Warfare and Economic Inequality: Evidence from Preindustrial Germany (c. 1400-1800)

Felix S.F. Schaff, London School of Economics
f.s.schaff@lse.ac.uk

1 Introduction and Historical Concept

It has become a historic truism that wars reduce economic inequality. Whether this negative relationship is due to the destruction of capital, demographic decline, the confiscation of riches, plundering, state collapse or decline of trade and commerce, this empirical regularity is thought to hold throughout history (for studies on equalising wars see van Zanden 1995, Piketty 2014, Scheidel 2017, Alfani, Gierok and Schaff 2020). Often previous studies have focused on the largest wars of history, such as the world wars or the Thirty Years' War (1618-48).

This paper examines the accuracy of the "war reduces inequality"-hypothesis for wars in the preindustrial period. It argues that the conventional view overlooks that warfare had two countervailing effects: multifaceted destruction could reduce inequality, but inegalitarian resource extraction could also increase inequality. Because this second factor often outweighed the limited destruction of *ordinary* conflicts, most wars between major political authorities in the preindustrial era actually led to higher economic inequality. Resource extraction resulted from communities' fundamental task to maintain peace and provide protection for inhabitants. Incidents of warfare in the surrounding area increased the risk of being attacked. To provide protection against that risk, communities built walls, bought armaments, employed wardens, extended bureaucracies and paid mercenaries. To pay for all this political authorities typically extracted economic resources via inequality-promoting channels, such as regressive taxation, credit or collaboration with corporate groups. These channels redistributed wealth from the poor to the rich, increasing inequality (see Friedrichs 1979). The hypothesised extractive effect of conflict exposure is schematically summarised in Figure 1.

Only in truly major wars, such as those that have usually been studied, could destruction outweigh extraction and reduce inequality. The Holy Roman Empire – Germany, for short – is the ideal testing ground for this question. It was the area where a truly major war took place, the Thirty Years' War. Moreover, Germany was historically a very diverse entity in economic, geographical and institutional terms. I will account for this diversity and make use of it to document the countervailing effects of warfare on inequality.

To test this hypothesis the paper employs novel data on the distribution of wealth at the household-level in 72 urban and rural communities (25-year intervals), collected from new archival property tax records and secondary sources (see Alfani, Gierok and Schaff 2020). These taxes were levied on household assets such as real estate, animals and cash money, but real estate was the main asset class everywhere. The wealth inequality data are combined with information from secondary sources about 687 battles and sieges between important political actors in Germany from 1400 to 1800 (see Figure 2).

Consistent with the literature, my first econometric strategy exploits the plausibly exogenous occurrence of battle action, and I account for potential omitted variable bias and reverse causality. I then move to a difference-in-differences research design to establish a more robust causal relationship between the two variables in question for the case of the Schmalkaldic War (1546-47). I combine this quantitative analysis with a historical account of what actually happened in places that experienced warfare in preindustrial Germany, and I rationalise this historical account in a conceptual framework about the two countervailing effects of conflicts on inequality. To address concerns about endogeneity I employ several strategies. Most importantly, I limit the analysis to conflicts between important political actors - analogous to interstate wars in modern times - because these wars were more likely to be exogenous events for individual communities. Moreover, I consider wars in a fairly large radius (150km) around a community, and not primarily whether a community was actually attacked.

