 2018 wave of the China Family Panel Studies (CFPS), a nationally representative household survey conducted by the Institute of Social Science Survey (ISSS) at Peking University. The dataset includes detailed information on charitable giving, which we use to measure pro-social behaviors. Another key advantage of the CFPS is its inclusion of respondents' province of birth and early childhood migration history. By combining this information with provincial-level variation in famine intensity, we are able to construct measures of individuals' exposure to the



Figure 3: Regional dispersion of excess death rates

Data source: National Statistical Bureau.

famine during early life.

We focus on individuals born between 1950 and 1967. Since the famine mainly affected rural areas (Chen and Zhou, 2007), we restrict our sample to individuals with rural Hukou status at age 3, and this results in an initial sample of 5,672 individuals. Of these, 44 respondents (0.78% of the sample) reported residing in a province different from their birthplace at ages 3 or 12, despite strict migration restrictions. To minimize potential bias from interprovincial migration, we exclude these individuals. We also drop 252 observations with missing values on outcome or control variables. Our final sample consists of 5,376 observations, which we use in the baseline regressions.

3.2 Measurement of Variables

Our outcome variable is charitable giving, measured using two variables: (1) Donation, a binary variable coded as 1 if the respondent made a donation in 2017 (one year prior to the survey) and 0 otherwise; (2) Amount of Donation, measured in China Yuan (CNY).[1] The "amount of donation" variable is winsorized at the 1st and 99th percentiles to address outliers. Famine intensity is measured by provincial excess death rates (EDR) during the famine, following Lin and Yang (2000). The EDR is calculated as the death rate in 1960 (the peak year of the famine) minus the average death rate for the three years preceding 1959, the year the famine began.

Table 1 presents the summary statistics for our sample. The mean value of Donation is 0.131, indicating that 13.1% of individuals in our sample made a charitable contribution. The EDR ranges from 0.57 to 57 per thousand people, reflecting substantial variation in famine intensity across Chinese

[1]This variable captures general donations, excluding those made to specific individuals such as friends or relatives.

provinces. The average family size is 3.795, suggesting that most families had more than one child. This is also consistent with the high proportion of respondents with rural Hukou (73.4%), which highlights both the low level of urbanization and the vulnerability of rural residents to famines.

Table 1: Summary Statistics of Main Variables

Variable	Mean	SD	Min	P50	Max	N
Famine intensity						
EDR	14.755	13.589	0.570	8.600	57.000	5376
Dependent Variables						
Donation	0.131	0.337	0.000	0.000	1.000	5376
Donation Amount	66.788	868.191	0.000	0.000	50000.000	5372
Control Variables						
Male	0.510	0.500	0.000	1.000	1.000	5376
Family Size	3.844	2.035	1.000	3.000	15.000	5376
Rural Hukou	0.824	0.381	0.000	1.000	1.000	5376
Employed	0.775	0.418	0.000	1.000	1.000	5376
Health	0.581	0.493	0.000	1.000	1.000	5376
Height	162.383	8.267	108.000	162.000	190.000	5376
Married	0.918	0.275	0.000	1.000	1.000	5376
Education	5.759	4.519	0.000	6.000	18.000	5376
Log Family Income	10.698	1.147	0.000	10.820	16.030	5376

Notes: This table presents the summary statistics for our main variables. Family size is the total number of family members. Rural *Hukou* is a dummy indicator for respondents with a rural *Hukou*. Healthy is coded as 1 if the respondent self-reported as "healthy" or "very healthy" and 0 otherwise. Employed is a dummy indicator for respondents being employed at the time of the survey. Education is coded as 0 = illiterate, 6 = primary school, 9 = middle school, 12 = high school, 14 = junior college, 16 = bachelor and 18 = master. Family income is the log of annual family income.

3.3 Baseline Specification

We use two sources of variation to validate our identification strategy. The first is variation across birth cohorts, as individuals from different age groups experienced varying levels of famine exposure depending on the timing of the Great Famine relative to their formative years. The second source of variation is the intensity of famine, measured by the excess death rate (EDR). Within the same birth cohort, individuals in provinces with higher EDRs are considered to have been exposed to more severe famine conditions.

Our identification strategy is based on the assumption that the age at which individuals are exposed to adverse events plays a critical role in shaping long-term beliefs and attitudes. This assumption is well-supported by previous research (e.g., Heckman, 2006; Heckman, Liu, Lu and Zhou, 2020; Heckman and Zhou, Forthcoming). Specifically, we estimate the following specification:

$$Y_{i,j,p} = \sum_{j=1}^{4} \beta_j \left(\text{BirthCohort}_{i,j,p} \times \text{EDR}_p \right) + \gamma \mathbf{X_i} + \mu_p + \delta_j + \epsilon_{i,j,p}. \tag{3.1}$$

In equation (3.1), Y_i represents our measure of charitable giving for individual i, who was born in cohort j and province p. The term $\text{BirthCohort}_{i,j}$ is a vector of indicators for an individual i born

in cohort j. We categorize individuals exposed to the famine into four cohorts based on their birth years: (1) 1950-1952, (2) 1953-1955, (3) 1956-1958, and (4) 1959-1961. Individuals born in 1962-1967, who were not directly exposed to the famine, serve as the reference group. EDR_p represents the excess death rate in province p. The coefficients of the interaction between the excess death rate and birth cohort indicators, β_j, are the parameters of interest, and capture the difference in charitable giving between individuals with higher and lower exposure to the famine.

