Global Evidence on Cooperation

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Abstract This paper presents globally representative evidence on impersonal cooperation using a standardized, incentivized experimental paradigm administered in 125 nationally representative samples, comprising more than 50,000 participants. We provide four main insights. First, we document the global distribution of impersonal cooperation, showing that while cooperation is widespread, its prevalence varies systematically across countries. Second, higher levels of cooperation are positively associated with key indicators of development, including GDP, life satisfaction, and life expectancy. Third, impersonal cooperation is embedded within a society's broader social system and coherently related to social beliefs, values, and norms. Fourth, we document that a broad set of contemporaneous and historical factors that have been posited to decrease the relative costs of interacting with strangers are related to population-level cooperation. Moreover, we show that variation in impersonal cooperation partially reflects ancient migration patterns.

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1 Introduction

Overcoming social dilemmas is a fundamental problem of human existence and often requires cooperation among unrelated strangers. Understanding the nature and foundations of cooperation has therefore been a central research objective in economics and other social sciences. Using novel and globally representative data, we seek to make progress with respect to several central questions. First, how prevalent is human cooperation across the globe, and do cooperation rates vary systematically across countries? Second, is a society's capability to engage in impersonal cooperation positively associated with economic and social benefits, such as GDP or life expectancy? Third, can impersonal cooperation be characterized as part of a society's broader social system, and is it coherently associated with related social beliefs, values, and norms? And fourth, is the variation in impersonal cooperation across countries systematically related to contemporaneous and historical factors that have been posited to have altered the relative costs and benefits associated with impersonal cooperation, such as the quality of institutions or historic kinship tightness?

To address these questions, we conduct a cooperation experiment in 125 representative country samples with more than 50,000 individuals. Our global sample represents 92% of the world's adult population and 96% of global GDP. To measure impersonal cooperation, we conduct a simple, two-player cooperation experiment. Each participant is matched with a stranger from their country and decides whether to cooperate or to defect. Cooperating is costly, but if both players choose to cooperate, this generates a positive global externality in the form of a donation to a climate charity. We chose the context of climate change as the global climate is arguably one of the most important common goods and because the decision context is one where the benefits of cooperation mostly accrue to unknown, distant individuals. The experiment captures the central trade-off individuals face in social dilemmas but is at the same time extremely simple. Participants' decisions were probabilistically incentivized, and we followed a comparable methodology in 125 representative country samples, using state-of-the-art sampling and translation methods as well as cultural and cognitive pre-testing. We show that our measure of cooperation correlates well with existing proxies of cooperation, such as vaccination or blood donation, as well as related experimental measures of cooperation.

Our first main finding concerns the global population's willingness to cooperate. Around the globe, 69% of people are willing to cooperate with a stranger from their country. This relatively high level of impersonal cooperation masks substantial variation across countries, with cooperation rates ranging from 28% to 92%. This variation does not merely reflect sampling noise. We show that the observed variation is significantly larger than expected by chance and that it is systematically related to cultural

differences between countries, which we proxy using data from the World Values Survey (Muthukrishna et al., 2020). We show that the greater the cultural differences between two countries, the larger the differences in population-level cooperation rates.

Our second set of results examines how variation in cooperation rates across populations is associated with social and economic outcomes. In particular, our globally representative data allow us to test and confirm a notion that is typically assumed in most of the cooperation literature: the notion that a society's capability to engage in impersonal cooperation is positively associated with substantial economic and social benefits. We begin by investigating the relationship between cooperation and GDP, arguably the most important indicator of a country's economic development. We find a strong positive and statistically significant relationship, with a raw correlation between country-level cooperation and log GDP per capita of 0.62. This positive association remains statistically significant when we control for continent fixed effects and a large array of country-level controls. Moreover, we estimate a positive and significant effect in a subnational analysis, where we use regional-level data on GDP and cooperation and control for country fixed effects. Similar effects as for GDP are found for related measures of development such as the Human Development Index, life expectancy, and subjective well-being.

We then turn to exploring potential pathways through which cooperation may impact economic development. We show that a set of important proximate determinants of economic development are significantly correlated with population-level impersonal cooperation. These factors include measures of total factor productivity (TFP), labor productivity, international trade, innovation as proxied with scientific publications, and nepotism in business relationships. To illustrate, consider the role of TFP: The efficient use of inputs in a complex production process likely depends on a high degree of specialization, organizations with deep hierarchies and teamwork, rendering the capability to engage in impersonal cooperation critical. As a consequence, higher cooperation shares are hypothesized to be associated with higher levels of TFP. Consistent with our hypotheses, we find that all proximate factors that we study are statistically significantly related to impersonal cooperation. These findings suggest that cooperation may positively affect economic development through its effects on a set of important proximate determinants of development.

We also study the associations between cooperation and other important societal outcomes, including income inequality, tax revenues, and conflict. Societies that have higher cooperation rates display more equal income distributions, as measured in terms of a country's Gini coefficient, and lower economic inequality between groups, as measured by the ethnic inequality index developed by Alesina et al. (2016). More cooperative societies also tend to collect higher tax revenues, and they tend to be more peaceful. Together the results suggest that population-level cooperation rates are significantly as-

sociated with both economic and social outcomes.

In a third step, we document that impersonal cooperation is embedded in a broader social system of beliefs, norms, and values that likely reinforce one another. One example is that of general trust: High levels of trust in strangers likely facilitate cooperative interactions within a society, while the observation and experience of successful cooperation likely reinforce trust. Similar reinforcing mechanisms plausibly hold for a set of social factors that jointly determine a society's social system. In support of this notion, we show that cooperation is positively correlated with cooperation beliefs and general trust, a set of values including civic values, individualism, and moral universalism, as well as social norms, and norm enforcement. Moreover, we show that a summary index of these related social factors is strongly positively associated with population-level impersonal cooperation, suggesting the presence of cohesive social systems that likely support and enable impersonal cooperation.

Fourth, we turn to the question why some countries are more cooperative than others. Understanding the sources of cross-cultural heterogeneity in impersonal cooperation has always been a key interest in the social sciences, but to date, there is little consensus, and no generally agreed upon theory exists (Spadaro et al., 2022). Presumably, one limiting factor has been the lack of data that combine a well-defined measure of cooperation with global cultural coverage. A common feature of different hypotheses is the assumption that contemporary and historical factors have altered the relative costs and benefits associated with impersonal cooperation, e.g., through the functioning of formal institutions (North 1990; Acemoglu et al. 2005; Greif 2006; Herrmann et al. 2008; Tabellini 2008a) or environments that encourage interactions with strangers (e.g., due to low kinship intensity) or reinforce ties within close-knit communities (e.g., under heightened pathogen threats). We note that many of these factors have likely co-evolved with impersonal cooperation over a long period of time, which is why we neither attempt to establish causality nor gauge the relative importance of specific potential candidates. Instead, we ask whether specific factors suggested in the literature can account for variation in present-day impersonal cooperation.

We provide three sets of results. First, we show that the quality of formal institutions is strongly and positively associated with the level of impersonal cooperation. This positive relationship also holds for individual proxies of institutional quality, such as the rule of law or control of corruption, as well as for a joint measure based on the first principal component of all these proxies. Second, we explore whether historical factors that have been hypothesized to push individuals away from — or pull them toward — interactions with strangers are associated with present-day impersonal cooperation. For example, historically tight kinship structures have been hypothesized to reduce impersonal cooperation, as strong family-based networks prioritize cooperation within close in-groups

and limit trust toward outsiders (e.g., Enke, 2019; Schulz et al., 2019). Relatedly, historical exposure to the Western (and Eastern) church is thought to have promoted looser kinship structures — partly by prohibiting cousin marriage — while also spreading universal moral values (Enke 2019; Schulz et al. 2019; Schulz 2022). Consistent with these arguments, we find that present-day cooperation rates are strongly negatively associated with the strength of historical kinship tightness and positively associated with historical Western (and Eastern) church exposure. Similarly, in line with the parasite-stress theory, which posits that societies have restricted social interaction to local groups in an attempt to reduce the risk of infection, we find that pathogen prevalence and parasite stress are negatively correlated with impersonal cooperation (Fincher and Thornhill, 2012). Third, we examine whether contemporary differences in population-level cooperation rates can be traced back to very distant migration patterns. Following previous work, we proxy ancestral distance by constructing an index from measures of genetic distance (Spolaore and Wacziarg, 2009, 2017) and linguistic distance (Fearon, 2003) and show that variation in population-level cooperation is significantly related to ancestral distance as well as to its genetic and linguistic subindices. Similarly, we find a positive association between ancenstral distance and differences in cooperation rates in a subnational analysis, where the variation only stems from differences between migrants living in the same country, which allows us to hold the contemporary environment constant. These findings suggest that variation in cooperation is deeply rooted in ancestral migration patterns.

Related Literature Understanding the nature and foundations of human cooperation has been a central objective in economics and other social sciences (for reviews, see Bowles and Gintis 2011; Rand and Nowak 2013; Gächter 2014; Fehr and Schurtenberger 2018; Henrich and Muthukrishna 2021; Spadaro et al. 2022; van Lange and Rand 2022). A central question in this literature is whether cooperation varies substantially across societies and cultures and whether such cross-societal variation is systematically related to institutional or historical factors. Most existing empirical evidence on cooperation relies on non-representative data from a single country or a small set of countries, limiting the scope for exploring cross-cultural differences in impersonal cooperation. Our main contribution relative to the existing literature is to examine cross-societal variation in cooperation using a novel, globally representative dataset covering a large and diverse set of countries. We incorporate an incentivized cooperation experiment into the Gallup World Poll, enabling us to collect data on impersonal cooperation from 125 representative country samples. We present more than 50,000 individuals worldwide with the same decision situation, which allows us to obtain a measure of cooperation that is comparable across countries and cultures. This unprecedented data resource allows

us to investigate several interrelated questions on the global, cross-cultural variation in impersonal cooperation that, until now, could not be explored.

Most closely related to our work are the studies that measure cooperation consistently across different societies using the same experimental paradigm, albeit in a smaller set of countries. An early study by Henrich et al. (2001) conducted comparable public goods experiments in 7 small-scale societies with varied social and cultural conditions. They highlight that there is substantial cross-cultural variation in cooperation, which they find to be systematically related to market integration and the local importance of cooperation. Herrmann et al. (2008) conducted comparable public goods experiments among university undergraduates in 15 high- and middle-income countries to investigate patterns of cooperation and punishment behavior. They also document substantial cultural variation in cooperation, which is closely related to the extent to which individuals engage in 'antisocial punishment' — the tendency to sanction high contributors (see also Gächter et al., 2010). This tendency varies substantially across cultures and is most pronounced in countries with weak norms of civic cooperation and weak rule of law. More recently, Romano et al. (2021b) present cooperation data from a prisoner's dilemma game, conducted online with approximately 18,000 individuals from 42 high- and middle-income countries. The study's focus is on parochialism, the tendency to cooperate more with ingroup compared to outgroup members. They show that parochialism is a widespread phenomenon, which can be observed to a similar degree across the countries in the sample. They also show that cooperation levels vary systematically across countries, a variation that is associated with institutional differences, prevalent values, and ecological conditions. In related work, Romano et al. (2021a) test whether the cross-societal variation in cooperation is systematically related to prosocial behavior during the COVID-19 pandemic and support for regulations to address COVID-19, and find no consistent support for these hypotheses. Relative to these studies, we substantially increase the number of covered countries as well as the global coverage. The 125 countries in our sample form a geographically and culturally diverse group, encompassing all continents, various cultures, and economic conditions, which allows us to examine impersonal cooperation globally and to explore a broader set of hypotheses related to the cross-societal variation in cooperation.

Also relevant to our study is recent work by Spadaro et al. (2022), who conduct a meta-analysis based on more than 1,500 cooperation studies dating back to 1958. Most of these studies rely on non-representative student populations (85%), study Western samples (80%), and employ experimental protocols that vary widely between studies.[1] To extract a country-level measure of cooperation, Spadaro et al. (2022) need to statis-

[1]The experimental protocols differ, for example, with respect to group size, punishment or communication options, payment schemes, number of choice options, order of moves, or information conditions.

tically account for differences in design features. Contrary to other previous studies and our own analysis, Spadaro et al. (2022) do not detect significant cross-societal differences in cooperation and no systematic relation between the meta-analytic estimates of cooperation and cultural factors. In contrast to Spadaro et al. (2022), we use the same experimental paradigm in all countries, i.e., we present all respondents with the exact same decision environment. The approach has the advantage that we obtain country-level measures of cooperation that are comparable across the different countries in our sample.

Numerous hypotheses regarding the nature and origins of cross-cultural differences in cooperation have been proposed in the literature (see Spadaro et al. 2022 for a comprehensive review). For instance, well-functioning, impartial institutions are hypothesized to promote (but in turn may also rely on) impersonal cooperation (e.g., Tabellini 2008a,b, Henrich et al. 2010, Rustagi 2024), while historically tight kinship structures are hypothesized to reduce impersonal cooperation (Enke, 2019; Schulz et al., 2019). We discuss important hypotheses and related work in more detail in sections 5 and 6. Previous empirical studies exploring these hypotheses had to rely on relatively small sets of countries or indirect proxies of cooperation such as blood donations. In this context, our contribution is threefold. First, we substantially expand the available data that can help develop and test theories of cooperation. Second, we confirm that impersonal cooperation is embedded in a broader social system of beliefs, norms, and values that likely reinforce one another (Bowles and Gintis 2011, Enke 2019, Henrich and Muthukrishna 2021). Third, we find that past and historical factors that alter the relative costs and benefits associated with impersonal cooperation are consistently related to impersonal cooperation today, including, e.g., institutions (Tabellini 2008a,b), kinship tightness (Enke, 2019; Schulz, 2022), church exposure (Schulz et al., 2019), and pathogen stress (Fincher and Thornhill, 2012).

Turning to economic and social consequences, our paper adds to a long stream of work studying why some countries are richer and more developed than others. Research in development accounting has pointed to production factors in explaining income differences between countries (Hall and Jones 1999; Caselli 2005; Hsieh and Klenow 2010), but to date there is little consensus on why these proximate determinants of economic development may differ. Cultural candidates suggested in previous work include, e.g., social capital and trust (Knack and Keefer 1997; Guiso et al. 2004), civic values (Guiso et al., 2011), civic honesty (Cohn et al. 2019; Tannenbaum et al. 2025), or patience (Sunde et al., 2022). We add to this literature by showing that impersonal cooperation can statistically account for a substantial proportion of the variance in GDP as well as its proximate determinants. In this context, our results also relate to a recent literature on the link between the strength of family values or kinship tightness and economic develop-

ment. Alesina and Giuliano (2014) show a strong negative correlation between log GDP per capita and the strength of family ties. Enke (2019) shows that the relationship between log GDP per capita and historical kinship tightness is strongly negative, whereas Bahrami-Rad et al. (2024) argue that historical kinship tightness causally affects economic development and provide evidence that kinship tightness is also negatively associated with innovation and trade. We add to this literature by providing direct evidence on the link between impersonal cooperation and economic development, which has been a hypothesized channel in this literature. Moreover, we show that country-level cooperation is systematically related to a vector of important societal outcomes, including happiness, life expectancy, inequality, tax revenue, and peacefulness.

Finally, our study builds on and contributes to the recent literature presenting novel evidence on preferences and beliefs elicited in large-scale, representative global samples (see, e.g., Falk et al. 2018; Almås et al. 2022; Bursztyn et al. 2024; Cappelen et al. 2025; Almås et al. 2025). We integrate an incentivized, two-player game with direct payments to participants into a global survey. The approach allows us to leverage the strengths of the sampling methodology (global coverage) with the lab experimental approach (incentivized, two-player game). For economists and social scientists, the ability to conduct incentivized, multi-player experimental games within the Gallup World Poll presents numerous opportunities for future research.

