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Persistence of Individual and Social Preferences in Rural Settings

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Abstract

Preferences play a key role in decision-making and are generally assumed as time-invariant in economic modeling despite the mixed empirical evidence. We examine the stability of individual and social preferences in rural settings using the COVID-19 pandemic as a major global shock. We employ a unique longitudinal dataset comprising 1,262 smallholder households, based on interviews with household heads conducted across four survey waves between 2019 and 2022. We find a temporal, two-year shift in risk tolerance, while interpersonal trust and generosity perceptions show a sustained deterioration over three years. We explore possible variations by household characteristics and the degree of exposure to the virus, self-confinement, and extreme weather events.

Keywords: Preferences, stability, risk aversion, trust, generosity, rural areas

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1. Introduction

Individual and social preferences are important determinants of the decision-making process. Preferences influence a range of decision domains, including financial choices related to investment and savings, labor market participation, consumption patterns, health-related behaviors, and migration, with each having real consequences on individual and social welfare. Despite their relevance, economic models often assume that preferences are exogenously given and remain stable over time, even though empirical evidence on their persistence is mixed (Andersen et al., 2008; de Oliveira et al., 2012; Volk et al., 2012; Meier & Sprenger, 2015). Several studies suggest that individual preferences—particularly risk preferences—exhibit long-term stability (Schildberg-Horisch, 2018), which may be shaped by deeply rooted values as well as cultural and social norms, but there is also evidence that preferences may change systematically over the life course and in response to exogenous shocks or temporary fluctuations in self-control, emotions, or stress. Social preferences, while generally more stable over time (Chuang & Schechter, 2015), may still be shaped by specific events or contextual factors. A deeper understanding of the potential evolution of preferences, whether systematic or context-dependent, is essential for guiding policy design, particularly in vulnerable areas amid recurrent global and local disruptive events.

This study uses the COVID-19 pandemic as a major global shock to evaluate the persistence of households' individual and social preferences in rural areas. The pandemic put livelihoods and food security at risk for millions, particularly vulnerable populations in developing countries (The World Bank, 2020; World Food Programme, 2020; U.S. Global Leadership Coalition, 2022). The psychological and financial stresses and food-insecure experiences provoked by the pandemic, potentially affected the perceptions and emotions of people. Several studies report heightened mental health challenges during this period, including anxiety, depression, loneliness, boredom, and burnout, as well as concerns related to suicidal ideation, divorce, and lack of social support (Brodeur et al., 2021; Prati & Mancini, 2021). These factors represent important dimensions influencing perceptions of risk and uncertainty. Similarly, the pandemic and the policies implemented in response significantly altered human interactions, possibly influencing individuals' perceptions of trust, coordination, and cooperation—elements that can affect broader economic outcomes. In particular, social distancing measures and lockdowns severely disrupted common forms of communication and interaction that are essential for effective cooperation and coordination; moreover, the extent and depth of these measures may have eroded broader levels of trust, as individuals increasingly relied on close family ties and immediate social networks. In addition, evidence suggests that individual and social preferences may vary across different domains (i.e., age, gender, among others); accordingly, the observed effects on the studied indicators could be influenced by these factors. We focus on the rural area of Guatemala, where the government imposed several controls and lockdowns that combined constituted one of Central America's most restrictive environments until early 2022 (Hale et al., 2021). Additionally, most rural communities closed or limited their access through mid-2021 to prevent local contagion, further limiting mobility, disrupting value chains, and likely affecting people's attitudes.

We rely on a comprehensive panel survey of agricultural smallholder households across three departments in the Western Highlands of Guatemala, based on interviews with household heads conducted over four consecutive annual rounds from 2019 to 2022. This region represents the country's most vulnerable area with poverty rates of up to 81% (INE, 2015) and chronic malnutrition rates reaching 63% (MSPAS-INE-ICF, 2017). Building on Castillo & Hernandez (2023), which uses the early panel of households surveyed in 2019 and 2020 and shows that the initial COVID-19 confinement shifted preferences, we assess the persistence or reversal of these shifts through 2022 and evaluate their association with specific characteristics or factors. We focus on three standard preference indicators: risk aversion, trust, and generosity (perceptions on others willingness to help) that were elicited over the four survey rounds. We examine average variations in these indicators relative to pre-pandemic levels, and whether their evolution varied across different groups of households based on the age, gender, and education of the household head, as well as ethnicity and poverty status of the household. We also evaluate whether the observed variations in preferences were influenced by the degree of exposure to the virus, level of self-confinement (considering that most communities in the sample self-imposed additional entry and exit restrictions), and additional exposure to extreme weather events (as an important subgroup of households were affected by two major tropical storms towards the end of 2020).

The estimation results show that the willingness to take more risks significantly increased with the onset of the pandemic and only reversed back to pre-pandemic levels after three years, in 2022. The pandemic similarly triggered a deterioration of social perceptions regarding interpersonal trust and generosity that remained high over the period of study. Hence, while risk preferences exhibited a temporal divergence, shifts in social preferences were persistent over the course of three years. We generally do not find major variations across different household groups except for a larger risk tolerance increase among poor versus non-poor households, a somewhat larger deteriorated trust perception among young versus old household heads, and a worser perception of people's generosity among women than men. When exploring if the observed variations in preferences can be linked to specific local factors, we find that greater direct exposure to the virus slightly reduced the observed heightened risk tolerance, though not in the early months of the pandemic, while amplifying negative social perceptions of trust and generosity during its onset. Stricter mobility restrictions only had a marginal impact on risk tolerance and trust perceptions at the start of the pandemic, while we do not observe any differences between households additionally affected by extreme weather events and those not affected.

The study contributes to different literatures on the intersection of preferences' stability, decision making, and life experiences. There is abundant empirical evidence showing that exposure to a major life shock—e.g., severe injury, death in the family, sudden income loss, natural disaster, negative macroeconomic shock, financial crisis, civil conflict, and war—may affect individual and social preferences. Some examples include Eckel et al. (2009) and Castillo & Carter (2011) on the occurrence hurricanes; Kim & Lee (2014) on wars; Fisman et al. (2015) on economic recessions; Cassar et al. (2017) on tsunamis; Fleming et al. (2014), Hanaoka et al. (2018), Akesaka (2019) and Filipski et al. (2019) on earthquakes; and Aragon & Outes-Leon

(2020) on institutional changes.[1] Whether the effects are temporal or permanent remains an empirical question that cannot be generalized across different decision-making environments, samples, and type (and intensity) of events. We contribute to this literature by assessing the stability of individual and social preferences in the context of a major global disruption, such as the pandemic, as well as in the presence of additional compounding shocks, such as disruptive weather events.

The paper also adds to the literature on the effects of COVID-19 on risk aversion, interpersonal trust, and perceived generosity.[2] Despite the disruptive nature of COVID-19, most existing studies on its effects on agents' preferences and behaviors—primarily conducted in urban settings or within experimental and controlled online environments (e.g., Bu et al., 2020; Buso et al., 2020; Campos-Mercado et al., 2021; Shachat et al., 2021; Brañas-Garza et al., 2022; Gassmann et al., 2022; Harrison et al., 2022; Korlat et al., 2022; Tsutsui & Tsutsui-Kimura, 2022; Lohmann et al., 2023)—are concentrated in the initial phase of the pandemic, while evidence on the evolution of preferences beyond 2020 is scant. Two exceptions are Aragon et al. (2024) who examine changes in risk and time preferences among cab drivers in Peru's capital using panel survey data collected in May 2019 and January 2021, and Mineyama & Tokuoka (2024) who evaluate variations in risk preferences in Japan using a nationally representative household panel survey for several years in 2011-2022. We contribute to these studies concentrating on rural populations and relying on a unique panel of smallholder households tracked over four consecutive years.

The remainder of the paper is organized as follows. Section 2 describes the study's data and methodology. Section 3 presents and discusses the estimation results. Section 4 provides concluding remarks.

2. Empirical approach

2.1 Data

The dataset comprises a panel of rural households surveyed across four rounds: an in-person baseline survey implemented in November-December 2019, and three follow-up surveys administered via phone in May-June 2020, 2021, and 2022. The sample are commercial agricultural households (coffee and horticultural producers) located in the departments of Huehuetenango, Quiche, and San Marcos in the Western Highlands of Guatemala. Households were originally interviewed for an impact evaluation study of a value chain development program and then followed over time to assess the impacts of COVID-19 on livelihoods and

[1] See Schildberg-Horisch (2018) for a broader review of the impact of exogenous shocks on risk preferences.
[2] See Brodeur et al. (2021) for a general overview of the economic consequences of COVID-19.

food security in the region.[3] The study sample closely represents the region's market-oriented smallholders.[4]

The baseline survey gathered extensive household socioeconomic characteristics, agricultural practices, income sources, expenditures and assets, food security and nutrition, and individual and social preferences. The follow-up surveys collected information on selected outcomes related to incomes, food security and nutrition, and preferences. The baseline survey took approximately one hour, and the follow-up surveys lasted about 30 minutes, but the sequence of modules were the same across all surveys. The same group of local (women) enumerators interviewed the same households over time and the interviewee was the household head.[5]

Attrition fluctuated between 10% and 16% across rounds, despite the established protocols to contact all sampled households. These included calling at various times of the day and different days of the week and contacting community leaders or neighbors when households were unreachable or had disconnected numbers (given the high phone number turnover in rural Guatemala). Overall, approximately half of the attrition resulted from households declining to participate in another round, while the remainder was mainly due to difficulties in reaching them. A total of 318 (out of 2,142) households were lost in the second survey, 212 in the third survey, and 350 in the final survey, resulting in a final working sample of 1,262 households across 86 communities that participated in all four rounds. Appendix Figure A.1 illustrates the locations of the communities of these households across the three departments.

