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Violent conflict and inequality

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Violent Conflict and Inequality

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Violent Conflict and Inequality

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ABSTRACT

Violent Conflict and Inequality*

This paper analyzes the distributive impacts of violent conflicts, which is in contrast to previous literature that has focused on the other direction. We use cross-country panel data for the time period 1960-2005 to estimate war-related changes in income inequality. Our results indicate rising levels of inequality during war and especially in the early period of post-war reconstruction. However, we find that this rise in income inequality is not permanent. While inequality peaks around five years after the end of a conflict, it declines again to pre-war levels within the end of the first post-war period. Lagged effects of conflict and only subsequent adjustments of redistributive policies in the period of post-war reconstruction seem to be valid explanations for these patterns of inequality. A series of alternative specifications confirms the main findings of the analysis.

JEL Classification: O11, O15

Keywords: conflict, war, inequality, reconstruction, income distribution

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INTRODUCTION

The devastating effects of violent conflict on key economic and social areas such as physical infrastructure, human capital, or growth have increasingly been stressed in the recent conflict literature.[1] However, as Blattman and Miguel (2010) argue, there is little evidence on the impact of civil war on the fundamental drivers of long-run economic performance – institutions, technology, and culture. These fundamental elements of an economy can be reflected in a society's distribution of income, which previous studies have shown to be a highly persistent and definitive characteristic of a society.[2]

As violent conflict is likely to affect different segments of society to varying degrees, this raises a question about the distributional effects of conflict and how persistent these effects are. The focus of previous studies on the conflict-inequality nexus, however, has been on the role of inequality in promoting violent conflicts, rather than the reverse. Results are mixed: while vertical income inequality was not found to increase the risk of war onset (Collier and Hoeffler, 2004; Fearon and Laitin, 2003), horizontal inequalities, i.e. social and economic disparities between societal groups, seem to be positively related with the outbreak of conflict (Østby, 2008).

It is the purpose of this paper to study potential effects in the other direction. Using macro-level panel data from 128 countries for the time period 1960-2004, we analyze the impact of violent conflict on economic inequality, as measured by the Gini index. Being aware of the drawbacks of cross-country studies when it comes to the analysis of violent conflict, the objective of this research is not to determine the specific influence of each individual war. We rather aim at understanding the average distributional effects of conflict and their persistence in the war's aftermath. This approach allows us to understand the economic legacies of violent conflict by highlighting the link between inequality and post-war reconstruction. Results also contribute to the solution of the causality puzzle between conflict and inequality.

We find that inequality increases during the course of violent conflict, and particularly does so in the first five years after the end of conflict. Our estimates indicate that income inequality increases by around 1.7 Gini points during war. Given that Gini coefficients have, on average, changed by around 0.6 percentage points per decade between 1960 and 2004, the estimated impact of violent conflict on inequality is a remarkable one.

More strikingly, the redistributive effect of a violent conflict is magnified at the post-conflict stage, where countries see their Gini coefficient, on average, 2.7 points higher than countries

that have not had a war in the last ten years. Inequality is estimated to be highest five years after the end of a conflict, at which point it starts diminishing gradually from its peak point if peace is sustained. Lingering legacies of war and only subsequent redistributive adjustments are likely drivers of a temporary increase in inequality in the post-conflict transition.

The paper is structured as follows. The next section first reviews briefly the existing literature on the determinants of inequality before discussing the relation between conflict and inequality and the potential transmission channels. This is followed by the presentation of the data, the econometric approach, and the regression results. We conclude with some remarks on potential implications of our findings for the reconstruction process.

INEQUALITY AND VIOLENT CONFLICT

Determinants of Inequality

In line with most economic analyses, we define inequality as the disparity in the distribution of incomes among individuals within a society. Previous studies have identified several determinants of this type of inequality. Generally, inequality does not vary much within countries even over long periods of time, but it does show significant cross-country variation. Hence, country-specific and mostly structural, i.e. slowly-changing, factors play a crucial role in determining a country's level of inequality.

The literature is divided on the validity of the famous Kuznets (1955) hypothesis, which predicts an inverted U-shaped curve for the pattern of inequality in a country as the income level increases. Using different data and methodologies, these analyses of the effect of growth on the income distribution have yielded mixed results. Deininger and Squire (1998) argue that 'Kuznets curve' results from cross-country studies are mainly driven by middle-income and relatively unequal countries from Latin America.

A second prominent explanation for the level of income disparities is based on political economy arguments: it is assumed that the rich minority in a given society is tempted to implement inequality enhancing economic policy, either through its economic power or through direct political control (Bertola, 1993). The power of the elites to enforce such policies is then constrained by the degree of civil liberties, citizen rights, and political participation. Here, schooling and educational achievements are in general associated with greater citizen involvement and influence (Li et al., 1998).

One channel through which state institutions impact on the degree of inequality is social policy. Milanovic (1994) finds that the extent of government transfers is the primary determinant of inequality in Latin America, Asia, and Africa, in comparison with the OECD countries. Similarly, Bulir (2001) provides compelling evidence in support of the significant negative impact of fiscal redistribution on the level of inequality.