2 The Global Cooperation Dataset

Our goal is to study impersonal cooperation across the globe. We face three main challenges when designing our study. First, we need to measure cooperation in a large and diverse set of countries, and each country sample needs to broadly represent the country's population. Second, we need to present study participants with a precisely defined, incentivized cooperation decision, in which the decision to cooperate can trigger a meaningful externality. Third, to allow for a comparison across countries and cultures, the survey needs to be implemented in a comparable manner across all countries. This section explains how we design our global study to tackle these challenges.

2.1 Global Sample

To study cooperation across the globe, we collect the 'Global Cooperation Dataset' from a globally representative sample. We administer our cooperation module as part of the Gallup World Poll 2021/2022 in a large and diverse set of countries (Fig. 1). The 125 countries in our sample form a geographically and culturally diverse group, encompassing all continents, various cultures, and economic conditions. The countries in our

sample account for 96% of the world's GDP and 92% of the global population aged 15 and above.

Overall, our global sample comprises a total of 50,339 individuals from 125 countries, and most country samples comprise approximately 300 to 500 respondents aged 15 or above, with a median sample size of 420. Interviews were conducted via telephone (common in high-income countries) or face-to-face (common in low-income countries), with randomly drawn phone numbers or addresses. Participation in our cooperation experiment was voluntary, and we sought informed consent before asking participants to make the incentivized cooperation decision. The cooperation decision analyzed in this paper was presented to a randomly chosen half of the respondents who consented to participate.

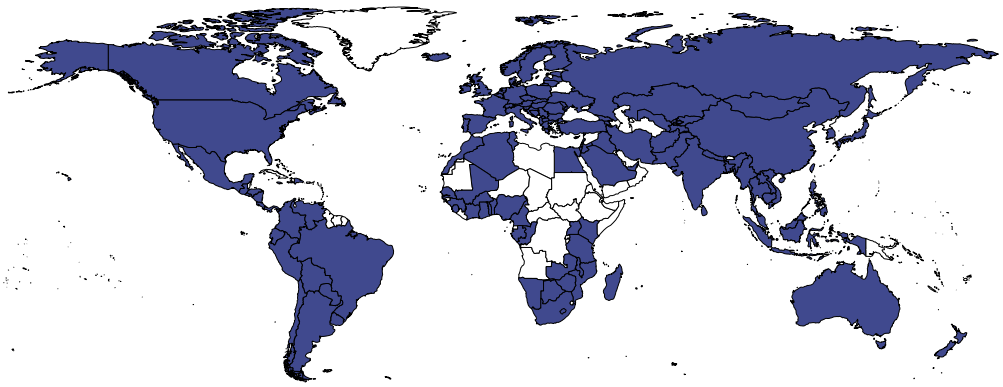
In all analyses, we use sampling weights to ensure that the country samples represent the country's population aged 15 or above. The weights are calculated in three steps. First, Gallup constructs a probability base weight to correct for disproportional selection probabilities resulting from the stratified random sampling procedure. In a second step, Gallup post-stratifies the base weights to adjust for non-response to the World Poll, matching the weighted sample totals to known population statistics. The standard demographic variables used for post-stratification are age, gender, education, and region. In a third step, we additionally post-stratify the weights provided by Gallup to account for the fact that a subset of all Gallup respondents participated in the cooperation experiment analyzed in this paper. The variables used for this additional post-stratification step are age, gender, income, education, and whether the individual lives in an urban or rural area. When describing the data at the supranational level, we additionally weight each country sample by its share of the world population.[2]

2.2 Measuring Cooperation

We measure impersonal cooperation across the world using an incentivized cooperation experiment. The design of our cooperation experiment is guided by four main objectives. First, participants need to be presented with a precisely defined decision situation, which captures the central trade-off individuals face in cooperation dilemmas, namely that cooperative behavior comes at a cost to individuals but results in the provision of the common good if other people cooperate as well. Second, our goal is to measure impersonal cooperation, which is why we match individuals with an unknown stranger from their country and choose an externality that mostly benefits distant strangers. Third, the decision situation needs to be easily understood by a diverse group of respondents from a large set of countries with very different cultural and educational backgrounds. Finally,

[2]See Appendix A.1 for a more detailed description of the sampling and weighting approach.

Figure 1: Coverage of the Global Cooperation Dataset



Notes: Blue area: All 125 countries in which the cooperation experiment was conducted. The countries account for 96% of the world's GDP and 92% of the global population aged 15 and above.

the cooperation experiment needs to be incentivized, i.e., decisions need to potentially result in actual payments to the study participants.

With these goals in mind, we design a simple, two-player cooperation experiment for which each individual is matched with another anonymous individual from their own country. Each individual can choose between cooperation and defection. The act of cooperation can trigger a positive global externality, namely a donation to a charitable organization that fights global warming. More specifically, the US version of the cooperation experiment reads as follows:[3]

> *Here is the decision you need to make. If you are randomly selected, you will be matched with another selected respondent from the United States. Both you and the other respondent can choose between two options.*
>
> - ***Option 1**: You receive $100 for yourself.*
> - ***Option 2**: You receive $70 for yourself. If BOTH you and the other respondent choose the smaller amount of $70, a donation of $400 will be made to fight global warming.*
>
> *If you are randomly selected, this is a real decision. What would you choose?*

The decision situation is deliberately kept simple, asking respondents to choose between only two available options.[4] Table 1 presents the normal form of this symmetric, simultaneous-move game and illustrates the central trade-off individuals face when deciding whether to cooperate or defect. While the decision to cooperate comes at a cost

[3] See Appendix A.2 for the full instructions.

[4] Extensive pre-tests in six culturally diverse countries demonstrated that more complex, continuous versions of the public good game led to comprehension difficulties in some countries.

Table 1: Normal form of the cooperation experiment

		Player 2	
		Cooperate	**Defect**
Player 1	**Cooperate**	($70, $70) + $400 donation	($70, $100)
	Defect	($100, $70)	($100, $100)

to the individual, the act of cooperation triggers a donation to a climate charity if both players choose to cooperate.[5] After the cooperation decision, respondents are asked to estimate how many out of 100 other respondents in their country choose to only receive the smaller monetary amount, i.e., to cooperate. Possible answers range from 0 to 100.

We deliberately measure impersonal cooperation using an experiment in which participants can choose whether or not to cooperate with a stranger and in which the benefits of cooperation – fighting climate change – mostly accrue to distant strangers.

An innovative aspect of our study is to incorporate an incentivized decision into the Gallup World Poll that could result in direct payments to participants (see Appendix A.3 for more details). We collaborated closely with Gallup to determine the feasibility of incentive payments in each respective country. In 114 out of 125 countries, we were able to incentivize individual decisions in the cooperation experiment. In two of these countries, the use of incentives for minors was prohibited by law. In the remaining eleven countries, the use of incentive payments was not feasible for legal or logistical reasons. When the cooperation experiment could not be incentivized, we presented participants with an exactly identical but hypothetical decision situation.

In the 114 countries in which we could incentivize the decision, we used a probabilistic incentive scheme. More specifically, one of the 114 countries was randomly chosen, and in this country, 10% of participants were randomly selected and matched to another selected respondent from this country. For those selected pairs of individuals, the decisions were implemented accordingly. Before making their decision, participants were informed about the fact that we ask this question to people in more than 100 countries, that one country would be randomly selected, and that there is a 1 in 10 chance that their decision will be a real decision if their country is selected.

[5]The charity we chose is *atmosfair*, which is a charity that offsets CO_2 emissions. At the time of the survey, it cost about $28 to offset 1 ton of CO_2 emissions. The World Bank estimates that a typical US resident causes about 16 tons of CO_2 emissions per year. To put the amount into context, it costs about $450 to offset the annual CO_2 emissions of an average US citizen.

2.3 Survey Implementation

Structure Our experimental module was included in the Gallup World Poll 2021/2022. It was preceded by a brief definition of "global warming" to ensure a shared understanding of the term.[6] In the countries in which the cooperation decision is incentivized, we first ask for informed consent to participate in a real decision, which can result in direct payments to participants. Next, respondents are presented with the cooperation experiment. Subsequently, they are asked to indicate their belief about the cooperation of others.

Translation To ensure comparability across countries and cultures, professional translators translated the survey into local languages using an elaborate, multi-step translation procedure. Monetary amounts were converted using World Bank purchasing power parity factors for comparability across countries.[7]

Pre-tests The survey was rigorously pre-tested in six countries with diverse cultural backgrounds — Colombia, Egypt, India, Indonesia, Kenya, and Ukraine — to ensure that individuals with varying cultural, economic, and educational backgrounds understand the questions in a consistent manner. Detailed probing questions investigated respondents' interpretation of key terms, and respondents were encouraged to voice any comprehension difficulties. In fact, the decision to use the simplified version of the cooperation experiment in which the decision is binary was made after we witnessed in the pre-tests that a more complicated, continuous version of the public good game would have led to comprehension problems in some countries.

2.4 Relation With Other Measures of Cooperation

In this section, we examine the relationship between our country-level measure of cooperation and other indicators of cooperative behavior used in previous studies. We proceed in two steps. First, we assess whether our country-level measure of cooperation is positively associated with the prevalence of real-world behaviors used as proxies for cooperation in previous studies (e.g., blood donations). This relationship is not obvious, as such behaviors may not only reflect cooperative attitudes but also institutional factors (e.g., blood donation regulations). Second, we investigate whether our cooperation measure is positively associated with other country-level measures of cooperation, which are also derived from incentivized experiments but rely on data from a substantially smaller

[6]This definition is part of the preceding Global Climate Change Survey module analyzed in Andre et al. (2024). We deliberately use the term "global warming" instead of "climate change" to avoid confusion with seasonal weather variations, but we use both terms synonymously in this paper.

[7]See Appendix A.4 for more details on the translation procedure, the adaptation of the monetary amounts, and the cultural pre-tests.

set of countries. Again, a positive association is not self-evident, given differences in the underlying methodologies — such as variations in experimental protocols or sampling strategies.

Table 2 presents the results of country-level regressions, in which we regress the alternative measures of cooperation on a country-level measure of cooperation derived from our controlled experiment.[8] To facilitate interpretation, we standardize our cooperation measure to have a mean of zero and a standard deviation of one. We use the full sample of respondents when constructing our standardized cooperation measure used in the analyses presented in Panel A. For the analyses presented in Panel B, we instead construct the standardized cooperation measure using young individuals (below age 35) with a high school degree only. This subsample mirrors a typical 'student population', which is useful for comparison, as most previous experimental studies have relied on student samples.

Columns 1–5 display the associations between our experimental measure of cooperation and other non-experimental, country-level proxies for impersonal cooperation. We find that countries with higher levels of cooperation, as measured through our incentivized experiment, have significantly higher COVID-19 vaccination rates (columns 1–3), higher blood donation rates (column 4), and more cooperative labor-employer relations, as measured in the Executive Opinion Survey of the World Economic Forum (column 5). There is essentially no difference in the estimated associations regardless of whether we use the full sample (Panel A) or the restricted sample (Panel B) to construct our country-level measure of cooperation.

Next, we examine the association between our country-level cooperation measure and alternative experimental measures of cooperation. Despite differences in experimental protocols and sampling procedures, we find positive associations with the measures reported in Herrmann et al. (2008) (15 countries; 13 overlapping with our sample) and Romano et al. (2021b) (42 countries; full overlap), the two largest existing cross-country studies employing consistent experimental protocols to measure cooperation across societies.[9] For example, a one-standard-deviation increase in our cooperation measure is associated with a 0.77-standard-deviation increase in the experimental measure of cooperation reported in Herrmann et al. (2008) (column 6). This coefficient is imprecisely estimated, which is unsurprising given the small number of countries used in this analysis ($N = 13$). We note, however, that the coefficient is more precisely estimated and

[8] See Appendix B for a full list of country-level variables used in this paper, including their sources and definitions.

[9] Using the same experimental protocols across countries, Herrmann et al. (2008) conduct four-player Public Goods experiments, whereas Romano et al. (2021b) conduct two-player Prisoner's Dilemma games. In both of these studies, the positive externality is a financial benefit that accrues to the other group member(s).

Table 2: Relation with alternative measures of cooperation

	Dependent variable:							
	COVID-19 vaccination			Other proxies for cooperation		Experimental cooperation measures		
	(1) At least one dose (%)	(2) Fully vaccinated (%)	(3) At least one booster (%)	(4) Blood donations (per 1,000 capita)	(5) Cooperation in labor market (WER, std.)	(6) Herrmann et al. (2008, std.)	(7) Romano et al. (2021b, std.)	(8) Spadaro et al. (2022, std.)
A. Full sample								
Cooperation (std.)	8.111***	9.407***	12.115***	9.891***	0.183**	0.771	0.263**	-0.084
	(1.948)	(1.852)	(1.853)	(1.594)	(0.090)	(0.517)	(0.114)	(0.136)
R^2	0.117	0.159	0.257	0.369	0.034	0.137	0.086	0.007
Countries	123	123	114	113	116	13	42	65
B. Young with high school degree								
Cooperation (std.)	8.442***	9.743***	11.767***	7.740***	0.171**	0.894**	0.288***	0.001
	(2.046)	(1.944)	(1.781)	(1.528)	(0.086)	(0.340)	(0.106)	(0.130)
R^2	0.127	0.171	0.249	0.221	0.030	0.244	0.106	0.000
Countries	123	123	114	113	116	13	42	65

Notes: This table presents the results from OLS regressions. The unit of observation is a country. "Cooperation (std.)" is the standardized national cooperation rate. "At least one dose (%)", "Fully vaccinated (%)", and "At least one booster (%)" are the share of the population with at least one dose of vaccination, the share that is fully vaccinated, and the share with at least one booster shot against COVID-19, using WHO data as of December 2023. "Blood donations (per 1,000 capita)" is the number of blood donations per 1,000 capita (from Schulz et al., 2019). "Cooperation in labor markets" is the perceived degree of cooperation in labor-employer relations as measured in the Executive Opinion Survey of the World Economic Forum (standardized). "Herrmann et al. (2008, std.)", "Romano et al. (2021b, std.)" and "Sparado et al. (2022, std.)" indicate experimental measures of cooperation from the studies indicated in the column header. Panel A constructs our cooperation measures from the full sample of World Poll respondents. Panel B presents estimates if we instead construct the cooperation measure by restricting the sample to World Poll respondents aged 35 or below with a secondary or tertiary degree. Robust standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

reaches statistical significance when we focus on student populations, as Herrmann et al. (2008) (see Panel B).

In contrast to these results, we note that our measure of cooperation is uncorrelated with the country-level cooperation index that Spadaro et al. (2022) extract from Public Goods and Prisoner's Dilemma experiments using a meta-analytic approach (column 8).[10] Contrary to Herrmann et al. (2008), Romano et al. (2021b), and our own analysis, Spadaro et al. (2022) also report no statistically significant cross-societal differences in cooperation and no systematic relation between the meta-analytic estimates of cooperation and cultural factors. The lack of consistency between the studies' results may stem from important differences in the methodology. The studies differ not only in the samples used but also in their underlying experimental protocols, a variation that Spadaro et al. (2022) need to statistically account for to derive a country-level measure of cooperation. This contrasts with Herrmann et al. (2008), Romano et al. (2021b), and our own approach, which employ the same experimental paradigm across societies.