The term X_i represents a vector of control variables for individual i, including gender, family size, hukou status, employment status, health status, height, marital status, education attainment, and family income. μ_p denotes birth province fixed effects, which account for the impact of time-invariant provincial characteristics on charitable giving. Note that EDR_p is omitted from the regression because it is absorbed by the birth province fixed effects. We also include birth cohort fixed effects, δ_j, to control for cohort-specific differences in donation behavior. Standard errors are clustered at the birth province level to account for within-province correlations in charitable giving.

The validity of our identification strategy depends on two key assumptions. First, conditional on birth province and birth cohort fixed effects, the assignment of famine intensity for affected cohorts is assumed to be unrelated to omitted factors. It is possible that individuals in regions with higher famine exposure may differ from those in less-exposed areas, we address this by controlling for time-invariant, birth-province-specific factors using μ_p, as well as including the vector of control variables, X_i.

The second assumption is that there was no systematic migration of individuals from less-affected provinces to those more severely impacted by the famine. As previously noted, only 0.78% of individuals in our original sample reported living in a province different from their birthplace at ages 3 or 12. This is consistent with the fact that migration was strictly prohibited during the famine period. Consequently, migration is unlikely to pose a significant threat to our identification strategy.

4 Results

4.1 Baseline Results

Table 2 presents the estimates from equation (3.1). We find positive and significant coefficients for Cohort 1956-1958 $\times$ EDR in both columns (1) and (2). This suggests that larger exposure to the Great Famine increased both the likelihood and amount of donations among individuals who were 1 to 3 years old at the famine's onset. These results remain consistent with a large body of literature highlighting the importance of early childhood in shaping social preferences (e.g., Gould, Lavy and Paserman, 2011; Cappelen, List, Samek and Tungodden, 2020; Kosse, Deckers, Pinger, Schildberg-Hörisch and Falk, 2020).

The effects are economically substantial. A one-standard-deviation increase in famine intensity results in a 20.7% increase in the probability of making a donation (i.e., 0.002 $\times$ 13.58 / 0.131 = 0.207) and an 18.9% increase in the amount donated (i.e., 0.93 $\times$ 13.58 / 66.68 = 0.189). Given that the average excess death rate in our sample is 14.76 per thousand, donations from individuals born between 1956 and 1958 would have been 22.53% lower in probability and 20.59% lower in amount,

if the famine had not occurred.

Table 2: Effects of the great famine on charitable giving

	Donation (1)	Donation Amount (2)
Cohort 1950-1952 × EDR	-0.000	0.494
	(0.001)	(0.297)
Cohort 1953-1955 × EDR	0.001	0.095
	(0.001)	(0.263)
Cohort 1956-1958 × EDR	0.002**	0.930***
	(0.001)	(0.269)
Cohort 1959-1961 × EDR	0.000	-0.301
	(0.001)	(0.450)
Male	-0.021*	-1.369
	(0.012)	(6.679)
Family Size	-0.003	-1.290
	(0.004)	(1.966)
Rural Hukou	-0.101***	-50.973***
	(0.016)	(8.236)
Employed	0.045***	17.287**
	(0.014)	(6.719)
Health	0.016*	11.948***
	(0.009)	(3.822)
Height	0.002***	0.451**
	(0.000)	(0.213)
Married	-0.011	-7.713
	(0.017)	(6.619)
Education	0.008***	3.910***
	(0.001)	(0.525)
Log Family Income	0.021***	8.239***
	(0.005)	(2.494)
Cohort FE	YES	YES
Birth Province FE	YES	YES
Observations	5376	5372
Adjusted R2	0.060	0.067

Notes: This table presents the estimates of Equation (3.1). Cohorts born in 1962-1967 serve as the reference group. The dependent variables are the dummy indicator for charitable donation and the donation amount in CNY. Standard errors clustered at the birth-province level are in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.2 IV Estimation

A key identification challenge is measurement error in famine intensity, which could bias our estimates. To address this concern, we employ an instrumental variable (IV) strategy. Our IV construction is based on the underlying causes of the famine, which are widely debated but broadly fall into two categories: "human errors" and "natural disasters". The "human errors" perspective highlights the causes of institutional failures, resource misallocation, and grain export policies (Lin and Yang, 2000; Kasahara and Li, 2020), while the "natural disasters" view attributes the famine primarily to extreme weather events (Houser, Sands and Xiao, 2009). For example, in 1959, the Yellow River flooded, rendering over 40 million hectares of agricultural land unusable. This flood was followed by a series of additional disasters, including droughts, extreme heat, further floods,

typhoons, disease outbreaks, and insect infestations.

Building on these causes, we construct two sets of IVs to instrument local famine intensity. The first set includes three variables that capture extreme weather conditions during the famine period: extreme high temperatures, extreme low temperatures, and extreme rainfall. Adverse weather conditions could have reduced grain yields (Schlenker and Roberts, 2009; Ciccone and Ismailov, 2022), thereby contributing to the famine. At the same time, these temporary weather shocks are unlikely to be directly correlated with charitable donations made six decades later.