Furthermore, the so-called capital markets argument builds on the relevance of productive investments for both overall and individual prosperity. When access to credit is constrained and requires ownership of collateral, the poor are particularly prevented from investments in physical and human capital (Tsiddon, 1992). Deininger and Squire (1998) reveal a significant impact of initial asset inequality – proxied by the distribution of land – on subsequent economic growth especially in low income countries. Ceteris paribus, a more unequal distribution of assets leaves a greater number of individuals credit-constrained, which hampers effective educational interventions and leads to intergenerational persistence of income inequalities in the long term (Deininger and Olinto, 2000).

The magnitude of this effect is influenced by the level of financial development, with a more developed financial system being better equipped to deal with credit constraints and market imperfections (see Levine (2005) for a survey). Beck, Demirgüç-Kunt and Levine (2007), for instance, show that higher levels of financial intermediation reduce income inequality by disproportionately boosting the income of the poor. Li et al. (1998) test the political economy and the capital markets arguments simultaneously and find empirical evidence in support of both mechanisms.

When it comes to the impact of macroeconomic policy on income inequality, the role of trade openness is particularly contested. From a theoretical point of view, the distributive effects of openness depend, among other things, on factor endowments. Empirical evidence is mixed: Anderson (2005) emphasizes that other factors associated with greater openness positively impact on wage differentials and, more generally, on other measures of inequality. Similarly, Barro (2000) finds a positive relationship between openness to trade and income inequality in his cross-country panel analysis. Milanovic and Squire (2005), however, find little evidence for an impact of tariff liberalization on wage inequality in their literature review.

Finally, Barro (2000) reveals significantly higher levels of inequality both in Latin America and in Africa, even when controlling for other factors mentioned above. Historical legacies and, in particular, different experiences of colonization are often seen as one explanation for the high levels of inequality in these regions (Acemoglu et al., 2000).

Distributional Effects of Violent Conflict

We analyze the effects of violent conflict on income inequality in two broad ways: through war-related changes in the structural determinants of inequality that we have discussed above, and 'pure' war effects. The structural determinants of inequality predict the level of income dispersion in a country and are mostly observable from data. The pure war effect captures a country's vulnerability to war, which is often not directly measurable in the data, but crucial in determining how the inequality level of a country might react during the course of a conflict. In this section, we discuss potential ways in which violent conflict impacts on the distribution of incomes during conflict and in the period of post-conflict reconstruction through these two channels.

An immediate macroeconomic effect of violent conflict is on economic growth. Several empirical analyses have confirmed the substantially negative impact of war on economic output.[3] Typically, productive forces of the economy are destroyed, transaction costs increase, and economic activity is disrupted due to an unsafe business environment. Agents involve in dissaving and portfolio substitution as they shift their property out of the country, which further exacerbates the deterioration of the capital stock. Sectors that are relatively intense in capital and/or transactions are therefore expected to contract more in the presence of civil war (Collier, 1999).

When war impacts differently on labor and capital intensive goods, we would expect the returns to labor and capital to adjust accordingly. Scarcity of physical and human capital is thereby likely to result in rising relative prices of capital intensive goods, while, at the same time, owners of unskilled labor face risks of falling wages and unemployment. Conflict-related obstacles to international trade further distort domestic prices.[4] Changes in the relative availability of production factors and resulting price distortions are therefore likely to be important drivers of redistribution in a war-torn economy.

In war-affected countries where the primary sector is still dominant and the majority of (rural) households are engaged in agriculture, farmers often lose their access to markets and thus the ability to gain from market exchange. Deininger (2003) shows that the persistent civil strife in Uganda during the 1990s reduced off-farm investments and led to a shift of economic activities towards subsistence and less integration to markets. Similarly, agricultural households in Rwanda generally tended to return to subsistence farming after the 1994 genocide (McKay and Loveridge, 2005).

While the poor and the unskilled seem to face the greatest economic hardship during war, the emergence of a small minority of war profiteers is likely to cause greater heterogeneity in the income distribution. War economies, in general, are characterized by the lack of a pacified market structure, short-term economic opportunism over long-term strategies, and the emergence of unorthodox business organizations. It is the decay of states and the dissolution of the state monopoly of the legitimate use of physical force that create the essential preconditions for such an environment (Endres, 2003). As civil war materializes, not only are contractual obligations worthless and trust demolished, but also new commercial opportunities for the exploitation of assets, investment, services, marketing and welfare arise (Pugh, 2003). 'War entrepreneurs' thereby capitalize on diminished security during conflict times and the opportunity to engage in a variety of activities ranging from drug-trafficking to controlling cross-border trade.

With heightened insecurity and destroyed facilities in conflict areas, certain regions might lose ties with the rest of the economy, causing whole groups of people living in these regions to be disadvantaged. Conflict areas are typically plagued by pillaging, robbery, and the confiscation of private property, with the owners of small-sized production facilities and those with private wealth located in remote areas likely to be the first and most hit by the conflict. As illegal economic activity, such as cultivation of drugs or taxation by the militia, picks up in these regions, a viable profiteering market system emerges which benefits a certain small minority and strikes its roots in the region as the duration of the conflict increases.