In sum, our country-level measure of cooperation is positively correlated with alternative experimental measures of cooperation, which have used consistent experimental protocols to measure cooperation across countries, and it is positively associated with the prevalence of real-world behaviors used as proxies for cooperation in previous studies.

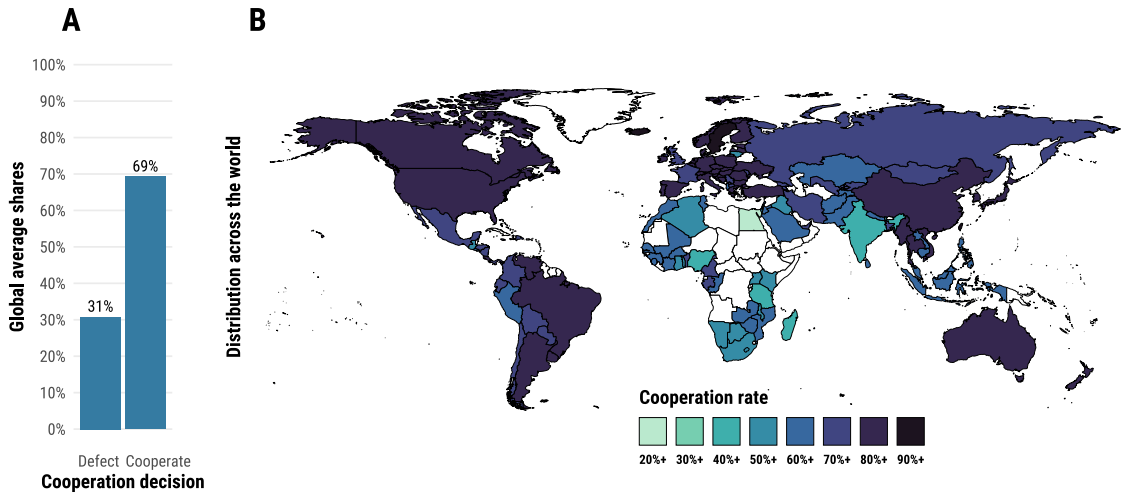
3 Cooperation Across the World

We begin the discussion of our results by examining the extent to which humans across the world are willing to cooperate with an unrelated stranger on the provision of a common good. Figure 2 illustrates the global average share of people choosing to cooperate (Fig. 2A) as well as the variation in cooperation across countries (Fig. 2B). Our findings reveal that a significant majority of the global population is willing to cooperate with a stranger. 69% of people in our globally representative sample choose to cooperate, and 31% choose to defect. Cooperation rates are high in many countries around the world. In the vast majority of countries (121 out of 125), the share of respondents engaging in costly cooperation exceeds 50%. Notably, in half of the countries in our sample, more than 75% of respondents choose to cooperate.

The world map in Figure 2B highlights considerable variation in cooperation rates across countries and cultures. The country-level cooperation rates range from 28% (Egypt) to 91–92% (Sweden, Iceland, Taiwan). These differences result in even greater variation in the likelihood of successful cooperation. The rates of successful co-

[10]Note that the cooperation index reported in Spadaro et al. (2022) is also uncorrelated with the cooperation measure of Romano et al. (2021b).

Figure 2: Cooperation Across the World



Notes: Panel A presents the global average shares of respondents choosing to defect or cooperate. Population-adjusted weights are used to ensure representativeness at the global level. Panel B presents a world map in which each country is colored according to its share of respondents choosing to cooperate. Countries that were not included in the 2021/2022 Gallup World Poll are colored in white. Sampling weights are used to ensure representativeness at the country level.

operation, calculated by squaring the cooperation rates, range from 8% to 84%, respectively. Cooperation rates also differ substantially across world regions (Supp. Tab. S.1). The shares of individuals choosing to cooperate are lowest in Sub-Saharan Africa (56%) and North Africa and the Middle East (62%), and they are highest in Western Europe (83%) and Australia and New Zealand (86%).

To set the stage for our later analyses, we study whether the observed variation in population-level cooperation is systematic or whether it merely reflects sampling noise. We proceed in two steps. First, we note that of all possible pairwise country comparisons (7,750), 63% of the country-level cooperation shares are significantly different from each other at the 5% level (two-sided t-test). Moreover, the standard deviation of country-level cooperation shares is four times greater than expected by chance (p-value < 0.001, randomization test).

As a second test, we examine whether cross-country differences in cooperation are systematically related to differences in culture, as suggested by previous research (e.g., Boyd and Richerson 2009, Gächter et al. 2010, Bowles and Gintis 2011, Enke 2019, Henrich and Muthukrishna 2021). To assess cultural variation, we rely on a measure derived by Muthukrishna et al. (2020), which is based on data from the 2005–2009 and 2010–2014 waves of the World Values Survey (WVS). The measure draws on responses to more than 100 survey items encompassing a broad spectrum of culturally transmitted values, beliefs, and behaviors, including views on what people consider important in life, family norms, and religious or political attitudes. For each country pair, the index

is derived as the proportion of the total variance that can be attributed to differences between countries, relative to the total variance (Muthukrishna et al., 2020).

Table 3: Dyadic regression: Cultural distance subcomponents

	Dependent variable: Absolute distance in cooperation rates (in pp)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cultural distance (std.)	4.205***						
	(0.660)						
Sub-index distance (std.):							
Beliefs		3.830***					
		(0.674)					
Group member			2.681***				
			(0.545)				
Law				3.007***			
				(0.693)			
Political					3.942***		
					(0.642)		
Sexuality						2.912***	
						(0.654)	
Social relations							3.596***
							(0.641)
R^2	0.584	0.578	0.536	0.550	0.574	0.545	0.561
Country pairs	3,240	3,240	3,240	3,240	3,240	3,240	3,240
Countries	80	80	80	80	80	80	80
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: This table shows dyadic regression estimates where the unit of observation is a country pair. The dependent variable is the absolute distance in cooperation rates between the two countries that form a pair. "Cultural distance" is a measure of cultural distance derived from the World Values Survey following the methodology in Muthukrishna et al. (2020). All other regressors are standardized sub-components of the cultural distance measure. Each sub-index is constructed based on a subset of WVS survey items that conceptually cluster into different thematic domains (Muthukrishna et al. 2020): Beliefs (e.g., religiosity, morality); Group Member (e.g., trust, in-/out-group attitudes); Law (e.g., views on rules and compliance); Political (e.g., political attitudes, democratic values); Sexuality (e.g., attitudes toward sexual norms, views on homosexuality); and Social Relations (e.g., family, parenting, and community preferences). All measures of cultural distance are standardized to have a mean of zero and a standard deviation of one. All regressions include country fixed effects and control for the log of the geographic distance between the two countries that form a pair. Robust standard errors corrected for two-way clustering at both countries in a pair are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To test for the association between cooperation and culture, we use a dyadic regression framework. We take each possible pair of countries as unit of observation for which data on the cultural distance between the two countries are available. For each country pair (i, j), we calculate the absolute difference in cooperation rates between the two countries, $||\Delta\text{Cooperation}_{i,j}||$, and regress it on the measure of absolute cultural distance, $||\Delta\text{Culture}_{i,j}||$, which we standardize to have a mean of zero and a standard deviation of one:

$$\|\Delta\text{Cooperation}_{i,j}\| = \alpha + \beta\|\Delta\text{Culture}_{i,j}\| + \gamma_i + \gamma_j + \delta log\text{D}_{i,j} + \varepsilon_{i,j}. \quad (1)$$

To account for any unobservables that are country-specific, we include country fixed effects γ_i and γ_j. All regressions additionally control for the log of the geographic distance between the two countries that form a pair (D_{ij}). $\varepsilon_{i,j}$ is the country-pair-specific error term, which we cluster at the level of the first and second country in a pair. The coefficient of interest is β. If the estimated β is significantly positive, this implies that countries that are culturally one standard deviation more similar have cooperation rates that are β percentage points (pp) more similar.

Our results show that population-level cooperation is significantly related to cultural variation (see column 1 of Table 3). To illustrate, a one-standard-deviation increase in cultural distance is associated with a 4.2 pp increase in the absolute difference in cooperation rates, a large and statistically significant effect (p-value < 0.001). Further analyses show that this association does not only hold for the WVS summary index, but also for the six sub-indices (Beliefs, Group member, Law, Political, Sexuality, and Social relations).[11] For all sub-indices we find a positive and statistically significant association (see columns 2–7 in Table 3).[12]

Taken together, a relatively high share of the global population chooses to cooperate with an unrelated stranger on the provision of a common good, but there is also substantial cross-societal variation, which is quantitatively important and appears to be systematic.

4 Cooperation and Economic Development

Addressing important social and economic problems often involves the willingness to cooperate with unrelated individuals. This applies to all levels of human interaction, from local interactions to the national and international level. If impersonal cooperation plays a fundamental role for the functioning of societies, one would expect societies capable of sustaining higher levels of cooperation to be more prosperous relative to

[11] Each sub-index is constructed based on a subset of WVS survey items that conceptually cluster into different thematic domains (Muthukrishna et al. 2020): Beliefs (e.g., religiosity, morality); Group Member (e.g., trust, in-/out-group attitudes); Law (e.g., views on rules and compliance); Political (e.g., political attitudes, democratic values); Sexuality (e.g., attitudes toward sexual norms, views on homosexuality); and Social Relations (e.g., family, parenting, and community preferences).

[12] We detect similar associations if we proxy cultural variation with the help of the Ethnographic Atlas, which provides evidence on more than 1,200 pre-industrial societies, describing a broad range of cultural practices such as subsistence mode, religious beliefs, or kinship organization (Murdock, 1967). For this alternative measure, a one-standard-deviation increase in cultural distance is associated with an 8.6 pp increase in the absolute difference in the cooperation rate (p-value < 0.001). For details, see Appendix Table S.2.

countries with lower levels of cooperation. In the following, we test whether population-level cooperation shares are associated with a set of economic and social indicators of welfare and development.

Economic Development We first explore the association between country-level cooperation rates and GDP, arguably the most important measure of a country's economic development. Table 4 presents the results of OLS regressions in which we regress country-level log GDP per capita, adjusted for purchasing power, on country-level cooperation rates, which we standardize to have a mean of zero and a standard deviation of one. The results of the univariate regression presented in column 1 reveal a strong positive association: a one-standard-deviation (or 12-percentage-point) increase in the cooperation rate is associated with a 66 log point (or 93%) increase in GDP per capita (p-value < 0.001). Figure 3A visualizes this strong positive relationship. Statistically, population-level cooperation alone explains about 38 percent of the between-country variation in log GDP per capita. The raw correlation between the cooperation share and log GDP per capita is $\rho = 0.62$ (p-value < 0.001).

In columns 2–5, we add various controls including continent fixed effects, ecological characteristics, and genetic diversity. Including these controls reduces the coefficient on cooperation, which, however, remains substantial and statistically significant. For example, in column 5, a one-standard-deviation increase in cooperation is associated with a 0.19 log points (or 21%) increase in GDP. In column 6, we show the results of a subnational analysis, i.e., a regression including country fixed effects. The advantage of a regional-level analysis is that it allows to account for unobserved heterogeneity at the country level, such as differences in domestic policies and institutions. Column 6 presents regression coefficients at the regional level based on regions with at least 10 World Poll respondents (670 regions). Results show that the average regional cooperation rate and economic development are also positively associated within countries, across regions (p-value $= 0.005$).[13] The fact that the coefficient is much smaller than the country-level coefficient reported in column 1 suggests that — above and beyond measurement error and attenuation bias — the effect of cooperation on economic development could be characterized by complementarities. For example, higher cooperation rates in one region could generate positive externalities for the whole country, which are absorbed by the country fixed effects in column 6.

Given the strong link between impersonal cooperation and GDP, we also expect positive associations with other country-level measures and outcomes that are tightly linked to economic development, such as the Human Development Index (HDI), life expectancy,

[13]We also find a positive association between cooperation and income at the individual level, using country/region fixed effects. In this individual-level analysis, the individual decision to cooperate is associated with a 25 percent higher income (p-value < 0.001).

Table 4: Cooperation and GDP

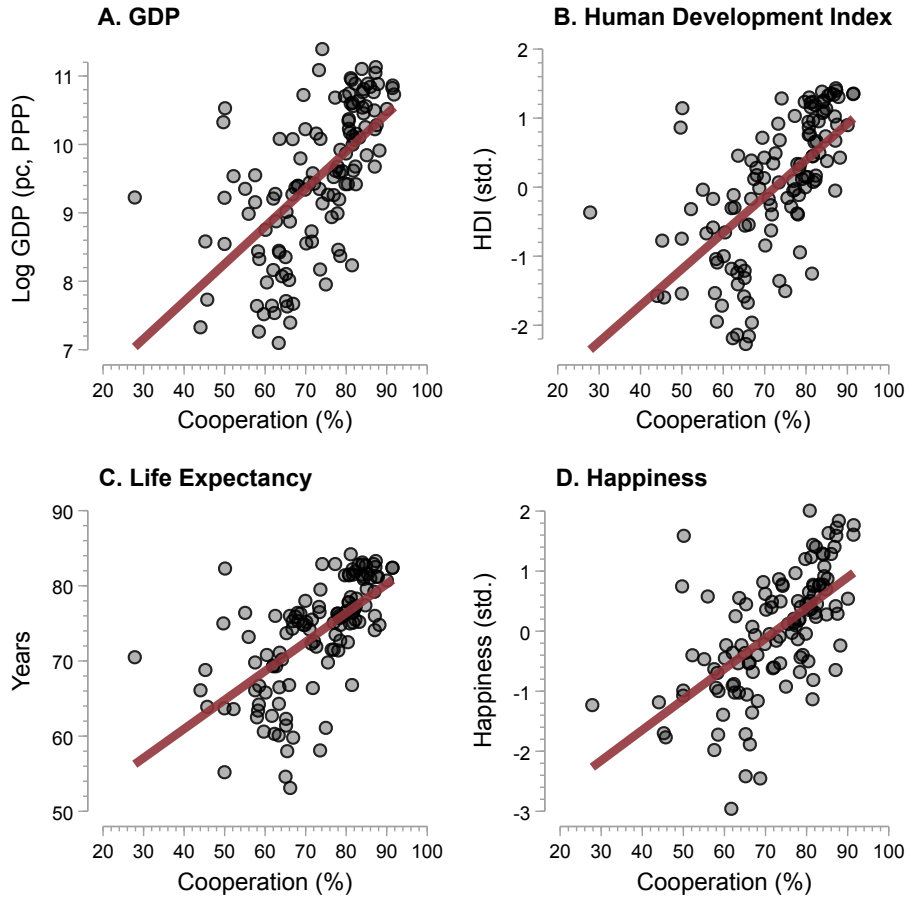
	Dependent variable: Log GDP (pc, PPP)					
	(1)	(2)	(3)	(4)	(5)	(6)
Cooperation (std.)	0.658***	0.281**	0.215**	0.209***	0.193**	0.075***
	(0.099)	(0.115)	(0.084)	(0.079)	(0.083)	(0.026)
Average precipitation (std.)			0.101	-0.067	-0.109	
			(0.093)	(0.100)	(0.101)	
Average temperature (std.)			0.077	-0.056	-0.062	
			(0.123)	(0.118)	(0.115)	
At risk of malaria (%)			-0.012***	-0.011***	-0.011***	
			(0.003)	(0.002)	(0.003)	
(Sub-)tropical zone (%)			-0.005*	-0.001	-0.001	
			(0.003)	(0.003)	(0.003)	
Distance to coast (std.)				-0.270**	-0.276**	
				(0.114)	(0.116)	
Longitude				0.002	0.001	
				(0.003)	(0.004)	
Percentage of arable land				-0.007	-0.008	
				(0.006)	(0.005)	
Land suitability for agriculture				-0.007**	-0.006*	
				(0.003)	(0.003)	
Genetic diversity					36.431	
					(43.655)	
Genetic diversity (sqrd.)					-28.374	
					(31.454)	
R^2	0.379	0.534	0.687	0.737	0.740	0.909
Observations	125	125	117	114	114	670
Continent fixed effects		Yes	Yes	Yes	Yes	
Country fixed effects						Yes
Unit of observation	Country	Country	Country	Country	Country	Region

Notes: This table presents regression estimates at the country (columns 1–5) or a subnational level (column 6). The dependent variable is log GDP per capita (PPP-adjusted). Column 6 uses log regional GDP as an outcome instead, which we obtain from Wenz et al. (2023). "Cooperation (std.)" is the standardized national cooperation rate. At the subnational level, we restrict to regions with at least 10 World Poll respondents in 2019. Columns 2–5 include continent fixed effects. Column 6 includes country fixed effects. Robust standard errors clustered at the country level in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

or subjective well-being. Support for these hypotheses is shown in Panels B–D of Figure 3. Countries with higher impersonal cooperation display a significantly higher HDI and higher levels of subjective well-being. A ten-percentage-point increase in cooperation is associated with a 0.53-standard-deviation increase in the HDI and a 0.51-standard-deviation increase in well-being, respectively (p-value < 0.001). For life expectancy, shown in Panel D, a ten-percentage-point increase in population-level cooperation is associated with a 3.9-year increase (p-value < 0.001). With respect to these three measures, cooperation shares statistically explain between 37% and 40% of the country-level variation. We further note that the respective associations between cooperation

Figure 3: Cooperation and economic development



Notes: This figure presents scatterplots at the country level. The dependent variable is indicated in the panel header. Linear regression estimates are shown as red lines.

and HDI, life expectancy, as well as subjective well-being remain statitically significant if we condition on a country's GDP.[14]

In sum, we find strong support for the hypothesis of a positive association between impersonal cooperation and GDP, both at the national and subnational level. In addition, important related measures of prosperity are strongly positively correlated with cooperation.