We measure extreme weather conditions using provincial temperature data from NOAA National Centers for Environmental Information (NCEI) and precipitation data from ERA5-Land. Specifically, we compute the yearly average number of extreme high-temperature days and extreme low-temperature days during the crop growth period, along with the size of areas affected by extreme precipitation. We divide these measures by their respective values in the three years preceding the famine (1956-1958), yielding three variables that capture abnormal temperature and rainfall shocks during the famine period.

Second, following Xu, Li, Zhang and Liu (2016), we use the number of exaggerated grain harvest reports as another IV. This variable reflects institutional distortions in agricultural reporting, which contributed to famine severity but are unlikely to be related to charitable behaviors 60 years later. During the Great Leap Forward, some local officials inflated grain harvests to gain career progression and other benefits. These false reports led to excessive compulsory grain procurement, failed agricultural experiments, and reduced sown acreage, increasing food shortages and famine intensity (Ashton, Hill, Piazza and Zeitz, 1992). Thus, the count of grain harvest exaggerations in a province is positively associated with famine severity and can serve as a valid IV, assuming it is unrelated to individual prosocial behavior.

Our construction of the second IV draws on newspaper reports detailing grain harvest exaggerations by county officials, as documented in the 1958 archives of the People's Daily (Renmin Ribao), a key official press in China. Xu, Li, Zhang and Liu (2016) meticulously geocoded 558 instances of grain harvest exaggerations at the county level, defined as harvests exceeding 1000 catties per mu (about 3000 kg per acre) (Kung and Lin, 2003). These reports, spanning from June to September 1958, represent a period recognized as the peak of falsified grain harvests. We aggregate the exaggerations at the provincial level and use the provincial total as our our instrumental variable.

Specifically, our IV specifications are:

$$\text{BirthCohort}_{i,j,p} \times \text{EDR}_p = \sum_{k=1952}^{1961} \left(\text{BirthCohort}_{i,j,p} \times Z_p\right) + \gamma \mathbf{X_i} + \mu_p + \delta_j + \epsilon_{i,j,p} \tag{4.1}$$

$$Y_{i,j,p} = \sum_{j=1}^{4} \beta_j \widehat{\text{BirthCohort}_{i,j,p}} \times \text{EDR}_p + \gamma \mathbf{X_i} + \mu_p + \delta_j + \epsilon_{i,j,p}. \tag{4.2}$$

Equation (4.1) represents the first stage of our IV estimation, where Z_p is the number of days with extremely high temperatures or the number of exaggerations in Province p. Other variables are defined as in equation (3.1). We instrument $\text{BirthCohort}_{i,j,p} \times \text{EDR}_p$ with $\sum_{j=1}^{4} \left(\text{BirthCohort}_{i,j,p} \times Z_p\right)$ and obtain the fitted values $\widehat{\text{BirthCohort}_{i,j,p}} \times \text{EDR}_p$ for each birth cohort j. These fitted values are then used in the second-stage regression, as shown in Equation (4.2). Table 3 reports the results for

our IV estimation.[2] As shown, the coefficients for the 1956-1958 cohort are significant and positive, in line with our baseline findings. Overall, the IV estimation remains consistent with the baseline results, although the coefficients have increased slightly.

Table 3: IV estimation results

	IV: Grain Harvest Exageration		IV: Extreme Weather	
	Donation (1)	Donation Amount (2)	Donation (3)	Donation Amount (4)
Cohort 1950-1952 × EDR	-0.001	0.235	-0.000	0.766**
	(0.001)	(0.321)	(0.001)	(0.368)
Cohort 1953-1955 × EDR	-0.000	-1.184**	0.000	0.505*
	(0.001)	(0.472)	(0.001)	(0.298)
Cohort 1956-1958 × EDR	0.003***	1.382***	0.002**	0.923***
	(0.001)	(0.333)	(0.001)	(0.346)
Cohort 1959-1961 × EDR	0.003	-0.520	0.000	-0.513
	(0.002)	(0.540)	(0.001)	(0.494)
Control	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES
Birth Province FE	YES	YES	YES	YES
Sample Restriction	Full Sample	Full Sample	Full Sample	Full Sample
Observations	5376	5372	5225	5221
Adjusted R2	0.058	0.065	0.059	0.067

Notes: This table reports the estimates of Equation (4.2). In columns 1-2, the instrumental variable is the provincial number of exaggerations of grain harvests, while in columns 3-4, it includes the number of days with extreme high temperature and low temperature, along with the size of areas affected by extreme rainfall during famine period, divided by their respective values in the three years preceding the famine, to capture extreme weather conditions. Cohorts born in 1962-1967 are used as the reference group. The dependent variables are the dummy indicator for charitable donation and the donation amount in CNY. Standard errors clustered at the birth-province level are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.3 Robustness Analyses

4.3.1 Prefecture level measure of famine intensity

In our baseline regressions, famine intensity is measured at the provincial level, which does not account for within-province variation. To address this limitation, we conduct a robustness check using a more localized measure of famine exposure at the prefecture level. However, this approach presents two challenges. First, prefecture-level death rate data is unavailable. To overcome this, we construct an alternative measure of famine intensity using data from China's 1982 Census. Specifically, we calculate the cohort size reduction rate for individuals born during the famine period (1959–1961) relative to those born in the three preceding years (1956–1958) for each prefecture. Second, the CFPS dataset does not include respondents' prefecture of birth. To address this, we use the China General Social Survey (CGSS) as an alternative dataset for the robustness check. The 2012 wave of the CGSS, a nationally representative survey, provides information on charitable giving, volunteering, prefecture of birth, and detailed personal characteristics, allowing us to approximate respondents' prefecture of residence during the famine period.