Violent conflicts will also negatively affect social spending. The government's ability to raise revenues necessary for public investment and redistribution is often limited by a sluggish economy, an adverse investment environment, and the hardships associated with collecting taxes and protecting state property. Significant increases in military spending during violent conflicts are directly related: Collier and Hoeffler (2002) estimate an average increase of military expenditure of around 1.8 percentage points of GDP during war times, which is likely to cut into the social spending and interfere with redistributive goals.

Lower government spending on education, along with the destruction of educational infrastructure and the absence of teachers, often impedes the maintenance of schooling during war and results in lower overall educational attainment in the society.[5] Likewise, wars frequently lead to the deterioration of public health, caused by the destruction of health infrastructure, the loss of skilled medical personnel and reductions in government health spending (Iqbal, 2006). Ghobarah, Huth and Russett (2003) find greatly rising risks of death

and disability from many infectious diseases in war-affected countries, with women and children as the most common long-term victims. Narrowed opportunities for schooling combined with increased incidence of disease particularly among already vulnerable groups are expected to cause a rise in human capital inequality, which is likely to be amplified the longer and more intense a conflict is.

Furthermore, violent conflicts and post-conflict episodes are typically characterized by an increased proportion of the elderly, the disabled and female-headed households in the population (Goodhand, 2001). The conflict's impact on human capital inequality and the composition of the population by gender and age is thereby likely to be realized only in the medium and long term. This creates a higher dependency ratio in households. De Walque (2006) analyzes the demographic impacts of the Khmer Rouge period in Cambodia and finds that women of nuptial age had to delay their marriages due to excess mortality especially among young men. Focusing on female refugees during the 1994 Rwandan genocide, Verwimp and Bavel (2005) reveal higher fertility rates among women who fled their country compared to those who never left Rwanda.

To summarize, we expect rising levels of income inequality during the course of war, with the redistributive effects of war being dependent on conflict- and country-specific circumstances. The extent to which a civil war affects the income distribution in a country also seems to be influenced by the duration of war, as the number of individuals and regions affected by violent conflict is likely to increase as the war gets longer. The destruction of physical capital and decreased investment lower the long-run equilibrium level of the economy's capital stock, which is likely to stand at a lower level as the conflict spans multiple years. This implies that the long-run effects of conflict will be more rooted in the economy for longer wars.

The further evolution of inequality in the post-conflict period thus depends greatly on the legacies of war. In general, the average level of GDP is significantly lower after a civil war, in comparison with the pre-war period. This loss is significant even if the war is brief, and it increases gradually with war duration (Chen, Loayza and Reynal-Querol, 2008). A long-lasting peace following the end of a conflict then creates room for economic recovery and sustained growth, as predicted by the neoclassical growth theory. While Chen et al. (2008) find evidence in support of a peace dividend, Collier (1999) expects a rapid economic recovery only after a long war.

Peace time can have a negative effect on inequality as governments may enact more distributive policies and investments in underdeveloped regions, where economic activity

starts to pick up following the end of a conflict. Once peace is achieved, the conflict-ridden regions might see the return of immigrants and private investment, which are likely to adjust back to their previous levels rather slowly and depending on the risk of conflict relapse. After peace is achieved, countries affected by the conflict might gradually deemphasize military spending in their use of fiscal resources. However, high levels of violence and insecurity often persist and war economies are likely to survive into the post-conflict period. Indeed, the risk of conflict relapse is especially high within five years of the end of a previous conflict (Chalmers, 2007), and governments tend to maintain a high level of military spending in the first decade following a ceasefire (Collier and Hoeffler, 2002).

Hence, the ruling government in an immediate post-war country may not have the political incentive or the budgetary allowance to engage in redistribution. This is coupled with the struggles of the elites in the society to define their new positions in the post-conflict period. As a result, personal and patrimonial links determine the distribution of assets and access to economic gains (Pugh, 2003). Some individuals, groups or regions are likely to benefit more than others especially in the early process of post-war reconstruction. The anarchic business environment survives for some time, during which the beneficiaries from this environment aim at exploiting their potentially closing opportunities. These group's high earnings gradually erode as a secure economic environment is back in place. Once the legacies of war vanish, the economy is likely to make its transition to its regular market structure.

Finally, outside interventions, e.g. UN peace operations, contribute to the post-conflict democratization process and the containment of violence (Doyle and Sambanis, 2000). This process, though, often evolves over several years and does not spread uniformly over the country, with remote areas being likely to benefit at last. The redistributive impact of these external interventions would then also come into effect with certain retardation.

We therefore think that the distributional effects of the post-conflict period would be realized not right after the violent conflict ends, but after a while when individuals in the economy are assured of the presence of a long-lasting peace. We further expect that the changes in the composition of human capital, caused by war casualties, displacement, or disruptions in the education and health sector, affect income distribution well beyond the end of the fighting.

