# Historical Conflict and Contemporary Economic Preferences*

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**Abstract**

This paper investigates the violent origins of contemporary time and risk preferences, commonly referred to as patience and risk-taking. I test the hypothesis that patience and risk-taking – both vital traits for economic development – are formed endogenously as a function of historical exposure to large-scale conflict. I combine a new geocoded dataset of pre-industrial historical conflict (1200-1700 C.E.) with data from the Global Preferences Survey. Using subnational variation, I find that historical conflict lowers contemporary patience significantly. The effect on risk-taking is ambiguous. Results are robust to an instrumental variables approach. These findings are consistent with an evolutionary framework of endogenous preference formation in which conflict lowers incentives for long-term investment behavior due to increased expropriation risk in the decision environment.

**Keywords:** Time preference, Risk preference, Conflict, Comparative Development
**JEL Codes:** D74, D90, O10

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# 1 Introduction

Time and risk preferences are central to a wide range of economic development outcomes, including education, investments, entrepreneurship, and productivity (Falk et al., 2018; Bisin and Verdier, 2011; Doepke and Zilibotti, 2014; Aghion and Howitt, 1992). Accordingly, differences in time and risk preferences have been shown empirically to explain variation in the accumulation of human and physical capital around the world (Sunde et al., 2021; Hanushek et al., 2022). Understanding the determinants of global preference variation is, therefore, a question of first-order importance in behavioral and cultural development economics. While these economic primitives were once assumed to be exogenously assigned, recent advances indicate that time and risk preferences are endogenous to deep historical and ecological factors (Galor and Özak, 2016; Becker, 2019; Cao et al., 2021; Henrich, 2015; Nisbett, 2004) and tend to persist between generations (Meier and Sprenger, 2015; Schildberg-Hörisch, 2018; Chowdhury et al., 2022).

One factor that may shape preferences in the long run is large-scale violent conflict. Evidence from field experiments has established that time and risk preferences are affected by exposure to conflict in the short-run (Callen et al., 2014; Voors et al., 2012). One potential explanation for this relationship is that, in unstable environments where episodes of violent conflict and expropriation are frequent, property rights become highly insecure, and investment attitudes are depressed as a result.[1] While several papers have shown that violence has sizable long run effects on other contemporary economic outcomes such as trust (Besley and Reynal-Querol, 2014; Nunn and Wantchekon, 2011), physical capital (Collier, 2003; Abadie and Gardeazabal, 2003), and human capital (Riano and Valencia Caicedo, 2020; Fergusson et al., 2020), it is unclear whether violence also shapes time and risk preferences in the long-run.[2] This is an important question, because understand-

[1] In the long-run, stable property rights have a first-order effect on economic growth and investment (Acemoglu and Johnson, 2005)

[2] Some papers have also found no evidence of long lasting economic effects (Miguel and Roland, 2011; Davis and Weinstein, 2002). Bauer et al. (2016) find that war can also have positive social effects.

ing the drivers of slow-moving and fundamental factors like preferences can shed light on the historical roots of global economic divergence.

In this paper, I investigate the long-run relationship between conflict and economic preferences. I examine the association between a novel measure of historical conflict — the cumulative years of conflict exposure in a subnational region from 1200-1700 C.E.— and contemporary measures of time and risk preferences elicited in a global survey. I present a conceptual framework to explain the link between historical conflict, property rights security, and the endogenous formation of economic preferences. The framework is premised on the logic of standard cultural evolution models, which link individuals' beliefs and preferences to their long run decision environment. Since wars create expropriation risk to private property and adversely affect the intertemporal decision making environment, I predict a negative relationship between historical conflict and contemporary preferences over patience and risk.

I find that historical conflict exposure has a negative effect on contemporary patience. Individuals in subnational regions that experienced more conflict between 1200-1700 are today significantly less patient than other individuals in the same country. A 20 percent increase in historical conflict relative to other regions in the same country lowers patience today by 7.7 percent of the standard deviation across countries. These estimates are robust to an instrumental variable strategy using temperature shocks as an instrument for conflict.

To arrive at these estimates, I build a new global dataset of historical conflict by digitizing the *Dictionary of Battles and Sieges*, an exhaustive source of all militarized conflict events in recorded history (Jaques, 2007). The data construction process involved tabulating a three-volume paperback reference work into a detailed battle-level dataset with over 6300 observations. For each battle entry, I studied the textual description and manually coded all key attributes, including the location of each battle. These locations were then transformed into geographic coordinates by sending the data through a georeferencing

process. The resulting dataset is, to my knowledge, one of the largest publicly available georeferenced source of historical conflict data based on its temporal and spatial coverage (Ahmad, 2022).

This data construction exercise results in a subnational region-level dataset that allows me to overcome three important empirical challenges to identification. First, by controlling for country fixed effects, I hold constant all national-level economic and political covariates, including state institutions and other factors that may correlate with both historical conflict and contemporary preferences. Second, by controlling for a rich set of subnational ecological variables, I account for additional factors that could be correlated with conflict, and have been highlighted in the literature as deep determinants of preferences, such as agro-climatic conditions (Galor and Özak, 2016), pastoralism (Cao et al., 2021; Becker, 2019) and terrain ruggedness (Nunn and Puga, 2012). Third, by controlling for contemporary conflict at the subnational Admin-1 level, I account for the possibility that my analysis may be capturing the already established contemporaneous relationship between conflict and economic preferences through serial correlation.

To test the robustness of my OLS findings, I introduce an instrumental variables (IV) strategy with the goal of further isolating exogenous variation in historical conflict. I use historical temperature anomalies (1200–1700 C.E.) to instrument for historical conflict at the level of a subnational region. The plausibly exogenous nature of temperature anomalies allows me to relax the conditional independence assumption of my OLS specifications. IV results are consistent with the main findings. Historical conflict exposure has a lasting, negative, and statistically significant effect on patience. The effect on risk-taking is ambiguous.

The assumed channel of persistence is that historical conflict shapes beliefs about the security of local property rights, which in turn shape one's preferences for intertemporal investments. According to this interpretation, the effects are tied to one's physical environment. An alternative interpretation is that historical conflict shapes cultural values, which

are transmitted between generations within cultural groups irrespective of one's location.

To distinguish between these interpretations, I harness data on historical migration patterns. By observing individuals from different cultural groups in the same physical environment, I can disentangle the role of location-specific persistence from that of cultural persistence. To do this, I link individuals to their original cultural groups by combining information on the contemporary distribution of languages with information on the preindustrial locations of ethnic groups using the Ethnographic Atlas (Murdock, 1967). I find that, while historical conflict in a location is relevant for preference outcomes today, historical conflict in one's ethnic homeland is not. This is consistent with the theory that the relationship between historical conflict and contemporary preferences persists through location-specific beliefs about the environment. This finding bears implications for the consequences of migratory flows more generally, as I find that conflict-affected beliefs tend to fade away when individuals migrate.

I test for geographic heterogeneity in my results, and find that the association between historical conflict and lower patience is not observed in Western Europe and its offshoots, i.e., United States, Canada, Australia and New Zealand[3]. I explain this finding in light of existing literature on the interplay between institutions and culture, which highlights that rules-based state institutions can substitute for values-based cultural beliefs in the endogenous formation of preferences (Lowes et al., 2017; Bowles and Polania-Reyes, 2012). During the preindustrial period, Western Europe was a highly fragmented region with many kingdoms and city states competing for regional and overseas influence. While this unique political geography created grounds for frequent episodes of violent conflict between states, it also afforded local elites greater bargaining power to lobby for institutions that were conducive to long-term investments and growth (Dincecco and Wang, 2018; Tilly, 1994). The formalization of property rights protection gave rise to key investment mechanisms such as joint stock companies and long-term financing instruments. I argue

[3]The classification of Western offshoots is borrowed from Maddison (2006)

that this institutional transformation in western Europe not only created an environment of safe property rights, but also successfully crowded out the adverse cultural effects of conflict. This is consistent with bellicist theories associated with the development of state capacity in Western Europe (Tilly, 1994). In other parts of the world, the political geography of historically consolidated states and the ensuing lack of elite bargaining power may have served as potential reasons for the persistence of conflict-affected preferences.

This paper contributes to three broad streams of literature in economics. First, it contributes to the literature on long-run determinants of preferences by taking a first look at the link between a region's historical property rights environment and the economic preferences of its modern populations. Economic historians studying preference variation have largely focused on the role of ancestral modes of production as long-run determinants, e.g., agriculture and its effect on patience (Galor and Özak, 2016); and nomadic pastoralism and its effect on risk attitudes, revenge-seeking and gender norms (Cao et al., 2021; Becker, 2019). I build upon this work by looking beyond modes of subsistence and instead focusing on the primitive role of the security environment — the safety of one's life and property — in shaping one's beliefs about the future, which in turn affect preferences related to intertemporal decision making.