Given the relatively high attrition between the baseline and the working sample, in Appendix Table A.1 we assess the comparability of households in these two samples based on observable baseline characteristics. We find that most characteristics are largely balanced between the two samples, except for minor imbalances in the share of male-headed households, household size, livestock ownership, and whether coffee is among the main crops produced. This suggests that potential attrition bias is not a major concern, but we conduct robustness checks in the next section.

Panel A of Table 1 provides descriptive statistics for a range of household characteristics of our working sample (measured at baseline). Most household heads are male (85%) with an average age of 48 years, with no or partial elementary education (67%), and primarily speak a native language other than Spanish (71%). The average household size is close to 6 members and

[3] The sample includes beneficiaries and non-beneficiaries of a project that aimed to boost agricultural incomes and strengthen the resilience of small farmers in the Western Highlands while enhancing the nutritional well-being of their families. We find no systematic differences between project beneficiaries and non-beneficiaries, suggesting the project did not influence the modeled preferences.

[4] Ceballos et al. (2021) and Castillo and Hernandez (2023) provide additional details on the study sample frame.

[5] We engage local women as survey enumerators, based on our prior experience conducting household surveys—both in person and by phone—in rural areas of Guatemala. Their involvement facilitates household access and improves communication. An in-kind gift (calendar and pen) was given as a token of appreciation for the time spent completing the baseline in-person survey, while small airtime top-ups of 1.33 US dollars were given after each follow-up phone survey.

around half of the dwellings have finished floors (55%) and walls (47%). Most dwellings have access to water systems (85%) and electricity (83%) but lack connection to a drainage network (69%). The average daily per capita expenditure is 11.3 quetzales (equal to 1.5 US dollars) and only 24% of the households own a vehicle. The average land size is 0.9 hectares, and most households produce coffee (78%) and maize (48%).

Panel B of the table reports a set of relevant variables measured at the local level. The total number of official COVID-19 cases during the period of study, reported by the Ministry of Health in Guatemala (MSPAS, 2025), ranged between 24 and 1,742 per 10,000 people in the municipalities of the study sample.[6] Almost all households (98%) where located in communities that also restricted their borders (entry or exit) since the start of the COVID-19 pandemic for up to 12-13 months in some cases, as reported by the community leaders. In addition, 43% of the households were in communities affected by ETA and IOTA tropical storms in late 2020 and reported being severely impacted primarily through crop losses.

Lastly, Panel C of the table presents summary statistics for the three outcomes of interest measured during the four survey rounds. Appendix B details the specific questions used to elicit these measures related to risk aversion, interpersonal trust, and perceived generosity. As noted by Castillo & Hernandez (2023), these survey questions are regarded as a reliable substitute when experimental protocols cannot be implemented, whether due to practical limitations (as in our case, particularly the limited attention span available during the interviews) or financial constraints.

The risk tolerance indicator is a widely recognized, experimentally verified, and straightforward method commonly employed in large-scale surveys (e.g., German Socio-Economic Panel (SOEP) and Global Preferences Survey (GPS)), which measures the willingness to take risks of an individual on a scale 0 (I am not willing to take any risks) to 10 (I am willing to take risks).[7] The second indicator captures the level of distrust of people, measured on a Likert scale ranging from 1 (Generally speaking, you can almost always trust people) to 4 (You should almost always be very cautious), which is a simplified adaptation of the National Opinion Research Center's General Social Survey (GSS), also referred to as Rosenberg's Generalized Trust Question, additionally used in the GPS. While not a perfect measure of trust, it has been shown to correlate with other robust, incentivized experimental responses assessing trust and trustworthiness (Glaeser et al., 2000; Naef and Schupp, 2009; Fleischer et al., 2016; Falk et al. 2016, 2018). The third outcome is related to perceived generosity or social support, specifically perceptions of others' unwillingness to help. We approximate this perception using a Likert scale ranging from 1 (People would try to help me almost every time) to 4 (People worry about their own problems all the time). Although a simplified measure, we can find similar approximations in other instruments used to capture measures of received and perceived social support in

[6] The population of the municipality is obtained from the most recent Population Census of 2018 (INE, 2020).

[7] See Dohmen et al. (2011) and Falk et al. (2016, 2018) for a discussion on the reliability of this simple measure compared to measures elicited using standard experimental approaches.

different dimensions (e.g., Cohen & Hoberman, 1983; Cohen et al., 1985; Norris & Kaniasty, 1996).

The number of observations differs for each preference indicator, as we exclude cases where a household either did not respond or could not decide, or did not know what to respond. We elicit the risk indicator for all 1,262 households over the four survey rounds, the trust indicator for 1,191 households, and the perceived generosity indicator for 1,164 households. We do not find though systematic differences in observable characteristics across the three samples, which help to discard potential bias from sample selection in the responses.

2.2 Methodology

The empirical analysis is organized into three sections. We first examine before-after variations in preferences over the four survey rounds. We estimate the following household fixed-effects model,

$$Y_{ijt} = \alpha_0 + \alpha_1 t_1 + \alpha_2 t_2 + \alpha_3 t_3 + X_{ijt}\delta + \theta_i + u_{ijt} \quad (1)$$

where Y_{ijt} represents the preference measure of interest (i.e., risk, trust, or generosity) reported by household i located in community *j* at period t; t_1, t_2, and t_3 are dummy variables for the 2020, 2021, and 2022 survey rounds (2019 is the base year); X_{ijt} is a vector of household and community characteristics; θ_i captures household-specific elements; and u_{ijt} is an idiosyncratic error term. Except for household size that was collected during all rounds, all other household and community characteristics were only collected at baseline (i.e., are time invariant), such that they are absorbed by θ_i. While human mobility was somewhat restricted until mid-2021 as numerous communities in the sample closed their borders for several months following the pandemic, controlling for household size permits to account for possible shifts in demographic patterns or migration flows.[8]

In equation (1), parameter α_0 captures the (unconditional) mean of each modeled preference indicator at baseline (2019). Parameters α_1, α_2, and α_3 measure, in turn, the average change in each indicator in 2020, 2021, and 2022 relative to 2019.

Second, we analyze whether the evolution of individual and social preferences vary across different household groups. We accordingly augment equation (1) to,

$$Y_{ijt} = \beta_0 + \beta_1 t_1 + \beta_2 t_2 + \beta_3 t_3 + \sum_{s=1}^{3} \beta_{4s} t_s * G_{ij} + X_{ijt}\delta + \theta_i + u_{ijt} \quad (2)$$

[8] We also performed an additional exercise excluding all households that reported a change in household size or composition between 2019 and 2022 and find similar results.

where G_{it} is an indicator variable identifying whether the household falls into a specific group that includes: age (40 years old or below), gender (male) and education (completed elementary education or above) of household head, ethnicity (household self-identifies as indigenous), and poverty status.[9] Parameters $\beta_{4s},\ s = 1,2,3$, allow for tracking the evolution of the modeled preference indicators over time, distinguishing between the different household groups considered.

Finally, we assess whether the changes in preferences were intensified or not by local factors or events such as the level of exposure to the virus at the municipality level, degree of self-confinement during the COVID-19 pandemic at the community level, and whether the household reported being affected by ETA and IOTA tropical storms that hit the country in November 2020. Similar to equation (2), we estimate the following model,

$$Y_{ijt} = \gamma_0 + \gamma_1 t_1 + \gamma_2 t_2 + \gamma_3 t_3 + \sum_{s=1}^{3} \gamma_{4s} t_s * F_{ijt} + X_{ijt}\delta + \theta_i + u_{ijt} \qquad (3)$$

where F_{ijt} captures each local factor: official number of COVID-19 cases per 10,000 people by the date of each survey round; percentage of months with community mobility restrictions by the date of each survey round; and if household reported being heavily impacted by ETA and IOTA tropical storms. In this case, parameters $\gamma_{4s},\ s = 1,2,3$, permit determining whether the observed variations in preferences were affected or not by the exposure to these additional factors.

The inclusion of household fixed effects in the regression analysis controls for time-invariant household and location characteristics that could be confounded with the modeled preference indicators. Yet, we recognize that we cannot exclude the possibility of time-varying omitted variables that could potentially affect our results (besides changes in household size). To account for this potential source of bias, we perform an additional exercise using household data from a fifth (in-person) survey round conducted in 2022, just five months after the fourth round, where 777 of the households in our working sample participated.[10] Although this new survey did not gather information on preferences, it collected information on a wide array of household characteristics (similar to the baseline survey). We impute these characteristics to the same households interviewed in the previous fourth round and estimate our base model allowing for time-varying household controls, to assess changes in preferences between 2019 and 2022.

[9] A household is classified as indigenous if the survey respondent self-identifies as indigenous, while is classified as poor if their per capita daily expenditure falls below 1.9 US dollars (in 2011 national prices), which was the international poverty threshold set by the World Bank before 2022.

[10] The additional survey was implemented in November-December 2022 as part of the endline evaluation of the value chain project. As shown in Appendix Table A.2, the households participating in the five survey rounds are generally comparable to those interviewed at baseline in 2019.

3. Results

3.1 Before-after changes in preferences

Table 2 reports the regression results of estimating equation (1) for each preference indicator. Column (1) corresponds to the willingness to take risks on a scale 0-10, column (2) to distrust of people on a scale 1-4, and column (3) to perception of people's unwillingness to help on a scale 1-4. The standard errors are clustered at the community level to account for likely within-community correlation in the modeled indicators, i.e., common individual perspectives due to shared socioeconomic characteristics and cultural factors, collective community behavior, and similar patterns of exposure to the virus and other shocks.