DATA AND ECONOMETRIC APPROACH

Data

Our data include annual observations from 128 countries for the time period 1960-2004. We do not restrict our sample to a subset of (developing) countries, but include all nations for which data is available. For robustness, we also repeat the analysis for the sub-sample of developing countries. The time period is chosen for two reasons: first, the nature of violent conflicts has changed substantially after World War II, and the shift from interstate to intrastate wars may have also come along with different distributional effects. The second reason is a practical one, with most relevant variables being only available from 1960 onwards. We use yearly observations to employ the full information available. Most notably, this allows us to capture the short-term impacts of violent conflicts on inequality. As previous studies on both the determinants of inequality and war have used five year averages, we also present results obtained from this type of data for comparison.

Data on inequality are taken from the UNU-WIDER World Income Inequality Database (WIID) version 2.0b (WIID, 2007). Since the WIID2 estimates come from very different surveys and are based on different income concepts and statistical units, adjustments are needed to ensure comparability. In the database, each observation is assigned a quality rating ranging from 1 to 4,[6] with more than 60 per cent of our observations belonging to the first two categories. Six per cent of all observations fall into the fourth category and, as these estimates are considered unreliable, are excluded from our analysis.

When multiple estimates are available for a particular country in a particular year, we retain (a) the observation with the highest quality rating, (b) data based on surveys that cover the whole country area (c) data based on gross or disposable income concepts, (d) data using the person as unit of analysis, (e) data adjusted for household size, (f) data using the household as income sharing unit, and (g) data covering the whole population and all age groups. If still more than one estimate fulfills these criteria, we derive the median from the remaining observations.

To ensure comparability, we follow the standard approach in the literature and apply a regression-based adjustment to the Gini coefficients (Dollar and Kraay, 2002; Lundberg and Squire, 2003; Grün and Klasen, 2001). The fixed effects (FE) panel regression yields the expected results and is shown in Table A1 in the Appendix. Regression coefficients of the different income concepts are used to adjust all Gini observations that are not based on gross income per capita.

The WIID2 database offers the most comprehensive and reliable collection of income inequality measures that is currently available. However, especially for low-income countries,

observations on Gini coefficients have been quite scarce. Table A2 in the Appendix shows the availability of Gini coefficients for different regions and further distinguishes between countries at war and those not at war. Obviously, data on income inequality is particularly difficult to obtain from war-affected countries. The cross-continent comparison, however, also reveals substantial differences in the availability of Gini estimates in peace times. We therefore account for potential sample selection that would bias our estimates when the availability of inequality data is non-random across countries.

Data on conflict come from the 1946-2006 UCDP/PRIO Armed Conflict Dataset Codebook Version 4-2007[7] (Gleditsch et al, 2002). For the purposes of this study, we focus on (civil) wars, which require that 1,000+ battle deaths in at least one year during the course of the conflict are observed.[8] Our civil war incidence variable is coded 1 in all country years with at least one active war as defined by the 1,000+ battle deaths threshold.

For the purposes of this study, a short war is understood to have lasted less than five years in the total course of the conflict, and a long war is understood to have lasted more than five years. A country is listed as a long war country beginning in that year when the duration of conflict exceeded the sixty months threshold. We further define the variable "post-conflict incidence," which is coded 1 if a country observed its last war less than ten years ago and intended to capture the impact of war on inequality during the post-conflict phase. Lastly, we define the variable "post-conflict duration," which measures the time passed since the last war incidence in terms of years.

Civil wars are not necessarily spread throughout the whole country, but might be confined to a few regions. As the same is true for the coverage of the surveys that underlie the Gini coefficients, we verify for each war observation whether the conflict regions are included in the Gini estimate. Whenever the conflict region is not covered, we recode the war incidence variable to 0 and classify the observation as "being indirectly affected by war".[9] This way, we recoded twenty-two out of 140 war observations.[10] Table A3 in the Appendix lists all the conflicts for which war or post-war observations on inequality are available.

Motivated by the previous discussion, we use a set of control variables that has been compiled from the World Development Indicators and the Penn World Tables. Table 1 provides summary statistics of the explanatory variables included in the analysis; Table A4 in the appendix defines the variables and gives the data sources. With respect to the expected distributional effects of violent conflict, the data enable us to control for changes in GDP, government spending, and external trade. The impact of potential labor market distortions,

demographic changes, and evolving war economies is hardly measurable and therefore absorbed by the set of war variables that we include in our analysis.

Econometric Approach

Following the approach of previous studies on the determinants of cross-country differences in income inequality (see Li et al, 1998; Table 6; Barro, 2000; Table 6), we begin our analysis with an ordinary least squares (OLS) framework:

$$Y_{it} = W_{it}\alpha + X_{it}\beta + \varepsilon_{it} \qquad (2)$$

where Y_{it} is the adjusted Gini coefficient, W_{it} is a measure of war, X_{it} is a matrix of other covariates that determine income inequality, and ε_{it} is the unobservable error term for country i in period t. The coefficient of interest is α, which captures the effect of war on income inequality.