Potential Pathways In this section, we explore whether impersonal cooperation is also positively associated with proximate determinants of economic development studied in the literature. The basic intuition is that the provision of public goods, which critically depends on impersonal cooperation, may be essential for the efficient production (and distribution) of goods and services.

A particularly important proximate determinant of economic development is total

[14]OLS coefficients of cooperation conditional on GDP are 0.069 for HDI (p-value = 0.017), 1.227 for life expectancy (p-value = 0.015), and 0.228 for subjective well-being (p-value = 0.004), respectively.

factor productivity (TFP), an indicator of an economy's capacity to generate income from production inputs, in particular labor and physical capital. As is well known, TFP varies substantially across countries and accounts for a substantial part of the variation in GDP. However, less consensus has been reached on the sources of TFP. Impersonal cooperation and the provision of public goods could be a potential driver of differences in TFP, given that the efficient use of inputs in complex production processes often relies on a high degree of specialization, the division of labor, organizations with deep hierarchies, teamwork, and other organizational features that require cooperative behaviors. We therefore expect a positive and significant relation between country-level TFP and cooperation shares. A related proximate determinant is labor productivity (GDP divided by hours worked), for which we also expect a positive association with cooperation rates.

In addition, we consider the relationship between cooperation and international trade. International trade may be facilitated through cooperation, as societies with higher levels of impersonal cooperation may be better positioned to engage in mutually beneficial exchanges with strangers from other countries. Impersonal cooperation may be particularly important in the context of international trade, as it often involves exchange with unknown counterparts in a context where transactions are not completed on the spot and where legal enforcement is incomplete.[15]

Further, higher levels of impersonal cooperation might foster greater innovation and knowledge sharing. The intuition is that impersonal cooperation enables diverse teams to work together, potentially enhancing the exchange of ideas and knowledge across different groups. This suggests that impersonal cooperation may be positively related to innovation, which we measure in terms of scientific publications. Moreover, cooperation may facilitate the efficient allocation of talent and resources, as individuals might be more likely to sort into firms or occupations based on their talents rather than family networks. We therefore test whether impersonal cooperation is negatively associated with nepotism, which is negatively correlated with economic development.

Results are shown in Table 5. We regress each of our five proximate determinants of economic development (TFP, labor productivity, international trade, innovation/scientific publications, and nepotism) on our measure of impersonal cooperation. We also display each determinant's correlation with log GDP per capita. All five regression coefficients have the expected sign and are both quantitatively and statistically significant. For example, a one-standard-deviation increase in impersonal cooperation is associated with a 0.33-standard-deviation increase in TFP (column 1) and a 0.46-standard-deviation increase in labor productivity (column 2). It is also associated with a 0.26-standard-deviation lower incidence of nepotism (column 5). While we cannot establish causality, these results are in line with the hypothesis that impersonal cooper-

[15] See Guiso et al. (2004) for a similar argument related to trust.

Table 5: Pathways from cooperation to economic development

	(1) Total factor productivity (std.)	(2) Labor productivity (std.)	(3) Trade (% of GDP)	(4) Log scientific publications	(5) Nepotism in business (std.)
Cooperation (std.)	0.333**	0.461***	14.004***	1.356***	-0.258***
	(0.154)	(0.148)	(3.408)	(0.286)	(0.082)
R^2	0.115	0.141	0.084	0.308	0.074
Countries	101	38	121	108	104
Corr(Outcome, log GDP)	0.757	0.914	0.357	0.838	-0.570

Notes: This table presents the results from OLS regressions. The unit of observation is a country. "Cooperation (std.)" is the standardized national cooperation rate. "Labor productivity" is GDP divided by hours worked (available for OECD countries only). Robust standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

ation is a key cultural factor that explains variation in GDP through a set of important proximate determinants of economic development.

Inequality, Taxes and Conflict Impersonal cooperation affects human interactions not only in the realm of production and economic development. It is a critical prerequisite for solving a large set of social problems that are governed by social interactions and externalities. Next, we examine the association between cooperation rates and three additional societal outcomes: inequality, taxes, and conflict.

To measure economic inequality, we first use the Gini index provided by the World Bank. The Gini index measures the extent to which the distribution of income (or, in some countries, consumption expenditure) among individuals or households within a society deviates from a perfectly equal distribution. Moreover, we use the ethnic inequality index developed by Alesina et al. (2016), which captures within-country differences in mean income — as captured by luminosity per capita — across groups. We expect more cooperative societies to favor higher levels of equality. First, equality is often viewed as a common good, which requires cooperative efforts such as collecting taxes and redistribution. Second, cooperative individuals place a higher value on the well-being of others than non-cooperative individuals. Societies comprising higher shares of cooperators should therefore favor policies that enhance equality.

The provision of public goods is a central objective of national governments and requires the collection of taxes. Hence, tax revenues are critical for the provision of public goods, and more cooperative societies are expected to display higher levels of tax revenues compared to less cooperative societies. To test this hypothesis, we use a measure of tax revenues in percent of GDP provided from the World Development Indicators database, where taxes refer to compulsory transfers to the central government

Table 6: Cooperation and other societal outcomes

	(1) Gini coefficient (std.)	(2) Ethnic inequality (std.)	(3) Tax revenue (% of GDP)	(4) Societal safety and security index (std.)	(5) Ongoing conflict index (std.)	(6) Militarization index (std.)
Cooperation (std.)	-0.440***	-0.415***	1.574**	0.442***	-0.358***	-0.196*
	(0.134)	(0.086)	(0.712)	(0.087)	(0.084)	(0.103)
R^2	0.191	0.174	0.063	0.199	0.130	0.039
Countries	98	120	103	122	122	122

Notes: This table presents the results from OLS regressions. The unit of observation is a country. "Cooperation (std.)" is the standardized national cooperation rate. "Ethnic inequality (std.)" is a Gini-based measure of economic inequality between ethnic groups from Alesina et al. (2016). "Societal safety and security" is a component of the Global Peace Index (GPI) that measures the level of societal safety and security in a country, with larger values denoting higher safety. "Ongoing conflict" is a component of the GPI that measures the level of ongoing domestic and international conflict, with larger values denoting higher conflict intensity. "Militarization" is a component of the GPI that measures the level of militarization in a country, with larger values denoting higher militarization. Robust standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

for public purposes.

Finally, we study the relation between impersonal cooperation and conflict, testing the intuitive hypothesis that cooperative societies should favor peace and safety over conflict. To do so, we use data from the Global Peace Index (GPI), which ranks 163 independent states and territories according to their level of peacefulness. The GPI covers three specific domains: (i) societal safety and security (e.g., low crime rates, harmonious relations with neighbouring countries, a stable political scene); (ii) ongoing domestic and international conflict (e.g., extent to which countries are involved in internal and external conflicts); and (iii) militarization (e.g., the link between a country's level of military build-up and its level of peacefulness, both domestically and internationally).

Results are presented in Table 6 where we regress six societal measures of equality, tax revenue, and conflict on our measure of population-level impersonal cooperation. We find that more cooperative societies are significantly more equal, have higher tax revenues, and display higher levels of peacefulness. To illustrate, a one-standard-deviation increase in cooperation is associated with a 0.44 standard deviation lower Gini coefficient, a 0.42 standard deviation lower ethnic inequality index, and 1.6 percentage point higher tax revenues. Statistically, population-level cooperation explains about 19 percent of the variation in the Gini coefficient. The coefficients for the three GPI-domains of peacefulness all have the expected sign and are statistically significant.

5 Impersonal Cooperation as Part of a Social System

Impersonal cooperation represents a form of social behavior that is deeply embedded within a society's broader social fabric (see, e.g., Bowles and Gintis, 2011; Enke, 2019; Henrich and Muthukrishna, 2021). It constitutes a key element of an interconnected system of social factors — such as shared beliefs, norms, and values — that mutually reinforce one another and shape collective behavior. For instance, high levels of impersonal cooperation are unlikely to emerge in environments characterized by low general trust in strangers and weak cooperation beliefs. Conversely, elevated levels of trust and strong expectations of cooperative behavior are plausibly sustained only in contexts where individuals routinely observe and engage in successful cooperation with unfamiliar others. Similarly, sustained cooperation is supported and reinforced by a system of pro-social values and cooperation-enhancing norms that reward cooperative behavior and impose social or material sanctions on norm violations and defection.

In the following, we describe the co-occurence of these social factors with impersonal cooperation at the global scale. To do so, we first study bivariate associations of impersonal cooperation with societal markers of beliefs, social norms, and values. To account for the simultaneity of factors, in a second step, we show how societal levels of impersonal cooperation are related to a summary indicator of these factors.

Our findings on the bivariate associations are summarized in Table 7, which presents regression coefficients for each potential factor with country-level cooperation rates as the dependent variable. For ease of interpretation, all regressors as well as our country-level measure of cooperation are standardized to have a mean of zero and a standard deviation of one. For each regression, we report the point estimate (column 1), robust standard errors (column 2), the 95% confidence interval (column 3), the R^2 (column 4), and the number of countries used in the estimation (column 5). A description of all measures and data sets is provided in Appendix B. Sample sizes vary depending on data availability.

We begin with examining the association between beliefs about cooperation and cooperation rates. A large body of laboratory and field experimental research provides evidence in line with the concept of 'conditional cooperation', wherein a substantial proportion of people are willing to cooperate if they believe others will cooperate as well (Fischbacher et al. 2001; Fehr and Fischbacher 2004; Gächter 2007; Rustagi et al. 2010; Gächter 2014). At the same time, people are arguably more likely to expect others to cooperate when successful cooperation is a common experience in their country. Accordingly, we expect a systematic and positive association between impersonal cooperation and cooperation beliefs. Indeed, country-level cooperation rates are strongly positively correlated with average beliefs about the share of individuals choosing to co-

operate (see Table 7).[16] The effect size is sizeable: a one-standard-deviation increase in our country-level measure of beliefs about the cooperation of others is associated with a 0.57-standard-deviation increase in cooperation rates (p-value<0.001).

The belief that others are likely to cooperate is closely related to the notion of generalized trust. In the absence of generalized trust, individuals may be hesitant to cooperate with those outside their immediate social networks. Similarly, trust in unfamiliar individuals is more likely to emerge in contexts where interactions between strangers reliably result in cooperative outcomes. Trust has been shown to be a key predictor of cooperative behavior at the individual level (Balliet and van Lange, 2013), and it has been shown that the extent to which individuals perceive strangers as trustworthy varies substantially across countries (Falk et al., 2018; Guiso et al., 2011). Therefore, we expect trust to be positively associated with both beliefs about the cooperation of others and with levels of impersonal cooperation. Using data from the WVS and the Global Preferences Survey (GPS)[17], we find a strong positive association between the country-level belief that most people can be trusted and the belief that others will cooperate ($\rho=0.445$, p-value<0.001) as well as between trust and actual cooperation rates ($\beta=0.425$, p-value<0.001, see Table 7).

Alongside beliefs, commonly shared pro-social values are part of a social system and have been linked to cooperation in previous work (Guiso et al., 2011). The first measure of societal-level values we examine concerns civic values — persistent, shared values that facilitate cooperation among community members. Following the work by Guiso et al. (2011), civic values are constructed as the standardized first principal component of three items from the World Values Survey, covering whether it is justified to claim government benefits to which one is not entitled, to cheat on taxes, and to accept a bribe. Values are recoded such that larger values of the first principal component mean lower justifiability, i.e., higher civic values. We find that a one-standard-deviation increase in civic values is associated with a 0.22-standard-deviation increase in cooperation (p-value$=0.050$).

Societies also differ in the extent to which they embrace individualistic or collectivistic values (Hofstede et al., 2010; Triandis, 2018). Collectivistic societies are said to prioritize the interdependence of community members, while individualistic societies emphasize autonomy and independence. The relationship between these values and impersonal cooperation is complex, and the predictions are mixed (Spadaro et al., 2022).

[16]We note that beliefs and cooperation decisions are also positively associated at the individual level. We examine the individual-level determinants of cooperation, and how these vary across countries, in Andre et al. (2025).

[17]We use both data sources to increase coverage. The World Values Survey (WVS) contains trust data from 91 countries, whereas the Global Preferences Survey (GPS) contains trust data from 73 countries. Together, we have data on 101 countries. The estimated effect of trust on cooperation is positive and statistically significant for each separate data source as well (p-value<0.001).