We observe important and diverse changes in the modeled individual and social preferences over time.[11] In the case of willingness to take risks, the pandemic prompted people to take more risks in their daily activities, which seem to have persisted until 2021. The risk-seeking score significantly increased by about two points or 40-42% between 2019 and 2020-2021 (from 4.54 to 6.36-6.45) and only reverted to pre-pandemic levels in 2022 (4.97). Other studies have also documented an increase in risk tolerance after the pandemic onset across different experimental and non-experimental contexts and domains (e.g., Shachat et al. (2021) in China; Gassmann et al. (2022) in France; Tsutsui & Tsutsui-Kimura (2022) and Mineyama & Tokuoka (2024) in Japan; Aragon et al. (2024) in Peru), although these studies do not report reversals except for Gassmann et al. (2022) that show a return to previous levels after just four months.[12] Bogliacino et al. (2021) similarly demonstrate that negative shocks, such as the COVID-19 pandemic, can impair cognitive functioning and make people more risk loving (and exercise negative reciprocity) using longitudinal data for Italy, Spain, and the United Kingdom. Bu et al. (2020), in contrast, find a lower risk tolerance in China, likely driven by pessimistic beliefs at the beginning of the pandemic rather than shifts in overall risk preferences.

Regarding social preferences, we observe deteriorated perceptions of trust and generosity that persist over time. The level of distrust of people increased from 2.99 in 2019 to around 3.5 over the following three years, equivalent to a sustained 16-18% increase relative to pre-pandemic levels. The indicator measuring the perceived degree of others' reluctance to help remained rather unchanged during early stages of the pandemic (at close to 3) but it boosted to 3.24 in 2021 (equivalent to an 11% increase compared to the baseline) and to 3.43 in 2022 (17% increase). Shachat et al. (2021) also document lower trust levels but high rates of altruism and cooperation during the onset of the pandemic in China, while Buso et al. (2020) find a decrease in cooperation in Italy and Brañas-Garza et al. (2022) a decrease in generosity in Spain. Lohmann et al. (2023) likewise report heightened anti-social behavior in the wake of COVID-19 in China. All these findings rely on experimental designs but only cover immediate or short-term changes.

[11] For illustration purposes, Appendix Figure A.2 depicts the evolution of the preference indicators over the study period.

[12] Tsutsui & Tsutsui-Kimura (2022) show that people became more risk tolerant throughout their five waves of data collection during March-June 2020, but the changes were smaller in the last two waves.

Some previous studies that assess changes in social preferences and prosocial behavior in the aftermath of exogenous negative shocks (i.e., natural disasters, war, civil unrest, violence outbreak, and economic crisis) document improvements, reflected in higher levels of trust, trustworthiness, cooperation, reciprocity, and overall social cohesion (Voors et al., 2012; Becchetti et al., 2014; Bauer et al. 2016; Andrabi et al., 2017; Cassar et al., 2017), while others show either no result or negative effects (Fleming et al., 2014; Grosjean et al., 2014; Cassar et al., 2013; Böhm et al., 2021). Although disentangling the specific psychological or social mechanisms underlying our results is beyond the scope of the study, the nature of the pandemic shock and the policies adopted in response pose a distinct challenge relative to other shocks. Prosocial behavior and social cohesion may emerge as optimal responses to social dilemmas and depend on various factors that influence coordination and cooperation. However, during a pandemic, social interaction itself can directly and negatively affect individual and collective well-being.

3.1.1 Robustness checks

We perform two additional estimation exercises to assess the robustness of our base results. First, to further reduce concerns about potential selection (attrition) bias affecting our estimations, we re-estimate our baseline model depicted in equation (1) using the full unbalanced panel of households (i.e., all households interviewed at each survey round). As shown in Panel A of Appendix Table A.3, the evolution of the three indicators is very similar to the base results reported in Table 2. Risk tolerance exhibits a 41-42% increase in 2020 and 2021 relative to the pre-pandemic level and reverts to the initial level in 2022. The distrust of people shows a sustained post-pandemic 16-18% increase, while the perception of people's unwillingness to help shows a monotonic increase across years (6%, 12%, and 18% compared to the pre-pandemic level).

Second, to partially mitigate concerns around time-varying omitted variables influencing our results, we take advantage of household data collected during an additional survey round in 2022 for a subset of households in our working sample. As noted, we can assign the gathered household characteristics to the same households surveyed in the previous fourth round and estimate our model for 2019 and 2022 with controls for observable household characteristics that may vary over time. Panel B of Appendix Table A.3 shows that the changes in the preference indicators between 2019 and 2022 in this alternative estimation closely aligns with the main results. The average risk tolerance level in 2022 is not statistically different than the baseline level, while the distrust of people and perception of people's unwillingness to help show a 16% and 13% persistent increase, respectively.

3.2 Changes in preferences by household characteristics

We now examine whether changes in the modeled preference indicators differ across household groups, as modeled in equation (2). We allow for five possible dimensions of household

heterogeneity that could influence preferences formation and stability. These include the age, gender, and education of the household head (i.e., the survey respondent) and the household ethnicity and poverty status. Most of these attributes are typically considered in studies examining preferences' patterns (e.g., Eckel & Grossman, 2008a, 2008b; Tymula et al., 2012; Carlsson et al., 2014; Schildberg-Horisch, 2018; Cobo-Reyes et al., 2020; Castillo & Zhangallimbay, 2021; Thöni & Volk, 2021). The estimation results are reported in Table 3.[13] Panel A of the table reports the results for risk tolerance, Panel B for the distrust of people, and Panel C for the perceived unwillingness to help.

We generally do not find much varying patterns in the evolution of preferences (relative to pre-pandemic levels) among different household groups. On the willingness to take risks, we only observe some differences between poor and non-poor households. Poor households appear to be more prone to take risks in 2020 and 2021, showing around a double fold score increase compared to non-poor households. This higher risk tolerance could be explained by the daily hardships and obstacles faced by poor households that likely exacerbated with the pandemic.

As for distrust of people, differences emerge solely between younger and older individuals. Trust perceptions deteriorated to a larger extent among household heads aged 40 or younger relative to older heads, especially in 2021 and marginally in 2022. The score increased by about one third more among younger heads. It seems that younger adults are more vulnerable to trust erosion in adverse situations, whereas older adults may be more resilient, possibly due to greater life experience and previous successful collective learning processes.

The perceived degree of others' reluctance to help shows somewhat more differences across certain household characteristics. Women household heads deteriorated their perception of people's generosity to a much larger degree than men. The score on the perceived degree of others' unwillingness to help increased by more than six times among women than men in 2020, by more than two times in 2021, and by 1.4 times in 2022. We also find some differences by age and education in 2021 (younger and more educated heads exhibiting worsened perceptions) and by ethnicity in 2020 (indigenous households displaying marginally less worsened perceptions). The findings by gender and age are, for example, at odds with Korlat et al. (2022) who find that schoolgirls perceive more support from teachers than boys in Austria and with Brañas-Garza et al. (2022) who find a decrease in generosity among older individuals in Spain, possibly driven by expectations about others' behavior, among other factors. Cobo-Reyes et al. (2020) also find that altruism declines with age (adults 30 old and above) but women are less likely to be classified as altruistic than men.

3.3 Changes in preferences by local factors

We also evaluate whether the observed variations in preferences can be linked to certain factors at the local level, as defined in equation (3). We consider three contextual factors that may

[13] Appendix Figure A.3 presents the estimated changes in the preference indicators in 2020, 2021, and 2022 with respect to 2019, based on the regression results.

trigger group behaviors associated with social norms and interactions, which can collectively influence the preference formation process: degree of exposure to the virus, level of self-confinement, and exposure to severe weather events.

3.3.1 Exposure to the virus

COVID-19 represented a global disruption with major impacts across multiple domains, but the level of proximity to the virus could have further influenced households' attitudes and perceptions. While we lack data on COVID-19 exposure at the community level, we can use the official number of cases at the municipality level (the next administrative unit after a community) as a proxy measure, assuming a homogeneous risk of viral exposure across households within the municipality.

Panel A of Table 4 reports the estimation results using the cumulative rate of cases at the time of each survey round. We find contrasting results across individual and social preference indicators. The exposure to the virus does not seem to have affected the initial shift in risk preferences in 2020, as opposed to 2021 and to some extent in 2022; in the latter two years, ten more infections per 10,000 people in the municipality are associated with a 0.05 and 0.03 lower increase, respectively, in the risk tolerance score (relative to the pre-pandemic level). In contrast, the closeness to infection cases appears to have influenced the initial adjustment in trust and generosity perceptions; ten more infections (per 10,000 people) are associated with a 0.41 and 0.46, respectively, larger increase in the scores measuring distrust and others unwillingness to help in 2020.

These findings suggest that increased exposure to the virus slightly reduced the heightened risk tolerance, though not during the initial months of the pandemic, while intensifying negative social perceptions related to trust and generosity at the beginning of the pandemic. In line with our results, Lohmann et al. (2023) document that anti-social behavior increased with the degree of virus exposure during the first COVID-19 wave in China, while Bu et al. (2020) show that greater exposure reduced planned risk-taking and risky investments.

3.3.2 Self-confinement

Another possible factor influencing the evolution of preferences is the extent of confinement faced by households during the pandemic. As indicated above, in addition to the national containment and lockdown measures implemented by the central government, several communities independently chose to further restrict their entry and exit in response to the pandemic, in some cases for several months. These stricter local controls could have also shaped households' preferences due to disruptions in trade, food supply, and overall economic and social dynamics.