In our setting, however, estimates from a pooled OLS regression might be biased. Applying OLS assumes independent and identically distributed errors ε, which is violated whenever omitted factors are correlated with the explanatory variables. With most of the variation in Gini coefficients occurring between countries and being related to often structural and hardly measurable country characteristics, drawing inference from pooled OLS is at least problematic.

As panel data are available, we can control for time-constant unobservables by estimating FE models. The introduction of country-fixed effects allows us to capture a substantial proportion of the cross-country differences in inequality and enables us to focus on the determinants of within-country variations, most notably the effects of violent conflict. Nevertheless, we also estimate OLS regressions to replicate previous studies and to highlight the difference between OLS and FE estimation.

Given the relatively sparse availability of Gini coefficients, we also have to deal with potential sample selection biases. This would be a problem if the observability of Gini coefficients is non-random and dependent on factors that affect the degree of inequality itself, such as the quality of institutions. In particular, measures of inequality might rarely be reported from countries affected by violent conflict. A model accounting for such selection mechanisms can be estimated by maximum likelihood.

However, maximum likelihood estimation of sample selection models is quite arduous. The most commonly used procedure to solve sample selection bias in an OLS setting is Heckman's (1979) well-known two-stage procedure, which requires the calculation of an inverse Mills ratio from a pooled Probit regression and the inclusion of the inverse Mills ratio (IMR)[11] in the primary equation of interest. We implement this methodology when we estimate equation (1) with OLS.

The variable we use to identify the selection model is population size. We assume that, on the one hand, more populous countries tend to produce more income data which allows the calculation of Gini estimates, and that, on the other hand, inequality itself is not determined by the pure size of a society (note that the Gini coefficient satisfies the population principle, stating that scaling up a society has no impact on measured inequality).

In the context of panel data, the FE estimator is consistent if the selection bias operates purely through the individual effects. In this study, this would mean that *only* time-invariant country-specific effects determine whether the Gini is observed or not for a country-year data point. As this assumption would be implausible, one needs to correct for possible selection bias and unobserved heterogeneity also in the panel data. Yet, the usual Heckman (1979) procedure cannot be implemented in FE models because it would produce inconsistent estimators (Wooldridge, 2002).

An alternative and yet very similar procedure was proposed by Wooldridge (1995), whereby one estimates a cross-sectional Probit model for each period t and computes the value of the inverse Mills ratio. The IMR derived from the T Probit models enters the main regression as an additional explanatory variable to control for possible sample selection. Thus, our panel data model is:

$$Y_{it}^{*} = W_{it}\alpha + X_{it}\beta + \mu_i + \xi_t + e_{it} \qquad (3)$$

$$d_{it}^{*} = z_{it}\gamma + \delta_i + \psi_t + \nu_{it} \qquad (4)$$

$$d_{it} = 1 \text{ if } d_{it}^{*} > 0 \qquad (5)$$

$$Y_{it} = Y_{it}^{*} * d_{it} \qquad (6)$$

where Y_{it}, W_{it}, and X_{it} are defined as above and z_{it} is a matrix of covariates that determine the selection of the Ginis. The Gini coefficients in the primary equation of interest, (3), are observed only for the observations that satisfy the selection rule given in (4) (i.e. $d_{it}^{*} > 0$). We assume that the error components are normally distributed and correlated with the component of the same dimension in the other equation.

To solve for selection bias, we follow Wooldridge (1995) and estimate a cross-sectional Probit model with explanatory variables z_i and dependent variable d_{it} for each period t and compute the inverse Mills ratio, λ_{it}, which is then included in the main equation:

$$Y_{it} = W_{it}\alpha + X_{it}\beta + \rho\lambda_{it} + \eta_{it} \qquad (7)$$

We start by building our model on the variables used by Li et al. (1998) and Barro (2000) as a way of replicating these influential studies. We first determine the set of covariates X_{it} that predicts income inequality in an OLS framework. After controlling for sample selection bias, we turn to FE estimation and the impact of war on inequality.

RESULTS

Descriptive Statistics

Table 1 provides summary statistics for the variables included in the analysis. In our data set, a typical conflict lasted eight and a half years on average. The mean number of annual battle deaths in the same period was 4,750. Table 2 presents the means of Gini coefficients in different phases of war, which point to a change in the course of inequality during war over the last decades. These figures need to be interpreted with caution, as we compare relatively few observations from different countries, drawn from an unbalanced panel. However, they provide a first insight into the pattern of inequality in the course of war. While the Gini coefficient averages around forty in countries not affected by war, inequality seems to be significantly higher in countries either at war or in the early post-war period, with an average Gini coefficient of around forty-seven (Panel A). In the late period of post-war reconstruction, i.e. five to ten years after the end of war, a lower Gini coefficient of 43.5 can be observed on average.

Looking at differences between short and long wars, we find larger average increases in inequality during war and early post-war times in short wars (Panel C). The Gini coefficient shows less variation in long wars; however, we observe much higher levels of inequality in countries that have experienced a long war.

As we do not control for country characteristics at this stage, this result seems to be at least partly driven by the relatively large share of long-war observations from Latin America, where inequality tends to be structurally high for historical reasons. We therefore calculate deviations of inequality from within-country means in order to control for such structural country characteristics. Graph 1 and Graph 2 depict the median values of these deviations for

the war onset and the post-war period, respectively, hence describing average changes in inequality in the course of violent conflict.