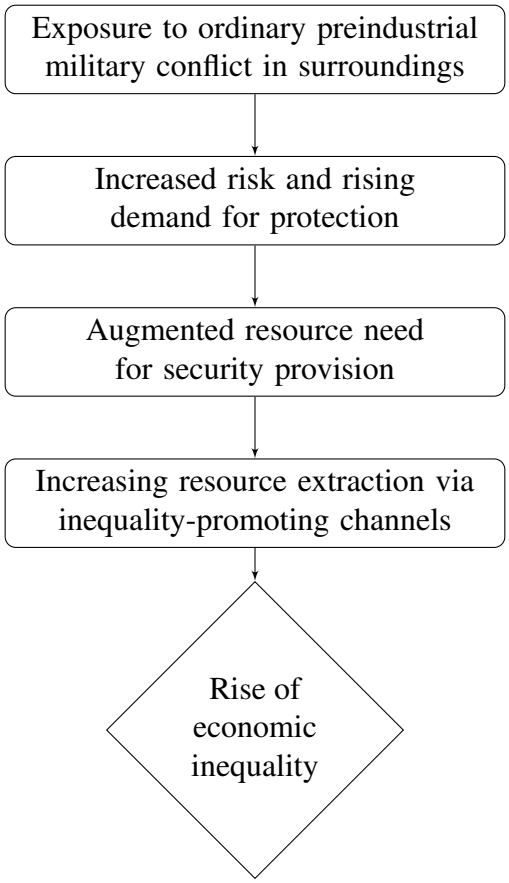
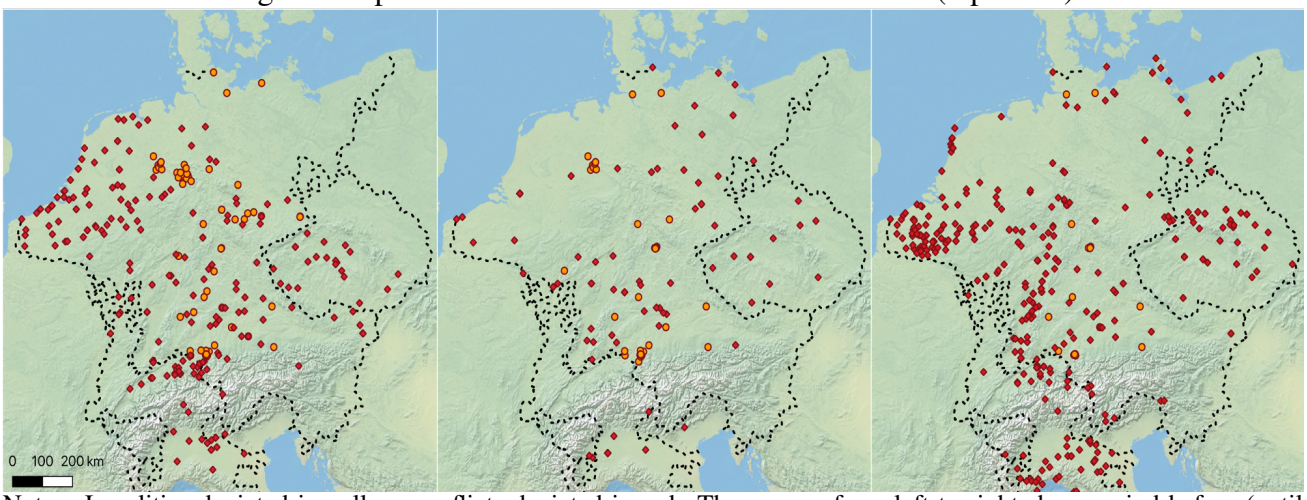


Figure 1: Extractive effect of warfare on economic inequality

Figure 2: Spatial distribution of localities and conflicts (3 periods)



Notes: Localities depicted in yellow, conflicts depicted in red. Three maps from left to right show period before (until 1617), during (1618-1648) and after the the Thirty Years' War (until 1800).

2 Empirical Analysis

The preferred specification used to measure the impact of conflicts on inequality are variants of the following:

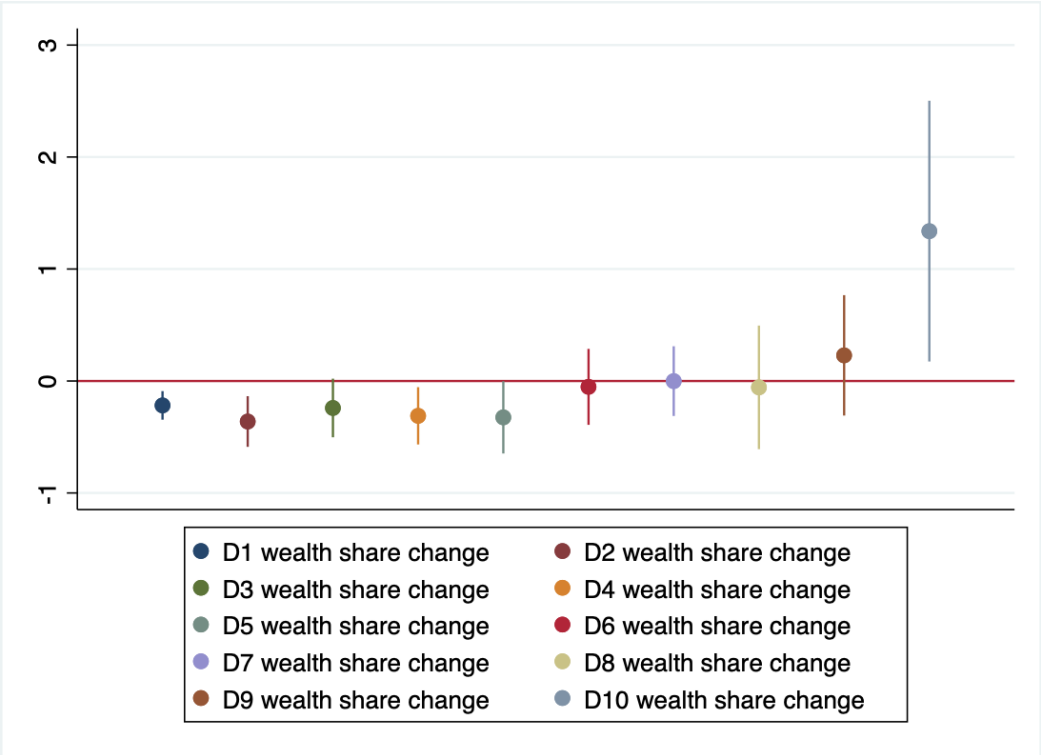
$$I_{i,t} = \alpha_i + \pi_t + \beta C_{i,t-1} + \boldsymbol{\gamma}' \boldsymbol{X_{i,t}} + \epsilon_{i,t} \tag{1}$$