Panel B of Table 4 presents the estimation results using the percentage of months the community was closed at the time of each survey round. We find that more severe local

restrictions only marginally influenced risk tolerance and trust perceptions at the onset of the pandemic. A ten percent increase in the number of months a community remained closed prior to the first survey round in 2020, is correlated with a 0.22 lower increase in the risk tolerance score and with a 0.06 larger increase in the score measuring distrust of people. We do not observe statistically significant differences in the evolution of the generosity indicator associated with varying levels of self-confinement. In Italy, Buso et al. (2020) explored variations in preferences with the degree of social isolation during the COVID-19 lockdown but find higher selfishness and lower levels of cooperation with stronger isolation.

Undoubtedly, the degree of self-confinement across communities could be correlated with multiple factors related to selective exposure or pre-existing beliefs and experiences in the community as well as leadership, institutional, and cultural characteristics that can also influence households' attitudes and perceptions.[14] To the extent that these underlying differences are mainly structural and did not vary during our period of study, the inclusion of household fixed effects in the estimations mitigate potential endogeneity from voluntary confinement decisions. Still, the results should be taken with caution as there could have been other unobserved triggering events during the COVID-19 pandemic, which led to self-confinement decisions.

3.3.3 Compound shocks

Lastly, the occurrence of a natural disaster can influence preferences, acting in this case as a compound shock in the aftermath of the pandemic. In late November 2020 (i.e., eight months after COVID-19 was declared a pandemic), Guatemala was struck by two tropical storms, ETA and IOTA, which triggered severe flooding, landslides, and mudflows across most of the country (IFRC, 2021). As indicated earlier, more than two out of five sampled households reported being severely affected by these storms. We thus evaluate if the modeled preferences followed a different pattern between households affected by these major storms and those that were not.

Panel C of Table 4 reports the corresponding estimation results. We do not observe notable differences in the variations of risk, trust, and perceived generosity indicators between affected and non-affected households, neither in 2020 (prior to the occurrence of the storms) nor in 2021 or 2022. Ceballos et al. (2024) also find that the storms did not influence, for example, households' intentions to emigrate in 2021, although they increased food insecure episodes and promoted poorer diets. While facing a traumatic event after a tropical storm or hurricane might play a role in preferences' formation, as documented in some studies (e.g., Eckel et al., 2009; Castillo & Carter, 2011), this literature focuses on the effects of a single shock—the natural disaster itself. In our study, the absence of differences could be attributed to the relative magnitude of the COVID-19 pandemic as a major global shock, whose impact on the modeled preferences likely surpassed that of other shocks.

[14] See Castillo and Hernandez (2023) for further discussion on this matter

4. Conclusions

Individual and social preferences play a key role in agents' decision making and are typically regarded as time-invariant in economic modeling despite the growing mixed empirical evidence. In this paper, we examine the persistence of preferences in rural settings leveraging the COVID-19 pandemic as a significant global disruption with major impacts across multiple health, economic, financial, and social domains. We rely on a unique longitudinal survey of 1,262 smallholder households in Guatemala that were followed over four rounds between 2019 and 2022. We focus on three standard preference indicators measuring risk aversion, interpersonal trust, and perceived generosity. We find a temporal, two-year increase in risk tolerance, while trust and generosity perceptions show a lasting deterioration over three years. Additional robustness checks support these findings. We also observe a greater increase in risk tolerance among poor households compared to non-poor ones, a somewhat more significant decline in trust perceptions among young (aged 40 or below) versus old household heads, and a more negative view of people's generosity among women than men. When exploring whether preference variations relate to specific local factors or events, we find that increased direct exposure to the virus slightly diminished the elevated risk tolerance observed, though not in the early months of the pandemic, while intensifying negative social perceptions of trust and generosity at the onset. More stringent mobility restrictions had only a marginal effect on risk tolerance and trust perceptions at the beginning of the pandemic, while we do not observe differences between households additionally affected by weather shocks and those that were not.

Understanding the effects and dynamics of individual and social preferences is of utmost importance for the design of post-disaster policies, particularly in vulnerable areas. How preferences respond to and retain the effects of exogenous shocks may determine the effectiveness of programs designed to alleviate and mitigate such impacts. Information campaigns, for example, should account for potential challenges arising from the erosion of social capital and its lasting effects on collective action, market exchange, supply chain integration, and broader economic outcomes. Recovery programs should devote sufficient efforts to restoring general trust within communities to facilitate more effective and timely outcomes. Moreover, while the COVID-19 pandemic represents an extreme event, developing insurance markets and community-based informal mechanisms, such as collective funds through agricultural organizations, can aid mitigate risks from unforeseen shocks, especially in disaster-prone communities. Well-designed schemes may help curb not only the deterioration of social capital but the sensitivity of individual preferences which, though temporary as suggested by our results, can influence the economic recovery process through household decisions related to consumption, labor participation, and other livelihood strategies.

In sum, our study provides a unique opportunity to assess the long-term effects of a major global shock on preferences among rural populations. Although we use experimentally validated survey methods and conduct robustness checks, fully incentivized experiments remain a promising avenue for future research to strengthen empirical evidence on the impact of unforeseen events over extended periods in vulnerable settings. Differences between our results and those reported in the referenced literature may stem from variations in methods and sample

characteristics. Overall, conducting experimental research in rural areas of developing countries remains challenging; however, the widespread adoption of new information technologies can facilitate the implementation of remote experimental methods, including mobile phone-based approaches.

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Table 1. Summary statistics of study sample

Variables	Mean	Standard deviation	Minimum	Maximum
Panel A: Household characteristics measured at baseline survey (1,262 households)				
Household head is male	0.849	0.358	0.000	1.000
Household head age (in years)	48.065	13.417	16.000	94.000
Household head has no education	0.369	0.483	0.000	1.000
Household head has partial elementary education	0.299	0.458	0.000	1.000
Household head completed elementary education or higher	0.332	0.471	0.000	1.000
Household head main language spoken is Spanish	0.288	0.453	0.000	1.000
Household size	5.887	2.707	1.000	18.000
Household is beneficiary of school public program	0.266	0.442	0.000	1.000
Dwelling has finished walls	0.457	0.498	0.000	1.000
Dwelling has finished ceiling	0.138	0.345	0.000	1.000
Dwelling has finished floor	0.540	0.499	0.000	1.000
Dwelling is connected to electricity	0.841	0.366	0.000	1.000
Dwelling is connected to water system	0.851	0.356	0.000	1.000
Dwelling is connected to drainage network	0.313	0.464	0.000	1.000
Household cooking fuel is electricity or gas	0.032	0.177	0.000	1.000
Daily per capita household expenditures (in Quetzales)	11.263	12.327	0.167	108.972
Household owns TV or radio	0.729	0.445	0.000	1.000
Household owns vehicle	0.244	0.430	0.000	1.000
Household owns livestock	0.596	0.491	0.000	1.000
Agricultural land size (in hectares)	0.908	1.338	0.007	21.840
Agricultural land has irrigation system	0.147	0.354	0.000	1.000
Coffee among main crops produced	0.822	0.383	0.000	1.000
Cardamom among main crops produced	0.119	0.324	0.000	1.000
Corn among main crops produced	0.471	0.499	0.000	1.000
Beans among main crops produced	0.176	0.381	0.000	1.000
Panel B: Local factors or events (1,262 households)				
Confirmed COVID-19 cases per 10,000 people in municipality (2020-2022)	148.832	134.701	24.226	1574.500
Community with mobility restrictions (2020--2022)	0.976	0.152	0.000	1.000
% of months community with mobility restrictions (2020-2022)	17.207	10.742	0.000	46.154
Household affected by tropical storms ETA or IOTA	0.430	0.495	0.000	1.000
Panel C: Outcome variables measured across four survey rounds				
Risk tolerance (scale 0-10), 1,262 households	5.113	3.109	0.000	10.000
Distrust of people (scale 1-4), 1,191 households	3.312	0.749	1.000	4.000
Perception of people's unwillingness to help (scale 1-4), 1,164 households	3.219	0.841	1.000	4.000

Note: Panel A of the table presents summary statistics of household characteristics collected at baseline in 2019 (1,262 reporting households or observations); Panel B of factors or events at the local level during the period of study (1,262 observations); and Panel C of the three preference indicators measured across four survey rounds (5,048 observations for risk tolerance; 4,764 observations for distrust of people; and 4,656 observations for perception of people's unwillingness to help).

Table 2. Changes in individual and social preferences

Coefficient	(1)	(2)	(3)
	Dependent variable:		
	Risk tolerance (scale 0-10)	Distrust of people (scale 1-4)	Perception of people's unwillingness to help (scale 1-4)
2020 survey round	1.81879***	0.47308***	0.09559
	(0.29928)	(0.05954)	(0.06492)
2021 survey round	1.90372***	0.48162***	0.31364***
	(0.27672)	(0.04476)	(0.07080)
2022 survey round	0.43060	0.52382***	0.50439***
	(0.39914)	(0.05709)	(0.05964)
Household size	-0.07927	-0.00751	0.01044
	(0.07173)	(0.01185)	(0.01705)
Constant	4.54347***	2.98628***	2.92942***
	(0.42950)	(0.07168)	(0.10256)
Household fixed effects	Yes	Yes	Yes
Observations	5,048	4,764	4,656
R-squared	0.092	0.107	0.071

Note: This table reports the estimation results for the modeled preference indicators depicted in equation (1) in the main text. Column (1) corresponds to risk tolerance; column (2) to distrust of people; and column (3) to perception of people's unwillingness to help. Robust standard errors reported in parentheses clustered by community. ***, **, and * denote statistical significance at, respectively, the 99%, 95%, and 90% levels.