[2]Results for the first-stage regressions are reported in Table A1 in Appendix 6.

Using the CGSS data and the prefecture-level famine intensity measure, we re-estimate our baseline specifications. The results, presented in Table B1, show that donation behavior and volunteer service are positively associated with famine intensity for cohorts born between 1956 and 1958. Specifically, columns 1 and 2 show that both the likelihood of making donations and the donation amounts increase with famine intensity, consistent with our baseline findings. Column 3 further demonstrates that early-life famine exposure increases the probability of engaging in volunteer services for the same cohorts. Taken together, these results provide additional evidence supporting the link between famine exposure and prosocial behaviors.

It is worth noting that while the results using the CGSS and prefecture-level famine intensity align with our baseline findings, we still rely on the CFPS-based provincial-level famine intensity as our primary measure. This choice is driven by the CFPS's inclusion of detailed information on early childhood family environments, which allows us to investigate the mechanisms behind the observed effects, as discussed in Section 5.

4.3.2 Placebo tests

Our difference-in-differences approach relies on the parallel-trend assumption: in the absence of the famine, cohort trends in charitable giving should be unrelated to famine intensity. To test this assumption we conduct a placebo analysis following Chen and Zhou (2007), using a subsample of individuals born after the famine (1962–1967). By 1962, the famine's effects had largely dissipated, with average mortality rates declining to 10 deaths per thousand, around the 1958 levels. Since the 1962–1967 cohorts were not directly exposed to the famine, we expect no significant impact on their prosocial behaviors.

Using the 1967 cohort as the control group and applying the same specification as in equation (3.1), we test whether the famine had any effect on individuals who were not directly exposed. As shown in Table B2, the famine's effects on these cohorts are either statistically insignificant or have the wrong sign, supporting the validity of our DID estimates presented in Table 2.

4.3.3 Mortality Selection

Another potential concern is mortality selection. If healthier individuals were more likely to survive the famine, and there is a positive correlation between health and prosociality, our estimates could be biased upward. Indeed, Brown, Consedine and Magai (2005) finds a positive correlation between altruism and health in a U.S. sample. However, mortality selection cannot explain the contrasting effects of famine between individuals with and without siblings, which are reported and discussed in Section 5.1, since such selection is unlikely to occur exclusively among those with siblings. Furthermore, if mortality selection were the main driver of our findings, we would expect the strongest effects to appear among cohorts born during the famine (1959–1961), as they faced the highest mortality risks (Bombardini and Li, 2020). Since we do not observe significant effects in these cohorts, it is unlikely that mortality selection is the primary driver of our main results.

Beyond mortality selection during the famine, another concern is the potential for early death among affected cohorts. Individuals who experienced more severe famine in childhood may have been more likely to die earlier than their less-affected counterparts, even if they survived the famine,

due to its long-term adverse health effects (Chen and Zhou, 2007; Lindeboom, Portrait and Van den Berg, 2010). In Section 4.3.1, we partially address this issue using the CGSS data, which yields robust results. The CGSS 2012 data cover younger cohorts at the time of the survey, making them less susceptible to mortality concerns.

To further address this issue, we directly estimate the impact of the Great Famine on the likelihood of early death among individuals surveyed in the first wave of the CFPS (2010). Specifically, we examine whether famine exposure influenced the probability of dying before 2018, when our outcomes were measured, or before age 60.[3] The results in Table B3 show that the probability of early death increases with famine intensity for cohorts born during the famine, but not for others. These findings align with Lindeboom, Portrait and Van den Berg (2010), which reports that individuals exposed to the Dutch Potato Famine in utero or during their first year of life experienced reduced longevity. Thus, our results suggest that reduced longevity among famine-exposed individuals is unlikely to explain the observed effects on charitable giving.

4.3.4 Controlling for the Effects of Clans

Previous studies suggest that kinship-based clans played a significant role in saving lives during the famine (Cao, Xu and Zhang, 2022). This finding implies that clans may have influenced prosociality by fostering collaboration among members (Madsen and Madsen, 1984), raising concerns about omitted variable bias.

In our main specification, we include province-fixed effects, which partially mitigate this issue. To further address the potential confounding effects of clan culture, we control for the county-level density of clan temples. The results, presented in Table B4, confirm that our main findings remain robust, though the coefficients become larger after controlling for clan density.

5 Mechanisms

5.1 Intrahousehold Interactions

Previous studies have highlighted the role of intrahousehold interactions in shaping long-term outcomes, including prosocial behaviors (Kosse, Deckers, Pinger, Schildberg-Hörisch and Falk, 2020; Seror, 2022; Heckman and Zhou, Forthcoming). Building on these findings, we empirically examine whether intrahousehold interactions serve as a mechanism through which early-life famine experiences affect charitable giving in later life. Specifically, we first divide the sample into two groups based on sibling status during the famine. We then separately estimate the impact of early-life famine exposure on prosocial behaviors by repeating the baseline regression for each group.

