On the Determinants of Conflict: Inherited Risk Attitudes of Rulers

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Abstract

I study the relationship between individual monarchs' risk preferences and interstate war in Europe from 1495 to 1918. Specifically, genealogical data is combined with the Global Preferences Survey to measure the "inherited risk attitude" of individual monarchs. Leveraging recent evidence supporting the inter-generational transmission of risk preferences, this measure proxies a ruler's risk attitude accounting for ruler-specific ancestry. For a given country pair, the data suggest that war incidence increases with rulers' risk tolerance. Interestingly, this effect appears to operate exclusively through the more risk tolerant ruler in a given pair. In a simple model, I show that this asymmetry is predicted when commitment power is limited. In contrast, bargaining failure models of conflict relying on incomplete information predict <u>both</u> rulers' risk preferences should affect war frequency.

JEL Classification Codes: D74, D85, F51, N43, Z10

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1 Introduction

Do leaders matter? This is an old question that has long attracted the attention of social scientists. The great man theory, popularized by Carlyle (1840), holds that "the history of the world is but the biography of great men." This view implies that the individual characteristics of political leaders are vital determinants of the course of history. However, many modern social scientists argue that political outcomes are the product of social systems and other factors that transcend the identities of particular individuals. For instance, the realist approach to international relations eschews the role of the individual and instead treats the state as the unit of analysis [Goodin (2010)]. This realpolitik approach views abstract geostrategic considerations and the distribution of power among states as the key drivers of international politics. This leaves little role for the personal attributes of political leaders.

In this paper, I provide empirical evidence indicating that individual leader characteristics do affect important political outcomes. Specifically, I study how the risk preferences of monarchs affected the likelihood of interstate conflict in Early Modern Europe. This question requires two primary pieces of data. The first is a historical record of European warfare linked to individual leaders (i.e., monarchs). This is borrowed from Benzell and Cooke (2019). The second is data on the individual risk preferences of the monarchs. While this is not directly observable, I leverage recent evidence on the inter-generational transmission of risk preferences [e.g., Dohmen et al (2012)] to construct a proxy measure of individual rulers' *inherited risk attitude* based on genealogical records and newly available cross-country data on risk attitudes taken from the experimentally validated Global Preferences Survey ("GPS") [Falk et al. (2016); Falk et al. (2018)].[1]

[1] The potential importance of heterogeneous ruler risk attitudes has been recognized since at least Bueno de Mesquita (1978). Using qualitative evidence, Byman and Pollack (2001) argue that the warmongering of Napolean, Hitler, and Saddam Hussein can be attributed to their risk tolerance. However, the authors acknowledge a need for more rigorous testing of this hypothesis. Most attempts to test this hypothesis empirically have relied upon variation in national and/or international political conditions rather than ruler-specific characteristics [Huth et al. (1992); Morrow (1987)]. My proposed proxy varies with individual ruler

My proposed proxy measure of ruler risk attitudes relies on two key assumptions. First, I assume that an individual's risk attitude can be proxied by the average risk attitude of his or her parents. This assumption is supported by Dohmen et al. (2012) which provides empirical evidence for the transmission of risk preferences from parents to children and further shows that this effect is symmetric between mothers and fathers. Preference transmission can occur through either cultural [Bisin and Verdier (2001)] or genetic channels [Linnér et al. (2019)]. Second, when I am unable to identify an individual's parents, I assume that the average risk attitude of the individual's home region (measured by GPS) approximates the individual's idiosyncratic risk attitude. This assumption is consistent with a large literature on long-run cultural persistence which suggests that population preferences are rooted in the distant past and are stable over very long periods.[2] Under these assumptions, I utilize GPS country-level preference measures in conjunction with genealogical data compiled by Tompsett (2014) to calculate the *inherited risk attitude* for each monarch in the data.[3]

With this measure in hand, I construct an unbalanced panel dataset with observations at the country pair-year level. This allows me to estimate the effect of ruler risk attitude on war. Controlling for country pair and year fixed effects, I find that a one standard deviation increase in a ruler's risk tolerance increases the annual probability of war onset by 18.2% for a given pair of countries. Interestingly, this effect appears be driven by the more risk tolerant ruler in the pair. This asymmetric effect has important consequences for rationalist theories of war.

In particular, following Fearon (1995), many formal theories of war rely on

ancestry in order to better approximate the ideal "deep parameter."

[2] Studies demonstrating long-run persistence of preferences include Voigtlander and Voth (2012); Alesina, Guilano, and Nunn (2013); Guiso, Sapienza, and Zingales (2016); Galor and Ozak (2016). Kelly (2019) has highlighted potential issues with spatial regression discontinuity studies of cultural persistence, however other studies using alternative methods have reached similar conclusions.

[3] Relatedly, Pan, Siegel and Wang (2017) use the ethnic background of CEOs as a proxy for CEO risk attitudes. Their study finds that risk attitudes of CEOs can have important effects on corporate investment decisions.

bargaining failures caused by incomplete information. However, such models imply that the risk attitudes of *both* rulers should affect the probability of war. This is inconsistent with my empirical finding that only the risk attitude of the more risk tolerant ruler appears to matter. However, another class of rationalist models of war [e.g., Powell (2006), Schwarz and Sonin (2007)] point toward commitment problems. Using a simple model, I show my empirical findings favor explanations focused on lack of commitment power rather than incomplete information.

My results provide empirical evidence for the importance of individual leader characteristics in international relations. This is consistent with a growing literature in political science investigating the impact of various attributes of individual leaders. For instance, some recent papers have found evidence that leader characteristics like age [Horowitz, McDermott, and Stam (2005); Bertoli, Dafoe, and Trager (2019)], sex [Reiter, Stam, and Horowitz (2016); Dube and Harish (2018)], military experience [Horowitz and Stam (2014)], and kinship ties [Benzell and Cooke (2019)] are important determinants of interstate conflict. Relatedly, Olken and Jones (2005) show that political leaders have played an important role in shaping economic growth since World War II. As discussed in Horowitz and Fuhrmann (2018)'s survey of this literature, these studies help to answer the central question of "What role do individual leaders play in international relations?"

2 Data Description

In order to investigate the impact of ruler risk preferences on war, I require data on historical war incidence and a measure of ruler risk preference. The data on war is relatively straightforward and is borrowed from Benzell and Cooke (2019). However, obtaining a measure of risk preferences for the rulers of Early Modern Europe requires a more creative approach. I propose a proxy measure called *inherited risk attitude* that is based on a combination of historical genealogical records and a modern cross-country measure of risk tolerance based on an experimentally-validated preference survey.

2.1 War Data

For data on war in Early Modern Europe, I use the data set compiled by Benzell and Cooke (2019) which combines and extends various sources [e.g., Wright (1942); Brecke (2012)] to construct a database of wars between pairs ("dyads") of sovereign European monarchies for the years 1495 - 1918. These data include 92,321 dyad-years. Crucially, this data set also records the history of individual monarchs of each country. This enables individual monarch characteristics (like risk attitude) to be tied to interstate conflict.