Table 3. Evolution of preferences by household characteristics

Coefficient	(1)	(2)	(3)	(4)	(5)
	Household group indicator:				
	Head 40 years old or below	Head male	Head completed elementary or above	Indigenous	Poor
	Panel A: Dependent variable: Risk tolerance (scale 0-10)				
2020 survey round	1.77303***	1.58968***	1.92096***	1.25555***	1.01183**
	(0.29095)	(0.33103)	(0.32677)	(0.35333)	(0.40111)
2021 survey round	1.79746***	1.63957***	1.96899***	1.46341***	0.79686*
	(0.28982)	(0.27301)	(0.30165)	(0.37971)	(0.45003)
2022 survey round	0.47510	0.58315	0.39159	0.63093	0.25585
	(0.37613)	(0.46637)	(0.38153)	(0.49296)	(0.50461)
2020 survey round x Group indicator	0.14737	0.26976	-0.30752	0.70945	0.93914**
	(0.30540)	(0.32570)	(0.34362)	(0.46710)	(0.40360)
2021 survey round x Group indicator	0.34301	0.31102	-0.19629	0.55465	1.28822***
	(0.27512)	(0.25677)	(0.31656)	(0.45190)	(0.38434)
2022 survey round x Group indicator	-0.14380	-0.17961	0.11742	-0.25234	0.20354
	(0.38321)	(0.40958)	(0.35387)	(0.66606)	(0.47988)
Constant	4.51930***	4.54730***	4.55168***	4.54891***	4.51208***
	(0.42810)	(0.42958)	(0.42988)	(0.42791)	(0.43640)
Household fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	5,048	5,048	5,048	5,048	5,048
R-squared	0.093	0.093	0.093	0.096	0.097
	Panel B: Dependent variable: Distrust of people (scale 1-4)				
2020 survey round	0.47483***	0.50320***	0.48432***	0.50250***	0.51014***
	(0.05831)	(0.10431)	(0.06009)	(0.08928)	(0.09331)
2021 survey round	0.43116***	0.53700***	0.48190***	0.35825***	0.40174***
	(0.04700)	(0.08428)	(0.04283)	(0.08812)	(0.10248)
2022 survey round	0.48095***	0.43049***	0.54936***	0.42611***	0.52998***
	(0.05780)	(0.08566)	(0.05159)	(0.11573)	(0.10964)
2020 survey round x Group indicator	-0.00538	-0.03546	-0.03356	-0.03724	-0.04339
	(0.09094)	(0.09526)	(0.07315)	(0.09804)	(0.10250)
2021 survey round x Group indicator	0.16323**	-0.06520	-0.00102	0.15592	0.09340
	(0.06881)	(0.09176)	(0.07065)	(0.10142)	(0.10480)
2022 survey round x Group indicator	0.13828*	0.10984	-0.07603	0.12354	-0.00720
	(0.07252)	(0.08173)	(0.07480)	(0.13160)	(0.10935)
Constant	2.99602***	2.98449***	2.98131***	2.98200***	2.98242***
	(0.07158)	(0.07189)	(0.07216)	(0.07323)	(0.07625)
Household fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	4,764	4,764	4,764	4,764	4,764
R-squared	0.110	0.108	0.107	0.109	0.107

(Continue)

Coefficient	(1)	(2)	(3)	(4)	(5)
	Household group indicator:				
	Head 40 years old or below	Head male	Head completed elementary or above	Indigenous	Poor
Panel C: Dependent variable: Perception of people's unwillingness to help (scale 1-4)					
2020 survey round	0.09714	0.34424***	0.07908	0.24615**	0.24900*
	(0.07028)	(0.11885)	(0.07341)	(0.10084)	(0.13983)
2021 survey round	0.24980***	0.57935***	0.25969***	0.28268**	0.25259**
	(0.07630)	(0.11754)	(0.07219)	(0.11468)	(0.11406)
2022 survey round	0.46254***	0.68344***	0.47281***	0.65385***	0.53721***
	(0.06429)	(0.11152)	(0.06476)	(0.09906)	(0.11296)
2020 survey round x Group indicator	-0.00461	-0.29233**	0.04884	-0.19027*	-0.17989
	(0.10745)	(0.11303)	(0.09850)	(0.11231)	(0.13766)
2021 survey round x Group indicator	0.20401**	-0.31238**	0.15923**	0.03915	0.07149
	(0.09329)	(0.12473)	(0.07837)	(0.13934)	(0.12335)
2022 survey round x Group indicator	0.13341	-0.21053*	0.09301	-0.18891	-0.03847
	(0.09038)	(0.12151)	(0.08290)	(0.11847)	(0.11278)
Constant	2.93945***	2.93100***	2.93542***	2.93007***	2.92395***
	(0.10352)	(0.10188)	(0.10317)	(0.10336)	(0.10573)
Household fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	4,656	4,656	4,656	4,656	4,656
R-squared	0.075	0.075	0.073	0.075	0.073

Note: This table reports the estimation results for the modeled preference indicators depicted in equation (2) in the main text, distinguishing by different household characteristics (measured at baseline) in each column: if head 40 years old or below, if head male, if head completed elementary education or above, if household self-identifies as indigenous, and if poor household. Panel A corresponds to the results for risk tolerance; Panel B to the distrust of people; and Panel C to perception of people's unwillingness to help. All regressions control for household size measured in each survey round. Robust standard errors reported in parentheses clustered by community. ***, **, and * denote statistical significance at, respectively, the 99%, 95%, and 90% levels.

Table 4. Evolution of preferences by local factors

Coefficient	(1)	(2)	(3)
		Dependent variable:	
	Risk tolerance (scale 0-10)	Distrust of people (scale 1-4)	Perception of people's unwillingness to help (scale 1-4)
Panel A: COVID-19 cases per 10,000 people in municipality (Infection rate)			
2020 survey round	1.91641***	0.41015***	0.02485
	(0.33670)	(0.06207)	(0.06787)
2021 survey round	2.20559***	0.47440***	0.29811***
	(0.33952)	(0.05008)	(0.08182)
2022 survey round	0.84107*	0.50807***	0.48968***
	(0.50086)	(0.07031)	(0.06653)
2020 survey round x Infection rate	-0.06534	0.04137***	0.04594***
	(0.04261)	(0.01028)	(0.01701)
2021 survey round x Infection rate	-0.00515***	0.00012	0.00026
	(0.00187)	(0.00040)	(0.00051)
2022 survey round x Infection rate	-0.00276*	0.00011	0.00010
	(0.00162)	(0.00023)	(0.00021)
Constant	4.57227***	2.98587***	2.92862***
	(0.42631)	(0.07025)	(0.10184)
Household fixed effects	Yes	Yes	Yes
Observations	5,048	4,764	4,656
R-squared	0.096	0.113	0.077
Panel B: Percentage of months community closed borders (Mobility restriction degree)			
2020 survey round	2.69465***	0.23400*	0.05499
	(0.56140)	(0.13772)	(0.11685)
2021 survey round	1.50170***	0.44958***	0.31575***
	(0.45023)	(0.07317)	(0.09359)
2022 survey round	0.32576	0.45269***	0.46927***
	(0.57680)	(0.12646)	(0.09716)
2020 survey round x Mobility restriction degree	-0.02196*	0.00601*	0.00102
	(0.01252)	(0.00305)	(0.00255)
2021 survey round x Mobility restriction degree	0.01257	0.00100	-0.00007
	(0.00915)	(0.00202)	(0.00326)
2022 survey round x Mobility restriction degree	0.00610	0.00414	0.00204
	(0.03403)	(0.00645)	(0.00565)
Constant	4.52247***	2.98550***	2.92914***
	(0.43370)	(0.07113)	(0.10332)
Household fixed effects	Yes	Yes	Yes
Observations	5,048	4,764	4,656
R-squared	0.099	0.113	0.072

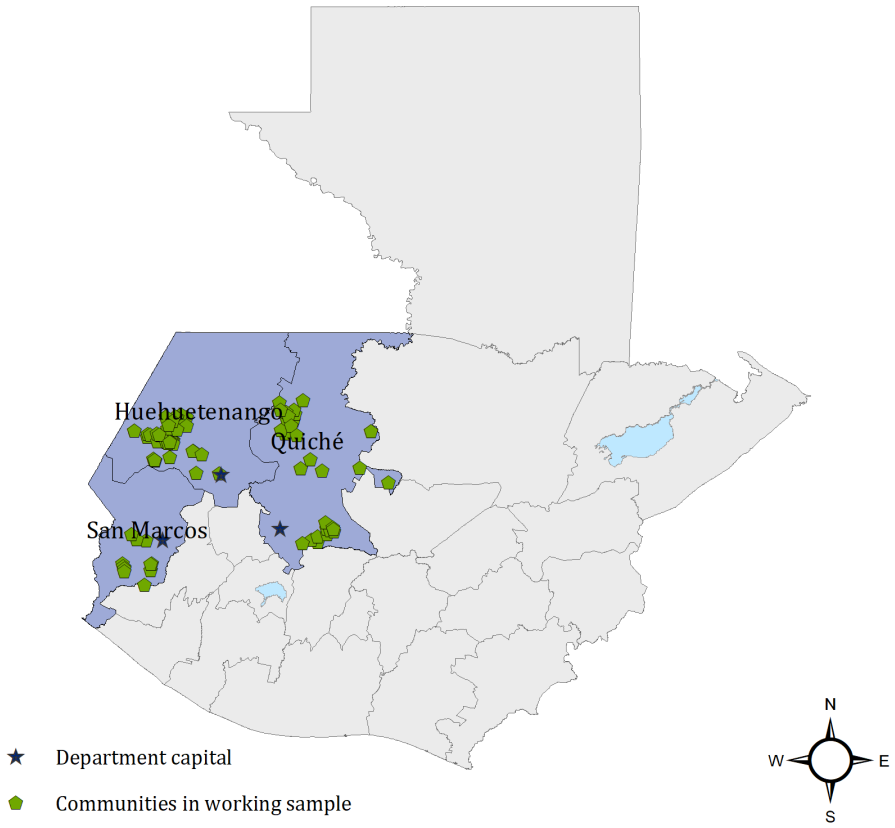
(Continue)