Second, this paper contributes to the literature on the long-term destructive effects of large-scale violence by finding estimates that are consistent with the idea that wars are effectively "development in reverse" (Collier, 2003; Abadie and Gardeazabal, 2003; Riano and Valencia Caicedo, 2020; Fergusson et al., 2020). Furthermore, this paper specifically focuses on the long-term behavioral costs of conflict. Laboratory and field experiments have documented a short-run causal effect of conflict episodes on risk perception, appraisals of control, and appraisals of certainty (Callen et al., 2014; Voors et al., 2012; Moya, 2018; Lerner et al., 2003). But this literature does not speak to the long-term persistence of these behavioral effects. In my knowledge, this paper is the first explore this question at a global scale.

Third, this paper contributes to an emerging stream of research that supports an evolutionary perspective of long-run economic development (Nunn, 2021; Tabellini, 2008; Doepke and Zilibotti, 2017). My results suggest that historical conflict is associated with contemporary preferences in much of the developing world, but not in the developed economies of Western Europe and its offshoots. I explain these findings in light of the view that strong institutions act as substitutes to culture, as was the case in Western Europe's development experience. This view aligns with recent literature on the interplay between institutions and culture (Lowes et al., 2017; Bowles and Polania-Reyes, 2012)

The rest of this paper is structured as follows: Section 2 lays out the conceptual framework; section 3 describes the data; section 4 provides details about estimation and empirical strategy; section 5 presents the results; section 6 explains mechanisms of persistence; section 7 discusses heterogeneity in the results; and section 8 concludes.

# 2 Conceptual Framework

I now present a framework of preference formation through the logic of standard cultural evolution models (Boyd and Richerson, 1988, 2005). The main insight that emerges from this framework is that individuals in places with more historical conflict will today be more impatient and risk averse. Intuitively, a long history of violent conflict becomes embedded in individuals' long-run beliefs about expropriation risk in the environment. As the perceived likelihood of an unforeseeable, uninsurable future event of violence and expropriation becomes high, the incentives for long-term, illiquid investments become weaker. Subsequently, individuals form preferences favoring short-term, risk averse behavior in order to adapt to the local environment.

In this framework, norms and preferences are formed through a natural selection process determined by relative payoffs (Giuliano and Nunn, 2021). Any set of behavioral choices that is relatively beneficial in a given local environment is selected by rational

agents over other sets. If the same environment persists, the payoff to the optimal choice set remains unchanged. In the long-run, these choices crystallize into sticky preferences. Consistent with this logic, if local environmental conditions persistently favor current consumption over future consumption due to extreme future uncertainty, individuals will form adverse beliefs about the local environment and will subsequently form a taste for impatience. Similarly, if future states of the world are heavily skewed towards bad states relative to good states of the world, individuals will develop risk averse preferences due to their beliefs. As preferences are inherently sticky by definition, these beliefs may not respond immediately to short-run changes in observed conflict.

According to this framework, the long-run decision environment plays a critical role in the formation of beliefs and preferences. From an economic development perspective, one fundamental attribute of the decision environment is the security of property rights in a region. A large volume of literature speaks to the first-order positive effects of property rights security on economic growth and investment (Acemoglu and Johnson, 2005; North and Thomas, 1973; Besley, 1995; Goldstein and Udry, 2008; Field, 2005). Conversely, studies show that weak property rights and expropriation risk adversely affect the overall investment climate of an economy (Besley and Ghatak, 2010; Nunn, 2007).

On the basis of such a model of endogenous preference formation, it is plausible that historical conflict contributes to the formation of time and risk preferences through its effect on the property rights environment. Large-scale violent conflict and property rights security have been closely related, as wars elevate expropriation risk in the environment. Thus, it is plausible that prolonged historical exposure to wars lead to the formation of beliefs about the security environment, which in turn resulted in lower levels of patience and risk-taking. The hypothesized causal chain can be summarized as follows:

*Historical conflict* $\Rightarrow$ *Expropriation risk* $\Rightarrow$ *Historical time and risk preferences* $\Rightarrow$ *Contemporary time and risk preferences*

***Hypothesis.*** *Historical conflict exposure shaped beliefs about the investment environment,*

*through its adverse effect on perceived property rights security. These beliefs have persisted over time. Regions of the world with more historical conflict are today host to populations that are more impatient and risk averse.*

# 3 Data

To test this hypothesis, I require detailed data on historical conflict and contemporary economic preferences. I use this section to introduce my data sources and present descriptive statistics for each. A major contribution of this paper is the construction of a new historical dataset that provides comprehensive coverage of all conflict events in recorded history. After introducing the data, I define all key variables used in my analysis. In the final part of this section, I explain other data sources that I use to construct the main control variables.[4]

In order to keep the geographic scope of my investigation as wide as possible, I require all datasets to have global coverage. As a result, my analysis is representative for 90 percent of the world's population. All data sources are bridged at the level of a subnational region (Admin-1). [5]

## 3.1 Historical Conflict

One challenge for empirical research on the long-term effects of conflict has been the limited availability of disaggregated data on militarized conflict in the preindustrial world. Most research on this topic has relied on only two publicly available sources of data: *The Conflict Catalogue* by Brecke (1999), which is used in Besley and Reynal-Querol (2014), Iyigun (2008), Iyigun et al. (2017) and Zhang et al. (2007); and *Warfare and Armed Conflicts*

[4]I use two additional data sources to understand the mechanisms of persistence. These are introduced in Section VI: Channels of Persistence

[5]A grid cell-level bridging of the data would have been ideal, as it would provide more granularity to my analysis. That is not possible, however, as the data on preferences is representative at the subnational Admin-1 level.

data by Clodfelter (2017), which is used in Iyigun et al. (2017), Dincecco and Onorato (2018), Dincecco and Wang (2018). Brecke (1999) and Clodfelter (2017) have been the preferred choice for researchers interested in historical conflict because they both provide global coverage. However, with the earliest reported battle dating back only to the fifteenth century, neither dataset provides extensive temporal coverage for the preindustrial period. Moreover, in my knowledge, geocoded data for *Brecke* is only available for the continent of Africa. For *Clodfelter*, only the battles for Europe, western Asia, and China have been geocoded. Since neither of these data sources readily provide geocoded data with global coverage, I require a new source of global conflict data for the purposes of this paper.

To address this gap, I construct a new dataset named the *Database of Historical Conflict* (*DHC*). The *DHC* is a newly digitized source of data that provides near comprehensive coverage on all militarized conflict events in recorded history for the period C.E. 0-1900. The underlying information for the *DHC* is sourced from the *Dictionary of Battles and Sieges*, a three-volume printed compendium of militarized conflict by Jaques (2007). According to the lexicographer, a conflict event is defined as "any clash between organised forces of combatants" in order to keep the scope as wide as possible. The principle of inclusion is defined as as any event that can be supported by two or more independent recorded sources. The *DHC*, which serves as a digitized and georeferenced product of Jaques (2007), was prepared over the course of seven years.[6]

The *DHC* has three main advantages over *Brecke* and *Clodfelter*. First, The temporal coverage of the *DHC* dates back to the year 0 C.E., which a significant improvement relative to the coverage of *Brecke* (C.E. 1400) and *Clodfelter* (C.E. 1492). Second, each conflict event in the *DHC* is associated with a precise geocoded location. An updated version of *Brecke* only identifies location at the country-level, and while *Clodfelter* does provide locations, they are not fully geocoded. Third, comparing overlapping periods between the *DHC*

[6]Two recently published datasets, Kitamura (2021) and Miller and Bakar (2022), also use Jaques (2007) as the main source of data. My understanding is that these datasets and the *DHC* were developed concurrently. Although similar in coverage, the three datasets may complement each other due to the different methodologies used in their construction.

and *Brecke*, I find that the *DHC* (N=5047) captures more events than *Brecke*(N=2913), owing to to its better coverage in Asia. Overall, accounting for both temporal and spatial coverage, the *DHC* presents a significant improvement in the quality of available data on pre-industrial conflict.

The construction process of the *DHC* consisted of three phases.[7] In the first phase, I started by digitizing a war-level chronological index that is printed at the beginning of Jaques (2007). Subsequently, I transformed this alphabetical war-level index into a tabulated battle-level dataset. In the second phase, I read the textual description associated with each individual battle, and added new variables to the dataset, including the historical location and duration of each battle. For a large subset of the data, I also coded dummy variables indicating the nature of conflict (intrastate/interstate) and the nature of combat (ground/naval). In the final stage, I geocoded the location of each battle.