Table 1: Summary Statistics For War Data

	Observations	Mean	Std Dev	Min	Max
War	92321	.0384	.1921	0	1
War Start	88868	.0083	.0908	0	1
Neither Landlocked	92321	.6096	.4878	0	1
Adjacent	92321	.1462	.3533	0	1
Genetic Tie	92321	.2062	.4045	0	1
Same Religion	92321	.4713	.4992	0	1

Note: This table summarizes two categories of variables: conflict measures and dyadic covariates. War encodes whether a dyad-year is at war. War Start focuses on previously peaceful dyads. Dyadic covariates include genetic, religious, and geographic controls.

These data include 865 country pairs. Table 1 reports summary statistics for these data. The first group of variables measure conflict activity. These variables are primarily based on Wright (1942), but are expanded and cross-checked using data from other sources. War is a dummy variable that indicates whether a pair of countries are at war in a given year. War Start is a dummy for whether a pair begins a war, conditional on being at peace (war) in the previous year. Wars start in approximately 0.83% of previously peaceful dyads. Overall, 3.84% of dyad-years are at war.

The second class of variables are pairwise covariates. The variables Neither Landlocked and Adjacent are geographic control variables which vary over time with border changes. These are derived from Reed (2016). Reed provides maps of Europe for the entire time period at very high frequency. Genetic Tie is a dummy for whether the pair of rulers are blood relatives within 3 generations (i.e., whether the rulers share a great-grandparent). Same Religion is a dummy variable that codes whether the pair of rulers are members of the same religious group (Catholic, Protestant, or Orthodox).

2.2 Inherited Risk Attitude

Table 2: Average Risk Tolerance and Patience in European Countries

Country	GPS Risk Tolerance	GPS Patience
Netherlands	0.1893	0.9517
Sweden	0.0519	1.0715
United Kingdom	0.0487	0.5350
France	-0.0301	0.3569
Germany	-0.0445	0.6244
Lithuania	-0.0459	-0.0617
Austria	-0.0618	0.6083
Poland	-0.0736	0.0717
Italy	-0.0936	0.1085
Greece	-0.1571	-0.3601
Spain	-0.1584	0.1985
Romania	-0.2296	-0.2682
Russia	-0.3234	-0.0753
Hungary	-0.4985	-0.4309
Portugal	-0.7924	-0.3116

Note: GPS preference measures are standardized against a worldwide sample of individual survey respondents. For example, an average Dutch respondent was found to have a risk tolerance 0.189 standard deviations above the global average level of risk tolerance within the GPS study.

In order to study risk preference of historical monarchs, I construct a proxy for individual ruler risk tolerance by combining (i) genealogical data[4] including

[4] This genealogical data was originally compiled by Tompsett (2014) and was utilized by Benzell and Cooke (2019) to study the relationship between kinship network ties and inter-state conflict.

records of over 14,000 European nobles and royals alive between 1495 and 1918 and (ii) an experimentally validated measure of average risk tolerance for 15 modern European countries taken from the Global Preference Survey ("GPS") [Falk et al (2018)]. A summary of the GPS data for average risk tolerance is presented in Table 2. Table 2 also includes GPS data on average patience by country which is used in later robustness checks. The GPS measures individual risk tolerance based on qualitative and quantitative survey questions that are chosen based on their ability to predict experimental outcomes in incentivized lottery choice experiments.[5]

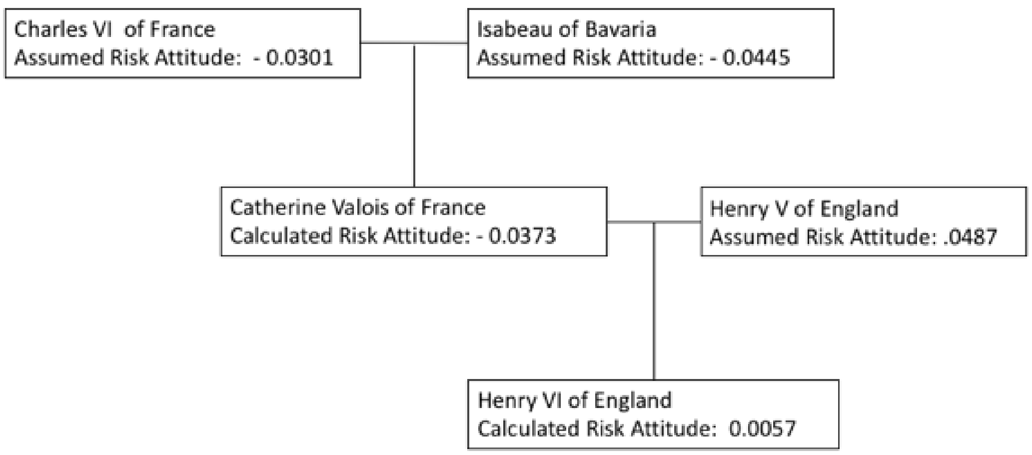

Figure 1: The above example illustrates how the inherited risk attitude is inductively calculated. In this example, parents are not observed for Charles VI of France, Isabeau of Bavaria, or Henry V of England. Therefore, these individuals are assumed to have their home region's average risk attitude. Children of these individuals are assumed to have the average risk attitude of their parents.

The proxy is constructed in two steps. First, all individuals in the genealogical data without identified parents are matched to their home region. For these individuals, I assume their risk attitude is equal to their home region's average risk attitude from GPS.[6] Second, for all individuals with iden-

[5]The qualitative question asks participants "How do you see yourself: Are you a person who is generally willing to take risks, or do you try to avoid taking risks?" The quantitative questions ask for choices between hypothetical money lotteries and sure monetary payouts.

[6]In some cases, individuals were from regions that did not neatly fit into any of the

$$\underbrace{\begin{bmatrix} \text{50\% English} \\ \\ \text{25\% German} \\ \\ \text{25\% French} \\ \vdots \end{bmatrix}}_{\text{Ruler Ancestry}} \bullet \underbrace{\begin{bmatrix} 0.0487 \\ \\ -0.0445 \\ \\ -0.0301 \\ \vdots \end{bmatrix}}_{\text{GPS Risk Tolerance}} = 0.0057$$

Figure 2: Inherited risk attitude can also be thought of as a weighted average of country level risk attitudes where weights are determined by a ruler's individualized ancestry.

tified parents, I recursively assign them an inherited risk attitude equal to the average of their parents' inherited risk attitudes. An example of this process is depicted in Figure 1. After calculating the inherited risk attitude of every ruler in the data, I re-standardized the measure within the sub-population of individuals identified as ruling monarchs in the Benzell and Cooke (2019) data. This allows for a more straightforward interpretation of later empirical results.

Inherited risk attitude can be viewed as a weighted average of country level risk attitudes where weights are determined by a ruler's individualized ancestry. For example, in Figure 1 Henry VI's inherited risk attitude can be found using the following calculation:

15 modern countries included in the GPS data. In such cases, individuals were assumed to have the GPS risk attitude of the nearest included country. If the individual's missing home region was near the border of two GPS countries, then the individual was assigned the average risk attitude across those two GPS countries.

$$
\underbrace{\begin{bmatrix} 50\%\text{English} \\ \\ 25\%\text{German} \\ \\ 25\%\text{French} \\ \vdots \end{bmatrix}}_{\text{Ruler Ancestry}} \bullet \underbrace{\begin{bmatrix} 0.0487 \\ \\ -0.0445 \\ \\ -0.0301 \\ \vdots \end{bmatrix}}_{\text{GPS Risk Tolerance}} = 0.0057
$$

This interpretation shows that GPS risk tolerance could be easily replaced with other cross-country measures to yield similar inherited measures of other traits. It also highlights the fact that variation in inherited risk attitude is a result of variation in ancestry leading to various weightings of the GPS country risk measures.