Table 7: Determinants of cooperation: Co-evolving social systems

	Point estimate (1)	Standard error (2)	95% CI (3)	R^2 (4)	N (5)
Cooperation beliefs (own data, std.)	0.570***	0.105	[0.362,0.778]	0.325	125
Trust (WVS and Falk et al. 2018, std.)	0.425***	0.070	[0.286,0.564]	0.176	101
Civic values (WVS, std.)	0.222*	0.112	[-0.000,0.444]	0.048	89
Individualism (Beugelsdijk et al. 2018, std.)	0.650***	0.084	[0.483,0.817]	0.400	87
Moral universalism (Enke 2019, std.)	0.365***	0.105	[0.156,0.574]	0.121	65
Norms (Andre et al. 2024, std.)	0.376***	0.124	[0.131,0.622]	0.142	125
Altruistic punishment (Falk et al. 2018, std.)	0.369***	0.084	[0.201,0.538]	0.115	73
First principle component (std.)	0.748***	0.144	[0.458,1.039]	0.438	41

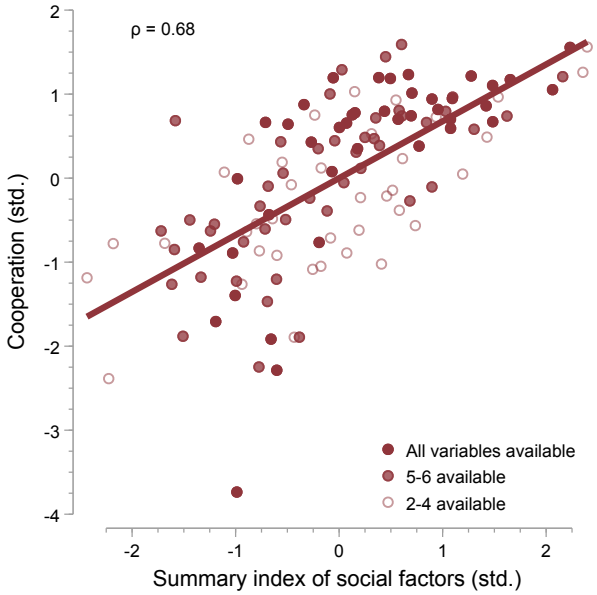
Notes: Each row presents the results from a separate bivariate regression where the unit of observation is a country. The dependent variable in each regression is the national cooperation rate, which we standardize to have a mean of zero and a standard deviation of one in the full sample of 125 countries. All regressors are standardized to have a mean of zero and a standard deviation of one. For each regression, we report the point estimate (column 1), robust standard errors (column 2), the 95% confidence interval (column 3), the R^2 (column 4), and the number of countries (column 5).

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

On the one hand, collectivistic societies could exhibit higher levels of cooperation since cooperation involves prioritizing the collective interest. On the other hand, impersonal cooperation — collaborating and exchanging with those outside one's ingroup — may be more prevalent in individualistic societies. Indeed, we find a strong positive association between cooperation rates and individualism as measured by Beugelsdijk and Welzel (2018) (β=0.650, p-value<0.001, see Table 7).

Cooperation with unrelated strangers is facilitated in a system of values that extends pro-social concerns to those who are socially distant and outside one's immediate ingroup. The idea that there is a universal standard of right and wrong that applies equally to everyone, regardless of an individual's culture, nationality, or social position has a long-standing tradition in philosophy and religion. More recently, the notion of moral universalism also received increasing attention in the social sciences (Haidt 2007; Enke et al. 2023; Enke 2024; Cappelen et al. 2025). Recent empirical work has shown that the prevalence of universal values varies between countries, and it has been hypothesized that moral universalism has developed together with impersonal cooperation, complementing one another (Enke, 2019). Our data support this line of argument and reveal a strong positive association between the prevalence of universal moral values, as measured by Enke (2019), and cooperation rates at the country level (β=0.365, p-value<0.001, see Table 7).

Figure 4: Cooperation and social systems



Notes: This figure presents scatterplots at the country level between the standardized national cooperation rate and a standardized linear index of the variables included in Table 7 ($N = 125$). Data availability of the variables underlying the index is indicated. Linear regression estimate shown as a red line.

Finally, societal equilibria are defined by a set of social norms, which describe behavioral rules or principles that reflect a community's collective understanding of what is considered typical and morally acceptable (Bicchieri 2006; Krupka and Weber 2013; Nyborg et al. 2016; Fehr and Schurtenberger 2018). These norms establish standards of conduct, shape individual behavior, and are enforced in a decentralized manner. A large body of research highlights the importance of social norms for cooperative behavior as well as the role of altruistic punishment for sustaining cooperation (Ostrom 2000; Fehr and Gächter 2002; Fehr and Fischbacher 2004; Falk et al. 2005; Henrich 2006; Bowles and Gintis 2011). Altruistic punishment occurs when people are willing to incur personal costs to sanction norm violators, even if they are not immediately affected and have no material benefit from sanctioning. Drawing on two measures of norms and norm enforcement, namely a measure of pro-climate social norms taken from Andre et al. (2024) and a measure of altruistic punishment taken from Falk et al. (2018), we document the following patterns. At the country level, we find a positive association between the prevalence of pro-climate social norms and the willingness of individuals to cooperate on the provision of the global common good ($\beta = 0.376$, p-value<0.001, see Table 7). Moreover, cooperation rates are significantly higher in countries with a greater tendency to engage in altruistic punishment ($\beta = 0.369$, p-value<0.001, see Table 7).

The bivariate associations shown in Table 7 are consistent with the notion that im-

personal cooperation varies systematically with other social beliefs, values, and norms. Since these factors likely complement and reinforce one another, we also perform a principal component analysis to extract a proxy from all of these other social factors. As shown in the bottom row of Table 7, the first principal component is strongly positively correlated with cooperation rates. A one-standard-deviation increase in the principal component is associated with a 0.748-standard-deviation increase in cooperation rates (p-value<0.001). Due to data availability, this analysis relies on only 41 countries. To increase coverage, we therefore construct a simple summary index at the country level. For each country in our sample ($N = 125$), we average all available standardized beliefs, norms, and values shown in Table 7. This implies that — given data availability — for some countries, the index is based on all seven factors, while for other countries, it is based on a smaller number of factors. The scatter plot shown in Figure 4 displays how our summary index is related to the respective standardized level of impersonal cooperation. Each dot represents a country, and different colors indicate the number of social factors used for the construction of the summary index. The figure reveals a strong, systematic, and positive association: Countries that jointly feature high levels of pro-cooperation beliefs, norms, and values also display high levels of impersonal cooperation. The effect size is large, with a correlation of 0.677 (p-value<0.001) and an R^2 of 45.8 percent. Together with the bivarate associations, these findings support the notion that impersonal cooperation is deeply embedded within a society's broader social fabric.

6 Origins of Impersonal Cooperation

Population-level cooperation strongly varies across the globe, a variation that is associated with important societal-level outcomes. This raises the question why some societies are more successful than others in sustaining high levels of impersonal cooperation. In the past decades, anthropologists, psychologists, and economists have put forward numerous theories and hypotheses regarding the potential societal-level factors that favor impersonal cooperation. These theories suggest a role for both historical and contemporaneous factors, and they differ in what is assumed to be the specific mechanism. However, common to these theories is that external factors have shifted the relative costs and benefits of impersonal cooperation — either through formal institutions or through social environments that push individuals to interact more with strangers (e.g., in response to loosening kinship ties or residential mobility) or pull toward interactions with closer community members (e.g., due to pathogen threats). Moreover, it has been hypothesized that common ancestral histories of exposure to environmental factors have shaped today's differences in population-level cooperation.

Hence, our analysis proceeds in three steps. First, we examine how contemporaneous differences in the quality of formal institutions relate to impersonal cooperation. Second, we explore how historical factors that push individuals away from — or pull them toward — interactions with strangers are associated with impersonal cooperation. Third, we adopt a deep historical perspective by investigating whether ancient migration patterns predict present-day patterns of impersonal cooperation. Our analysis is descriptive and neither aims at establishing causality nor at detecting the relative importance of specific factors. We believe this is appropriate given that the relevant factors are likely to have co-evolved over long periods of time, causality is likely to be bidirectional in many cases, and various factors complement each other in promoting cooperation. When we present the results, we therefore provide a step-by-step analysis of potential country-specific factors and examine their associations with population-level cooperation.

6.1 Institutional Quality

Formal institutions and impersonal cooperation are likely connected through multiple channels. Institutions establish predictable rules and procedures that structure human interaction, reduce the costs and risks of interacting with strangers, and enable cooperation beyond tight-knit groups (North 1990; Henrich et al. 2010). Institutions also provide third-party enforcement through legal systems, courts, and penalties, which deters opportunistic behavior and ensures commitments are honored (Acemoglu et al., 2005; Greif, 2006; Tabellini, 2008a). This is particularly relevant in impersonal contexts where informal mechanisms (such as reputation or reciprocity) are often ineffective. By contrast, if institutions are perceived as corrupt, people might question the social order and engage in dishonest and anti-social behaviors (Gächter and Schulz, 2016). In fact, in their empirical analysis across 15 countries, Herrmann et al. (2008) show that the rule of law in a country is negatively associated with the prevalence of anti-social punishment, i.e., the sanctioning of people who behave cooperatively. They also posit that the quality of formal institutions favors trust and cooperative beliefs among citizens, and hence higher levels of impersonal cooperation. Moreover, it has been argued that participatory and inclusive institutions empower individuals to collectively discuss, define, and enforce rules, thereby establishing norms of cooperation (Guiso et al., 2016; Rustagi, 2024). In short, well-functioning, impartial, and efficient institutions are thought to change the relative costs and benefits of impersonal cooperation, as they reduce uncertainty, foster exchange among strangers, and provide incentives for cooperation (see also Alesina and Giuliano, 2015, and Spadaro et al., 2022, for reviews).

To test for the association between institutional quality and population-level cooperation, we use the World Bank's Worldwide Governance Indicators. These indicators

capture various facets of institutional quality, including the rule of law, voice and accountability (i.e., the extent to which citizens can participate in selecting their government and express their opinions), political stability, government effectiveness, regulatory quality, as well as control of corruption.[18] We also derive a summary index of institutional quality from the complete set of the World Bank's Worldwide Governance Indicators, using the first principal component.

Results are presented in Table 8, Panel A, which presents bivariate regression coefficients with standardized country-level cooperation rates as the dependent variable. All regressors are standardized to have a mean of zero and a standard deviation of one. For each regression, we report the point estimate (column 1), robust standard errors (column 2), the 95% confidence interval (column 3), the R^2 (column 4), and the number of countries used in the estimation (column 5). For each of the World Bank's indicators on institutional quality, we find a positive association with impersonal cooperation. Effect sizes for the individual indicators are statistically significant and quantitatively large. A one-standard-deviation increase in institutional quality is associated with an increase in population-level cooperation rates in the range between 47.9 and 53.8 percent of a standard deviation. Notably, the explained variance is about 25 percent for each individual indicator. In addition, the coefficient for the summary index is statistically significant, with an effect size of 0.55 and an explained variance of 29.4 percent. These findings suggest that societies with well-functioning institutions are better equipped to sustain high levels of impersonal cooperation.

6.2 Historic Differences and Interaction Patterns

Several prominent theories argue that historical differences in social interaction patterns have resulted in different levels of impersonal cooperation today. In particular, it has been posited that specific historical factors have shifted benefits and costs related to cooperating with ingroup members (family, close networks, community) relative to the benefits and costs related to cooperating with strangers. What distinguishes these theories is the ultimate cause for the emergence of specific interaction patterns and their timing in history.

One important historical factor that has affected patterns of social interaction is the pre-industrial kinship structure (Enke, 2019; Schulz et al., 2019). Anthropologists have long recognized that historical kinship systems vary in their degree of tightness, which reflects how deeply individuals are integrated into large extended family networks (Murdock, 1949). In tightly-knit kinship systems, effective cooperation is argued to occur primarily within close ingroups, often accompanied by mistrust towards outsiders. Con-

[18] A detailed description of measures and data sets used in this section is provided in Appendix B.

versely, in looser kinship systems, people are said to be more likely to engage with strangers and place less emphasis on prioritizing the ingroup. Recent empirical studies have shown that societies with historically looser kinship structures are more likely to uphold universal moral values today, they are more likely to embrace individualistic (rather than collectivistic) values, and their members are more likely to engage in altruistic punishment and impersonal cooperation (Enke, 2019; Schulz et al., 2019). Based on incentivized cooperation data, the empirical link between kinship tightness and impersonal cooperation could so far only be established using the 15 countries covered by Herrmann et al. (2008). Using our data, we can exploit large cultural variation in both kinship tightness and impersonal cooperation, and, in line with previous findings, we find a strong negative association between the strength of historical kinship tightness and cooperation rates at the country level ($\beta = -0.528$, p-value<0.001, see Table 8).

Historically, the Western Church is thought to have promoted looser kinship structures — partly by prohibiting cousin marriage — while also spreading universal moral values (Enke 2019; Schulz et al. 2019; Schulz 2022). The same argument applies, although to a weaker extent, to the Eastern Church, which also spread universal moral values and banned cousin marriage, but enforced this less strictly. As discussed above, both looser historical kinship tightness and universal moral values are positively associated with impersonal cooperation in our data, and likely conducive to the emergence of cooperative behavior. Accordingly, historical exposure to the Western church, and to a lesser extent to the Eastern church, should be associated with higher levels of impersonal cooperation. Consistent with this line of argument, the strength of historical exposure to the Western Church is significantly positively related to impersonal cooperation today ($\beta = 0.524$, p-value<0.001). The positive association with Eastern Church exposure is also noticeable ($\beta = 0.214$, p-value<0.001), but significantly smaller (p-value<0.001).

Another mechanism that has been suggested to affect the nature of social interactions is the response to environmental threats. For example, the 'parasite-stress' theory of social behavior posits that in response to parasite threats and contagious diseases, societies have restricted social interaction to local groups in an attempt to reduce the risk of infection which may result from interacting with strangers (Fincher and Thornhill, 2012). We use two markers of environmental stress: pathogen prevalence (Murray and Schaller, 2010) as well as parasite stress (Fincher et al., 2008). For both measures, we find the expected negative relationships, with effect sizes of $\beta = -0.592$ (p-value<0.001) for pathogen prevalence and $\beta = -0.580$ (p-value<0.001) for parasite stress, respectively.

A related set of theories posit that patterns of social interaction were affected by the Neolithic Transition, characterized by the transition from foraging to agriculture and sedentism. The argument is that this historical transformation led to substantial

increases in population density, group size, and social complexity, which progressively undermined the viability of kin-based and reputation-based cooperation strategies that had predominated in small-scale societies. As human groups expanded beyond the limits of face-to-face interaction, the evolutionary mechanisms that sustained cooperation in ancestral environments became insufficient (Richerson and Boyd, 2006). In addition, the Neolithic transition fostered economic specialization and interregional exchange, necessitating generalized trust and cooperation among non-kin. As a measure, we use the log years since the Neolithic transition (Ashraf and Galor, 2013), i.e., larger values indicate a longer time since settlement. Consistent with this theory, we find a positive relationship between impersonal cooperation and the time since the Neolithic transition, with an effect size of $\beta = 0.407$ (p-value<0.001).

We conclude this section with two contemporary measures of push-pull factors and test whether cooperation levels are higher in countries that are characterized by higher levels of mobility, measured in terms of relational and residential mobility (Bell et al., 2015; Oishi et al., 2015; Spadaro et al., 2022). The former refers to the degree to which individuals in a society can voluntarily form, maintain, and dissolve interpersonal relationships, which we proxy with a measure by Thomson et al. (2018). The latter refers to the share of individuals who have changed residence in their country, which is measured in Bell et al. (2015). Consistent with the hypothesis that mobility enhances the likelihood to interact with strangers, rendering it more likely to develop a need for impersonal cooperation, we find that residential mobility is positively and significantly correlated with cooperation ($\beta = 0.365$, p-value<0.001). The effect of relational mobility is positive as well, but not statistically significant. We note, however, that this test relies on a relatively small sample ($n = 34$).

In summary, our findings are consistent with theories suggesting that variations in impersonal cooperation arose from shifts in social structures that affected both the opportunities and the benefits from interacting and cooperating with strangers. For example, historical exposure to the Western church led to a ban on cousin marriage, implying that individuals could rely on family networks to a lesser extent (push factor). Likewise, parasite threats and pathogen prevalence resulted in less exchange with outgroups in order not to get infected (pull factor). While the ultimate causes and timing vary, the common feature of these hypotheses is that changes in the benefits and costs related to cooperating with ingroup members (family, close networks, community) versus outgroup members are associated with today's population-level impersonal cooperation rates.