We present the results in Table 4. The findings reveal strikingly different patterns in the effects of famine on prosocial behaviors between the two groups. Specifically, for those who had siblings during the famine, early-life famine exposure significantly increased charitable donations in adulthood. In contrast, for individuals who were only children during the famine, the effects were either insignificant or negative. Overall. the heterogeneity supports the idea that children with siblings

[3] We find similar results when using ages 65 or 70 as the cutoff.

may have developed a stronger sense of altruism through resource-sharing with their brothers and sisters during the famine, leading to a greater tendency for prosocial behavior in adulthood.

Table 4: Heterogeneity by sibling status during the famine

	Donation (1)	Donation Amount (2)	Donation (3)	Donation Amount (4)
Cohort 1950-1952 × EDR	0.000	0.561**	-0.002	0.925
	(0.001)	(0.223)	(0.002)	(0.860)
Cohort 1953-1955 × EDR	0.001**	0.525*	-0.003***	-1.675**
	(0.001)	(0.291)	(0.001)	(0.637)
Cohort 1956-1958 × EDR	0.003**	0.920**	0.000	0.763
	(0.001)	(0.359)	(0.002)	(0.584)
Cohort 1959-1961 × EDR	0.001	-0.421	-0.001	0.071
	(0.001)	(0.422)	(0.003)	(1.294)
Control	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES
Birth Province FE	YES	YES	YES	YES
Sample Restriction	With Sibling	With Sibling	Without Sibling	Without Sibling
Observations	3733	3729	1642	1642
Adjusted R2	0.055	0.068	0.065	0.060

Notes: This table reports the estimates of Equation (3.1) for two sub-samples: columns 1-2 report results for respondents who had siblings during the famine period while columns 3-4 for those without siblings. Cohorts born in 1962-1967 serve as the reference group. The dependent variables are the dummy indicator for charitable donation and the donation amount in CNY. Standard errors clustered at the birth-province level are in parentheses. ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1.

To further explore the role of family interactions in shaping charitable giving in response to the famine, we examine the effects of the famine on parental absence. In the CFPS, respondents were asked: "How long did you live apart from your father when you were 0-3 years old?" Responses ranged from 0 to 144 weeks. Using this information, we estimate the following specification:

$$FatherAbsent_{i,j,p} = \sum_{j=1}^{4} \left(\text{BirthCohort}_{i,j} \times \beta_k \text{EDR}_p\right) + \gamma \mathbf{X_i} + \mu_p + \delta_k + \epsilon_{i,j,p}, \tag{5.1}$$

where $FatherAbsent_i$ is an indicator for whether individual i lived apart from their father for 24 weeks or more between ages 0 and 3 [4]. $\mathbf{X_i}$ represents a set of control variables related to early-life socioeconomic status, including parental education levels, the individual's age and age squared as of 1959, and indicators for whether either parent was a farmer or a member of the Chinese Communist Party (CCP). Other variables are defined as in equation (3.1).

Table 5 presents the results from estimating Equation 5.1. We find a significant negative coefficient for EDR × Cohorts 1956-1958 among individuals with siblings during the famine. This suggests that early-age paternal absence was lower for those more exposed to the famine compared to those with less exposure. These findings imply that the famine may have increased family cohesion and thus strengthened intra-household interactions. Since such interactions are key to developing altruism, stronger familial bonds in early childhood likely fostered greater altruistic tendencies, eventually leading to higher charitable donations in adulthood.

A related question is why fatherhood absence decreased during the famine. Two factors may explain this. First, the opportunity cost of staying home was lower due to the poor economic

[4] We do not examine mothers' absence because it was rare in our sample, with only 0.7% of children's mothers leaving home for 24 weeks or more.

Table 5: Effects of Famine on Fahterhood Absence

	(1) FatherAbsent	(2) FatherAbsent	(3) FatherAbsent
Cohort 1950-1952 × EDR	0.000	0.001	-0.000
	(0.002)	(0.002)	(0.001)
Cohort 1953-1955 × EDR	0.000	0.001	0.001
	(0.001)	(0.001)	(0.002)
Cohort 1956-1958 × EDR	-0.001	-0.001**	-0.000
	(0.001)	(0.000)	(0.001)
Cohort 1959-1961 × EDR	0.001	0.000	0.002
	(0.000)	(0.001)	(0.001)
Control	YES	YES	YES
Cohort FE	YES	YES	YES
Birth Province FE	YES	YES	YES
Sample Restriction	Full Sample	With Sibling	Without Sibling
Observations	2791	1910	879
Adjusted R2	0.022	0.014	0.044

Notes: This table reports the effects of the great famine on fatherhood absence of the child. Cohorts born in 1962-1967 are used as the reference group. The outcome variable is coded as 1 if the child lived apart with his/her father for 24 weeks or more at ages 0-3 and 0 if not. Standard errors clustered at the birth-province level are in parentheses. ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1.

conditions. Second, as discussed in Bryan, Chowdhury and Mobarak (2014), the cost of a failed migration would have been especially high during the famine, when families were near subsistence levels. This also explains why fathers with multiple children were more likely to stay home, as having more dependents increased the cost of leaving.