The unit of observation in the resulting dataset is a conflict event, and each observation provides the year, duration, and location of the event. It also provides additional attributes for a large subset of events. Most importantly for the purposes of this paper, the *DHC* provides the precise geocoordinates for each historical battle. This allows me to aggregate conflict exposure at the level of a subnational region and subsequently bridge it to the data on contemporary preferences.

For this paper, I restrict the conflict data to the period between 1200 and 1700. As this period predates both the industrial revolution and the emergence of European colonialism around the world, choosing 1700 C.E. as the cutoff date allows me to focus exclusively on investigating the long-run effects of conflict from the preindustrial and precolonial period. In doing so, I contribute to an emerging stream of research that investigates the very deep roots of differences in contemporary economic development (Besley and Reynal-Querol, 2014; Michalopoulos and Papaioannou, 2013; Gennaioli and Rainer, 2007). The reason for choosing 1200 C.E. as the start date is that this allows me to take advantage of the large

[7]The data construction process was initiated as part of a data exercise for Iyigun et al. (2017), who used a geographical subset of this dataset. I wholeheartedly thank the coauthors for their support.

temporal coverage of my data, relative to older sources like Brecke (1999) and Clodfelter (2017) that only date back to 1400 C.E. Increasing the historical time horizon thus serves to ensure that many historical conflict events from the thirteenth and fourteenth century - including the historically significant Mongol invasions in many parts of world - are within the purview of my analysis. Table 1 presents descriptive statistics for the conflict data.

## 3.2 Preferences

For preferences, I use data from the *Global Preferences Survey* (*GPS*). The *GPS* is a cross-sectional dataset measuring the economic and social preferences of 80,000 individuals from 76 countries (Falk et al., 2018, 2016). The survey is from 2012, and draws representative samples of individuals at the level of a subnational region. The data represent 90 percent of the world's population.

The *GPS* has three important advantages over other widely used survey measures, such as the World Values Survey and the European Social Survey. One is that the *GPS* survey module developed by Falk et al. (2016) uses an experimentally validated research design. This means that the survey questions in the *GPS* have been confirmed in a laboratory setting as the best candidates for eliciting individual preferences. Second, the nearly global coverage of the *GPS* complements my conflict data, which also has global coverage. This allows me to maintain a large scope of investigation for my hypothesis. The third advantage of the *GPS* is that it is representative at the subnational (Admin-1) level. This makes the *GPS* an overall more advantageous choice in contrast to the World Values Survey, which is representative only at the country level.

## 3.3 Key Variables

**Historical Conflict Exposure.** The variable is constructed from the *DHC* as follows. Let $Dur_{b,r,c}$ be defined as the duration (in years) of battle $b$ in subnational region $r$ of country

$c$. The total conflict exposure of each subnational region can be defined as

$$\sum_{b=1}^{k} Dur_{b,r,c} = Dur_{1,r,c} + Dur_{2,r,c} + \dots Dur_{k,r,c}$$

Where $\sum_{b=1}^{k} Dur_{b,r,c}$ is the total conflict exposure from all battles in region r of country c. Since the conflict data has a very long right tail, I use the natural log of one plus the years of conflict exposure in region r, country c as the main explanatory variable:

$$HistConf_{r,c} = log(1 + \sum_{b=1}^{k} Dur_{b,r,c})$$

Figure 1 shows the frequency of historical conflict for the period C.E. 1200-1700. This period covered a total of 1,764 unique battle events conflict across 123 countries and 3,005 subnational regions. Notice that Figure 1 exhibits significant variation in the incidence and frequency of conflict. Table 1 presents descriptive statistics.

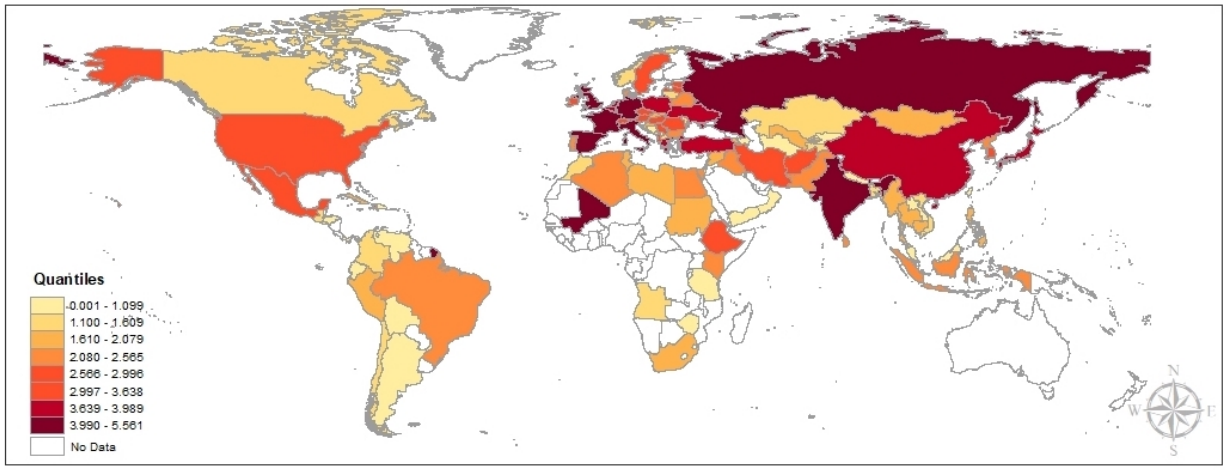


Figure 1: Historical violent conflict exposure in the world (1200-1700 C.E.) at the level of a country. Conlict exposure is defined as one plus the natural log of cumulative conflict event-years in each country. Data source: *DHC*

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**Patience.** In the *GPS*, Falk et al. (2018) construct patience as a weighted mean of survey responses to a quantitative survey and a qualitative one. The quantitative component consists of five interdependent hypothetical binary choices between immediate and delayed

financial rewards, i.e., receiving a payment today versus a larger payment in 12 months. This staircase format of questions — incrementally varying delayed payments conditional on the response while holding immediate payments fixed — allows the researcher to elicit the respondent's point of indifference between now and later, and hence a measure of intertemporal patience.[8] The qualitative component of the variable is derived from a self-assessed response on an 11-point Likert scale to the following question:

> *Please indicate your answer on a scale from 0 to 10, where 0 means you are "completely unwilling to do so" and a 10 means you are "very willing to do so". How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?*

**Risk-taking.** The risk-taking variable constructed in the same vein as the patience variable (Falk et al., 2018). The quantitative component of the risk-taking variable consists of a series of five interdependent binary choices between a fixed lottery in which the individual could win either a fixed amount or zero, and varying sure payments. The qualitative component is derived from the response on an 11-point Likert scale to the following question:

> *Please indicate your answer on a scale from 0 to 10, where 0 means you are "completely unwilling to do so" and a 10 means you are "very willing to do so". In general, how willing or unwilling you are to take risks?*

**Other Variables.** I include a wide range of control variables to account for differences in geographical characteristics at the subnational-level.[9] For subnational variation in population, land size, and land use, I use data from the PRIO-GRID v.2.0 dataset (Tollefsen et al., 2012). For terrain ruggedness, I use data from Nunn and Puga (2012).[10] For crop

[8] For more details, see Falk et al. (2018)

[9] While I introduce these variables here, I explain the rationale for each control variable in Section 4.

[10] The ruggedness variable captures topographic heterogeneity by caulculating the elevation differential between each point on earth and its neighboring points. For details, see Nunn and Puga (2012) and Riley et al. (1999)