Coefficient	(1)	(2)	(3)
	Dependent variable:		
	Risk tolerance (scale 0-10)	Distrust of people (scale 1-4)	Perception of people's unwillingness to help (scale 1-4)
Panel C: Affected by ETA or IOTA tropical storms (Adverse weather event)			
2020 survey round	1.93912***	0.53714***	0.11197
	(0.34049)	(0.06949)	(0.07344)
2021 survey round	1.93150***	0.49458***	0.31021***
	(0.31403)	(0.05302)	(0.08155)
2022 survey round	0.44211	0.52503***	0.56285***
	(0.54298)	(0.06896)	(0.07380)
2020 survey round x Adverse weather event	-0.27960	-0.14986	-0.03815
	(0.37195)	(0.09250)	(0.11351)
2021 survey round x Adverse weather event	-0.06448	-0.03031	0.00819
	(0.31629)	(0.08815)	(0.13133)
2022 survey round x Adverse weather event	-0.02677	-0.00284	-0.13667
	(0.54991)	(0.08295)	(0.11290)
Constant	4.54629***	2.98680***	2.93510***
	(0.43142)	(0.07179)	(0.10323)
Household fixed effects	Yes	Yes	Yes
Observations	5,048	4,764	4,656
R-squared	0.093	0.109	0.073

Note: This table reports the estimation results for the modeled preference indicators depicted in equation (3) in the main text, accounting for different local factors and events: the number of official COVID-19 cases at the time of each survey per 10,000 people in the municipality where the household is located in Panel A; the percentage of months the community where the household is located was closed at the time of each survey in Panel B; and whether the household reported being significantly affected by ETA or IOTA tropical storms in November 2020. Column (1) corresponds to risk tolerance; column (2) to distrust of people; and column (3) to perception of people's unwillingness to help. All regressions control for household size measured in each survey round. Robust standard errors reported in parentheses clustered by community. ***, **, and * denote statistical significance at, respectively, the 99%, 95%, and 90% levels.

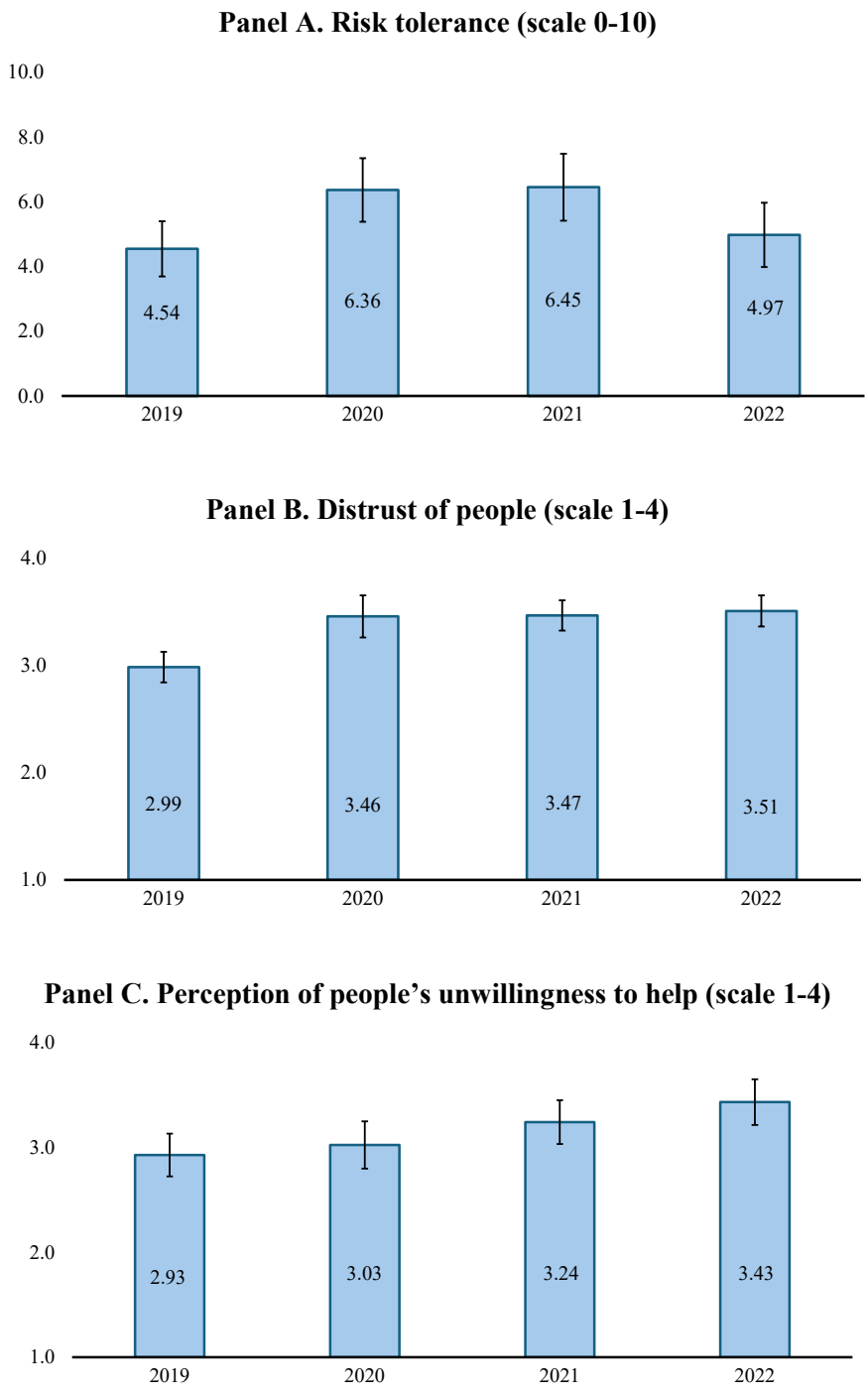
Appendix A. Supplementary Figures and Tables

Figure A.1. Location of households' communities in the study sample



Note: This figure maps the location (pentagons) of the communities of households that participated in all four survey rounds. The location of a community is determined by taking the average coordinates of all participating households in each community.

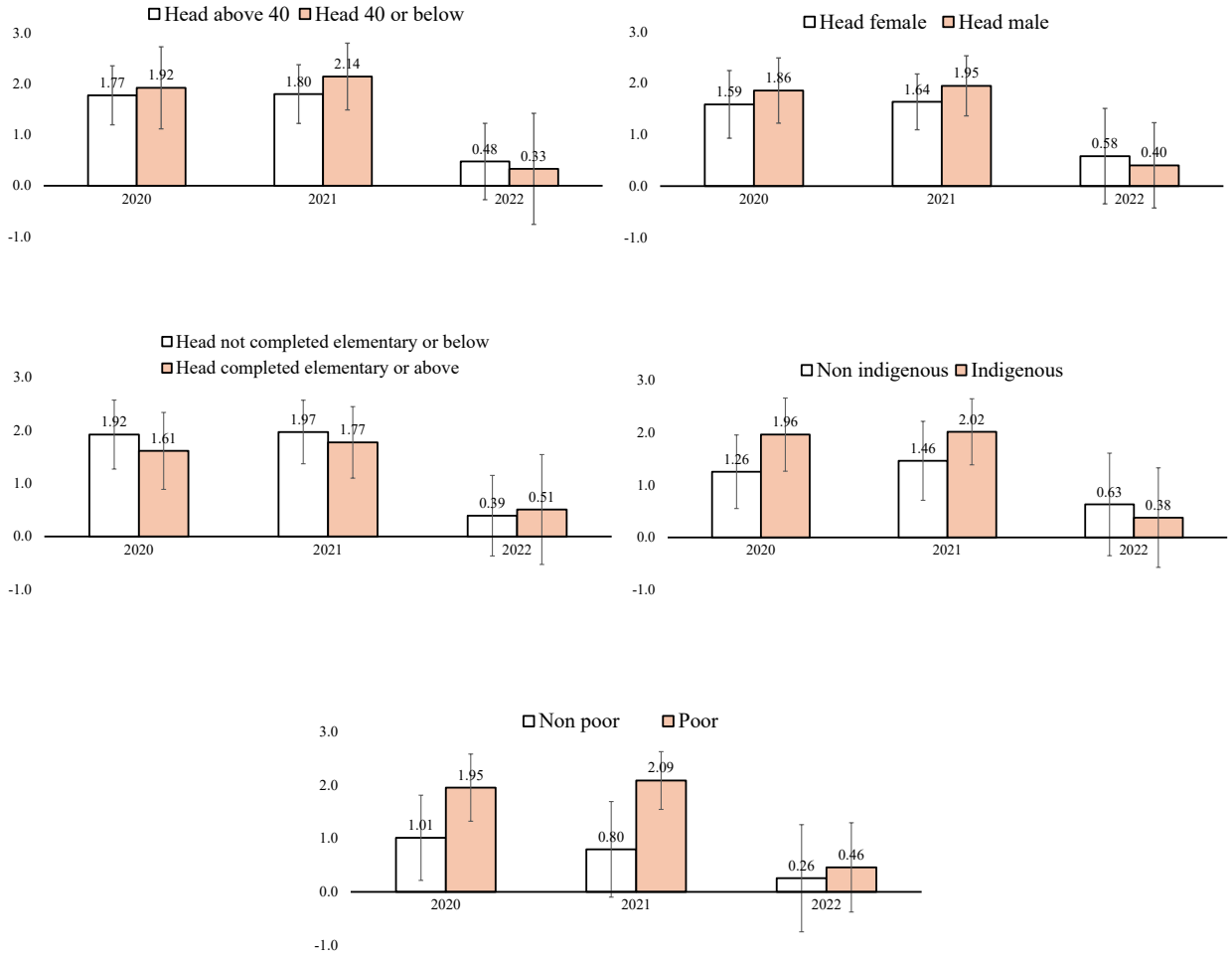
Figure A.2. Evolution of individual and social preferences