$I_{i,t}$ is wealth inequality of locality i in year t ($t = 1400, 1425, \ldots$ until 1600 and from 1675 until 1800). The Gini coefficient is the main inequality measure, but I also consider alternative dependent

variables based on wealth percentiles. Most of the results will refer to the period from 1400 to 1600 and from 1675 to 1800. The observations from 1625 and 1650, that is, those that fall into the period of the Thirty Years' War, are considered separately because a significantly different relationship between inequality and warfare is hypothesised during that period. $C_{i,t-1}$ is the measure of conflict exposure that takes the value one if there was a military conflict within 150 kilometres of locality i over the previous period. α_i and π_t are locality and time fixed effects. $\boldsymbol{X_{i,t}}$ is a vector of locality-level controls, included as robustness checks only because they could be collider variables (Schneider 2020). I account for several economic, demographic, institutional and geographic observable factors. Time-variant controls are log-population size, occurrence of epidemics, burgher participation in the local government, introduction of Protestantism and log-distance to the nearest university. Time invariant controls, interacted with time-dummies, are agricultural potential, distance to a navigable river and seaside location.

Consistent with the literature (Dincecco and Onorato 2016), my first econometric strategy exploits the plausibly exogenous occurrence of battle action from the perspective of an individual town. This assumption is supported by the focus on military conflicts in which important political actors participated, such as imperial estates (e.g., the Duke of Bavaria), or the King of France. It is unlikely that these authorities started a war because of inequality in some community. Moreover, I systematically review the literature on the main causes of all wars in the dataset. I find that in at least 97 percent of wars inequality was not a reason of the outbreak of war (analysis not reported).

Figure 3: Conflict exposure and wealth share change by deciles during ordinary conflicts



In Figure 3 the coefficients of the simplest specification are plotted, including locality and time fixed effects. The plotted coefficients are the point estimates on the conflict exposure indicator, when taking each decile of the wealth distribution as dependent variable. When a community was exposed to a conflict, the wealth shares of the poorest five deciles of the population did decrease and the share of the richest 10 percent (D10) increased significantly. This unequal redistribution is in line with the conceptual framework.

Similarly, the coefficients in Columns 1 to 3 of Table 1 suggest that exposure to ordinary conflicts increased inequality if measured with the Gini coefficient, the wealth share of the bottom 50 percent or the top 5 percent of the population. In Columns 4 to 6 the dataset has been split into the three subperi-

ods. Columns 4 and 6 show, as expected, a significant and positive conflict-inequality relationship for the first and third period. The effect becomes even stronger towards the end of the early modern period, which could be due to the acceleration of the costly "Military Revolution". These results are consistent with the hypothesis that the extractive, inequality-promoting effect of warfare often outweighed the destructive, inequality-reducing effect during ordinary wars.

Instead, the coefficient in Column 5 points towards a negative conflict-inequality relationship, during the time of the exceptionally destructive Thirty Years' War. This is consistent with the proposition that the Thirty Years' War had a different impact on economic inequality compared to ordinary conflicts because it was a truly major war. It had a globally destructive impact on the German economy and inequality, which went far beyond the immediate destruction of single battles, to which ordinary conflicts were instead limited.