This procedure has several advantages. First, the recursion means that only the small fraction of rulers' ancestors without identified parents need to be matched to their home regions through additional research (a time consuming process). Second, while the GPS input data only gives 15 distinct levels of risk attitude, the recursive method generates substantial cross-ruler variation in the inherited risk attitude proxy. Due to frequent cross-country inter-dynastic marriages, measured inherited risk attitudes vary substantially even among different rulers of the same country depending on ruler-specific ancestry.

3 Empirical Results

3.1 Ruler Changes And War Frequency

One potential concern with the inherited risk attitude proxy is that the underlying GPS data only provides a single measurement per country. However, as mentioned above, the benefit of combining the GPS risk measures with ruler-specific ancestry data is that this allows for variation even within country. Throughout the paper, the relationship between ruler risk attitude and war will be studied within country or within country pair. In other words, I rely on within country variation induced by ruler-specific ancestry rather than cross-country variation in population risk attitudes as measured by GPS.

To illustrate this idea, I first study the relationship between war onset and risk attitude following ruler changes. Specifically, I investigate whether a new ruler that is more (or less) risk tolerant than his predecessor fights more (or less) wars. To answer this question, I compare the difference in dyadic war onset frequency in the 5 years before and after ruler changes. Because ruler changes are often directly related to conflict, I leave out the year of the change.

Table 3 shows that new rulers fought wars slightly more often than their predecessors. However, separating ruler changes by the relative change in inherited risk attitude reveals interesting heterogeneity. This table shows that when more risk tolerant rulers take power, the likelihood of war onset increases substantially. Alternatively, new rulers that are more risk averse than their predecessors fight substantially fewer wars. These findings suggest that more risk tolerant rulers are more likely to start wars than their relatively risk averse counterparts.

Table 3 also indicates that the baseline frequency of war onset was relatively low preceding changes to more risk tolerant rulers and relatively high preceding changes to less risk tolerant rulers. This is consistent with the interpretation that ruler risk attitude affects the probability of war. Specifically, ruler changes leading to more risk tolerant rulers are more likely when the existing ruler was less risk tolerant than average. If less risk tolerant rulers are more likely to avoid war, then this could generate the observed difference in the baseline frequency of war onset.

3.2 Regression Results

In order to study the effects of ruler risk attitude on war onset, I estimate equation (1) which treats the probability of war onset as a linear function of ruler risk attitudes.

$$War\ Start_{(i,j),y} = \beta_1 Risk_{iy} + \beta_2 Risk_{jy} + \delta X_{(i,j),y} + \theta_{(i,j)} + \theta_y + \epsilon_{(i,j),y} \quad (1)$$

Table 3: Ruler Changes and Frequency Of War Onset

	All Ruler Changes	Increased Risk Tolerance Changes	Decreased Risk Tolerance Changes
Prior 5 Years	4.08%	3.42%	5.70%
Following 5 Years	4.31%	5.15%	4.48%
Difference	0.23%	1.73%	-1.22%

Note: This table reports the share of dyads that start a war in the 5 years before or after one of the pair of countries experiences a ruler change. For example, of the 8,396 dyads experiencing ruler changes, 4.31% of these dyads started a war at some point in the 5 years following the change ignoring wars that were started contemporaneously to the ruler change.

The outcome variable is a dummy for whether a war began in year y between countries i and j. Here $Risk_{iy}$ is the standardized inherited risk attitude measure for the ruler of country i in year y. Higher values imply greater risk tolerance (i.e., less risk aversion). This is the key variable of interest. $X_{(i,j),y}$ is a vector of dyad-year controls including geographic, religious, and genetic controls. $\theta_{(i,j)}$ and θ_y are fixed effects for dyad and year respectively.[7] Therefore, the key parameters of interest, β_1 and β_2, can be interpreted as the effect (in percentage points) of a one standard deviation increase in the risk tolerance of the ruler of countries i and j (respectively) on the probability of war beginning between between the two countries in a given year.

The first two columns of Table 4 estimate equation (1) with and without controls. By symmetry, we expect $\beta_1 = \beta_2$. And indeed, we see that the estimated parameters are not significantly different. Using the specification with controls, this implies that increasing the risk tolerance of one ruler by one standard deviation would result in a 0.151 percentage point increase in the rate of war onset each year for a given pair of countries. Since the overall probability of war onset is 0.83 percent this represents an 18.2 percent increase in the frequency of war onset.

[7] Country pair fixed effects account for unobserved, time invariant characteristics of each pair of countries. Importantly, this accounts for the population specific (and/or average ruler) risk preferences of the country pair and thus allows the model to focus on ruler specific variation in risk attitudes.

Table 4: Inherited Risk Attitude and War Onset

	(1) War Start	(2) War Start	(3) War Start	(4) War Start
Risk Tolerance Of Ruler 1	0.00166*** (0.007)	0.00151** (0.013)		
Risk Tolerance Of Ruler 2	0.00136** (0.025)	0.00151** (0.011)		
Higher Risk Tolerance			0.00293*** (0.002)	0.00278*** (0.004)
Lower Risk Tolerance			0.000584 (0.347)	0.000682 (0.276)
Same Religion		-0.00795*** (0.000)		-0.00791*** (0.000)
Neither Landlocked		0.00885** (0.015)		0.00877** (0.014)
Adjacent		0.00994*** (0.004)		0.00993*** (0.004)
Genetic Tie		-0.000807 (0.533)		-0.000289 (0.831)
Pair FE	X	X	X	X
Year FE	X	X	X	X
N	88861	88861	88861	88861

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. P-values calculated using robust standard errors clustered by country pair are reported in parentheses.

Additionally, I study equation (2) which allows for differential effects of ruler risk tolerance depending on which ruler is more risk tolerant.

$$\begin{aligned} War\ Start_{(i,j),y} = {} & \beta_1 \max(Risk_{iy}, Risk_{jy}) + \beta_2 \min(Risk_{iy}, Risk_{jy}) \\ & + \delta X_{(i,j),y} + \theta_{(i,j)} + \theta_y + \epsilon_{(i,j),y} \end{aligned} \tag{2}$$

Columns 3 and 4 of Table 4 estimate this equation with and without controls. In this case, β_1 measures the impact of changes in risk attitude for the more risk tolerant ruler and β_2 captures the impact for the less risk tolerant ruler. Interestingly, these regressions suggest that the more risk tolerant ruler is the primary channel through which ruler risk attitudes matter. This result suggests that increasing the risk tolerance of the more risk tolerant ruler by one standard deviation would lead to a 33.5 percent (or 0.278 percentage point) increase in the annual frequency of war onset. No significant effect is identified for the risk attitude of the relatively risk averse ruler.

Since war can be entered unilaterally, this directional effect is intuitive. If the more risk tolerant ruler is generally the party to initiate war, then only their risk preference should be expected to impact the dyad's overall war frequency. Section 4 introduces a simple model that captures this intuition.