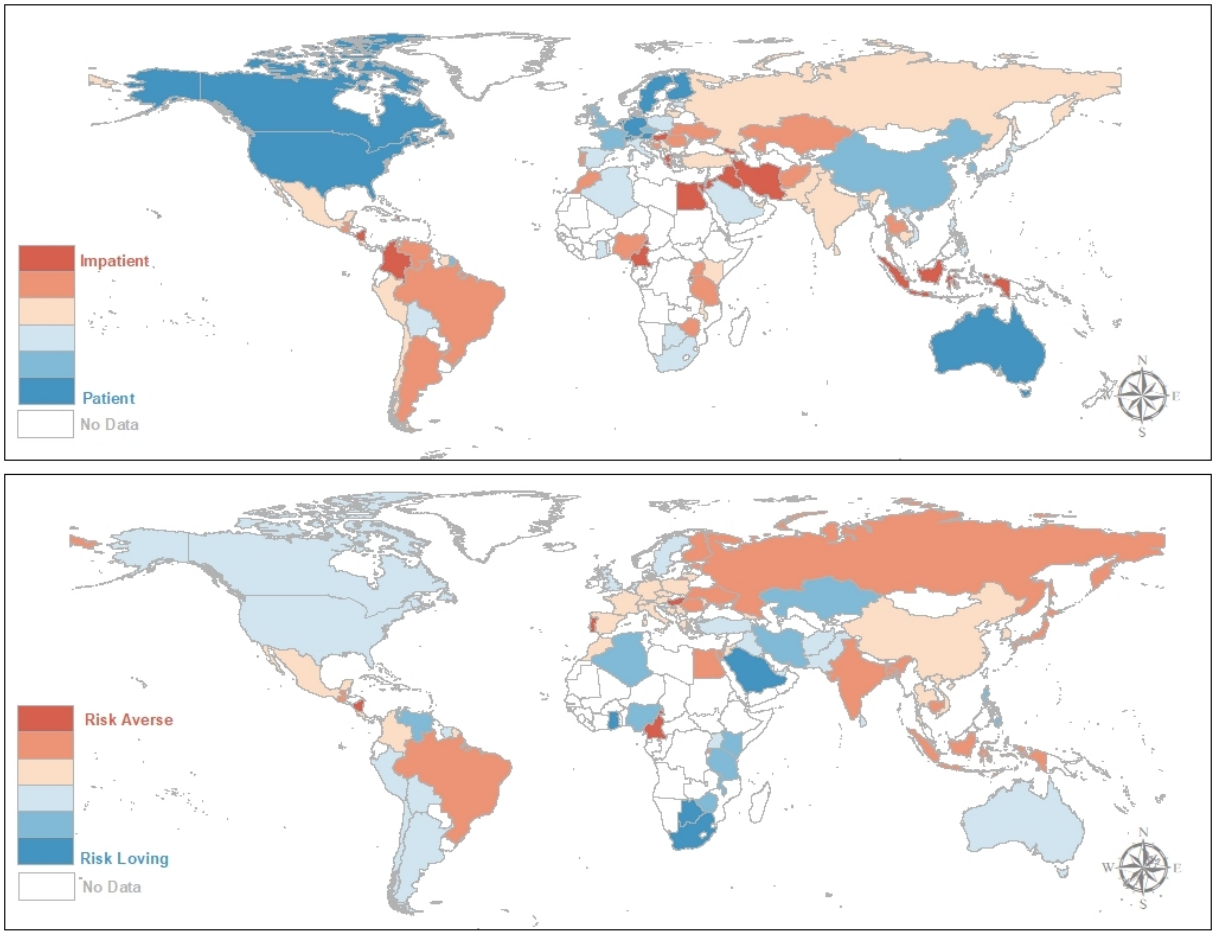


Figure 2: Global distribution of time preference (top) and risk preference (bottom) in the *Global Preferences Survey* (Falk et al., 2016, 2018).

suitability, I use FAO's Global Agro-Ecological Zones v4 dataset. For data on historical temperature variation, I use Mann et al. (2009).[11] I also include variables capturing a subnational region's distance from the sea and the length of its coastline, as well as a pre-industrial mobility index developed by Depetris-Chauvin and Özak (2016). Lastly, for data on contemporary conflict exposure, I use data from the Uppsala Conflict Data Program (UCDP) (Sundberg and Melander, 2013).

[11]Mann et al. (2009) use proxy data from a host of sources to reconstruct historical temperature differences for the entire world. Giuliano and Nunn (2021) use this dataset to measure historical environmental instability.

# 4 Estimation

I now estimate the relationship between historical conflict exposure and contemporary time and risk preferences, conditional on covariates. I use the following equation:

$$y_{i,r} = \alpha_{c(r)} + \beta HistConf_{i,r} + \gamma \mathbf{X}_{i,r} + \delta c_{i,r} + \epsilon_{i,r} \tag{1}$$

Where $y_{i,r}$ is the *GPS* measure of time or risk preference of individual $i$ in subnational region $r$. The variable $HistConf_{i,r}$ is a measure of historical conflict exposure introduced in Section 3.1; $\alpha_{c(r)}$ is a vector that captures country fixed effects; $X_{i,r}$ is a vector that includes a set of geographic controls and individual covariates that I discuss below in detail; $c_{i,r}$ is a measure of contemporary conflict exposure introduced in Section 3.3; and $\epsilon_{i,r}$ is an error term. The proposed hypothesis implies that $\beta < 0$.

There are three main sources of endogeneity that cloud the interpretation of $\beta$. First, country-level studies have highlighted several determinants of conflict that are plausibly correlated with preferences over time and risk. One example is the quality of national institutions. Reynal-Querol (2005) documents that strong and inclusive national institutions reduce civil conflict. It is possible in turn that national institutions are correlated with preferences, in which case failing to account for them will yield biased estimates of $\beta$. Other country-level factors include differences in the level of development (Collier and Hoeffler, 1998), natural resource endowments (Ross, 2004; Collier and Hoeffler, 1998), and the degree of ethnic fragmentation in a country (Fearon, 1995; Esteban et al., 2012).

To address this problem, I include country fixed effects in all my regressions. The inclusion of country fixed effects is a demanding specification for this paper, since a significant share of the variation in preferences and historical conflict is between countries. At the same time, it serves to ensure that the estimate for $\beta$ is not endogeneous to cross-country determinants of preferences and conflict. In this regard, I follow McGuirk and Burke (2020), Dube and Vargas (2013), Harari and La Ferrara (2018) and other papers

that exploit subnational variation to study conflict.

Second, a number of subnationally varying geographic and ecological characteristics may also be a source of omitted variable bias in the analysis. This includes variables that have been shown to be determinants of preference formation, and are also correlated with the frequency of conflict. One such variable is agro-climatic suitability. Galor and Özak (2016) show that contemporary differences in patience around the world have their origins in agriculture.[12] Furthermore, arable areas may also see more conflict over the appropriation of land (McGuirk and Burke, 2020). Since agro-climatic suitability is linked to both preferences and conflict, not accounting for it will result in biased estimates. I address this concern by including variables for land use and suitability. I also control for standard deviation from the long-term mean temperature of a region as a further proxy for climatic suitability.

Another geographic characteristic is terrain ruggedness. Ruggedness tends to be associated with pastoralism, which is a long-run determinant of culture and preferences (Nisbett and Cohen, 2018; Becker, 2019). Pastoralism has also been shown to be associated with revenge-seeking and violence (Cao et al., 2021). Additionally, ruggedness increases the logisitcal costs of trade, which negatively effects income (Nunn and Puga, 2012), and may also affect preferences in the long-run. To account for this, I include an index of ruggedness in the vector of control variables.

Subnational differences in population size and land area may also be a source of omitted variable bias. This is logical, as conflict is probabilistically more likely to occur in regions that constitute a larger share of a country's land mass relative to other regions. Similarly, conflict is more likely to occur in regions where there are more people. In order to account for this, I include the natural log of population size and the natural log of land area in my set of control variables.

[12]Galor and Özak (2016) empirically validate the hypothesis that during the preindustrial period, populations belonging to regions with higher agro-climatic suitability had a greater incentive to delay consumption and invest in agriculture, and this practice instilled values of long-term orientation in their descendants.

I also account for latitudinal and longitudinal differences between subnational regions. It is plausible that, historically, conflict was more likely across similar latitudes, as similar climate and the length of days may have made it easier to move large armies. A counter-argument to this hypothesis is that similar latitudes may have also made it easier to conduct trade, which may instead reduce conflict. I control for latitude and longitude to account for these differences.

The third potential source of endogeneity emerges from the possibility that the geography of violent conflict exhibits path dependence in the long-run. This would imply that, because of serial correlation, the $HistConf_{i,r}$ variable is just a proxy for contemporary conflict. Intuitively, this means that the coefficient $\beta$ is only capturing the contemporaneous effect of conflict on economic preferences, which is already well documented in the literature. In order to address this concern, I control for contemporary conflict exposure. The conflict data for the contemporary period is richer than the historical conflict data, in that it provides the number of violence-related deaths for each conflict event. This allows me to define the contemporary conflict variable as the number of total deaths in a region during the ten years prior to the survey year (2012).

Finally, the vector $X_{i,r}$ also controls for some baseline individual-level covariates. These include subjective math skills, which proxy for the individuals' cognitive ability to assess and answer intertemporal choice questions that are designed to elicit preferences, as well as age and gender of the respondents.

# 5 Results

Estimates of parameters in Equation 1 are reported in Table 2, with the coefficient on $HistConf_{i,r}$ as the main parameter of interest. Overall, the results indicate that the association between historical conflict and patience is negative and statistically significant. The association between historical conflict and risk-taking, on the other hand, is negative but

not statistically distinguishable from zero. Table 2 presents two sets of results for each outcome variable. Both sets of results include the baseline control variables outlined in the previous section. The second set of results, reported in columns 3-4, additionally control for contemporary conflict exposure.