We observe rather stable levels of inequality in the immediate pre-war period, while inequality increases on average once war has broken out (Graph 1). In the post-conflict period, inequality tends to increase again initially (Graph 2). The highest increases of inequality, in comparison with the long term within-country mean, are observed around five years after the end of war. After approximately one decade, however, average inequality turns back to the within-country mean and thus to pre-war levels.

Regression Results

To further disentangle the effects of war from other factors that determine inequality, we turn to the multivariate analysis and start with a simple OLS framework. Our baseline model is presented in Table 3. Following Li et al. (1998) and Barro (2000), we include the following variables: the initial Gini coefficient for the distribution of land (data from 1960), per capita GDP, the government share of real GDI as a proxy for the redistributive efforts of the government, a measure of trade openness, and continent dummies.

The coefficients in the first regression show the expected signs and are in line with the findings in the literature. While initial land inequality tends to increase income inequality, higher GDP per capita is significantly associated with lower levels of inequality. All the continent dummies are significant and have positive coefficients against the reference category, with the exception of the former East Bloc. The estimated coefficient on trade is very small in magnitude and far from being significant, possibly because of its differential effect on inequality due to country characteristics.

In the second regression, we therefore include an interaction term to control for a potentially different impact of trade on inequality in developed and developing countries.[12] Throughout all our regressions, we find the impact of trade openness to be slightly inequality-decreasing in more developed countries, while the opposite is true for low-income and low-middle-income economies.

We augment the previous regression with decade dummies in column (3) to control for global trends in inequality over time. Results point to increasing income disparities in the last two decades and suggest the role for globalization and technical change in shaping inequality. In column (4), we finally include the IMR derived from a probit regression on the availability of

Gini coefficients (see Table A5 in the Appendix for regression results) to correct for potential sample selection bias. The main findings are unaffected.

Given the crucial role that structural and mostly unobserved factors play in determining the level of inequality, controlling only for continent fixed effects might not be sufficient and the estimated coefficients from OLS may be susceptible to omitted variable bias. Moreover, we are primarily interested in how the incidence of violent conflict redistributes income *within* a conflict-ridden country, which calls for studying the within-country variation of inequality in more detail. From regression (5) onwards, we therefore rely on FE estimation. All time-invariant explanatory variables drop out; the remaining control variables still show the expected signs and are statistically significant.

Based on this regression, we now introduce different sets of war variables to assess the impact of violent conflict on inequality. Results are presented in Tables 4 and 5. The reference category in all war regressions is "countries not at war and not in the post-war period". In regression (6), we start with dummy variables for being either at war or in the post-war decade. In regression (6a), we also control for those observations where the civil war is fought only in certain regions which are not covered by the Gini estimate. We interpret this variable as the indirect impact of war on inequality.

We find that both being at war and being in the post-war recovery phase has a significantly inequality-increasing effect. War incidence raises the Gini coefficient by an estimated 1.6 points, while being in the post-war recovery stage raises the Gini coefficient by 2.1 points. Being indirectly affected by war has a slightly negative, but insignificant impact on inequality. This suggests that violent conflict primarily affects the income distribution in those regions directly hit by the war. However, as the coefficient is based on few observations, we prefer not to over-interpret this statistical control.

In regression (7), we split the war incidence dummy variable into short war and long war incidence to assess the impact of war duration. We include two dummy variables that indicate whether the observed war has lasted less than a total of five years in its full course or more. This distinction reveals larger positive impacts of violent conflict on inequality in longer wars: a long war has an estimated impact of increasing the Gini coefficient by 2.2 points, while no significant effect on the income distribution is found for shorter wars.

The regressions presented in Table 5 focus on the evolution of inequality in the post-war period. In regression (8), we split the post-war dummy into early and late recovery observations and include them in the regression along with the war incidence variable. Results

predict inequality to be particularly high in the first five years after the conflict, while this impact is smaller in magnitude and only marginally significant for countries in the late recovery stage, i.e. five to ten years after the official end of hostilities.

This result is confirmed by regression (9), where the post-war dummies are replaced by the continuous post-conflict duration variable and its square term. The highly significant coefficients suggest an inverted-U relationship between post-conflict duration and the Gini coefficient. According to the estimates, the post-war rise in inequality peeks around five years after the war has ended and vanishes one decade after the peace agreement has been signed.

Discussion

As discussed above, several channels possibly lead to increasing income disparities in times of war. As inequality is quite persistent and changes only slowly over time, war-related impacts on inequality might become fully apparent only in the post-war period. In what follows, we provide potential explanations for why this process peaks in the early post-war period. While some of the characteristics of post-conflict environments are hardly measurable, such as the evolution of war economies, the general security situation, related restrictions to internal trade, or the overall business climate, we can distinguish between a range of observable factors that potentially drive inequality in the recovery phase.