3.3 Randomization Inference

The dyadic nature of these data combined with the complex genealogical relationships between rulers is likely to generate a complex correlation structure among dyad-year observations. This correlation is unlikely to be fully accounted for by clustered standard errors. Alternatively, randomization inference can be used. This procedure tests the null hypothesis of no effect of ruler risk tolerance on war onset by comparing the coefficient estimates from the actual data to the distribution of regression coefficients obtained when ruler risk tolerance is assigned randomly.

An important consideration is exactly how this randomization is performed. In order to maintain the underlying correlation structure, the randomization is carried when matching individuals without parents to their home regions.

In other words, I start from a list of individuals matched to their correct home regions and then permute the list of matched home regions to create an alternative matching. Then starting from this permuted list of inputs, I reassign individual risk tolerances using the actual genealogical data. Among other things, this methodology maintains any correlation induced by the recursive assignment of risk tolerances as well as correlation resulting from regions that share genetically related rulers.

After repeating the analysis on 500 of these alternative data sets, I compare my actual results to these "possible" results and compute two-tailed rank order p-values. Figure 3 compares the regression results from Table 4 Column (4) to the distribution of coefficients obtained from regressions on the permuted data. This randomization procedure supports the results found above. Specifically, I find that only 1.4% of the permuted data sets produce coefficient estimates on maximum risk tolerance larger in magnitude than that from the actual data (0.00278). This suggests my results are unlikely to be driven by chance. Conversely, the coefficient on minimum risk tolerance estimated using actual data falls near the middle of the distribution of that would be expected due to chance. This supports the finding that the risk preference of the less risk tolerant ruler has no statistically significant effect on the frequency of war onset.

4 Implications For Theories Of Conflict

Following Fearon (1995), a large literature has used formal mathematical models to address the question of why rational actors fight costly wars rather than reaching a more efficient diplomatic settlement. Much of this literature has focused on informational problems that lead bargaining processes to fail probabilistically. These models assume that bargains that are struck can be reliably committed to by the parties. However, Fearon (1995) acknowledged that commitment problems can also be at the root of rational conflict. This idea has been further explored by other authors including Powell (2006) and Schwarz and Sonin (2007).

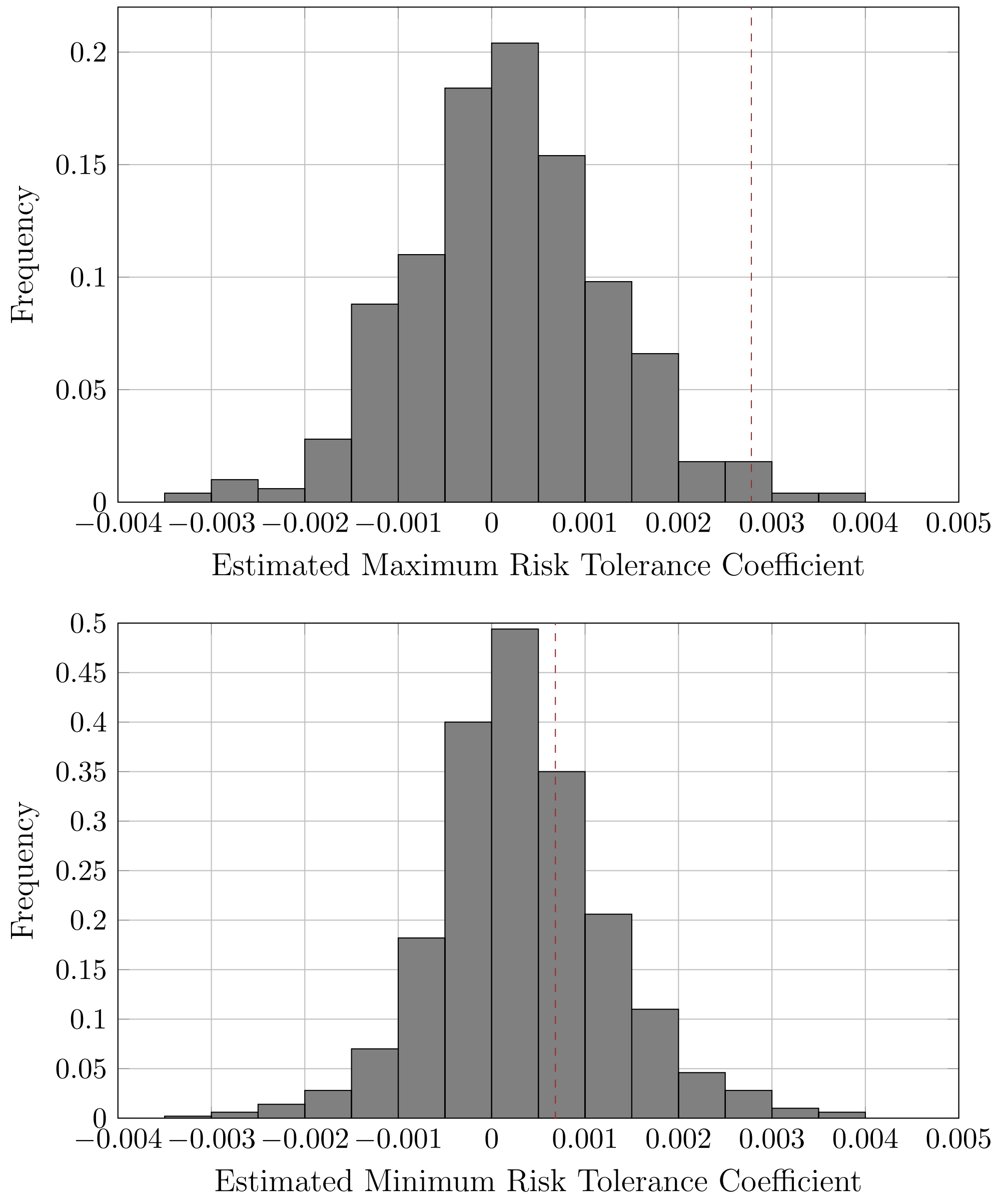

Figure 3: Randomization inference is conducted for eq. (2). The top figure represents the distribution of coefficient estimates for max risk tolerance and the bottom figure represents the distribution for min risk tolerance. Actual coefficient estimates are indicated by dotted red lines. The coefficient on max risk tolerance is greater in magnitude than 98.6% of estimates (p-value=0.014). The coefficient on min risk tolerance has a p-value of 0.39.

In this section, I present two simple models showing these two mechanisms imply differential effects of rulers' risk attitudes. Specifically, the asymmetric effect of risk attitudes within dyads is inconsistent with models relying on informational problems. In contrast, this asymmetric effect is predicted for countries of similar strength when commitment problems exist.