For patience, I estimate a negative and satistically significant $(p < 0.05)$ coefficient of $0.024$ on $HistConf_{i,r}$. This relationship is robust to controlling for contemporary conflict exposure $(\text{column } 3)$. The magnitude of the coefficient is stable across both specifications. According to these results, a 20 percent increase in historical conflict exposure is associated with a 1.2 percent decrease relative to the cross-country standard deviation of patience. The size of the effect, altough small, shows a statistically significant persistence in the long-run. This is a first considerable evidence of a relationship historical conflict and and economic preferences. I analyze this relationship in greater detail in the following sections.

For risk-taking, I estimate a coefficient of $-0.017$ on $HistConf_{i,r}$. This relationship, however, is not statistically significant, which means that I statistically fail to reject the null of there being no relationship. The lack of significance and magnitude of the coefficient is stable across both sets of specifications in Table 2. There are a number of potential explanations for this. Risk preferences may be shaped through heterogeneous mechanisms, some of which may dominate the effect of historical conflict. The lack of evidence may also arise due to my OLS estimates being biased downward.

Overall, I find that my estimates are consistent with the hypothesis that historical conflict exposure negatively affects time preferences in the very long run, but do not provide enough statistical significance to establish a definite long-run relationship for risk-taking. These results also align with the causally identified short-term effects of violence on time and risk preferences (Callen et al., 2014; Voors et al., 2012).

# 6 Instrumental Variables Strategy

It is of course impossible to control for all possible correlates of preferences that might also have triggered conflict. With the goal of ruling out selection on unobservable confounders, I introduce an instrumental variable (IV) strategy that isolates plausibly exogeneous variation in historical conflict.

$$Pref_{i,r} = \alpha_{c(r)} + \beta \widehat{HistConf}_r + \gamma \mathbf{X}_{i,r} + \delta c_{i,r} + u_{i,r}$$

$$HistConf_r = \alpha_{c(r)} + \pi_0 TempAnomaly_r + \pi_1 \mathbf{X}_{i,r} + \pi_2 c_{i,r} + v_{i,r}$$

The instrumental variable $TempAnomaly$ is based on historical temperature anomalies in a subnational (Admin-1) region during the period 1200 to 1700. Anomalies are defined as deviations from the long-term mean temperature of a region. The data for historical temperature anomalies is taken from Mann et al. (2009). The authors use a climate field reconstruction approach to reconstruct global patterns of surface temperature.[13] The dataset reports average annual temperature anomalies (deviations from the 1961 to 1995 reference-period average measured in degrees Celsius) at the level of a 5-degree grid-cell. The variable $TempAnomaly_r$ is constructed as the temporal mean of historical temperature anomalies for the period 1200 to 1700.

For the instrumental variable to be valid in this setting, it must meet two critical conditions. First, historical temperature anomalies must be correlated with historical conflict in a subnational region, i.e., the instrument must have a relevant first-stage. Second, it must be that historical temperature anomalies do not affect preferences through channels other than historical conflict, i.e., the instrument must satisfy the exclusion restriction.

The argument for temperature anomalies being relevant for conflict has strong theoretical and empirical support. Theoretically, we know that anomalies from moderate temperatures increase the risk of conflict in a region through their effect on agricultural

[13] The full dataset provides coverage for the period 500 to 1900. See Mann et al. (2009) for details.

production. This is because for agrarian populations, temperature shocks are equivalent to income shocks due to their contractionary effect on the agrarian economy.[14] Such weather induced income shocks increase the likelihood of conflict by lowering the opportunity costs associated with conflict (McGuirk and Burke, 2020; Chassang and i Miquel, 2009). A number of recent studies have also empirically established the relationship between weather shocks and conflict (McGuirk and Nunn, 2020; Miguel and Roland, 2011; Hsiang et al., 2013; Burke et al., 2015; Harari and La Ferrara, 2018).

In terms of potential violations of the exclusion restriction, it is important to note the IV captures deviations from long-term mean temperatures at the subnational level, which are exogenous and plausibly uncorrelated with other factors that vary at the subnational-level. Moreover, like the OLS specification, I include country fixed effects, which allows me to exploit only within-country variation in temperature anomalies. This empirical set up serves to address various country-level factors that may violate the exclusion restriction.

At the subnational level, I address three potential violations of the exclusion restriction highlighted in the literature by including them in a vector of control variables ($\mathbf{X}_{i,r}$) in both stages of the IV regressions. These factors also shape the historical decision environment, as they are determinants of preferences. First, the effect of temperature anomalies on preferences may be different for pastoral regions, as weather shocks do not necessarily translate into negative income shocks in the absence of agriculture. Moreover, pastoralism has been shown to be an important determinant of preference formation (Cao et al., 2021; Becker, 2019). This could potentially lead to a violation of the exclusion restriction in which temperature anomalies shape preferences through their effects on pastoralism. I address this problem by including controls for agro-climatic suitability, which include a terrain ruggedness index to proxy for the geographic suitability for pastoralism Nunn and Puga (2012), as well as variables capturing land suitability for agriculture.

Second, extreme temperature anomalies can affect preferences by forcing certain popu-

[14]Weather shocks were even more important in the pre-industrial period than they are today, because agriculture was the predominant mode of production.

lations to migrate away from a region. Living in a region that allowed for greater mobility in the preindustrial period may have induced more or less risk-taking individuals in the population to emigrate from these regions. This would alter the average preferences in the population left behind, and therefore create a violation of the exclusion restriction in which conflict shaped preferences through emigration from high mobility areas like coastal regions. In order to control for this channel, I include an index of pre-industrial mobility Özak (2018) to both stages of the IV regressions.

Third, the diesease ecology of a region is an important factor of the decision environment, and is correlated with climatic variations. If relationship between disease ecology and temperature anomalies would violate the exclusion restriction, as the the IV would be affecting preferences through the disease channel. In order to address this problem, I include a subational-level malaria index Kiszewski et al. (2004) in both stages of the IV regressions.

Like the OLS specification, the vector of control variable $\mathbf{X}_{i,r}$ also includes individual-level controls. I also include contemporary conflict exposure to control for serial corelation of conflict. Overall, $\mathbf{X}_{i,r}$ and country fixed effects allow me to address the major concerns about the exclusion restriction. Note that these controls are included despite the fact that temperature anomalies are largely treated as exogenous in the conflict literature. Nonetheless, I acknowledge that I'm not able to fully rule out the possibility that historical temperature anomalies could affect contemporary preferences through channels other than historical conflict.

The first-stage relationship between historical temperature anomaly and historical conflict is strongly positive and statistically significant at over 99 percent confidence level (Table 3). This relationship is robust to the inclusion of a range of subnationally varying controls (discussed above). All regressions in Table 3 include individual-level controls and country fixed effects. Subnational controls are added in each sequential column after column 1. Higher values of $TempAnomaly_r$ indicate more a higher frequency of weather

shocks, which typically would lead to more conflict in that region as an outcome of lower agricultural production. The F-statistic for the temperature anomaly instrument is roughly 18 across all regressions, which is greater than the typical threshold of 10 (Stock and Yogo, 2002). Overall, the results in Table 3 are consistent with the literature that the contemporaneous relationship between weather and conflict is strongly and positively correlated.

The second-stage equation estimates the impact of historical conflict on patience and risk-taking. The results for patience are reported in Table 4. Consistent with OLS results, the IV estimates show that historical conflict is negatively and statistically significantly associated with patience ($p < 0.05$). The relationship is estimated with country fixed effects, and is robust to the inclusion of subnational controls and contemporary conflict exposure. The coefficient on $\widehat{HistConf}_r$ is -0.15 for the most demanding specification (column 6). A 20 percent increase in historical conflict exposure lowers patience today by approximately 7.7 percent of the cross-country variation in patience.

The magnitude of the IV-2SLS estimated effect of historical conflict on contemporary patience (0.15) is significantly more negative than the OLS estimates (0.02). One reason why the IV estimates are larger can be due to classical measurement error in the historical conflict variable. Since the conflict data relies on recorded history, it is very likely that coverage is not perfect, with some regions providing more historical sources than others. A second reason why the IV estimates are larger may be due to the OLS estimates being biased downward. It is impossible to control for all possible factors that shape the decision environment and are therefore determinants of preferences. It is plausible that unobservable confounders at the subnational level is absorbing the effect of historical conflict on preferences.

The second-stage results for risk-taking are show a positive effect of historical conflict, but the results are not statistically significant (Table 5. This means that I fail to reject the null that historical conflict has no effect on risk-taking today. These results are consistent with my findings using OLS.