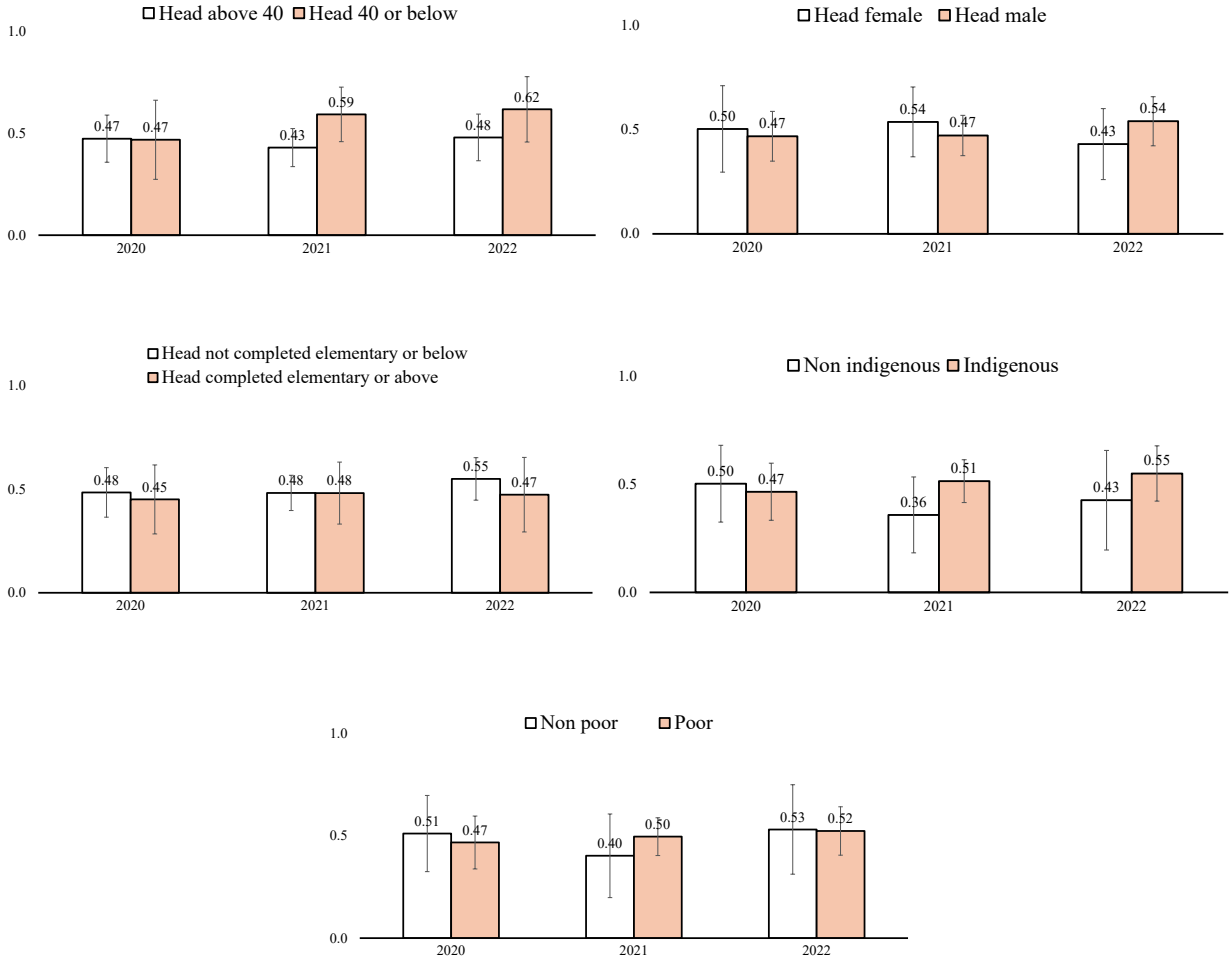
Note: This figure shows the estimated values of the preference indicators for each survey round based on the regression results reported in Table 2. Panel A corresponds to risk tolerance; Panel B to the distrust of people; and Panel C to perception of people's unwillingness to help. The vertical lines are the corresponding 95% confidence intervals.

Figure A.3. Estimated changes in preferences relative to 2019 by household characteristics

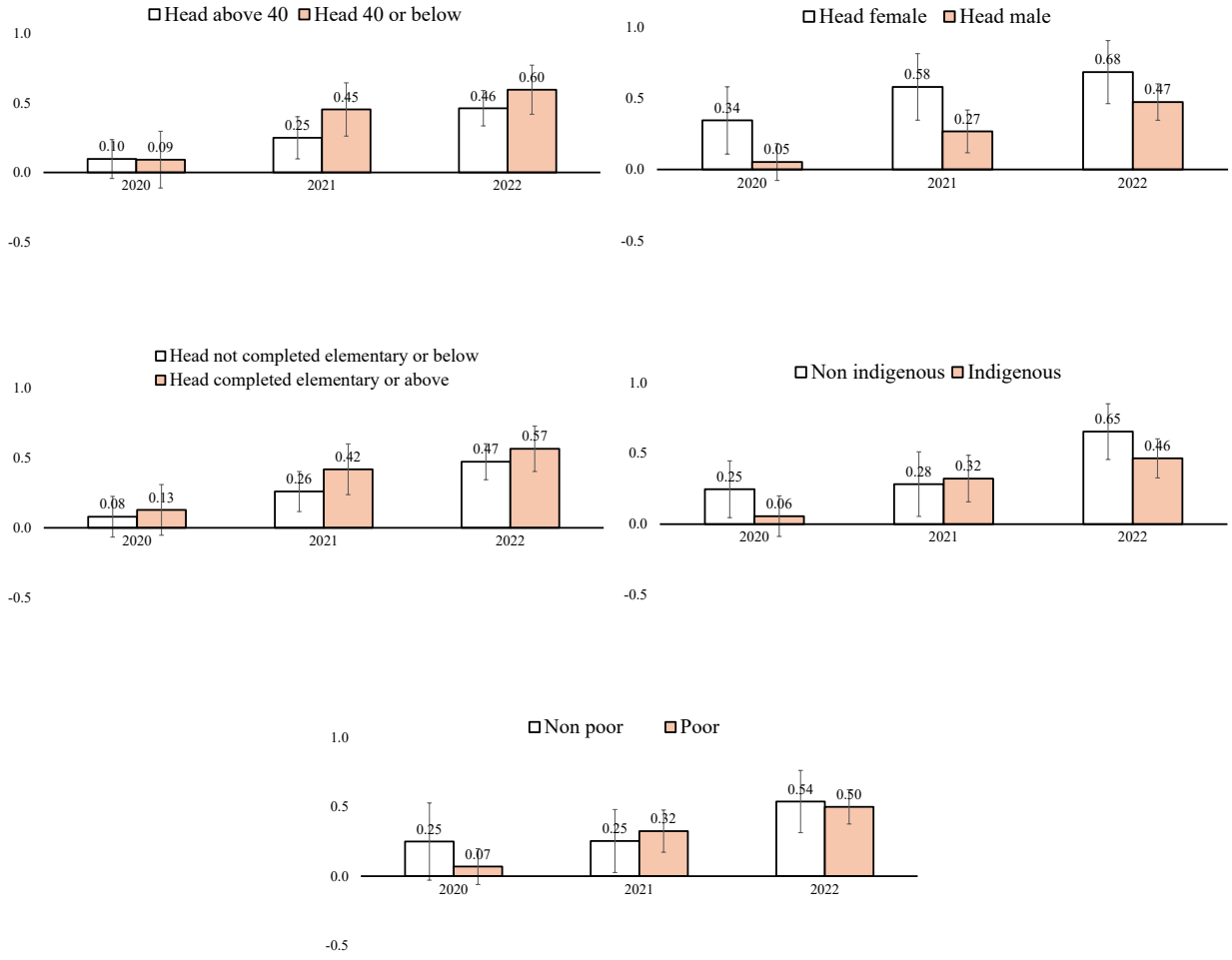
Panel A. Risk tolerance (scale 0-10)



Panel B. Distrust of people (scale 1-4)



Panel C. Perception of people's unwillingness to help (scale 1-4)



Note: This figure shows the estimated changes in preference indicators in 2020, 2021, and 2022 with respect to 2019, based on the regression results reported in Table 3 that distinguishes by different household characteristics (measured at baseline). Panel A corresponds to changes in risk tolerance; Panel B to changes in distrust of people; and Panel C to changes in perception of people's unwillingness to help. Each subfigure corresponds to a household characteristic that include age, gender, and education of head, indigenous, and poor household. The vertical lines are the corresponding 95% confidence intervals.