4.1 Commitment Problems And War

Consider a one-shot game between two countries led by Rulers A and B, respectively. Each ruler has a constant relative risk aversion utility function of the form:

$$u_i(c) = \frac{c^{1-\eta_i} - 1}{1 - \eta_i} \text{ for } i \in \{A, B\}$$

Here c can be thought of as the level of consumption in the ruler's country. Each rulers' risk attitude is given by η_i, which will be assumed to lie in the interval $[0, 1)$ for convenience. When at peace, each country enjoys consumption equal to $b > 1$. This can be thought of as arising from the gains from trade between the two countries. Either country can choose to forgo b and start a war unilaterally. The outcome of the war is probabilistic. Country A wins with probability p and country B wins with probability $1 - p$. When a country wins a war, it receives a prize $x < 2b - 1$.[8] The losing country gets a minimal level of consumption equal to 1. The value of x is stochastic with CDF F and is revealed prior to the decision of whether to declare war.

In this setting, war is inefficient. If commitment were possible, the countries could reach a mutually acceptable diplomatic solution by redistributing the gains from trade. However, if neither party can commit to following through with such an arrangement the inefficient war will be fought whenever one of the parties prefers the probabilistic spoils of war to the certain consumption level guaranteed by peace. Proposition 1 shows that if the two countries have relatively similar levels of power (i.e., $p \approx \frac{1}{2}$), then the more risk tolerant ruler will always be the one to initiate war. This proposition also establishes that the probability of war is independent of small changes in the risk attitude of

[8]This restriction ensures that war is inefficient.

the less risk tolerant ruler, but decreases as the more risk tolerant ruler becomes relatively more risk averse. This asymmetric result is consistent with the empirical evidence from the previous section.

Proposition 1: Assume $\eta_A < \eta_B$. In the absence of commitment power, there exists an $\epsilon > 0$ such that whenever $p \in [\frac{1}{2} - \epsilon, \frac{1}{2} + \epsilon]$, war occurs if and only if $u_A(b) \leq pu_A(x)$. Moreover, in this setting, the probability of war is decreasing in η_A and independent of η_B.

Proof: War occurs whenever either Ruler A or Ruler B prefers war to peace. Trivially, $u_A(b) < pu_A(x)$ implies Ruler A prefers war to peace and therefore is a sufficient condition for war. In order to establish this condition is also necessary, I need to show that $u_B(b) < (1-p)u_B(x)$ implies $u_A(b) < pu_A(x)$.

Ruler B will never declare war if $p > 1 - u_B(b)/u_B(2b-1)$. Notice $u_B(b)/u_B(2b-1) > 1/2$. Define ϵ such that $1/2 + \epsilon = u_B(b)/u_B(2b-1)$. Thus, Ruler B will never declare war if $p > 1/2 - \epsilon$. Therefore, necessity holds vacuously.

Thus, for $p \in [\frac{1}{2} - \epsilon, \frac{1}{2} + \epsilon]$, war will occur if and only if Ruler A is willing to start the war which occurs whenever $p \geq u_A(b)/u_A(x)$. Notice, for any given value of x, $u_A(b)/u_A(x)$ is increasing in η_A. Thus the inequality will be satisfied for fewer values of x as η_A increases. In other words, as Ruler A becomes more risk averse, the probability of war, $1 - F(u_A^{-1}(u_A(b)/p))$, decreases. ■

4.2 Example

Suppose Ruler A is risk neutral with utility $u_A(c) = c - 1$ and Ruler B is moderately risk averse with utility $u_B(c) = 2(\sqrt{c} - 1)$. Further, assume $b = 10$, $p = 0.55$, and $x \sim U[9, 19]$.

With these parameters Ruler B will never declare war. To see this notice:

$$4.3 \approx 2(\sqrt{10} - 1) > 0.45 \times 2(\sqrt{19} - 1) \approx 3.02$$

However, Ruler A will declare war whenever:

$$\begin{aligned} 10 - 1 &\leq 0.55 \times (x - 1) \\ 17.36 &\leq x \end{aligned}$$

This implies war would occur 16.4% of the time in this example. Now suppose Ruler A was replaced by a slightly more risk averse Ruler A′ with utility given by $u_{A'}(c) = \frac{c^{0.9}-1}{0.9}$. In this situation, Ruler A′ would declare war whenever:

$$\begin{aligned} \frac{10^{0.9} - 1}{0.9} &\leq 0.55 \times \frac{x^{0.9} - 1}{0.9} \\ 13.62 &\leq x^{0.9} \\ 18.21 &\leq x \end{aligned}$$

Thus, in this example, replacing the risk neutral Ruler A with the slightly risk averse Ruler A′ would decrease the probability of war from 16.4% to 7.9%.

Alternatively, if the rulers had the ability to commit, then they could negotiate and resolve potential conflicts through diplomatic means. For instance, if $x = 18$ Ruler A would prefer to declare war because the expected payoff from the risky war is greater than the sure payoff of peace. However, Ruler A's decision to declare war imposes a high cost on Ruler B. In fact, Ruler B would happily redistribute some of his country's peace surplus if it meant avoiding war. In particular, both countries would strictly prefer the distribution of benefits $(12, 8)$ to the uncertain prospects of war. Unfortunately, an inability to commit to this alternative distribution of peace benefits results in inefficient war between the countries led by Rulers A and B.

4.3 Asymmetric Information And War

We have just seen that rational actors may fight war due to an inability to commit to diplomatic solutions. However, Fearon (1995) shows that even with full commitment power rational actors may still fight wars when asymmetric information prevents successful bargaining. For instance, suppose each country faces a stochastic (and potentially small) cost of conducting a war. For each country, this cost is private information. Countries with high costs of fighting are at a disadvantage when negotiating a peace deal, therefore an incentive to misrepresent their private information exists.

To see how this mechanism works, suppose Ruler B has a stochastic cost, $c_B > 0$, associated with fighting wars. The realized cost of fighting is known to Ruler B prior to any negotiations, but unknown to Ruler A. Suppose the setting (like in the above example) is such that Ruler B would never voluntarily start a war, but there are occasions when A would rationally declare war in the absence of the ability to negotiate. In addition, after the realization of x, Ruler A can offer Ruler B a choice between war or an alternative distribution, $(z, 2b-z)$. Upon receiving the ultimatum, Ruler B can choose either to accept the proposed redistribution or to fight Ruler A in a war.

Recall that Ruler A issues this ultimatum without full information about Ruler B's type (i.e., Ruler B's cost of fighting wars). Under certain regularity conditions, Fearon (1995) shows that an optimizing Ruler A will make a peace demand, z, such that low cost types of Ruler B will prefer the risky war outcome over accepting Ruler A's peace demand, while high cost types will accept the proposed redistribution. Thus, war will still occur with positive probability despite the parties having full commitment power. Fearon (1995) assumes both rulers are risk neutral. However, he notes that risk aversion will tend to increase the potential bargaining range leading to more peace. For this environment, proposition 2 formally establishes that the probability of war is decreasing in Ruler A's level of risk aversion.

Proposition 2: If war occurs with positive probability, then the probability of war is strictly decreasing in η_A.

Proof: Assume Ruler A offers Ruler B a choice between war and the alternative distribution of benefits $(z, 2b-z)$, then Ruler B will prefer war whenever:

$$(1-p)u_B(x) - c_B > u_B(2b-z)$$
$$(1-p)u_B(x) - u_B(2b-z) > c_B$$

Thus, war occurs with probability $Q(z) \equiv G((1-p)u_B(x) - u_B(2b-z))$. When choosing an optimal offer, Ruler A chooses z to maximize $Q(z)pu_A(x) + (1 - Q(z))u_A(z)$.