In conclusion, two key insights emerge from our results. First, the contrasting effects of the Great Famine on charitable giving for children with and without siblings suggest that adverse life events do not automatically enhance prosocial behaviors. The development of altruistic tendencies, particularly a sharing ethos, may be crucial in fostering prosocial behaviors after such hardships. Second, our findings on paternal absence indicate that intra-household interactions may play an important role in shaping altruistic preferences in adverse environments.

5.2 Income Effects

An alternative explanation for our findings is that famine experiences may have enhanced the survivors' economic standing, providing them with more resources to donate. While most previous studies report the negative impacts of the Great Famine on socioeconomic outcomes (Chen and Zhou, 2007; Almond, Edlund, Li and Zhang, 2007), there are exceptions. For instance, Cheng, Guo, Hayward, Smyth and Wang (2021) find that migrant workers who experienced famine during childhood are more likely to become entrepreneurs, suggesting the famine might have had positive long-term effects on certain economic outcomes.

To investigate this possibility, we assess the effects of childhood famine exposure on educational attainment and income. We report these results in Table C1. In columns 1 and 3, with no control variables, we find no effects of famine exposure on education or income. In columns 2 and 4, after controlling for early-life characteristics as in Equation 5.1, we observe that the famine either de-

creased (for cohorts born between 1950 and 1952) or had no impact (for other cohorts) on education and income. Overall, these findings suggest that improvements in economic status are unlikely to explain our results.

5.3 Religiosity

Another potential channel is religiosity. As discussed in Ingersoll-Dayton et al. (2002), adverse life experiences may increase religiosity, which could in turn boost charitable giving. To test this, we examine whether famine exposure affected the likelihood of adopting religious beliefs. Table C2 presents these results. As shown, All coefficients are either insignificant or significantly negative, suggesting that religiosity does not drive our baseline results.

6 Concluding Remarks

In this study, we examine how early-life famine exposure affects charitable giving in adulthood. Using geographic variation in famine intensity as a proxy for treatment, we apply a cohort-based difference-in-differences approach. We find that exposure to more intense famine during early childhood significantly increased charitable donations in adulthoold for those born between 1956 and 1958. Specifically, a one standard deviation increase in famine intensity raised the likelihood of charitable giving by 20.7% and the donation amount by 18.9% for these cohorts. These findings, measured in 2018, highlight the lasting effects of famine on charitable behavior.

The heterogeneity analysis shows contrasting effects based on sibling statuses during the famine. Specifically, individuals with siblings exhibit heightened pro-social behavior, as evidenced by increased charitable giving. In contrast, individuals who were the only child show a decline in pro-social tendencies. Exploring potential mechanisms, we find that famine exposure reduces father absence for affected cohorts during ages 0-3, suggesting that the increase in charitable giving may be driven by heightened family interactions during the famine period.

Our findings highlight the role of family interactions in shaping altruism, aligning with previous studies that emphasize the role of social interactions in shaping individual preferences and other long-term outcomes (Kosse, Deckers, Pinger, Schildberg-Hörisch and Falk, 2020; Heckman and Zhou, Forthcoming). Building on these insights, we provide new evidence that early-life experiences can persist throughout the life cycle, influencing charitable giving in late adulthood.

This paper contributes to the discussion on how income and wealth affect social preferences and charitable giving. While wealth and income are often seen as primary determinants of giving (Kotsadam and Somville, 2024), much of the literature finds no causal link between these factors and donations (Haushofer, Larreboure, Lowes and Mait, 2023; Kotsadam and Somville, 2024). We provide new evidence that individuals more exposed to the famine–likely facing worse economic conditions–tend to donate more. We also show that these effects are likely driven by their intrahousehold interactions during the famine. This suggests that individuals with disadvantaged economic statuses may develop stronger altruistic tendencies during hardship, leading to more charitable giving.

This paper also has significant implications for policymakers aiming to encourage prosocial behaviors in individuals who have experienced hardship. Our findings in this paper highlight the need to strengthen early-life family interactions, especially those involving sharing and collaboration, during times of adversity.

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Appendices for Online Publication Only

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Appendix A. First Stage Results of IV Estimation