Table A.1. Orthogonality test between households interviewed at baseline and across the four survey rounds

Household characteristics (at baseline 2019)	(1) Households interviewed at baseline survey	(2) Households interviewed across four survey rounds	(3) p-value (1) vs (2)
Household head is male	0.830	0.849	0.005
	(0.012)	(0.012)	
Household head age (in years)	47.591	48.065	0.159
	(0.727)	(0.725)	
Household heads have no education	0.357	0.369	0.254
	(0.021)	(0.023)	
Household heads have partial elementary education	0.312	0.299	0.188
	(0.019)	(0.019)	
Household head completed elementary education or higher	0.331	0.332	0.917
	(0.018)	(0.021)	
Household head main language spoken is Spanish	0.303	0.288	0.399
	(0.053)	(0.050)	
Household size	5.772	5.887	0.036
	(0.113)	(0.129)	
Household is beneficiary of school public program	0.275	0.266	0.270
	(0.018)	(0.021)	
Dwelling has finished walls	0.467	0.457	0.484
	(0.035)	(0.033)	
Dwelling has finished ceiling	0.141	0.138	0.740
	(0.016)	(0.018)	
Dwelling has finished floors	0.546	0.540	0.649
	(0.037)	(0.033)	
Dwelling is connected to electricity	0.831	0.841	0.589
	(0.050)	(0.040)	
Dwelling is connected to water system	0.852	0.851	0.917
	(0.029)	(0.034)	
Dwelling is connected to drainage network	0.302	0.313	0.385
	(0.042)	(0.045)	
Household cooking fuel is electricity or gas	0.033	0.032	0.958
	(0.005)	(0.007)	
Daily per capita household expenditures (in Quetzales)	11.594	11.263	0.229
	(0.671)	(0.741)	
Household owns TV or radio	0.741	0.729	0.271
	(0.023)	(0.028)	
Household owns vehicle	0.238	0.244	0.543
	(0.024)	(0.028)	

(Continue)

Household characteristics (at baseline 2019)	(1) Households interviewed at baseline survey	(2) Households interviewed across four survey rounds	(3) p-value (1) vs (2)
Household owns livestock	0.568	0.596	0.045
	(0.034)	(0.033)	
Agricultural land size (in hectares)	0.943	0.908	0.422
	(0.098)	(0.080)	
Agricultural land has irrigation system	0.141	0.147	0.509
	(0.021)	(0.023)	
Coffee among main crops produced	0.780	0.822	0.038
	(0.053)	(0.042)	
Cardamom among main crops produced	0.141	0.119	0.211
	(0.056)	(0.044)	
Corn among main crops produced	0.479	0.471	0.577
	(0.042)	(0.040)	
Beans among main crops produced	0.177	0.176	0.912
	(0.024)	(0.022)	
Number of observations	2,142	1,262	

Note: This table reports the results of an orthogonality (balance) test of baseline characteristics between households interviewed at the baseline survey (2,142 households interviewed in 2019) and households interviewed across all four survey rounds (1,262 households in the final working sample). Columns (1) and (2) report the corresponding averages and standard errors (in parentheses) clustered by community. The p-values reported in column (3) correspond to the orthogonality test between the two groups of households. A value larger than 0.01 (0.05) indicates that the difference in means between the two groups is not statistically significant at a 99% (95%) confidence level.

Table A.2. Orthogonality test between households interviewed at baseline and across the five survey rounds

Household characteristics (at baseline 2019)	(1) Households interviewed at baseline survey	(2) Households interviewed across five survey rounds	(3) p-value (1) vs (2)
Household head is male	0.830	0.858	0.015
	(0.012)	(0.014)	
Household head age (in years)	47.591	49.233	0.005
	(0.727)	(0.797)	
Household head has no education	0.357	0.393	0.065
	(0.021)	(0.028)	
Household head has partial elementary education	0.312	0.308	0.781
	(0.019)	(0.026)	
Household head completed elementary education or higher	0.331	0.300	0.087
	(0.018)	(0.026)	
Household head main language spoken is Spanish	0.303	0.355	0.095
	(0.053)	(0.062)	
Household size	5.772	5.932	0.075
	(0.113)	(0.152)	
Household is beneficiary of school public program	0.275	0.225	0.001
	(0.018)	(0.022)	
Dwelling has finished walls	0.467	0.477	0.685
	(0.035)	(0.039)	
Dwelling has finished ceiling	0.141	0.147	0.689
	(0.016)	(0.022)	
Dwelling has finished floors	0.546	0.583	0.149
	(0.037)	(0.036)	
Dwelling is connected to electricity	0.831	0.861	0.161
	(0.050)	(0.047)	
Dwelling is connected to water system	0.852	0.855	0.919
	(0.029)	(0.036)	
Dwelling is connected to drainage network	0.302	0.332	0.255
	(0.042)	(0.053)	
Household cooking fuel is electricity or gas	0.033	0.033	0.894
	(0.005)	(0.008)	
Daily per capita household expenditures (in Quetzales)	11.594	11.248	0.470
	(0.671)	(0.855)	
Household owns TV or radio	0.741	0.750	0.634
	(0.023)	(0.025)	
Household owns vehicle	0.238	0.275	0.067
	(0.024)	(0.033)	

(Continue)

Household characteristics (at baseline 2019)	(1) Households interviewed at baseline survey	(2) Households interviewed across five survey rounds	(3) p-value (1) vs (2)
Household owns livestock	0.568	0.574	0.799
	(0.034)	(0.040)	
Agricultural land size (in hectares)	0.943	0.949	0.922
	(0.098)	(0.082)	
Agricultural land has irrigation system	0.141	0.154	0.472
	(0.021)	(0.027)	
Coffee among main crops produced	0.780	0.797	0.573
	(0.053)	(0.052)	
Cardamom among main crops produced	0.141	0.144	0.906
	(0.056)	(0.051)	
Corn among main crops produced	0.479	0.466	0.606
	(0.042)	(0.049)	
Beans among main crops produced	0.177	0.190	0.402
	(0.024)	(0.027)	
Number of observations	2,142	777	

Note: This table reports the results of an orthogonality (balance) test of baseline characteristics between households interviewed at the baseline survey (2,142 households interviewed in 2019) and households interviewed across all five survey rounds (777 households). Columns (1) and (2) report the corresponding averages and standard errors (in parentheses) clustered by community. The p-values reported in column (3) correspond to the orthogonality test between the two groups of households. A value larger than 0.01 (0.05) indicates that the difference in means between the two groups is not statistically significant at a 99% (95%) confidence level.

Table A.3. Changes in individual and social preferences, alternative estimations

Coefficient	(1)	(2)	(3)
	Dependent variable:		
	Risk tolerance (scale 0-10)	Distrust of people (scale 1-4)	Perception of people's unwillingness to help (scale 1-4)
Panel A: Unbalanced panel of households, 2019-2022			
2020 survey round	1.78923***	0.48923***	0.18022***
	(0.28372)	(0.05364)	(0.06269)
2021 survey round	1.83105***	0.49176***	0.34598***
	(0.26074)	(0.04224)	(0.06749)
2022 survey round	0.39764	0.53346***	0.53854***
	(0.40183)	(0.05606)	(0.05644)
Household size	-0.05905	-0.00830	0.00221
	(0.06397)	(0.01134)	(0.01443)
Constant	4.38756***	2.98256***	2.94046***
	(0.38106)	(0.06636)	(0.08365)
Household fixed effects	Yes	Yes	Yes
Observations	6,840	6,735	6,694
R-squared	0.098	0.115	0.063
Panel B: Allowing for time-varying controls for subsample of households, 2019 vs 2022			
2022 survey round	0.50177	0.48113***	0.43775***
	(0.41870)	(0.08111)	(0.07144)
Household size	-0.07836	0.02116	0.00016
	(0.12396)	(0.02552)	(0.02588)
Constant	5.52888***	2.98029***	3.45735***
	(1.31347)	(0.27962)	(0.25747)
Household time-varying controls	Yes	Yes	Yes
Household fixed effects	Yes	Yes	Yes
Observations	1,554	1,468	1,440
R-squared	0.062	0.224	0.165

Note: This table reports the estimation results for the modeled preference indicators depicted in equation (1) in the main text, using the full unbalanced panel of households over the four survey rounds in Panel A and allowing for time-varying controls for a subsample of households that were interviewed for an additional round in 2022 to model changes in preferences between 2019 and 2022 in Panel B. See the main text for additional details on the exercise performed in Panel B. Column (1) corresponds to risk tolerance; column (2) to distrust of people; and column (3) to perception of people's unwillingness to help. Robust standard errors reported in parentheses clustered by community. ***, **, and * denote statistical significance at, respectively, the 99%, 95%, and 90% levels.

Appendix B. Survey instrument to elicit preference indicators

This appendix presents the questions used to construct the three indicators measuring a household individual and social preferences: risk aversion, trust in people, and perception of people's generosity.

Risk aversion

Are you generally a person who is fully prepared to take risks or tries to avoid taking risks? On a scale 0 (*I am not willing to take any risks*) to 10 (*I am willing to take risks*), in which number are you?

0	1	2	3	4	5	6	7	8	9	10

Trust in people

Generally speaking, would you say that you can trust people or that you should be very cautious when dealing with people? With which of the following statements do you agree?

i. You can almost always trust people

ii. You can generally trust people

iii. You should generally be very cautious

iv. You should almost always be very cautious

v. Cannot decide/Don't know/Refuses to answer [separate options]

Perception of people's generosity

How often do you think people would try to help you, or how often do you think people are just worried about their own problems? With which of the following statements do you agree?

i. They would try to help me almost every time

ii. They would try to help me most of the time

iii. They are worried about their own problems most of the time

iv. They worry about their own problems all the time

v. Cannot decide/Don't know/Refuses to answer [separate options]

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