Taking the first order condition gives:

$$Q'(z)[u_A(z) - pu_A(x)] = (1 - Q(z))u'_A(z)$$

This can be interpreted as Ruler A wanting to equalize the marginal cost and marginal benefit of increasing his peace demand, z.

Rearranging this equation yields:

$$\frac{u_A(z) - pu_A(x)}{u'_A(z)} = \frac{1 - Q(z)}{Q'(z)}$$

For a fixed z, the left hand side ("LHS") of this equation depends on η_A (through u_A), but not η_B. Similarly, the right hand side ("RHS") depends on η_B through Q and Q', but not η_A. Notice the LHS is increasing in z. Holding

z constant, the LHS is also strictly increasing in η_A as shown below:

$$
\begin{aligned}
&\tfrac{d}{d\eta_A}\left[\frac{u_A(z)-pu_A(x)}{u'_A(z)}\right]\\
=&\tfrac{d}{d\eta_A}\left[\frac{(z^{1-\eta_A}-1)-p(x^{1-\eta_A}-1)}{(1-\eta_A)z^{-\eta_A}}\right]\\
=&\tfrac{d}{d\eta_A}\left[\frac{(z-z^{\eta_A})-z^{\eta_A}p(x^{1-\eta_A}-1)}{(1-\eta_A)}\right]\\
=&\tfrac{d}{d\eta_A}\left[\frac{z-z^{\eta_A}(1-p+px^{1-\eta_A})}{(1-\eta_A)}\right]\\
=&\frac{-z^{\eta_A}}{1-\eta_A}\left[\frac{px^{1-\eta_A}+(1-p)(1)-z^{1-\eta_A}}{1-\eta_A}+px^{1-\eta_A}(ln(z)-ln(x))+(1-p)ln(z)\right]\\
=&\frac{-z^{\eta_A}}{1-\eta_A}\left[px^{1-\eta_A}\left(ln\left(\frac{z}{x}\right)-\frac{\left(\frac{z}{x}\right)^{1-\eta_A}-1}{1-\eta_A}\right)+(1-p)\left(ln(z)-\frac{z^{1-\eta_A}-1}{1-\eta_A}\right)\right]>0
\end{aligned}
$$

This implies that if z^* is an equilibrium offer at (η_A, η_B), then an increase in Ruler A's coefficient of risk aversion, η_A, would incentivize Ruler A to lower his peace demand, z^*, in order to satisfy the adjusted first order condition. Thus, more types of Ruler B will be willing to accept peace. In other words, the probability of war decreases as η_A increases. ■

Proposition 2 establishes that Ruler A's risk attitude affects the probability of war. In addition, Ruler B's risk attitude also affects the probability of war in this setting. In general, the relationship between war probability and Ruler B's risk attitude is non-monotonic. Using similar parametrizations to the example in Section 4.2, Figure 4 illustrates how the probability of war varies non-monotonically with Ruler B's risk attitude.[9] In addition, this figure illustrates the result from Proposition 2 that the probability of war is decreasing in Ruler A's degree of risk aversion.

The fact that the probability of war depends on both rulers' risk prefer-

[9]In this setting, war is stochastic conditional on the value of winning a war, x. This is a change from the earlier setting (without commitment power) where war was a deterministic function of x.

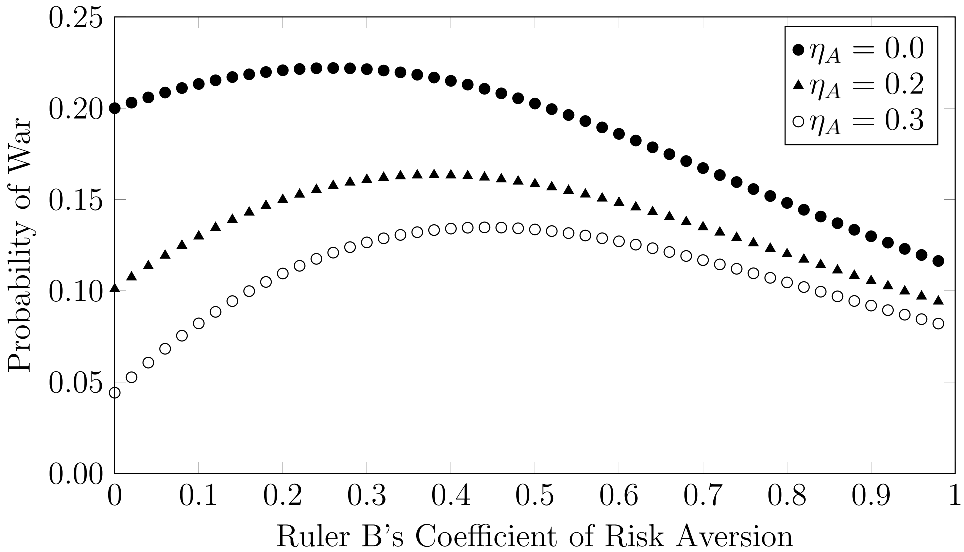

Figure 4: Under incomplete information about Ruler B's cost of fighting, the probability of war is a non-monotone function of Ruler B's risk attitude. This figure illustrates this for $b = 10, p = .55, x = 16, \eta_A \in \{0, 0.2, 0.3\},$ and $c_B \sim U[0, 5]$.

ences is an important difference from the commitment problem explanation of war outlined above. In light of this, the empirical results presented in the previous section can be interpreted as supporting explanations of war that rely upon commitment problems as opposed to explanations focused on bargaining failures due to incomplete information.

5 Robustness

This section addresses several potential concerns with the empirical results presented in Section 3. In particular, I provide evidence that my findings are not driven (i) by idiosyncrasies in the GPS risk measure or (ii) by using a modern day measure to proxy historical population preferences. In addition, I study the relationship between interstate war and ruler traits other than risk tolerance.

5.1 Alternative Measure Of Country Risk Attitudes

My primary analysis constructed inherited risk attitudes based upon the GPS risk tolerance index. I believe this GPS index is currently the most reliable cross-country measure of risk preferences. However, as a robustness check, I recompute the inherited risk attitudes of each ruler based on Hofstede's Uncertainty Avoidance Index (UAI).[10] UAI was originally intended to measure aversion to more amorphous forms of uncertainty (e.g., ambiguity) than the lottery risk measure constructed by the GPS. However, UAI has been shown to be correlated with risk attitudes measured in incentivized choice experiments involving monetary lotteries [Rieger, Wang, and Hens (2014)]. Thus it is a plausible alternative to the GPS measure. Table 5 replicates columns (3) and (4) of Table 4 using the UAI based measure of inherited risk tolerance.[11] Results are consistent with the primary findings, though the effect size is somewhat attenuated under the UAI measure. This is consistent with UAI being a less precise measure of population risk attitudes than GPS.

[10]The UAI was originally introduced by Hofstede (1980), but has been subsequently updated. I use the most recent available version taken from Hofstede et al. (2010).

[11]UAI measures uncertainty aversion rather than tolerance. Therefore, the UAI is multiplied by negative one before constructing the proxy for ruler risk tolerance.