Table A1: Results for first stage of IV regressions

Panel A: IV = Extreme Weather	(1) 1950-1952 × EDR	(2) 1953-1955 × EDR	(3) 1956-1958 × EDR	(4) 1959-1961 × EDR
Cohort 1950-1952 * Extreme Heat	8.409***	-0.153	-0.010	-0.038
	(2.528)	(0.204)	(0.106)	(0.092)
Cohort 1953-1955 * Extreme Cold	0.473	-0.119	-0.154	-0.018
	(2.518)	(0.193)	(0.111)	(0.079)
Cohort 1956-1958 * Extreme Rainfall	5.317	0.285	0.322	0.010
	(7.647)	(0.524)	(0.327)	(0.213)
Cohort 1959-1961 * Extreme Heat	-0.052	7.856***	0.261	-0.040
	(0.043)	(1.999)	(0.184)	(0.050)
Cohort 1950-1952 * Cold	-0.031	0.569	-0.317*	-0.005
	(0.033)	(1.955)	(0.159)	(0.028)
Cohort 1953-1955 * Rainfall	0.110	4.758	0.795*	0.024
	(0.080)	(6.247)	(0.401)	(0.073)
Cohort 1956-1958 * Extreme Heat	0.082	0.261	7.252***	0.009
	(0.088)	(0.209)	(1.923)	(0.034)
Cohort 1959-1961 * Cold	-0.171*	-0.334*	1.405	-0.053
	(0.094)	(0.164)	(2.397)	(0.046)
Cohort 1950-1952 * Rainfall	0.345*	0.939**	3.170	0.131
	(0.199)	(0.427)	(6.677)	(0.110)
Cohort 1953-1955 * Extreme Heat	0.108	0.131	0.107	7.101***
	(0.176)	(0.254)	(0.165)	(1.522)
Cohort 1956-1958 * Cold	-0.043	-0.003	0.019	0.209
	(0.135)	(0.200)	(0.122)	(2.073)
Cohort 1959-1961 * Rainfall	0.071	0.164	0.056	5.700
	(0.196)	(0.322)	(0.225)	(6.307)
Adjusted R2	0.756	0.776	0.789	0.781
F-statistics	437.10	2551.54	570.49	2469.08
Control	YES	YES	YES	YES
Observation	5225	5225	5225	5225
Panel B: IV = Harvest exaggeration				
Cohort 1950-1952 × IV	0.144***	-0.005	-0.003	-0.003
	(0.038)	(0.004)	(0.003)	(0.002)
Cohort 1953-1955 × IV	-0.001	0.135***	-0.002	-0.001
	(0.001)	(0.035)	(0.003)	(0.001)
Cohort 1956-1958 × IV	-0.001	-0.002	0.138***	-0.001*
	(0.001)	(0.004)	(0.036)	(0.001)
Cohort 1959-1961 × IV	-0.002	-0.004*	-0.002	0.139***
	(0.002)	(0.002)	(0.002)	(0.036)
Adjusted R2	0.648	0.657	0.646	0.632
F-statistics	5.83	13.00	7.83	14.67
Control	YES	YES	YES	YES
Observation	5376	5376	5376	5376

Notes: This table presents the estimates of Equation (4.1). The IVs are the number of grain harvest exaggerations in provincial level in Panel A and days of extreme heat during crop growing seasons in Panel B. All regressions control for fixed effects for cohort and province of birth. Standard errors clustered at the birth-province level are in parentheses. ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1.

Appendix B. Robustness Checks

Table B1: Estimations Using Prefecture-level Measure of Famine Intensity

	(1) Donation	(2) Donation Amount	(3) Volunteer Service
Cohort 1950-1952 × Famine Intensity	0.083	14.732	-0.025
	(0.221)	(85.422)	(0.083)
Cohort 1953-1955 × Famine Intensity	0.257	30.464	0.167
	(0.294)	(112.724)	(0.126)
Cohort 1956-1958 × Famine Intensity	0.493**	150.099**	0.396***
	(0.199)	(68.805)	(0.082)
Cohort 1959-1961 × Famine Intensity	0.294	127.617	0.303*
	(0.298)	(91.210)	(0.159)
Control	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes
Birth Prefecture FE	Yes	Yes	Yes
Observations	1330	1327	1330
Adjusted R2	0.130	0.108	0.059

Notes: This table reports the effects of famine intensity on prosocial behavior estimated with CGSS2012 dataset. Cohorts born in 1962-1967 are used as the reference group. Famine intensity is measured at the prefecture level as the reduction in cohort size during the famine period (1959-1961) relative to the pre-famine period (1956-1958), based on China's 1982 Census data. The outcome variables include: (1) a dummy variable indicating whether the respondent made any charitable donations, (2) the total amount of donations in Chinese yuan, and (3) a dummy variable indicating participation in volunteering activities. The sample is restricted to respondents with rural hukou during the famine period. Robust standard errors clustered at the provincial level are reported in parentheses. ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1.

Table B2: Placebo tests

	(1) Donation	(2) Donation Amount
EDR × Born in 1963	0.001	-0.455
	(0.002)	(0.749)
EDR × Born in 1964	0.002	0.342
	(0.002)	(1.040)
EDR × Born in 1965	0.002	-0.122
	(0.002)	(0.761)
EDR × Born in 1966	0.002	0.309
	(0.002)	(0.724)
EDR × Born in 1967	-0.001	-0.449
	(0.001)	(0.836)
Control	YES	YES
Cohort FE	YES	YES
Birth Province FE	YES	YES
Observations	2351	2349
Adjusted R2	0.069	0.086

Notes: This table reports the results of placebo test. The sample is restricted to cohorts born in 1962-1967 and cohort 1962 serves as the reference group. The dependent variables are the dummy indicator for charitable donation and the donation amount in CNY. Standard errors clustered at the birth-province level are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B3: Famine Experience and the Probability of Early Death