The coefficient in Column 7 shows that the conflict-inequality relationship on average and over the whole period 1400 to 1800 was positive. Notwithstanding the exceptionally negative effect of the Thirty Years' War, there was a generally positive relationship that ran from conflict exposure to inequality. Columns 8 and 9 suggest that these baseline results also hold when economic, demographic, institutional and geographic observable factors are controlled for.

Table 1: Conflict exposure and economic inequality: baseline results

	(1) Gini	(2) Bot. 50%	(3) Top 5%	(4) Gini	(5) Gini	(6) Gini	(7) Gini	(8) Gini	(9) Gini
	1400-1600 & 1675-1800			1400-1600	1625-1650	1675-1800	1400-1800	1400-1600 & 1675-1800	
Conflict exposure	0.021***	-1.456***	1.069**	0.013*	-0.054***	0.044**	0.015**	0.017**	0.017*
	(0.007)	(0.451)	(0.469)	(0.006)	(0.012)	(0.020)	(0.007)	(0.007)	(0.009)
Time-var. controls	NO	NO	NO	NO	NO	NO	NO	YES	YES
Time-invar. controls	NO	NO	NO	NO	NO	NO	NO	NO	YES
Locality FE	YES	YES	YES	YES	NO	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	380	380	380	288	56	92	436	380	380
Adjusted R^2	0.363	0.355	0.146	0.227	0.083	0.084	0.328	0.377	0.442

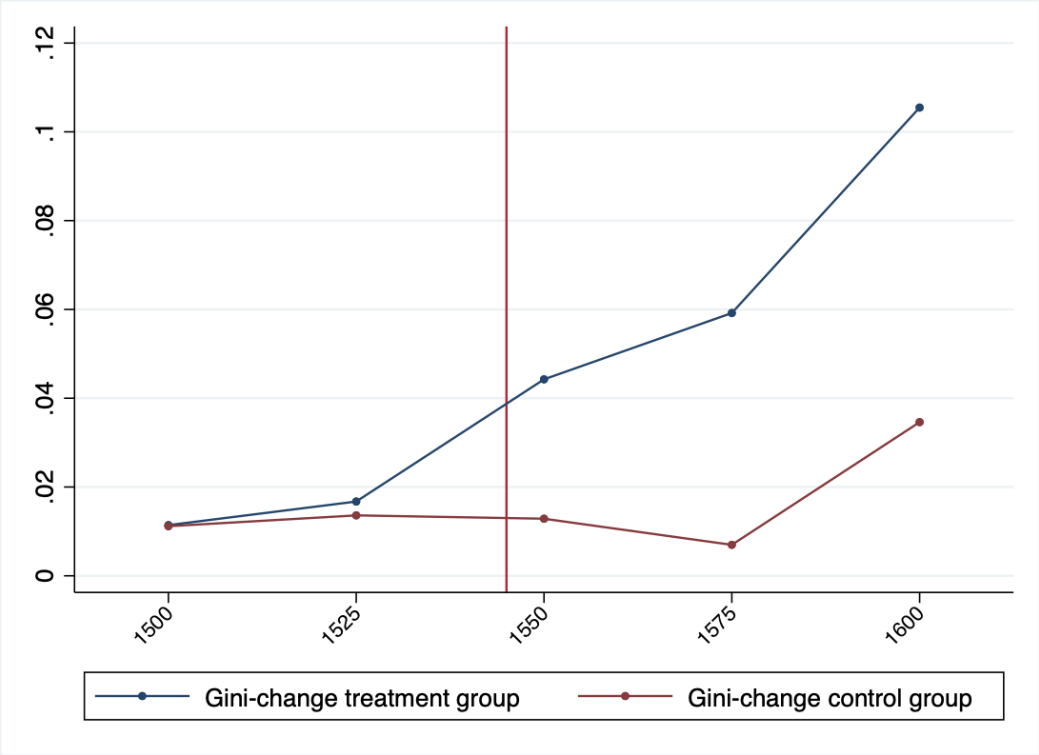
Notes: Estimation method is OLS. Standard errors clustered at locality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Further analysis (not reported) indicates that city states - small polities, with higher per capita defence costs and a higher need to extract resources - experienced a particularly pronounced inequality increase when exposed to a conflict. This is consistent with the hypothesis that resource extraction, to pay for defence and warfare, promoted inequality.

These main results are confirmed by several robustness checks, including a placebo test, alternative conflict measures and the use of spatial-dependence robust standard errors. Moreover, the results are confirmed by a case study of the Schmalkaldic War (1546-47), employing a difference-in-differences set-up. This "Religious War" of the sixteenth century broke out when the Catholic Emperor Charles V started an attack to destroy the Schmalkaldic League, an alliance of Protestant Imperial Estates. Figure 4 reports inequality trends for the treatment and control groups: localities that were either exposed or not to battles of the war. Figure 4 provides visual evidence suggesting that pre-war trends in observables are indeed parallel.