Graph A1 in the Appendix presents the average evolution of different socio-economic indicators in the transition period from war to peace. Similar to the illustration of changes in inequality in the course of war (see Graphs 1 and 2), we calculate the average deviation from the respective within-country means for each variable. This enables us to depict overall trends in the post-conflict period, while accounting for structural country characteristics at the same time.[13]

An important determinant of inequality in the post-conflict stage is the state's ability to engage in social spending. The substantial decline in average tax revenues in the post-conflict period points to severe budget constraints especially in the first years after the end of conflict (Graph A1.A). This scarcity of available resources necessarily results in preferential treatment of certain sectors, with reconstruction priorities likely to favor the rebuilding of infrastructure over redistribution. Over and above, military spending rises sharply during civil wars and decreases only gradually in the post-conflict period. On average, military expenditure remains

substantially above the long-term country means in the first five post-conflict years (Graph A1.B).

Governments hence seem to maintain enlarged military budgets to prevent the start of a new war and as a sign of power in the post-conflict period, when war legacies are still very much alive. High military expenditures are thereby likely to additionally cut into the budget for social spending. The observed average decreases in social contributions and public education expenditures (Graphs A1.C and A1.D) seem to further confirm a very limited scope for redistribution in the immediate post-conflict period.

Beside of public spending, some of the other previous hypotheses on the distributive impact of violent conflict are supported by descriptive statistics. First, labor force participation is found below the long-term average and exhibits a strong U-shape in the first ten years after the end of the conflict. Along with the high need for capital goods in the reconstruction process, this pattern is likely to mirror falling wages and rising levels of unemployment. Second, a recovery of the primary sector is, on average, only observed around five years after the end of the conflict, as indicated by a substantial rise in the area of land under cereal production at that time (Graph A1.F). Such improving conditions for agriculture often benefit poor households in rural areas, contributing to a reduction of inequality.

Third, we observe an increased age dependency ratio (the ratio of children and elderly to working-age people) by the end of war, and its return to the long-run mean approximately five years later (Graph A1.G). To the extent that the underlying demographic changes constitute a disproportional burden on poor households, income disparities might increase. Fourth, substantial aid inflows are observed in the first five years of the reconstruction period (Graph A1.H). As a uniform allocation of funds to all areas is difficult to achieve, international assistance could temporarily affect the course of inequality as well.

Finally, the magnitude of all these effects should depend on the scale of destruction. We test this hypothesis by using a different definition of conflict: the 25+ battle deaths threshold war variable also includes periods of lower intensity types of violence. We rerun our main regressions, and coefficient estimates of the war- and post-war variables (for this and other alternative specifications) are summarized in Table 6.[14] Using the lower intensity threshold, the estimated post-war increases in inequality diminish, but do not vanish (column 1).

Potential Objections

A major concern to our approach is the assumption of exogenous war variables. While OLS estimation requires exogeneity of the regressors to yield unbiased results, the measures of war might be suspected to be endogenous in this framework. There are two possible reasons: first, if unobserved factors exist that jointly determine inequality and war, an omitted variable bias occurs. This problem is largely dealt with by FE estimation, since the FE estimator controls for unobservable effects which are constant over time. This, for instance, accounts for underlying characteristics of the society that affect both the dispersion of incomes and the proneness to conflict.

Second, we would face the problem of reverse causality if the occurrence of war does not only affect inequality, but if inequality itself impacts on the incidence of war. This link between inequality and political violence has attracted much attention in the literature. Gurr's (1970) classical theory of relative deprivation argues that it is not absolute destitution that causes rebellion, but unfavorable comparisons between one's individual circumstances and those of other members of society.

At this point, drawing a distinction between different types of inequality has proved to be crucial: horizontal inequalities between religious or ethnic groups are seen as one major cause of today's violent conflicts (Stewart, 2008). Østby (2008) provides empirical evidence on the positive relationship between such *horizontal* inequalities and the outbreak of conflict. The Gini coefficient, however, measures *vertical* inequality, i.e. income inequality between individuals, and thus fails to capture the conflict-inducing disparities between different societal groups.

In line with this, prominent cross-country studies on the determinants of violent conflicts have consistently found that income inequality does not increase the risk of conflict (e.g. Collier and Hoeffler, 2004; Fearon and Laitin, 2003). Sambanis (2005) notes that the reason that inequality is dismissed as insignificant in most quantitative analyses of war can be attributed to the construction of the Gini coefficient as a vertical inequality measure. We therefore believe that the problem of possibly endogenous war variables is negligible in this setting, with FE estimation delivering consistent estimates. This is also confirmed by the observed within-country deviations of inequality, where inequality, on average, does not increase prior to the onset of war (Graph 1).

Robustness Tests

In order to verify the robustness of our results, we further apply a series of tests based on the set-up of the FE regressions in Table 4. First, we use pooled OLS estimation instead of FE in order to make our results comparable to previous studies (column 2). Compared to FE, OLS estimates of the war coefficients are in general larger in magnitude, indicating that the OLS war estimates have absorbed some of the time-invariant, unobserved country characteristics.