	(1) Died	(2) Died	(3) Died before 60	(4) Died before 60
Cohort 1950-1952 * EDR	0.001	0.004	-0.000	0.000
	(0.001)	(0.002)	(0.000)	(0.001)
Cohort 1953-1955 * EDR	-0.000	0.002	-0.000	0.000
	(0.000)	(0.001)	(0.000)	(0.001)
Cohort 1956-1958 * EDR	-0.000	0.001	-0.000	0.000
	(0.001)	(0.001)	(0.000)	(0.001)
Cohort 1959-1961 * EDR	0.001*	0.001*	0.001**	0.001
	(0.000)	(0.001)	(0.000)	(0.001)
Control	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES
Birth Province FE	YES	YES	YES	YES
Family FE	NO	YES	NO	YES
Observations	10271	6875	10271	6875
Adjusted R2	0.033	0.098	0.018	0.018

Notes: This table reports the effects of famine experience on early death. Sample if restricted to people entering the CFPS survey in 2010. Cohorts born in 1962-1967 serve as the reference group. In columns 1-2, outcome variable is an indicator for whether the person died between 2010 and 2018, while in columns 3-4, the outcome variable is an indicator for whether the person died before 60. Control variables include all controls included in 3.1. Standard errors clustered at the birth-province level are in parentheses. ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1.

Table B4: Controlling for Clan Culture

	(1) Donation	(2) Donation	(3) Donation Amount	(4) Donation Amount
Cohort 1950-1952 × EDR	-0.000	-0.000	0.543*	0.531*
	(0.001)	(0.001)	(0.278)	(0.276)
Cohort 1953-1955 × EDR	0.001	0.001	0.118	0.112
	(0.001)	(0.001)	(0.278)	(0.280)
Cohort 1956-1958 × EDR	0.003**	0.003**	0.999***	0.984***
	(0.001)	(0.001)	(0.270)	(0.262)
Cohort 1959-1961 × EDR	0.000	0.000	-0.341	-0.322
	(0.001)	(0.001)	(0.442)	(0.440)
Number of Clan Temples	-0.006**		-2.695	
	(0.003)		(1.853)	
Having a Clan Temple		-0.015		-10.952
		(0.018)		(6.662)
Control	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES
Birth Province FE	YES	YES	YES	YES
Observations	5312	5312	5308	5308
Adjusted R2	0.060	0.059	0.068	0.067

Notes: This table presents the estimates of Equation (3.1) with additional controls accounting for the influence of clan culture. Columns 1-2 include the number of clan temples in the respondents' village as a control variable, while columns 3-4 include a dummy variable indicating the presence of a clan temple. Cohorts born in 1962-1967 serve as the reference group. The dependent variables are the dummy indicator for charitable donation and the donation amount in CNY. Standard errors clustered at the birth-province level are in parentheses. ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1.

Appendix C. Mechanism Analysis on Income Effect and Religiosity

Table C1: Effects of Famine Exposure on Education and Income

	(1) Education	(2) Education	(3) Log Family Income	(4) Log Family Income
Cohort 1950-1952 * EDR	-0.022	-0.040**	-0.005	-0.009*
	(0.014)	(0.019)	(0.003)	(0.005)
Cohort 1953-1955 * EDR	0.004	0.006	0.002	-0.003
	(0.015)	(0.013)	(0.002)	(0.003)
Cohort 1956-1958 * EDR	-0.018	-0.007	-0.003	0.000
	(0.027)	(0.025)	(0.003)	(0.003)
Cohort 1959-1961 * EDR	0.010	0.003	0.005	0.002
	(0.025)	(0.027)	(0.003)	(0.003)
Control	No	YES	No	YES
Cohort FE	YES	YES	YES	YES
Birth Province FE	YES	YES	YES	YES
Observations	6149	3293	6149	3293
Adjusted R2	0.104	0.242	0.150	0.216

Notes: This table reports the effects of famine experiences on education and income. In columns 2 and 4 we control for gender, both parents' education, their age and age squared as of 1959, as well as indicators for whether either parent was a farmer or a CCP member. Cohorts born in 1962-1967 serve as the reference group. The outcome variables are years of schooling and log of family income. Standard errors clustered at the birth-province level are in parentheses. ***p $<$ 0.01, **p $<$ 0.05, *p $<$ 0.1.

Table C2: Effects of the Great Famine on Religiosity

	(1) Buddism	(2) Islam	(3) Christianity	(4) Any religious belief
Cohort 1950-1952 * EDR	0.000	0.000	0.001	0.000
	(0.001)	(0.000)	(0.001)	(0.002)
Cohort 1953-1955 * EDR	0.000	0.000	-0.001*	-0.000
	(0.001)	(0.000)	(0.001)	(0.001)
Cohort 1956-1958 * EDR	-0.001	0.000	-0.000	-0.001
	(0.001)	(0.000)	(0.001)	(0.001)
Cohort 1959-1961 * EDR	0.001	0.001	-0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Control	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES
Birth Province FE	YES	YES	YES	YES
Observations	5364	5370	5373	5363
Adjusted R2	0.056	0.019	0.023	0.064

Notes: This table reports the effects of the great famine on religiosity. The dependent variables for columns 1-3 are dummy indicators coded as 1 if the respondent believe in a corresponding religion. The dependent variable for column 4 is a dummy indicator coded as 1 if the respondent believes in any one of the four religions and 0 otherwise. Cohorts born in 1962-1967 are used as the reference group. Standard errors are clustered at the level of the respondents' province of birth. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.