Overall, the results of the instrumental variable analysis corroborate the main findings, and provide evidence to suggest that the historical conflict has a plausibly causal long-lasting effect on preferences. This effect, while small, is seen to persist over many generations. This makes it important to explore the channels of persistence that transmit this effect in the long-run

# 7 Channels of Persistence

I now turn to look more closely at the assumed channel of persistence that may be underpinning my results. In Section 2, I present a conceptual framework which shows that historical conflict may shape contemporary time and risk preferences through its effect on the security of property rights in the local environment. According to this framework, conflict increases expropriation risk, which affects beliefs about one's environment, and in turn these beliefs persist to form preferences. The critical assumption here is that conflict-affected beliefs are specific to the local environment, which implies that the channel of persistence operates through one's physical location. I refer to this as the place-based channel.

One implication of the place-based channel of persistence is that individuals' preferences may change if they physically move to a new environment, e.g., one where the level of expropriation risk is distinct from the prior environment. In particular, this logic implies that migrants, upon moving to a new country or location, will update their beliefs about the environment in accordance with their new external environment. In such a setting, historical conflict in one's ancestral homeland may not affect contemporary preferences. Thus, if the channel of persistence is assumed to be place-based, one should observe migrants and/or their descendants converge to the local preferences of their new locations.

Alternatively, It is possible that when individuals migrate, their conflict-affected beliefs move with them and persist long after the individuals have left their external environment

behind. This hypothesis is premised on the idea that cultural beliefs — like ideologies — are inherently sticky, and may be transmitted from generation to generation irrespective of one's location (Alesina et al., 2013; Giuliano and Tabellini, 2020). This would imply a direct relationship between historical conflict and contemporary preferences, one that is orthogonal to the external environment, and therefore does not operate through the place-based channel. Instead, this channel posits that conflict effects are internalized by individuals in the form of values, and these values are passed down from ancestors to their descendants through cultural transmission. I refer to this as the ancestry-based channel.

To distinguish between these two channels, I require an empirical specification that allows me to separate the ancestry-based channel from the place-based channel. Up to this point, my analysis links contemporary preferences to conflict exposure through location, i.e., conflict in the subnational region of one's current physical environment. I now link contemporary preferences to conflict exposure through ancestral affiliation, i.e, conflict in the preindustrial ethnic location of one's ancestry. I refer to this as conflict exposure in one's ancestral homeland, or $HistConf_{i,r}^{anc}$. Since one's current location may not be the same as the preindustrial location of one's ancestors, a relationship between $HistConf_{i,r}^{anc}$ and contemporary preferences will support the hypothesis that that conflict effects persist orthogonally to one's external environment, i.e., there may be ancestry-based persistence.

Constructing the $HistConf_{i,r}^{anc}$ variable is a two-step process that requires two sources of GIS data. First, it requires georeferenced data on the preindustrial homelands of ethnic groups around the world. This will allow me to assign conflict to ethnic territories, in the same way I assigned conflict to subnational regions.I use the same period of coverage (1200 - 1700 C.E.) to ensure comparability. Second, it requires data on the contemporary population distribution of ethnic groups. This will allow me to link ancestral conflict exposure to the subnational region of residence of the respondent in *GPS*.

For locations of ethnic homelands, I use data from the Ethnographic Atlas (*EA*) (Murdock, 1967). The EA is a world-wide ethnicity-level database containing ethnographic

information on preindustrial groups, including their locations. It is the most comprehensive source of global cross-cultural information on over 1300 ethnic groups, and is widely used in economics and other social sciences Nunn (2008); Alesina et al. (2013); Giuliano and Nunn (2018); Michalopoulos and Papaioannou (2013).[15]

One challenge with using the *EA* data is that it provides ethnic group locations in the form of point coordinates. For the construction of the $HistConf_{i,r}^{anc}$ variable, I require that ethnic homelands be defined by borders in the form of polygons, which can be used to assign and aggregate conflict exposure at the level of each ethnic group. I address this issue by creating proximal boundaries for each ethnic group using a spatial partitioning technique, known as Thiessen polygons.[16]This technique uses an iterative geometric process to convert each set of *EA* point coordinates into a polygon (Brassel and Reif, 1979). The main property of each resulting polygon is that any location within that polygon will be closer to its associated point — the nearest ethnic group — than to any other point. This provides me with a GIS shape file that divides the world's land into polygons representing the proximate preindustrial ethnic homeland of each *EA* group. I use these polygons to assign conflict exposure using the aggregation methodology described in section 3.3.

The second step involves linking the newly constructed ethnicity-level conflict data with contemporary invdividual-level preferences data in the *GPS*. I follow Giuliano and Nunn (2018), who link ethnic groups in the *EA* to contemporary population distributions using the *Ethnologue: Languages of the World* (Gordon Jr, 2009)[17] The *Ethnologue* maps the population distribution of more than 7,000 languages and dialects spoken worldwide today. Giuliano and Nunn (2018) manually matched each of the contemporary language groups in the *Ethnologue* to one of the ethnic groups from the *EA*, which also provides the native language of each group. This process allows me to link preindustrial conflict exposure to the world's population distribution today. Finally, I calculate the average ancestral

[15]See Bahrami-Rad et al. (2021) for an empirical validation of the *EA* data.
[16]Also known as Voronoi diagrams.
[17]I use data from the sixteenth edition of the Ethnologue.

conflict exposure of populations in each subnational Admin-1 region today, by overlaying Admin-1 shape file on top of *Ethnologue* language groups. This completes the crosswalk between individual-level contemporary preferences and conflict exposure in one's ancestral homeland, bridged at the level of a subnational Admin-1 region.

To summarize, I link each subnational Admin-1 region in the *GPS* to $HistConf_{i,r}^{anc}$, a newly constructed variable which measures average conflict exposure in the ethnic homelands of the contemporary subnational population. The new $HistConf_{i,r}^{anc}$ variable differs from the original $HistConf_{i,r}$ variable, in that it assigns conflict exposure to ancestral groups of *GPS* respondents, instead of assigning it to regions of residence of the respondents. This differential assignment of conflict allows me to test the assumed channel of persistence, i.e. the place-based channel. A statistically significant association between $HistConf_{i,r}^{anc}$ and preferences over time and risk will be consistent with the hypothesis that the long-run effects of conflict persist through the ancestry-based channel.

I now re-estimate Equation 1 using $HistConf_{i,r}^{anc}$ as the main explanatory variable. Table 6 presents the results. The coefficient on the main variable of interest is yet again negative for patience, but never statistically different for zero for any of the three specifications. To confirm these findings, I regress patience and risk-taking on both measures of historical conflict. The results are presented in Table 7. Similar to Table 6, the place-based conflict variable is negative and statistically significant for patience, whereas the ancestry-based conflict variable is negative but not statistically different from zero.

Overall, these results are consistent with the conceptual framework presented in Section 2, and support my hypothesis that the relationship between historical conflict and patience persists through the place-based channel.

The findings in this section offer important insights that are relevant for policy makers dealing with immigration policy. Instead of looking at the effects that migrants have on their host communities - which is a widely studied research question in public policy - this paper looks at the effects that host communities have on immigrants. I find empirical

evidence in support of the hypothesis that in the long-run, economic preferences of immigrants from conflict regions converge to local preferences. This is an important finding, as many advanced economies today are experiencing significant migrant inflows from high conflict areas. More generally, in a globalizing world, these findings align with the positive effects of migration.

# 8 Understanding Theoretical Mechanisms

The previous section indicates that historical conflict affects preferences through a place-based channel of persistence, in which higher conflict reduces long-run property rights security, which in turn lowers the incentives for accumulating patience. This evidence, although suggestive in nature, is consistent with the conceptual framework of this paper, in which I assume that conflict adversely shapes the property rights environment. However, a large volume of existing literature on state formation suggests that that the long run relationship between conflict and property rights security might be significantly different for western Europe relative to other areas of the world (Tilly, 1992, 1994; Dincecco and Wang, 2018). This literature, known as the bellicist account of state formation, argues that in pre-industrial western Europe, historical conflict led to a specific transformation of statehood in which newly established institutions led to a strengthening of property rights security, as opposed to a weakening of the same.

These Bellicist accounts provide a theoretical explanation for western Europe's unique long-run relationship between conflict and broad-based property rights. In his seminal work, Tilly (1992) argues that relative to the rest of the pre-industrial world, western Europe was a highly fragmented region with many small kingdoms and states competing for regional and overseas influence.[18] The competition that ensued from this fragmented political geography frequently escalated to wars, and created a sustained demand for

[18]Dincecco and Wang (2018) contrast western Europe's experience with that of preindustrial China, and show that political fragmentation matters for long-run develoment.

greater fiscal and operational resources. These requirements also provided strong bargaining power to the local elites of western European states, who always had the option to win support from a neighboring polity in exchange for a smaller share of their profits going towards financing conflict. As a result of this bargaining power, elites in western Europe were able to demand coercion control guarantees from their sovereigns, which resulted in the formalization of broad-based private property rights institutions in the region. According to Pomeranz (2021), this development transformed western Europe's overall economic environment, and subsequently gave rise to important economic growth mechanisms like joint stock companies and long-term financing instruments.