Table 5: Alternate Cross-Country Preference Index

	(1) War Start	(2) War Start
Max Risk Tolerance	0.00199** (0.032)	0.00192** (0.038)
Min Risk Tolerance	0.000898 (0.506)	0.000849 (0.524)
Controls		X
Pair FE	X	X
Year FE	X	X
N	88861	88861

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. P-values calculated using robust standard errors clustered by country pair are reported in parentheses.

5.2 Ancient Origins Of Risk Preferences

One possible concern with the inherited risk attitude measure is that it relies on modern population preference measures as a proxy for preferences of individuals alive hundreds of years in the past. A growing literature has provided evidence that various population preferences are rooted in the distant past. Taking this evidence seriously, I can replace modern population preference data with data on geographic factors (determined in the distant past) that are correlated with risk preferences.

I am not aware of any paper that directly identifies historical factors affecting long-run population risk attitudes,Becker, Enke, and Falk (2016) show that the genetic distance between populations (rooted in ancient migration patterns) is correlated with heterogeneity in risk attitudes. However, this evidence does not indicated any specific factors that raise or lower the level of risk tolerance in a given population. however the existing literature identifies an important link between agricultural factors and population time preference [Galor and Ozak (2016)] as well as local gender roles [Alesina, Giuliano, and Nunn (2013)]. Therefore, it is likely that agricultural factors are also associated with population risk preferences. Indeed, I find that land suitability is significantly (negatively) correlated with GPS risk tolerance.[12]

The suitability of a region's land for agriculture is likely (negatively) correlated with population risk tolerance for at least two reasons. First, early settlers with high risk tolerances would have been more willing to settle less fertile land. Second, lower land fertility likely led the local population to experience more volatility in crop output and potentially to become more risk tolerant through this exposure.[13] Thus as a robustness test, I repeat my analysis replacing GPS risk tolerance with land suitability. Using this (predetermined) proxy for risk attitude, Table 6 indicates that a one standard deviation decrease in *minimum* inherited land suitability is associated with a 24% increase in dyadic war frequency. This is consistent with my main results using GPS risk tolerance.[14] In other words, my results are not being driven by using modern day population preferences to proxy for historical population preferences.

[12]I use Ramankutty, Foley, Norman, and McSweeney (2002) measure the suitability of land for agriculture.

[13]Both of these channels could be due purely to selection, in each generation relatively risk averse individuals would emigrate to more stable environments. Alternatively, the second channel could be the result of endogenous preference formation.

[14]Because land suitability is *negatively* correlated with GPS risk tolerance, I find that *minimum* inherited land suitability is *negatively* correlated with conflict frequency.

Table 6: Land Suitability As A Proxy For Risk Attitude

	(1) War Start	(2) War Start
Max Land Suitability	-0.000342 (0.808)	-0.000439 (0.753)
Min Land Suitability	-0.00217*** (0.007)	-0.00198** (0.015)
Controls		X
Pair FE	X	X
Year FE	X	X
N	88861	88861

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. P-values calculated using robust standard errors clustered by country pair are reported in parentheses.

5.3 Other Traits

Given my findings regarding ruler risk attitudes, it is natural to wonder what other individual ruler traits may affect conflict decisions. For example, one can tell various stories where more patient or trusting rulers may be less likely to engage in war. The GPS study provides cross-country indices for both of these traits. Therefore, I can use the same empirical framework to study the role of inherited trust levels and inherited time preference. As shown in Table 7, I find no relationship between either of these traits and war frequency. Just as the role of risk attitudes helps select between theoretical explanations for war, these negative results may also be useful in ruling out models of war that predict that rulers' time preferences or levels of mutual trust should affect war frequency. And finally these negative results further indicate the association between war frequency and inherited risk attitude is not driven by some quirk my the estimation procedure.

Table 7: Other GPS Traits

	(1) War Start	(2) War Start	(3) War Start
Max Trait	0.00278***	0.00000371	0.000847
	(0.004)	(0.993)	(0.255)
Min Trait	0.000682	-0.000683	-0.000906
	(0.276)	(0.344)	(0.319)
Controls	X	X	X
Pair FE	X	X	X
Year FE	X	X	X
N	88861	88861	88861
Trait	Risk Tolerance	Trust	Patience

Note: * $p < .1$, ** $p < .05$, *** $p < .01$. P-values calculated using robust standard errors clustered by country pair are reported in parentheses.

6 Conclusion

This paper introduces the concept of *inherited risk attitude* as a proxy for the actual risk preferences of historical monarchs. This measure combines modern cross-country survey evidence on population risk preferences with leader-specific genealogical data. This proxy is motivated by recent evidence that risk attitudes are transmitted inter-generationally and are persistent over long time horizons. Using this measure, I investigate the relationship between leader risk preferences and interstate war in the context of Early Modern Europe.

I provide empirical evidence that more risk tolerant rulers are more likely to fight wars. This evidence is based upon within country variation in ruler-specific inherited risk attitudes and does not directly rely on cross-country differences in population risk attitudes. In addition, the data indicate the effect is primarily driven by the more risk tolerant ruler. This asymmetry has interesting theoretical implications.

In particular, various models of conflict between rational actors have been proposed. Many of these predict that leader risk preferences are an important determinant of conflict. However, models focusing on bargaining failures due to incomplete information typically imply that the risk preferences of both leaders will affect the probability of war. Alternatively, models that explain interstate war through commitment problems predict the asymmetric pattern observed in the data. In other words, the finding that only the risk preferences of the more risk tolerant ruler affect war probability provides empirical support for theoretical models relying on commitment problems as opposed to models focusing on incomplete information.

In addition, this paper contributes to a growing empirical literature demonstrating the importance of individual leader characteristics. Investigating how particular qualities of historical political leaders (e.g., risk attitude) affected important outcomes like interstate war can help inform the choice of leaders in the future. In order to avoid costly wars, it may be wise to appoint risk averse leaders that are unlikely to gamble with the lives of their followers. These lessons can be applied in other contexts as well. For instance, using CEO ethnicity as a proxy for risk preference, Pan, Siegel, and Wang (2017) show that CEO risk preferences can have important effects on corporate investment decisions.

References

Alesina, Alberto, Paola Guiliano, and Nathan Nunn (2013) "On the origins of gender roles: women and the plough," *The Quarterly Journal of Economics*, Vol. 128, pp. 469 – 530.

Becker, Anke, Benjamin Enke, and Armin Falk (2016) "Ancient Origins of the Global Variation in Economic Preferences," *mimeo*.

Benzell, Seth and Kevin Cooke (2019) "A Network of Thrones: Kinship and Conflict in Europe, 1495-1918," *R&R at American Economic Journal: Applied Economics*.

Bisin, Alberto and Thierry Verdier (2001) "The economics of cultural transmission and the dynamics of preferences," *Journal of Economic Theory*, Vol. 97, pp. 298–319.

Brecke, Peter (2012) "Violent conflicts 1400 AD to the present in different regions of the world," in *1999 Meeting of the Peace Science Society, unpublished manusrcipt; 2012 update.*

Carlyle, Thomas (1840) *On Heroes, Hero-worship and the Heroic in History*: Chapman and Hall.

Dohmen, Thomas, Armin Falk, David Huffman, and Uwe Sunde (2012) "The Intergenerational Transmission of Risk and Trust Attitudes," *The Review of Economic Studies*, Vol. 79, pp. 645–677.