Table 8: Origins of cooperation: Institutions and push-pull factors

	Point estimate (1)	Standard error (2)	95% CI (3)	R^2 (4)	N (5)
A. Formal Institutions					
Rule of law (std.)	0.498***	0.073	[0.352,0.643]	0.245	123
Voice and accountability (std.)	0.479***	0.077	[0.326,0.633]	0.227	123
Political stability (std.)	0.501***	0.084	[0.335,0.667]	0.248	123
Government effectiveness (std.)	0.538***	0.072	[0.396,0.680]	0.286	123
Regulatory quality (std.)	0.532***	0.081	[0.372,0.692]	0.280	123
Control of corruption (std.)	0.495***	0.059	[0.379,0.611]	0.242	123
First principle component (std.)	0.545***	0.070	[0.407,0.683]	0.294	123
B. Push-Pull Factors					
Kinship intensity index (Schulz et al. 2019, std.)	-0.528***	0.076	[-0.677,-0.378]	0.274	123
Western church exposure (Schulz et al. 2019, std.)	0.524***	0.061	[0.404,0.645]	0.266	120
Eastern church exposure (Schulz et al. 2019, std.)	0.214***	0.057	[0.102,0.327]	0.044	120
Pathogen prevalence (Murray and Schaller 2010, std.)	-0.592***	0.066	[-0.722,-0.462]	0.327	114
Parasite stress (Fincher et al. 2008, std.)	-0.580***	0.066	[-0.710,-0.449]	0.337	122
Years since Neolithic transition (Ashraf and Galor 2013, log, std.)	0.407***	0.084	[0.241,0.573]	0.167	120
Internal migration intensity (Bell et al. 2015, std.)	0.365***	0.122	[0.120,0.611]	0.131	54
Relational mobility (Thomson et al. 2018, std.)	0.277	0.173	[-0.076,0.630]	0.071	34

Notes: Each row presents the results from a separate bivariate regression where the unit of observation is a country. The dependent variable in each regression is the national cooperation rate, which we standardize to have a mean of zero and a standard deviation of one in the full sample of 125 countries. All regressors are standardized to have a mean of zero and a standard deviation of one. For each regression, we report the point estimate (column 1), robust standard errors (column 2), the 95% confidence interval (column 3), the R^2 (column 4), and the number of countries (column 5). Depending on data availability, we estimate effects on larger or smaller samples, respectively.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6.3 Deep Roots of Cooperation

In this section, we expand the historical perspective and study whether and to what extent today's variation in population-level cooperation has been shaped by the structure and timing of very distant ancestral migration patterns. The notion that contemporary cooperation patterns may be rooted in temporally distant migration movements rests on the fact that in the process of migrating 'out of Africa', human sub-populations settled in geographically separated settlements. As a consequence, they were exposed to different historical experiences, environments, and ecological pressures — which in turn may have shaped social preferences and cooperative attitudes (Becker et al., 2020).[19] Furthermore, historically and geographically separated populations are endowed with different genetic pools, either due to random genetic drift or in response to selection

[19]The online Appendix of Becker et al. (2020) contains a model that formalizes this intuition.

pressures, which are specific to ecological environments.

Following previous work, we proxy 'ancestral distance' by constructing an index from measures of genetic distance (Spolaore and Wacziarg, 2009, 2017) and linguistic distance (Fearon, 2003). To test for the association between ancestral distance and variation in cooperation, we use a dyadic regression framework. For each pair of countries (i, j), we calculate the absolute difference in cooperation rates between the two countries and their ancestral distance. To account for country-specific unobservables, we include country fixed effects. Standard errors are clustered at the level of the first and second country in a pair. All regressions control for the log of the geographic distance between the two countries forming a pair.

Results are reported in Table 9. Column 1 shows that the variation in population-level cooperation is significantly related to ancestral distance. The longer two populations have been separated in the course of the great expansion, the more dissimilar is their willingness to cooperate. A one-standard-deviation increase in ancestral distance is associated with a 2.5-percentage-point increase in the absolute difference in cooperation rates.[20] Columns 2–4 show that the significant effect of ancestral distance not only holds for the summary index but also separately for all three sub-indices. Effect sizes for the two genetic markers and the linguistic marker are very similar, and range from 2.0 percentage points to 2.7 percentage points, respectively.

In a final step, we employ a particularly conservative estimation strategy and study the relationship between differences in cooperation rates and ancestral distance at the subnational level. To this end, we make use of information about respondents' country of birth and perform a migrant analysis, similar to Becker et al. (2020). In these dyadic regressions, the unit of observation is a pair of migrant populations residing in the same host country. This means that we regress the differences in the cooperation rates between migrant populations who now reside in the same country on the ancestral distance between their countries of origin. Compared to cross-country regressions, this reduces the number of observations (but of course increases the number of pairs) and relies on the assumption that cultural traits of the origin countries are at least to some extent persistent (Alesina and Giuliano, 2011). The advantage of performing a migrant analysis is that part of the contemporary environment, which may shape cooperative attitudes, is held constant. Results are reported in column 5. We estimate a positive and significant coefficient, indicating that a one-standard-deviation increase in ancestral distance is associated with a 1.5-percentage-point increase in the absolute distance in cooperation.

In sum, our results suggest that population-level differences in impersonal coopera-

[20]This corresponds to a 24 percent of a standard deviation increase in absolute differences, an effect size very similar to that for the 'preference index' examined in Becker et al. (2020).

Table 9: Deep roots of cooperation

	Dependent variable: Absolute distance in cooperation (in pp)				
	Country-level analysis				Migrant sample
	(1)	(2)	(3)	(4)	(5)
Ancestral distance (std.)	2.510***				1.533**
	(0.517)				(0.718)
Sub-indices:					
Genetic distance (SW 2009, std.)		2.021***			
		(0.480)			
Genetic distance (SW 2017, std.)			2.701***		
			(0.614)		
Linguistic distance (Fearon 2003, std.)				2.097***	
				(0.449)	
R^2	0.475	0.464	0.474	0.465	0.239
N	6,328	7,021	6,786	6,555	5,103
Countries	112	118	116	114	106
Country fixed effects	Yes	Yes	Yes	Yes	Yes

Notes: This table shows dyadic regression estimates. The unit of observation in columns 1–4 is a pair of countries. In column 5, the unit of observation is a migrant population pair residing in the same host country. We exclude migrant population pairs consisting of less than five individuals. The dependent variable is the absolute distance in cooperation rates (in pp) between the two countries (columns 1–5) or between the two migrant populations (column 6) forming a pair. "Ancestral distance" is a standardized index of the absolute difference of three standardized variables: two measures of genetic distance from Spolaore and Wacziarg (2009) and Spolaore and Wacziarg (2017) and one measure of linguistic distance from Fearon (2003). The regressors in columns 2–4 are the three standardized components of the ancestral distance index. For better comparability, we standardize all indices on the country-pair level. All regressions include country fixed effects for the countries forming a pair, and column 6 includes country of birth fixed effects for the migrant populations. All regressions control for the log of the geographic distance between the two countries that form a pair. Robust standard errors corrected for two-way clustering at both countries (of birth) in a pair are shown in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

tion can be traced back to ancient migration patterns. This finding holds for a summary index of ancestral distance, separately for each sub-index, and in a subnational analysis.

7 Concluding Remarks

In this paper, we provide a set of novel insights into impersonal cooperation, arguably one of the most important social and economic behaviors. Our analysis draws on data generated from an incentivized, well-defined cooperation experiment conducted with a large, globally representative sample. This unique dataset allows us to provide a meaningful account of cooperative behavior across countries and cultures, and to make progress along several dimensions.

First, we document that impersonal cooperation is widespread and that the variation between countries is systematic, both in a statistical as well as a cultural sense. Second, our findings support the central assumption that cooperative societies fare better. Higher levels of cooperation are positively associated with greater economic development, as measured by GDP, the Human Development Index, life satisfaction, and life expectancy. These positive associations are consistent with the interpretation that impersonal cooperation is a critical societal resource for fostering well-being. We further show that impersonal cooperation is positively associated with various proximate determinants of economic development, such as total factor productivity, innovation and trade. Cooperative societies also display lower levels of income inequality, generate higher tax revenues, and appear to be more peaceful. Third, we show that impersonal cooperation is an integral part of a society's social system consisting of a set of behaviors, beliefs, norms, and values. Fourth, we study contemporaneous and historical origins of population-level cooperation that have been proposed in the literature. These include the quality of institutions as well as a set of push-pull factors that push individuals away from — or pull them toward — interaction with strangers. We also provide evidence that population-level differences in cooperation can be traced back to deep-rooted migratory patterns.

These findings provide a comprehensive set of stylized facts on some of the most debated issues and research questions concerning impersonal cooperation. Nonetheless, many important questions remain. For example, while it is not obvious how a deeply endogenous phenomenon such as cooperation is causally related to other institutional, historical, or cultural entities, future work may nevertheless establish causal pathways for specific relationships. For example, exploiting data on exogenous shocks may allow researchers to study whether cooperative societies are better equipped to respond to external threats. The fact that vaccination rates are significantly higher in more cooperative societies does suggest that such societies may be more resilient in coping with challenges arising from a pandemic, compared to less cooperative societies.

In conclusion, we view our paper as an initial step toward fully leveraging the potential of the Global Cooperation Data. Future research may further explore the intricate relationship between cooperation and various cultural or institutional contexts.

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Online Appendix

Global Evidence on Cooperation

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Summary of the Online Appendix

Section A provides details on the Global Cooperation Dataset.
Section B provides details on additional data sources and the construction of variables.
Section C contains supplementary tables.

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A The Global Cooperation Dataset

A.1 The Global Sample

Sampling Approach The experiment was carried out as part of the Gallup World Poll 2021/2022 in 125 countries. The cooperation experiment was included at the end of the World Poll after the completion of the *Global Climate Change Survey* block (Andre et al., 2024).

In the World Poll, each country sample was selected to be broadly representative of the resident population aged 15 and above, typically covering the entire country except for regions inaccessible due to safety concerns or very small islands. Interviews were conducted either by computer-assisted telephone interviews (landline/mobile) or face-to-face (mostly computer-assisted). An exception is Afghanistan where paper-and-pencil interviews were used for 73% of respondents due to security concerns. Telephone interviews were chosen in countries with high phone coverage, where this method is customary, or when COVID-19 restrictions prevented face-to-face surveys. Respondent selection for the World Poll was probability-based: telephone interviews employed random-digit dialing or nationally representative phone lists, while face-to-face interviews involved selecting households through random selection of primary sampling units and random-route procedures. Within the chosen households, respondents were randomly selected. If initial contact attempts failed (at least three for face-to-face, five for telephone), a substitution method was applied. More details are available in the documentation of the Gallup World Poll (Gallup, 2021).

The cooperation experiment analyzed in this paper was conducted with a subset of Gallup World Poll respondents. In the countries in which the cooperation decision was incentivized, we first asked every respondent for informed consent to participate in a decision that could have real monetary consequences. Among those who consented (or when incentives were not feasible), a random half of the respondents were assigned to the cooperation experiment analyzed in this paper.

Supplementary Table S.3 lists all countries and provides an overview of field times, sample sizes, interview modes, and languages for each country.

Ethics and Informed Consent The study was approved by the ethics committee of the Gallup World Poll. Informed consent was obtained from all research subjects participating in the Gallup World Poll. We sought additional informed consent for participation in our cooperation survey module. The reason is that the decision in the cooperation experiment could result in direct payments to participants.

Sampling Weights While the World Poll employs a probability-based sampling design, certain respondent groups have a higher likelihood of being selected due to the strati-

fied random sampling method. For instance, residents of larger households have a lower individual selection probability than those in smaller households, as households of different sizes are sampled with equal probability. To correct for these differences, Gallup computes a base weight to adjust for unequal selection probabilities. In a second step, the base weights are post-stratified to adjust for non-response and to match known population statistics. More details are available in the documentation of the Gallup World Poll (https://news.gallup.com/poll/165404/world-poll-methodology.aspx).

We additionally post-stratify the weights provided by Gallup to account for non-response to the cooperation experiment as well as for the fact that the cooperation decision analyzed in this paper was only presented to a randomly chosen half of the respondents who consented to participate. Of all Gallup World Poll respondents, 81% consented to participate in our cooperation experiment. Of those who consented and were presented with the cooperation decision analyzed in this paper, 96% provided valid answers. The variables used for this additional post-stratification step are age, gender, education, and whether the individual lives in an urban or rural area.

The weights we obtain using this procedure range from 0.04 to 5.06, with a 10%-90% quantile range of 0.28 to 2.09, ensuring that no observation is given an excessively disproportionate weight. 91% of all weights are between 0.25 and 4. We use these weights in our main analyses in two ways: first, when deriving national averages, we weight individual responses with those sampling weights; and second, when conducting individual-level regression analyses, we weight respondents with these sampling weights.

This weighting approach does not account for differences in population sizes across countries. As a result, at the global level, countries would implicitly be weighted by their sample sizes rather than their actual populations. To address this, we construct population-adjusted weights to ensure our data accurately represent the global population aged 15 and above that is covered by our survey. The population-adjusted weight of individual i in country c is derived as $\frac{w_{ic}}{\sum_{I_c} w_{ic}} s_c n$ where w_{ic} denotes the sampling weight we calculate for individual i in country c, I_c the set of all respondents in country c, s_c the country's share of the global population aged 15+, and n the total sample size of the global sample. Division by $\sum_{I_c} w_{ic}$ prevents countries with larger samples from receiving disproportionate weight, while multiplying by s_c renders each country's total weight proportional to its population share. Finally, multiplying by the constant n sets the overall sum of population-adjusted weights equal to n; this scaling does not affect our results. We apply these population-adjusted weights whenever presenting global statistics or aggregating data at supranational levels.

A.2 Questionnaire

The US-English version of the different survey items used in the analysis presented in this paper can be found below. Square brackets [ ] indicate information that is adjusted to each country. Parentheses ( ) indicate that a response option was available to the interviewer but not read aloud to the interviewee.

Consent form
Now, I would like to ask you two final questions where you can make a REAL decision and, if you are randomly selected, you will receive some money. Here are your chances of getting selected. We are asking this question to people in over 100 countries. One country is randomly selected. In that country, 1 out of 10 respondents is randomly selected. So, if [the United States] was selected, you have a 1 in 10 chance of receiving up to [100 US dollars] depending on your answer. May I continue with the two final questions?

Cooperation
Question: Here is the decision you need to make. If you are randomly selected, you will be matched with another selected respondent from [the United States]. Both you and the other respondent can choose between two options.

- Option 1: You receive [100 US dollars] for yourself.
- Option 2: You receive [70 US dollars] for yourself. If BOTH you and the other respondent choose the smaller amount of [70 US dollars], a donation of [400 US dollars] will be made to fight global warming.

If you are randomly selected, this is a real decision. What would you choose? *(Read Items)*

- Option 1 - to receive [100 US dollars] for yourself, and no donation will be made.
- Option 2 – to receive [70 US dollars] for yourself, and if the other respondent also chooses this option, a donation of [400 US dollars] will be made to fight global warming.

Coding: Binary dummy for Option 1. (DK) and (Refused) are coded as missing data.