Western Europe's unique relationship between long-run conflict and property rights security serves as a useful test for understanding the theoretical mechanism underlying preference formation presented in this paper. If historical conflict shapes contemporary preferences through the place-based property rights channel, these effects should not be seen in western Europe due to the offsetting effect of broad-based property rights institutions that emerged in that part of the world.

To test for these differences, I estimate the relationship between historical conflict and contemporary preferences separately for western European countries and the rest of the sample. In the western European sample, I also include western offshoot countries (Unites States, Canada, Australia and New Zealand).[19] I refer to these countries WE&WO. Table 8 reports the differential relationship between WE&WO and non-WEWO countries.

Columns 1-4 in Table 8 present OLS results for the full sample, whereas columns 5-8 additionally interact historical conflict with a dummy variable for WE&WO countries. All regression coefficients in columns 5-8 show that excluding WE&WO countries from the sample increases the magnitude of the effect of historical conflict on patience by nearly twice in magnitude, and makes the coefficient more statistically significant ($p < 0.01$) relative to the full sample. Importantly, I find that there is a statistically significant interaction

[19]The classification of western offshoot countries is taken from Maddison (2006). The results reported below are robust to excluding western offshoot countries.

between historical conflict and WE&WO countries ($p < 0.05$).

Overall, the results from this section are consistent with the hypothesis that the effects of historical conflict on economic preferences are not seen in western European and western offshoot countries. These findings are consistent with the conceptual framework of this paper, which posits that the effects of historical conflict persist through property rights insecurity. In the case of western Europe, property rights security was achieved through broad-based property rights institutions, which explains why the effect of historical conflict on preferences is not statistically different from zero. These results are also consistent with the literature on state formation in western Europe, as explained above. Moreover, these findings provide suggestive evidence on the interplay between institutions and culture. Consistent with recent findings in the literature, I find that rules-based state institutions can substitute for cultural beliefs in the formation of preferences Lowes et al. (2017); Bowles and Polania-Reyes (2012).

# 9 Conclusions

Time and risk preferences are central to economic decision-making, and provide key theoretical underpinnings to nearly all rational choice models. Recent developments in behavioral research methods have allowed economists to directly elicit these preferences, and a rich source of newly available data based on these methods has documented significant heterogeneity in time and risk preferences around the world. Moreover, studies have shown that these differences matter for long term development; differences in time preference are strongly and positively correlated with differences in income growth, productivity, and human capital all around the world (Sunde et al., 2022; Hanushek et al., 2022).

Motivated by these findings, this paper sets out to provide new insights into the origins of time and risk preferences. Using data with near global coverage, I find that individuals

in regions that experienced more large-scale conflict in the pre-industrial period (1200-1700 C.E.) are today less patient, i.e., they discount future gains more heavily. I do not find evidence of such an association for risk preferences. These estimates are robust to an instrumental variables approach, suggesting that the long-run relationship is causal in nature. To interpret these findings, I present a conceptual framework that explains how historical conflict events from hundreds of years ago may become embedded in one's beliefs about the environment, and in turn contribute to differences in preferences held today. I also investigate the channels of persistence, and find evidence supporting place-based persistence. This indicates that historical conflict lastingly lowers the incentives for long-term investments due to property rights insecurity in a region.

The findings of this paper are important for two key reasons. First, this paper shows that long periods of wars inflict long-term costs on the growth potential of a region by affecting primitive economic behavior. According to the United Nations, nearly two billion people – a quarter of the world's population – are now living in conflict-affected areas. The long-term consequences of living in conflict zones for such a large population of the world has important implications for long-run economic divergence. This makes ceasefires and cessation of conflict a first-order objective for economic development. Aligning international engagements and policy-making more closely with Sustainable Development Goal (SDG) 16 of the United Nations, which focuses on peace, justice, and strong institutions, is an obvious way forward. Moreover, I argue that a focus on supporting effective governance and broad-based property rights enforcement may address the long-run development constraints outlined in this paper.

Second, this paper shows that the effects of violent conflict are tied to regions, and that they diminish as migrant populations move to new regions. This is an important and relevant insight for immigration policy. In 2021, 84 million people were forcibly displaced because of conflict, according to the United Nations. The economic and cultural impact that immigrants from conflict zones have on host communities is part of today's public

policy discourse in developed economies. This paper shows that the negative effects of conflict on preferences do not persist if individuals move to new locations. In an environment where broad-based property rights are secure, migrants' preferences will converge to the preferences of their host communities.

This paper opens up a number of avenues for potential future research. First, we do not know if time preferences are responsive to behavioral interventions. In particular, behavioral interventions can be targeted toward regions where conflict levels have receded, but conflict-based preferences persist. Updating individuals' priors with regard to the local threat environment in these regions may lead to improved investments and development outcomes. Another under-researched area pertains to exploring the differential effect of historical conflict on in-expropriable investments, e.g., on human capital investments in education.

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# 10 Tables

Table 1: Descriptive Statistics

| | Subnational-level | | | | |
|---|---|---|---|---|---|
| **Conflict Data** | Mean | SD | Count | Min | Max |
| Duration (Log) | 0.60 | 0.86 | 1,091 | 0 | 4.51 |
| Duration (Years) | 2.02 | 5.04 | 1,091 | 0 | 90 |
| Events | 1.89 | 5.12 | 1,091 | 0 | 90 |
| | Individual-level | | | | |
| **Preferences Data** | Mean | SD | Count | Min | Max |
| Patience | 0 | 1.00 | 78,697 | -1.31 | 2.76 |
| Will. to take risks | 0 | 1.00 | 78,686 | -1.87 | 2.47 |
| Age | 41.81 | 17.51 | 78,994 | 15 | 83 |
| Subj. math skills | 5.16 | 2.82 | 78,212 | 0 | 10.00 |

*Notes.* Duration (log) is the main explanatory variable used in the analysis. It is calculated as one plus the cumulative years of conflict in a subnational Admin-1 region.

Table 2: Time Preference and Historical Confict (OLS).

| | I | | II | |
|---|---|---|---|---|
| | (1) Patience | (2) Risktaking | (3) Patience | (4) Risktaking |
| Hist. Conflict Exposure (log) | -0.0237** | -0.0169 | -0.0239** | -0.0171 |
| | (0.0120) | (0.0128) | (0.0121) | (0.0128) |
| Contemp. Conflict Exposure | | | -0.0001 | -0.0001 |
| | | | (0.0000) | (0.0001) |
| Country FE | Yes | Yes | Yes | Yes |
| Individual Controls | Yes | Yes | Yes | Yes |
| Agro-Climatic Controls | Yes | Yes | Yes | Yes |
| Preindustrial Mobility | Yes | Yes | Yes | Yes |
| Ruggedness | Yes | Yes | Yes | Yes |
| Population Density | Yes | Yes | Yes | Yes |
| Disease Ecology | Yes | Yes | Yes | Yes |
| Region Clusters | 1,091 | 1,091 | 1,091 | 1,091 |
| Observations | 77,524 | 77,484 | 77,524 | 77,484 |
| Dep. Var. Mean | 0 | 0 | 0 | 0 |
| Dep. Var. SD | 1 | 1 | 1 | 1 |
| Dep. Var. SD (Cross-Country) | 0.39 | 0.32 | 0.39 | 0.32 |

*Notes.* This table shows OLS results. Standard errors are clustered at the level of an Admin-1 region, and are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 3: 2SLS First Stage. Historical Conflict and Historical Temperature Anomaly.

| | First-stage 2SLS estimates. Dependent variable: Hist. Conflict | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Temperature Anomaly (1200-1700, avg.) | 7.1413*** (1.7497) | 6.9039*** (1.6880) | 6.9482*** (1.6735) | 6.9911*** (1.6796) | 7.0775*** (1.6931) | 7.0661*** (1.6905) |
| Contemp. Conflict Exposure | | | | | | -0.0001 (0.0002) |
| F-Statistic | 18.2 | 18.1 | 17.7 | 17.5 | 17.7 | 17.6 |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Agro-Climatic Controls | - | Yes | Yes | Yes | Yes | Yes |
| Preindustrial Mobility | - | - | Yes | Yes | Yes | Yes |
| Ruggedness | - | - | - | Yes | Yes | Yes |
| Disease Ecology | - | - | - | - | Yes | Yes |
| Region Clusters | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 |
| Observations | 77,945 | 77,945 | 77,945 | 77,945 | 77,945 | 77,945 |