Dube, Oeindrila and S.P. Harish (2016) "Queens," *mimeo.*

Falk, Armin, Anke Becker, Thomas Dohmen, Benjamin Enke, David Huffman, and Uwe Sunde (2018) "Global Evidence on Economics Preferences," *The Quarterly Journal of Economics*, Vol. 133, pp. 1645–1692.

Falk, Armin, Anke Becker, Thomas Dohmen, David Huffman, and Uwe Sunde (2016) "The preference survey module: A validated instrument for measuring risk, time, and social preferences," *IZA Discussion Paper No. 9674.*

Fearon, James (1995) "Rationalist Explanations for War," *International Organization*, Vol. 49, pp. 379–414.

Galor, Oded and Omer Ozak (2016) "The agricultural origins of time preference," *American Economic Review*, Vol. 106, pp. 3064–3103.

Goodin, Robert (2010) *The Oxford Handbook of International Relations*: Oxford University Press.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales (2016) "Long-Term Persistence," *Journal of the European Economic Association*, Vol. 14, pp. 1401–1436.

Hofstede, Geert (1980) *Culture's Consequences: International Differences in Work-Related Values*: Sage.

Huth, Paul, D. Scott Bennett, and Christopher Gelpi (1992) "System Uncertainty, Risk Propensity, and International Conflict Among the Great Powers," *Journal of Conflict Resolution*, Vol. 36, pp. 478–517.

Jones, Benjamin F. and Benjamin A. Olken (2005) "Do leaders matter? National leadership and growth since World War II," *Quarterly Journal of Economics*, Vol. 120, pp. 835–864.

Kelly, Morgan (2019) "Standard errors of persistence," *mimeo*.

Linner, Richard Karlsson, Pietro Biroli, Edward Kong, S Fleur W Meddens, Robbee Wedow, Mark Alan Fontana, ..., and Jonathan P Beauchamp (2019) "Genome-wide association analyses of risk tolerance and risky behaviors in over 1 million individuals identify hundreds of loci and shared genetic influences," *Nature Genetics*, Vol. 51, pp. 245–257.

de Mesquita, Bruce Bueno (1978) "Journal of Conflict Resolution," *Systemic Polarization and the Occurence and Duration of War*, Vol. 22, pp. 241–267.

M.Lahno, Amrei, Marta Serra-Garcia, Ben DExelle, and Arjan Verschoor (2015) "Conflicting Risk Attitudes," *Journal of Economic Behavior and Organization*, Vol. 118, pp. 136–149.

Morrow, James D. (1987) "On the Theoretical Basis of a Measure of National Risk Attitudes," *International Studies Quarterly*, Vol. 31, pp. 423–438.

Pan, Yihui, Stephan Siegel, and Tracy Yue Wang (2017) "Corporate Risk Cultural," *Journal of Financial and Quantitative Analysis*, Vol. 52, pp. 2327–2367.

Powell, Robert (1996) "Bargaining in the Shadow of Power," *Games and Economic Behavior*, Vol. 15, pp. 255–289.

Ramankutty, Navin, Jonathan A. Foley, John Norman, and Kevin McSweeney (2002) "The global distribution of cultivable lands: current patterns and sensitivity to possible climate change," *Global Ecology and Biogeography*, Vol. 11, p. 377392.

Reed, Frank (2016) "Centennia Historical Atlas Map Series, version 3.10."

Rieger, Marc Oliver, Mei Wang, and Thorsten Hens (2015) "Risk Preferences Around the World," *Management Science*, Vol. 61, pp. 637–648.

Schwarz, Michael and Konstantin Sonin (2008) "A Theory of Brinkmanship, Conflicts, and Commitments," *The Journal of Law, Economics, & Organization*, Vol. 24, pp. 163–183.

Tompsett, Brian C (2014) *Directory of Royal Genealogical Data*: Department of Computer Science, University of Hull.

Voightlander, Nico and Hans-Joachim Voth (2012) "Persecution Perpetuated: The Medieval Origins of Anti-Semitic Violence in Nazi Germany," *The Quarterly Journal of Economics*, Vol. 127, pp. 1339–1392.

Wright, Quincy (1942) *A Study of War–Vols. I-II*: Chicago, University of Chicago Press, Second Edition, with a Commentary on War since 1942; 1965.

Appendix

Out Of Sample: Modern Ugandan Villagers

Lahno, Serra-Garcia, D'Exelle, and Verschoor (2015) study the role of individual risk attitudes in interpersonal conflict in the context of modern day Ugandan villages. Specifically, they study the Bagisu people of Eastern Uganda. The Bagisu people (population 346,000) primarily live in rural areas and have a reputation for violent intra-clan conflict. Lahno et al collect data on (i) the risk preferences of villagers and (ii) a dyadic measure of conflict.

In particular, villager risk preferences are measured using incentivized choice experiments. This direct measurement of risk preferences is a clear advantage relative to the indirect proxy measure needed in my study of historical rulers. Interpersonal conflict is measured by asking villagers whether they "get along well or not." They find 21.5% of villager dyads report conflict.[15] The authors argue this is a means of asking about past conflict in a sensitive manner. Due to the sensitive nature of the topic, it is unclear whether this measure actually identifies violent conflict. Therefore, relative to my investigation of interstate war in Early Modern Europe, this setting allows for a much more direct measure of risk preference, but a less direct measure of conflict.

Ultimately, Lahno et al determine that larger differences in risk attitudes between dyads of villagers are associated with a higher rate of interpersonal conflict. The authors do not investigate whether there is a differential impact of risk preference between more and less risk tolerant members of the dyad. Using their data,[16] I study the differential effects of max and min risk tolerance rather than the difference in risk tolerance studied in the original paper. In accord with my main analysis, I use a linear probability model with normalized measures of risk tolerance. These results are summarized in Table 8 below.

Despite the vast differences between interstate war in Early Modern Europe and small scale interpersonal violence in Modern Uganda, I find that risk attitudes appear to have similar effects on conflict behavior. In both contexts, only the risk attitude of the more risk tolerant member of a dyad is associated with conflict frequency. In the Ugandan context, a one standard deviation increase in risk tolerance of the more risk tolerant ruler raises conflict frequency by 27%. This is remarkably similar to the proportional effect (33%) measured in Early Modern Europe.

[15]Dyads are coded as in conflict if either member reports they do not get along with the other person

[16]Amrei Lahno and Marta Serra Garcia graciously provided their data for this exercise.

Table 8: Interpersonal Conflict In Modern Uganda

	(1) Conflict	(2) Conflict
Max Risk	0.0574**	0.0584**
Tolerance	(0.022)	(0.019)
Min Risk	-0.0245	-0.0174
Tolerance	(0.104)	(0.224)
Controls		X
Village FE	X	X
Session FE	X	X
N	917	917

Note: The dependent variable is a dummy for whether dyads of villagers reported they do not get along well. Risk tolerance is a standardized version of the measure reported by Lahno et al for individual villagers. Control variables represent various measures of demographic (age, gender, religion,wealth, education, occupation) differences within a dyad. P-values calculated using robust standard errors clustered by village are reported in parentheses. * $p < .1$, ** $p < .05$, *** $p < .01$.