Beliefs
Question: We are asking this question to 100 other respondents in [the United States]. How many do you think choose to receive only [70 US dollars]?
Response: 0–100, (DK), (Refused)
Coding: 0–100, (DK) and (Refused) are coded as missing data

A.3 Incentivization of Cooperation Experiment

Feasibility of Incentive Payments In cooperation with Gallup, we determined in which countries it would be feasible to use incentives for the cooperation experiment. After consultation with each respective country team, it was determined that the administration of incentives was legal and logistically feasible in 114 of 125 countries. In two of these 114 countries (Togo and Mauritius), the use of incentives for minors was prohibited by law. In the remaining eleven countries (Armenia, Botswana, Estonia, Georgia, Guatemala, Iran, Japan, Madagascar, Malawi, Portugal, Saudi Arabia), it was either illegal or logistically infeasible to incentivize the decision. When the cooperation experiment could not be incentivized, participants were presented with an exactly identical decision situation but phrased in hypothetical terms: "Imagine you need to make the following decision. [...] What would you choose?"

Administration of Incentive Payments The incentive payments were determined and administered in the following way. First, Gallup randomly selected one country from the list of countries in which the cooperation experiment was incentivized. The selected country was Togo. In Togo, 10% of respondents were randomly selected and randomly matched to one other selected respondent from Togo. The individual payoffs were calculated based on both players' decisions in the cooperation game (see Table 1). Gallup then administered the individual payments to the selected respondents. If both players chose to cooperate, the donation was triggered and transferred to the climate charity *atmosfair* by the research team.

A.4 Survey Implementation

Translation The translation of the original US-English questionnaire into other languages followed the established TRAPD model, originally developed by the European Social Survey (2018). The TRAPD acronym represents translation, review, adjudication, pre-testing, and documentation. This method is team-based and has been demonstrated to yield more reliable translations compared to alternatives such as back-translation. The process consists of the following steps:

- *Translation*: An initial translation is carried out by a local professional translator.
- *Review*: A second professional translator from an independent company reviews the translation, identifies potential issues, suggests alternative wording, and provides explanatory comments in English.
- *Adjudication*: The initial translator evaluates these suggestions, either accepting or rejecting them. If suggestions are rejected, the translator provides an explana-

tion in English, and disputes are resolved by a third language expert, typically following further consultation with both translators.

- *Pre-testing*: The translated questionnaire undergoes pilot testing with at least ten respondents per language.
- *Documentation*: Translations and commentary (Gallup-internal) are documented.

Calibration of Monetary Amounts To ensure comparability across countries, monetary amounts were converted using World Bank purchasing power parity factors.

Pre-Tests In 2020, a preliminary version of the survey underwent extensive pre-testing in six culturally diverse countries — Colombia, Egypt, India, Indonesia, Kenya, and Ukraine — to ensure that respondents from varied cultural and economic backgrounds understood the questions clearly and consistently. Cognitive interviews were conducted by trained interviewers in local languages. Each question was followed by probing inquiries to assess respondents' comprehension of key terms and overall logic, while respondents were encouraged to highlight any comprehension difficulties. To address comprehension difficulties which were identified in some countries, we decided to use the simple, binary decision format rather than more complex, continuous versions of the public good game. Moreover, to avoid confusion with seasonal weather fluctuations, we changed the term "climate change" to "global warming".

B Data Sources and Construction of Variables

At least one dose The share of the population with at least one dose of vaccination against COVID-19, using WHO data as of December 2023.

Fully vaccinated The share of the population that is fully vaccinated against COVID-19, using WHO data as of December 2023.

At least one booster The share of the fully vaccinated population with at least one booster shot against COVID-19, using WHO data as of December 2023.

Blood donations The number of blood donations per 1,000 capita. Data from Schulz et al. (2019).

Cooperation in labor markets The perceived degree of cooperation in labor-employer relations as measured in the Executive Opinion Survey of the World Economic Forum.

Herrmann et al. (2008, std.) An experimental measure of cooperation for 15 countries from Herrmann et al. (2008), which we standardize to have a mean of zero and a standard deviation of one.

Romano et al. (2021b, std.) An experimental measure of cooperation for 42 countries from Romano et al. (2021b), which we standardize to have a mean of zero and a standard deviation of one across the 42 countries.

Spadaro et al. (2022, std.) A meta-analytic measure of cooperation derived from Public Goods and Prisoner's Dilemma experiments, obtained from Spadaro et al. (2022). We standardize the measure to have a mean of zero and a standard deviation of one.

Cultural distance (WVS) A measure of cultural distance derived by Muthukrishna et al. (2020), which is based on data from the 2005–2009 and 2010–2014 waves of the World Values Survey (WVS). The measure draws on responses to over 100 survey items encompassing a broad spectrum of culturally transmitted values, beliefs, and behaviors, including views on what people consider important in life, family norms, and religious or political attitudes. For each country pair, the index is derived as the proportion of the total variance that can be attributed to differences between countries, relative to the total variance (Muthukrishna et al., 2020). We standardize the measure at the country-pair level.

Average precipitation The long-run average of annual precipitation (in mm per year) (source: World Bank WDI database)

Annual temperature This is the annual average temperature (in ° Celsius) from 2010 to 2019. The data are available from the World Bank Group's Climate Change Knowledge Portal (CCKP) and derived from the CRU TS v.4.05 data.

At risk of malaria (%) The product of the population share living in regions of high malaria risk and the proportion of fatal malaria cases, which we obtain from Ashraf and Galor (2013).

Sub-tropical zone (%) The share of the population living in areas classified as (sub)tropical by the Köppen-Geiger climate classification system, which we obtain from Ashraf and Galor (2013).

Distance to coast Distance to the nearest coast. Data from Nunn and Puga (2012).

Longitude The longitude of the country's centroid, which we obtain from Ashraf and Galor (2013).

Percentage of arable land The share of arable land as reported by the World Bank WDI database.

Land suitability for agriculture An index consisting measures of climate suitability for cultivation (e.g. number of growing degree days) and indicators of soil suitability (e.g. carbon density), which we obtain from Ashraf and Galor (2013).

Genetic diversity A country's expected genetic diversity of the population. For details about the variable construction, see Ashraf and Galor (2013).

Life expectancy Life expectancy at birth in years. Data from the World Health Organization Global Health Observatory: `https://www.who.int/data/gho/`.

Human Development Index Human Development Index (HDI) taken from the United Nations Development Programme Human Development Report (2020): `http://hdr.undp.org/en/data`.

Happiness Country-level happiness scores are obtained from the 2022 World Happiness Report (Figure 2.1 in the report). The happiness score is based on subjective life evaluations elicited with a Cantril ladder question as part of the Gallup World Poll. The score is obtained by averaging over the 2019-2021 period for countries surveyed multiple times by the Gallup World Poll. The wording of the question is: "Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?"

Total factor productivity Total factor productivity from the Penn World Table version 10.01, using data from the year 2011.

Labor productivity Labor productivity is measured as GDP divided by total hours worked. Data from the OECD.

Trade (% of GDP) Trade is measured as the total sum of exports and imports of goods and services, measured as a share of GDP. Data from the World Bank WDI database.

Log scientific publications The natural logarithm of the average number of scientific articles published per capita between 2009 and 2018. Annual publication data is taken from the World Bank WDI database and normalized using annual population data from the Maddison Project Database (2020).

Nepotism in business A measure of favoritism toward family and close relations in business contexts, with higher values corresponding to a higher degree of nepotism. Data from Van de Vliert (2011).

Gini coefficient The Gini coefficient for the distribution of income from the World Development Indicators (WDI) database. In some countries, the Gini is calculated based on consumption expenditures.

Ethnic inequality The Gini coefficient of within-country between-ethnic group economic inequality, using per-capita luminosity data as a proxy for economic development. We use the baseline measure from Alesina et al. (2016), which is construced based on the finest level of Ethnologue's linguistic tree.

Tax revenue Tax revenues (as % of GDP) refers to compulsory transfers to the central government, excluding fines, penalties, and most social security contributions. Data from the World Development Indicators (WDI) database.

Societal safety and security A component of the Global Peace Index (GPI) that captures the level of societal safety and security in a country, including factors such as crime rates, political stability, terrorist activity, and internal displacement. We recode the variable such that higher values denote higher levels of safety and security. Data from the Institute for Economics and Peace (2020).

Ongoing conflict A component of the Global Peace Index (GPI) that measures the intensity of ongoing domestic and international conflict, including a country's involvement in and duration of conflicts. Higher values indicate more intense and persistent conflict. Data from the Institute for Economics and Peace (2020).

Militarization A component of the Global Peace Index (GPI) that reflects the degree of militarization in a country, including military expenditure, weapons availability, and armed forces personnel. Higher values denote a greater degree of militarization. Data from the Institute for Economics and Peace (2020).

Cooperation belief Average belief among World Poll respondents about the share of fellow citizens that will choose to cooperate in the incentivized cooperation game (0-100%). See Appendix Section A.2 for details.

Trust Measure of trust derived from two sources. If available, we use data from the World Values Survey (WVS), defined as the share of respondents who say that "most people can be trusted". We use data from WVS waves conducted between 1981 and 2022, selecting the most recent wave available for each country. If no WVS data are available, we draw on the Global Preference Survey (GPS) (Falk et al., 2018). Specifically, we impute missing WVS values using predicted values from a regression of the WVS trust measure on the GPS trust question. WVS data are available for 91 countries, GPS data for 73 countries, resulting in a combined sample of 101 countries.

Civic values (WVS, std.) Following Guiso et al. (2011), we construct the first principal component from three World Values Survey items that asked respondents to indicate on a scale from 1 (never justifiable) to 10 (always justifiable) whether the following can be justified: (i) "Claiming government benefits to which you are not entitled", "Avoiding a fare on public transport", "Cheating on taxes if you have a chance". We recode variables such that larger values denote higher civic values.

Individualism Extension of Hofstede's measure of individualism, which we standardize to have a mean of zero and a standard deviation of one in our sample. Data from Beugelsdijk and Welzel (2018).

Moral universalism Relative strength of universal compared to communal moral values, as measured by the Moral Foundations Questionnaire. Data from Enke (2019).

Norms The weighted share of World Poll respondents that endorse a pro-climate social norm, taken from Andre et al. (2024).

Altruistic punishment Measured using the Global Preference Survey (GPS) (Falk et al., 2018). Based on responses to the question: "How willing are you to punish someone who treats others unfairly, even if there may be costs for you?"

Rule of law Reflects the degree to which people have trust in societal rules and comply with them. The measure includes perceptions of crime prevalence, how fair and reliable the judicial system is, and whether legal contracts are properly enforced. Data from the World Bank Worldwide Governance Indicators.

Voice and accountability Captures the ability of citizens to participate in political processes, including participation in elections and access to civil liberties and political freedoms. It also reflects the independence of the media. Data from the World Bank Worldwide Governance Indicators.

Political stability Measures the perception of the likelihood of political instability and politically motivated violence. Data from the World Bank Worldwide Governance Indicators.

Government effectiveness Summarizes views on how well the public sector functions, including the quality of services, the capacity and independence of civil servants, and the credibility of government policy. Data from the World Bank Worldwide Governance Indicators.

Regulatory quality Prevalence of "market-unfriendly" regulation and policies, including price control mechanisms, the lack of proper bank supervision, and perceptions of excessive regulation in domains such as international trade. Data from the World Bank Worldwide Governance Indicators.

Control of corruption Captures corruption perceptions. It reflects a range of corruption-related issues, including informal payments to facilitate services, the impact of corruption on the business climate, large-scale political corruption, and the influence of elites in shaping state policy. Data from the World Bank Worldwide Governance Indicators.

Institutional quality Standardized index constructed from five measures from the World Bank Worldwide Governance Indicators: Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Regulatory Quality, Rule of Law, Control of Corruption. Individual measures are standardized before constructing the joint index. Larger values denote higher institutional quality.

Kinship intensity index A measure of kinship intensity that captures the "presence of cousin-marriage preferences, polygamy, co-residence of extended families, clan organization, and community endogamy" (Schulz et al., 2019), which we standardize. Data from Schulz et al. (2019).

Western church exposure A country's historical exposure to the Western church (in years), which we obtain from Schulz (2022). This measure accounts for migration patterns after 1500 CE.

Eastern church exposure A country's historical exposure to the Eastern church (in years), which we obtain from Schulz (2022). This measure accounts for migration patterns after 1500 CE.

Pathogen prevalence Standardized index of the historical prevalence of nine infectious diseases (leishmanias, schistosomes, trypanosomes, leprosy, malaria, typhus, filariae, dengue, and tuberculosis) coded from early 20^{th}-century epidemiological atlases for 230 geopolitical regions and averaged across diseases (Murray and Schaller, 2010).

Parasite stress Standardized country-level index of the historical burden of non-zoonotic (human-to-human) infectious diseases, capturing ecological "parasite stress". We use the version compiled by Schulz et al. (2019), which is based on the original measure developed by Fincher et al. (2008).

Neolithic transition Log number of years since a country's population adopted sedentary agriculture. Data from Ashraf and Galor (2013).

Internal migration intensity We use the Aggregate Crude Migration Intensity (ACMI) measure, which is the share of a country's population changing residence across internal administrative units. Data from Bell et al. (2015).

Relational mobility Standardized score of the perceived freedom and opportunity to form and end interpersonal relationships, measured via Relational Mobility Scale in 39 countries (Thomson et al., 2018).

C Supplementary Tables

Table S.1: Cooperation across world regions

	Cooperation (1)	Countries (2)
Australia and New Zealand	86.0%	2
Western Europe	82.8%	22
North America	81.4%	2
South America	78.7%	19
Eastern Europe	75.0%	22
South and East Asia	66.4%	21
North Africa and Middle East	62.3%	12
Sub-Saharan Africa	56.3%	25
World	69.1%	125

Notes: This table presents the cooperation rate for different world regions and groups of countries. The regional averages are derived as population-weighted averages of the national shares. We further report the number of surveyed countries that belong to each group.