*Notes.* This table shows the first stage estimates of instrumenting historical conflict with mean historical temperature volatility (1200-1700). These results are robust to accounting for a set of basic individual controls (age, age squared, math skills), contemporary exposure to conflict, and an extended set of geographic variables. Standard errors are clustered at the level of an Admin-1 region, and are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 4: 2SLS Second Stage. Time Preference (Patience) and Historical Conflict (IV).

| | Second-stage 2SLS estimates. Dependent variable: Patience | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Hist. Conflict Exposure | -0.1344* | -0.1580** | -0.1515** | -0.1496** | -0.1485** | -0.1495** |
| | (0.0729) | (0.0745) | (0.0736) | (0.0733) | (0.0727) | (0.0728) |
| Contemp. Conflict Exposure | | | | | | -0.0001 |
| | | | | | | (0.0001) |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Agro-Climatic Controls | - | Yes | Yes | Yes | Yes | Yes |
| Preindustrial Mobility | - | - | Yes | Yes | Yes | Yes |
| Ruggedness | - | - | - | Yes | Yes | Yes |
| Disease Ecology | - | - | - | - | Yes | Yes |
| Region Clusters | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 |
| Observations | 77,524 | 77,524 | 77,524 | 77,524 | 77,524 | 77,524 |
| Dep. Var. Mean | 0 | 0 | 0 | 0 | 0 | 0 |
| Dep. Var. SD | 1 | 1 | 1 | 1 | 1 | 1 |
| Dep. Var. SD (Cross-Country) | 0.39 | 0.39 | 0.39 | 0.39 | 0.39 | 0.39 |

*Notes.* This table establishes the negative statistically significant causal effect of historical conflict on time preference (patience), by instrumenting historical conflict with mean historical temperature volatility (1200-1700). These results are robust to accounting for a set of basic individual controls (age, age squared, math skills), contemporary exposure to conflict, and an extended set of geographic variables. Standard errors are clustered at the level of an Admin-1 region, and are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 5: 2SLS Second Stage. Risk Preference (Risk-taking) and Historical Conflict (IV).

| | Second-stage 2SLS estimates. Dependent variable: Risktaking | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Hist. Conflict Exposure | 0.0345 | 0.0416 | 0.0384 | 0.0393 | 0.0457 | 0.0451 |
| | (0.0730) | (0.0763) | (0.0755) | (0.0751) | (0.0744) | (0.0745) |
| Contemp. Conflict Exposure | | | | | | -0.0000 |
| | | | | | | (0.0001) |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual Controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Agro-Climatic Controls | - | Yes | Yes | Yes | Yes | Yes |
| Preindustrial Mobility | - | - | Yes | Yes | Yes | Yes |
| Ruggedness | - | - | - | Yes | Yes | Yes |
| Disease Ecology | - | - | - | - | Yes | Yes |
| Region Clusters | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 |
| Observations | 77,484 | 77,484 | 77,484 | 77,484 | 77,484 | 77,484 |
| Dep. Var. Mean | 0 | 0 | 0 | 0 | 0 | 0 |
| Dep. Var. SD | 1 | 1 | 1 | 1 | 1 | 1 |
| Dep. Var. SD (Cross-Country) | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 | 0.32 |

*Notes.* This table tests for the relationship between historical conflict and risk preference (patience), by instrumenting historical conflict with mean historical temperature volatility (1200-1700). These results are robust to accounting for a set of basic individual controls (age, age squared, math skills), contemporary exposure to conflict, and an extended set of geographic variables. Standard errors are clustered at the level of an Admin-1 region, and are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 6: Time Preference and Historical Confict (OLS).

| | I | | II | |
|---|---|---|---|---|
| | (1) Patience | (2) Risktaking | (3) Patience | (4) Risktaking |
| Log Hist. Conflict Exp. (Ancestry-Based) | -0.0296 (0.0187) | -0.0119 (0.0201) | -0.0297 (0.0187) | -0.0120 (0.0202) |
| Contemp. Conflict Exposure | | | -0.0001 (0.0000) | -0.0001 (0.0001) |
| Country FE | Yes | Yes | Yes | Yes |
| Individual Controls | Yes | Yes | Yes | Yes |
| Agro-Climatic Controls | Yes | Yes | Yes | Yes |
| Preindustrial Mobility | Yes | Yes | Yes | Yes |
| Ruggedness | Yes | Yes | Yes | Yes |
| Population Density | Yes | Yes | Yes | Yes |
| Disease Ecology | Yes | Yes | Yes | Yes |
| Region Clusters | 1,091 | 1,091 | 1,091 | 1,091 |
| Observations | 77,524 | 77,484 | 77,524 | 77,484 |
| Dep. Var. Mean | 0 | 0 | 0 | 0 |
| Dep. Var. SD | 1 | 1 | 1 | 1 |
| Dep. Var. SD (Cross-Country) | 0.39 | 0.32 | 0.39 | 0.32 |

*Notes.* This table shows OLS results. Standard errors are clustered at the level of an Admin-1 region, and are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 7: Time Preference and Historical Confict (OLS).

| | I | | II | |
|---|---|---|---|---|
| | (1) Patience | (2) Risktaking | (3) Patience | (4) Risktaking |
| Log Hist. Conflict Exp. (Place-Based) | -0.0228* | -0.0165 | -0.0230* | -0.0167 |
| | (0.0121) | (0.0128) | (0.0121) | (0.0128) |
| Log Hist. Conflict Exp. (Ancestry-Based) | -0.0280 | -0.0108 | -0.0281 | -0.0108 |
| | (0.0186) | (0.0200) | (0.0187) | (0.0201) |
| Contemp. Conflict Exposure | | | -0.0001 | -0.0001 |
| | | | (0.0000) | (0.0001) |
| Country FE | Yes | Yes | Yes | Yes |
| Individual Controls | Yes | Yes | Yes | Yes |
| Agro-Climatic Controls | Yes | Yes | Yes | Yes |
| Preindustrial Mobility | Yes | Yes | Yes | Yes |
| Ruggedness | Yes | Yes | Yes | Yes |
| Population Density | Yes | Yes | Yes | Yes |
| Disease Ecology | Yes | Yes | Yes | Yes |
| Region Clusters | 1,091 | 1,091 | 1,091 | 1,091 |
| Observations | 77,524 | 77,484 | 77,524 | 77,484 |
| Dep. Var. Mean | 0 | 0 | 0 | 0 |
| Dep. Var. SD | 1 | 1 | 1 | 1 |
| Dep. Var. SD (Cross-Country) | 0.39 | 0.32 | 0.39 | 0.32 |

*Notes.* This table shows OLS results. Standard errors are clustered at the level of an Admin-1 region, and are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 8: Heterogeneity Analysis: Western Europe and Western Offshoot Countries.

| | I | | II | | III | | IV | |
|---|---|---|---|---|---|---|---|---|
| | (1) Patience | (2) Risktaking | (3) Patience | (4) Risktaking | (5) Patience | (6) Risktaking | (7) Patience | (8) Risktaking |
| Hist. Conflict Exposure (log) | -0.0237** | -0.0169 | -0.0239** | -0.0171 | -0.0435*** | -0.0084 | -0.0438*** | -0.0087 |
| | (0.0120) | (0.0128) | (0.0121) | (0.0128) | (0.0150) | (0.0161) | (0.0150) | (0.0161) |
| Contemp. Conflict Exposure | | | -0.0001 | -0.0001 | | | -0.0001 | -0.0001 |
| | | | (0.0000) | (0.0001) | | | (0.0000) | (0.0001) |
| **Hist. Conflict Exposure (log) X WE&WO** | | | | | 0.0639** | -0.0275 | 0.0643** | -0.0272 |
| | | | | | (0.0261) | (0.0241) | (0.0261) | (0.0241) |
| Country FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Agro-Climatic Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Preindustrial Mobility | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Ruggedness | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Population Density | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Disease Ecology | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region Clusters | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 | 1,091 |
| Observations | 77,524 | 77,484 | 77,524 | 77,484 | 77,524 | 77,484 | 77,524 | 77,484 |
| Dep. Var. Mean | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dep. Var. SD | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Dep. Var. SD (Cross-Country) | 0.39 | 0.32 | 0.39 | 0.32 | 0.39 | 0.32 | 0.39 | 0.32 |

*Notes.* This table shows the differential effects of historical conflict for western European and western offshoot countries that are part of the sample. Western offshoot countries incude the United States, Canada, Australia and New Zealand. Region classifications are based on Maddison (2006). There is no conflict data for Australia and New Zealand in the period of coverage. These countries are therefore excluded from the analysis. Standard errors are clustered at the level of an Admin-1 region, and are reported in parentheses; *** denotes statistical significance at the 1% level, ** at the 5% level, and * at the 10% level.