To identify the effect of the Schmalkaldic War I estimate a model that is almost identical to Equation 1. The main difference is the inclusion of an interaction term between a post-treatment indicator and treatment status, where treated-status means having been exposed to the Schmalkaldic War. Table 2 reports the results. Columns 1 to 4 indicate that the Schmalkaldic War increased inequality: a wealth share loss of the poorest 50 percent of the population stands against a gain of the richest part. This effect is sizeable and highly significant.

Figure 4: Inequality trends: treatment and control groups



Notes: Estimates of Gini change obtained by regressing an unbalanced panel of Gini coefficients on a full set of locality fixed effects and year dummies (reference year 1475), for the treatment and control groups. Vertical line indicates the beginning of the Schmalkaldic War.

Table 2: Difference-in-differences estimates: the Schmalkaldic War

	(1) Gini	(2) Gini	(3) Bot. 50%	(4) Top 5%	(5) Gini
			1450-1600		
Post1546×War	0.038***	0.045***	-2.196***	4.807**	0.052***
	(0.013)	(0.011)	(0.553)	(2.221)	(0.012)
Post1546×War×League					-0.030
					(0.021)
Demographic controls	NO	YES	YES	YES	YES
Institutional controls	NO	YES	YES	YES	YES
Geographic controls×time	NO	YES	YES	YES	YES
Locality FE	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES
Observations	230	230	230	230	230
Adjusted R^2	0.261	0.401	0.389	0.185	0.405

Notes: Estimation method is OLS. Standard errors clustered at locality level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Scheidel (2017) hypothesises that preindustrial wars reduced inequality comparatively more among the losers of a war, because of the more intense destruction and plundering that the defeated experienced. The Schmalkaldic War makes it possible to test this argument since it had a clear loser: the members of the Schmalkaldic League. In Column 5 another interaction term has been added with a

third variable, a dummy indicating whether a locality was part of the league. The coefficient indicates that being among the losers and possibly experiencing more destruction in fact reduced inequality compared to other treated localities, but it is not significant. The main coefficient of interest remains significantly positive. It is also larger than the coefficient of the loosing group, giving further support to the notion that inequality-promoting extraction usually outweighed inequality-reducing destruction. In sum, these case study results strengthen the main analysis.

3 Conclusion

I find a strong and positive relationship running from warfare to economic inequality during ordinary conflicts. Wealth was transferred from the lower and middle classes to the rich. This strong statistical relationship is also economically relevant. Specifically, a one-standard deviation increase in conflict exposure is associated with an increase in the Gini coefficient by 15 percent of a standard deviation. This result is robust to several checks. Moreover, the result is supported by the difference-in-differences estimates. The inequality-increasing effect found during ordinary wars was significantly different from what is found during the time of the Thirty Years' War. During this truly major war destruction probably outweighed extraction and reduced inequality, but this was an exception and not the rule. My conceptual framework suggests that these seemingly puzzling empirical results reflect the two countervailing effects of conflicts on inequality: destruction and extraction. Since ordinary conflicts caused a locally very limited destruction, the indirect extractive effect of warfare was likely larger than the direct destructive effect in most wars.

The paper makes several contributions to the literature. Empirically, it questions a long-running assumption undergirding the relationship between warfare and inequality. Economic and demographic expansion, exclusive political institutions, and cultural norms and ideology have been proposed as major causes of preindustrial inequality growth (van Zanden 1995, Minns et al. 2020, Piketty 2020). Traditionally, warfare has been considered a factor that reduced inequality. Instead, the findings of this study suggest that warfare increased inequality. The argument is probably closest to Alfani and Di Tullio (2019), who argue that the way preindustrial European polities taxed their subjects to pay for the "Military Revolution" promoted inequality, and to Ogilvie (2021) and Acemoglu et al. (2005) who emphasise that extractive institutions more generally augmented inequality.

Finally, the paper also extends the literature on the nexus between warfare, state formation and fiscal capacity (O'Brien 1988, Volckart 2002, Dincecco and Prado 2012). I suggest that warfare not only increased fiscal capacity and stimulated the formation of economically beneficial, property rights-protecting states. When political elites reacted to the risk of warfare with resource extraction, they also made preindustrial communities more unequal.

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