Table S.2: Dyadic regression: Ethnographic Atlas distance

	Dependent variable: Absolute distance in cooperation rates (in pp)
	(1)
Ethnographic Atlas distance (std.)	8.580***
	(1.558)
R^2	0.481
Country pairs	7,021
Countries	118
Country fixed effects	Yes

Notes: This table shows dyadic regression estimates where the unit of observation is a country-pair. The dependent variable is the absolute distance in cooperation rates between the two countries that form a pair. "Ethnographic Atlas distance" is a standardized measure of distance derived from the variables included in the Ethnographic Atlas, following a methodology adapted from Muthukrishna et al. (2020). The regression includes country fixed effects and controls for the log of the geographic distance between the two countries that form a pair. Robust standard errors corrected for two-way clustering at both countries in a pair are shown in parenthesis.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table S.3: Overview of country samples and interview modes

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Afghanistan	Aug 8 – Sep 29, 2021	174	Face-to-Face and Paper and Pencil	Dari, Pashto	Gender-matched sampling was used during the final stage of selection. Paper and pencil interviews had to be used for 730 completes to minimize security concerns due to the Taliban takeover.
Albania	Jun 29 – Aug 26, 2021	341	Face-to-Face	Albanian	People living in remote or difficult-to- access rural areas were excluded. The excluded area represents approximately 2% of the population.
Algeria	Jul 9 – Aug 19, 2021	309	Landline and Mobile Telephone	Arabic	
Argentina	Jul 9 – Sep 2, 2021	389	Landline and Mobile Telephone	Spanish	
Armenia	Aug 5 – Dec 12, 2021	390	Face-to-Face	Armenian	Settlements near territories disputed with Azerbaijan were not included for insecurity reasons. The excluded area represents approximately 3% of the population.
Australia	May 3 – Jun 18, 2021	411	Landline and Mobile Telephone	English	
Austria	May 3 – Jun 7, 2021	400	Landline and Mobile Telephone	German	
Bangladesh	Feb 27 – Mar 30, 2022	398	Face-to-Face	Bengali	
Belgium	Sep 16, 2021 – Jan 21, 2022	349	Landline and Mobile Telephone	French, Flemish	
Benin	Jul 26 –Aug 12, 2021	479	Face-to-Face	Bariba, Fon, French	
Bolivia	Jul 11 – Jul 31, 2021	408	Mobile Telephone	Spanish	
Bosnia and Herzegovina	Jul 16 – Sep 11, 2021	447	Landline and Mobile Telephone	Bosnian	
Botswana	Sep 25 – Oct 21, 2022	1003	Face-to-Face	English, Setswana	Sampling units of population size less than 50 are excluded from the sampling frame. This exclusion is approximately 4% of the population of Botswana.
Brazil	Aug 3 – Nov 7, 2021	437	Landline and Mobile Telephone	Portuguese	
Bulgaria	Jun 4 – Jul 17, 2021	426	Landline and Mobile Telephone	Bulgarian	

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Burkina Faso	Aug 16 – Sep 8, 2021	427	Face-to-Face	Dioula, French, Fulfulde, Moore	
Cambodia	Aug 28 – Oct 5, 2021	385	Face-to-Face	Khmer	Koh Kong, Stueng Treng, Otdor Meanchey, and Kep provinces were excluded. These excluded areas represent approximately 3% of the population of Cambodia.
Cameroon	Jun 8 – Jul 2, 2021	441	Face-to-Face	French, English, Fulfulde	Some arrondissements in the Extreme North region, the Northwest region, and the South West region were excluded due to insecurity. Neighborhoods with less than 50 household were also excluded from the sampling. The exclusion represents 20% of the total population.
Canada	May 18 – Jul 6, 2021	418	Landline and Mobile Telephone	English, French	Northwest Territories, Yukon and Nunavut (representing approximately 0.3% of the Canadian population) were excluded.
Chile	Aug 19 – Dec 23, 2021	182	Face-to-Face	Spanish	
China	Dec 6, 2021 – Jan 22, 2022	1239	Mobile Telephone	Chinese	Tibet was excluded from the sample. The excluded areas represent less than 1% of the population of China.
Colombia	Jul 16 – Aug 19, 2021	418	Landline and Mobile Telephone	Spanish	
Congo - Brazzaville	Jun 25 – Jul 21, 2021	434	Face-to-Face	French, Kituba, Lingala	
Costa Rica	Jul 13 – Aug 15, 2021	424	Landline and Mobile Telephone	Spanish	
Côte d'Ivoire	Oct 28 – Nov 28, 2021	492	Face-to-Face	French, Dioula	
Croatia	Jun 18 – Jul 28, 2021	342	Landline and Mobile Telephone	Croatian	
Cyprus	Apr 22 – Jul 4, 2021	388	Landline and Mobile Telephone	Greek, English	
Czechia	Jun 9 – Aug 10, 2021	338	Landline and Mobile Telephone	Czech	
Denmark	Jun 1- Jul 18, 2021	452	Mobile Telephone	Danish	
Dominican Republic	Aug 1 – Sep 15, 2021	441	Face-to-Face	Spanish	

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Ecuador	Jul 23 – Sep 1, 2021	455	Landline and Mobile Telephone	Spanish	
Egypt	Sep 4 – Sep 22, 2021	268	Face-to-Face	Arabic	Frontier governorates (Matruh, Red Sea, New Valley, North Sinai, and South Sinai) were excluded, as they are remote and represent a small proportion of the population of the country. The excluded areas represent less than 2% of the total population.
El Salvador	Sep 16 – Nov 24, 2021	326	Face-to-Face	Spanish	
Estonia	May 31 – Jun 21, 2021	473	Mobile Telephone	Estonian, Russian	
Finland	Apr 13 – Jun 14, 2021	397	Mobile Telephone	Finnish, Swedish	
France	May 3 – Jun 16, 2021	401	Landline and Mobile Telephone	French	
Gabon	Oct 3 – Oct 30, 2021	483	Mobile Telephone	French, Fang	
Georgia	Jul 29 – Dec 5, 2021	439	Face-to-Face	Georgian, Russian	South Ossetia and Abkhazia were not included for the safety of the interviewers. In addition, very remote mountainous villages or those with less than 100 inhabitants were also excluded. The excluded area represents approximately 8% of the population.
Germany	May 3 – Jun 10, 2021	420	Landline and Mobile Telephone	German	
Ghana	Jul 27 – Sep 6, 2021	408	Face-to-Face	English, Ewe, Twi, Dagbani, Hausa	Localities with less than 100 inhabitants were excluded from the sample. The excluded areas represent approximately 4% of the population.
Greece	May 31 – Jun 30, 2021	408	Landline and Mobile Telephone	Greek	
Guatemala	Jun 29 – Oct 17, 2022	1000	Face-to-Face	Spanish	
Guinea	Sep 4 – Sep 25, 2021	455	Face-to-Face	French, Malinke, Pular, Soussou	
Honduras	Sep 21 – Dec 20, 2021	275	Face-to-Face	Spanish	
Hong Kong SAR China	Jun 11 – Aug 15, 2021	361	Landline and Mobile Telephone	Chinese	

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Hungary	Jun 16 – Jul 27, 2021	427	Landline and Mobile Telephone	Hungarian	
Iceland	Jun 2 – Jul 26, 2021	234	Landline and Mobile Telephone	Icelandic	
India	Jul 29 – Oct 14, 2021	854	Face-to-Face	Assamese, Bengali, Gujarati, Hindi, Kannada, Malayalam, Marathi, Odia, Punjabi, Tamil, Telugu	Excluded population living in Northeast states and remote islands, and Jammu and Kashmir. The excluded areas represent less than 10% of the population.
Indonesia	Jul 8 – Oct 16, 2021	450	Face-to-Face	Bahasa Indonesia	
Iran	Aug 24 – Aug 31, 2021	470	Landline and Mobile Telephone	Farsi	
Iraq	Nov 1 – Dec 6, 2021	305	Face-to-Face and Face-to-Face	Arabic, Kurdish	
Ireland	May 4 – Jun 8, 2021	393	Landline and Mobile Telephone	English	
Israel	Aug 15 – Nov 26, 2021	293	Face-to-Face	Hebrew, Arabic	The sample does not include the area of East Jerusalem. This area included in the sample of Palestinian Territories.
Italy	May 3 – Jun 14, 2021	431	Landline and Mobile Telephone	Italian	
Jamaica	Sep 18 – Nov 9, 2021	112	Face-to-Face	English	
Japan	Jun 11 – Aug 16, 2021	424	Landline and Mobile Telephone	Japanese	Landline RDD, excluded 12 municipalities near the nuclear power plant in Fukushima. These areas were designated as not-to-call districts due to the devastation from the 2011 disasters. The exclusion represents less than 1% of the population of Japan.
Jordan	Sep 1 – Sep 27, 2021	354	Mobile Telephone	Arabic	
Kazakhstan	Sep 4 – Oct 19, 2021	214	Face-to-Face	Russian, Kazakh	
Kenya	Jun 19 – Jul 21, 2021	431	Face-to-Face	English, Swahili	
Kosovo	Jul 3 – Sep 30, 2021	344	Face-to-Face	Albanian, Serbian	

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Kyrgyzstan	Aug 26 – Oct 4, 2021	269	Face-to-Face	Kyrgyz, Russian, Uzbek	
Laos	Aug 30 – Dec 14, 2021	344	Face-to-Face	Lao	Excluded Xaisomboun Province, Xayaboury Province and some communes that are unreachable and/or have security considerations. In addition, during fieldwork Attapu and Houaphan were also excluded due to COVID (COVID-19 red zones). The excluded areas represent approximately 14% of the population.
Latvia	Jun 11 – Jul 11, 2021	396	Mobile Telephone	Latvian, Russian	
Lebanon	Aug 10 – Aug 28, 2021	232	Landline and Mobile Telephone	Arabic	
Lithuania	Jul 8 – Aug 31, 2021	277	Landline and Mobile Telephone	Lithuanian	
Madagascar	Jun 16 – Jul 24, 2022	469	Face-to-Face	French, Malagasy	Regions that were unsafe or unreachable were excluded from the sample. The excluded areas represent approximately 17% of the total population.
Malawi	Jul 31 – Aug 13, 2021	453	Face-to-Face	Chichewa, English, Tumbuka	
Malaysia	June 10 – Nov 25, 2021	358	Landline and Mobile Telephone	Bahasa Malay, Chinese, English	
Mali	Jul 15 - Jul 31, 2021	421	Face-to-Face	French, Bambara	The regions of Gao, Kidal, Mopti and Tombouctou were excluded because of insecurity. Quartiers and villages with less than 50 inhabitants were also excluded from the sample. The excluded areas represent 23% of the total population.
Malta	Apr 11 – Jul 21, 2021	457	Landline and Mobile Telephone	Maltese, English	
Mauritius	Apr 24 – Jun 14, 2021	460	Landline and Mobile Telephone	Creole, English, French	
Mexico	Jul 14 – Aug 27, 2021	408	Landline and Mobile Telephone	Spanish	

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Moldova	Jul 13 – Sep 10, 2021	343	Face-to-Face	Romanian/ Moldavian, Russian	Transnistria (Prednestrovie) excluded for safety of interviewers. The excluded area represents approximately 13% of the population.
Mongolia	Aug 20 – Oct 12, 2021	409	Face-to-Face	Mongolian	
Morocco	Jul 10 – Aug 7, 2021	429	Mobile Telephone	Moroccan Arabic	
Mozambique	Oct 28 – Dec 20, 2021	390	Face-to-Face	Portuguese, Xichangana, Emakhuwa	Cabo Delgado province, as well as a small number of districts in other provinces, were excluded due to insecurity. The excluded areas represent 11% of population.
Myanmar (Burma)	Sep 22 – Oct 15, 2021	452	Mobile Telephone	Burmese	
Namibia	Aug 29 – Oct 10, 2021	387	Face-to-Face	English, Oshivambo, Afrikaans	
Nepal	Sep 9 – Nov 18, 2021	411	Face-to-Face	Nepali	
Netherlands	Apr 13 – Jul 9, 2021	435	Landline and Mobile Telephone	Dutch	
New Zealand	Apr 19 – Jun 4, 2021	482	Landline and Mobile Telephone	English	
Nicaragua	Sep 15 – Nov 22, 2021	459	Face-to-Face	Spanish	
Nigeria	Jul 15 – Aug 22, 2021	371	Face-to-Face	English, Hausa, Igbo, Pidgin English, Yoruba	The states of Adamawa, Borno and Yobe were excluded for safety and security reasons. These states represent 7% of the population.
North Macedonia	Jul 14 – Aug 29, 2021	341	Landline and Mobile Telephone	Macedonian, Albanian	
Norway	May 7 – Jun 22, 2021	457	Mobile Telephone	Norwegian	
Pakistan	Oct 13 – Dec 15, 2021	234	Face-to-Face	Urdu	Did not include AJK, Gilgit-Baltistan. The excluded area represents approximately 5% of the population. Gender-matched sampling was used during the final stage of selection.
Panama	Oct 4 – Dec 17, 2021	288	Face-to-Face	Spanish	
Paraguay	Sep 1 - Oct 12, 2021	361	Face-to-Face	Spanish, Jopara	
Peru	Aug 22 – Oct 21, 2021	398	Face-to-Face	Spanish	

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Philippines	Jun 11 – Aug 13, 2021	435	Mobile Telephone	Filipino, Iluko, Cebuano, Waray, Bicol	
Poland	Jun 8 – Jul 7, 2021	411	Landline and Mobile Telephone	Polish	
Portugal	Apr 27 – Jun 8, 2021	466	Landline and Mobile Telephone	Portuguese	
Romania	Jun 23 – Jul 29, 2021	353	Landline and Mobile Telephone	Romanian	
Russia	May 14 – Jul 14, 2021	799	Landline and Mobile Telephone	Russian	
Saudi Arabia	May 23 – Jun 6, 2021	494	Landline and Mobile Telephone	Arabic, English, Hindi, Urdu	Includes Saudis, Arab expatriates, and non-Arabs who were able to complete the interview in Arabic, English, Urdu or Hindi.
Senegal	Aug 17 – Sep 10, 2021	422	Face-to-Face	French, Wolof	
Serbia	Jun 8 – Jul 25, 2021	433	Landline and Mobile Telephone	Serbian	
Sierra Leone	Jun 15 – Jul 16, 2021	425	Face-to-Face	English, Krio, Mende	
Singapore	Jun 7 – Sep 20, 2021	379	Landline and Mobile Telephone	English, Chinese, Bahasa Malay	
Slovakia	Jun 30 – Jul 29, 2021	465	Landline and Mobile Telephone	Hungarian, Slovak	
Slovenia	Aug 26 – Sep 28, 2021	402	Landline and Mobile Telephone	Slovene	
South Africa	Aug 5 – Nov 9, 2021	363	Face-to-Face	Afrikaans, English, Sotho, Xhosa, Zulu	
South Korea	Jun 23 – Aug 11, 2021	379	Landline and Mobile Telephone	Korean	
Spain	May 3– Jun 14, 2021	407	Landline and Mobile Telephone	Spanish	
Sri Lanka	Oct 20 – Dec 1, 2021	400	Mobile Telephone	Sinhala, Tamil	
Sweden	May 10 – Jun 14, 2021	384	Landline and Mobile Telephone	Swedish	
Switzerland	May 3 – Jun 10, 2021	394	Landline and Mobile Telephone	German, French, Italian	

Country	Date of data collection	Sample size	Interview mode	Languages	Exceptions
Taiwan	May 31 – Jul 6, 2021	288	Landline and Mobile Telephone	Chinese	
Tajikistan	Aug 18 – Oct 11, 2021	318	Face-to-Face	Tajik	
Tanzania	Aug 2 – Aug 28, 2021	390	Face-to-Face	Swahili	
Thailand	Sep 19 – Nov 9, 2021	371	Mobile Telephone	Thai	
Togo	Sep 4 – Sep 22, 2021	477	Face-to-Face	French, Ewe	
Tunisia	Sep 24 – Oct 16, 2021	368	Face-to-Face	Arabic	
Turkey	Aug 9 – Sep 8, 2021	382	Landline and Mobile Telephone	Turkish	
Uganda	Sep 12 – Oct 3, 2021	354	Face-to-Face	Ateso, English, Luganda, Runyankole	Three districts in the North region were excluded for security reasons – Kotido, Moroto, Nakapiripirit. The excluded areas represent 2% or less of the population.
Ukraine	Jul 7 – Jul 19, 2021	379	Landline and Mobile Telephone	Russian, Ukrainian	
United Arab Emirates	May 30 – Jun 29, 2021	395	Mobile Telephone	Arabic, English, Hindi, Urdu	Includes only Emiratis, Arab expatriates and non Arabs who were able to complete the interview in Arabic, English, Urdu or Hindi.
United Kingdom	May 4 – Jun 9, 2021	421	Landline and Mobile Telephone	English	
United States	Apr 22 – Jun 21, 2021	404	Landline and Mobile Telephone	English, Spanish	
Uruguay	Aug 24 – Dec 1, 2021	421	Face-to-Face	Spanish	
Uzbekistan	Aug 12 – Oct 6, 2021	340	Face-to-Face	Uzbek, Russian	
Venezuela	Jul 26 – Sep 14, 2021	443	Landline and Mobile Telephone	Spanish	
Vietnam	Sep 25 – Oct 27, 2021	380	Mobile Telephone	Vietnamese	
Zambia	Aug 31 – Sep 28, 2021	324	Face-to-Face	Bemba, English, Lozi, Nyanja, Tonga	
Zimbabwe	Jun 26 – Aug 8, 2021	440	Face-to-Face	English, Shona, Ndebele	