Second, we include additional control variables to the full sample. The inclusion of M2/GDP, a proxy for financial development, and inflation leads to a certain decrease in size and significance of the war coefficients, probably related to a significant drop in sample size due to missing data (column 3). We do not include variables on schooling, as comparable time series data on education especially for developing countries would be available only from 1990 onwards. Li et al. (1998) use the initial mean years of secondary schooling in 1960, which would be absorbed by the country fixed effects in our framework.

Third, we run the FE regressions for the sub-sample of developing countries (column 4). Two differences to the results for the full sample emerge: inequality is estimated to rise especially in those countries experiencing a short war, and the post-conflict estimates are slightly smaller and less significant. Finally, we also introduce five year averages instead of annual data to our analysis (column 5). The results continue to hold for the post-conflict coefficients, but we cannot find strong evidence for the direct impact of being at war on inequality. This might be due to the fact that short-term dynamics are difficult to capture by this aggregated type of data.

CONCLUSION

In this paper, we study the link between conflict and income inequality in a direction that has not been investigated before in a cross-country setting. Specifically, we find that violent conflict leads to a higher level of inequality during the war, and this increase is further reinforced in the first five post-conflict years. Our estimates point to a fall in inequality in the late recovery stage and the return of inequality to pre-war levels within one decade after the end of conflict.

War-related changes to the national income distribution thus seem not to be permanent, but of temporary nature. We suggest several explanations for these patterns of inequality in the course of war. First and foremost, the dissolution of markets and the breakdown of the rule of law during conflict and in its immediate aftermath are likely to seriously cut into the state's

tax revenues. Increased military expenses further restrict the government's capacity to engage in social spending and redistribution. Demographic changes, distortions in the labor market, and disruptions of agricultural production seem to additionally contribute to rising income disparities in the wake of war.

Yet, we observe a similar decrease in inequality once the legacies of war vanish. The temporary widening of the income distribution might be attenuated by post-conflict recovery efforts, with the rebuilding of security, the revival of business activities, and a strengthening of distributive politics as crucial elements in this process. In line with previous work, we find no evidence that rising vertical inequalities contribute to the risk of conflict relapse.

However, we cannot assess the role of rising horizontal or regional disparities in the peace process. In light of rapid changes in income distribution in the regions most affected by conflict, the implementation of policies disaggregated by societal groups and regions seems essential. As the conflict literature is surprisingly weak on measures and discussions of 'horizontal' inequality and inter-regional comparisons, more research is needed in this field.

[1] See Collier and Hoeffler (2007) and Blattman and Miguel (2010) for two extensive surveys.

[2] See Mookherjee and Ray (2003) for a model of persistent inequality and a discussion of the literature on the persistence of inequality.

[3] See Blattman and Miguel (2010) and Collier and Hoeffler (2007).

[4] See, for instance, Martin, Mayer, and Thoenig (2008), who show that a 25 percent drop in trade is observed in the first year of the conflict, and that trade disruption worsens with time.

[5] Decreasing enrolment during conflict has been documented for Rwanda (Lopez and Wodon, 2005), Uganda (Deininger, 2003) and Tajikistan (Shemjakina, 2006). See Lai and Thyne (2007) for a cross-country analysis.

[6] Rating from "1" for observations where the underlying concepts are known and ok to "4" for observations classified as memorandum items (UNU-WIDER, 2007).

[7] UCDP/PRIO Armed Conflict Dataset is a collaborative project run by Uppsala Conflict Data Program at Uppsala University and International Peace Research Institute Oslo. The dataset and the codebook are accessible on the World Wide Web under the link: http://www.prio.no/CSCW/Datasets/Armed-Conflict/UCDP-PRIO/

[8] If a conflict escalates to war during the course of the conflict, the civil war variable is coded for the year the conflict first passed the 25 casualty threshold, even if the conflict reached the status of war only in later years.

[9] In cases where the area coverage of the Gini estimate was not clear, we left the war incidence variable unchanged.

[10] War observations that we had to recode were mainly based on surveys where the conflict regions were excluded for security reasons. For example, 1992 and 1993 Gini estimates for Georgia were derived from national surveys that did not cover the secessionist regions of Abkhasia and Tskhinvali, 1991 and 1996 surveys from Sri Lanka did not include the conflict-affected northern and eastern parts of the country.

[11] There are many somewhat differing definitions of the IMR in the literature. Stata uses the "nonselection hazard" instead of "inverse Mills", which is defined as $H(x) = f(x)/(1-F(x))$, where $f(x)$ is the probability density function and $F(x)$ is the cumulative density function. Mills' is usually taken to be $1/H(x)$, so the IMR is just the hazard.

[12] We use the country classification proposed by the World Bank (http://go.worldbank.org/D7SN0B8YU0). We classify low-income and lower-middle-income economies as "developing", while upper-middle-income and high-income economies are classified as "developed".

[13] Data is drawn from the World Development Indicators for the period 1960-2004. The relative scarcity of available information especially from the 1960s and 1970s prevents us from including these variables as further controls in the regression analysis, as this would reduce the sample size dramatically.

[14] The full results are not reported for lack of space, but are available from the authors upon request. For comparison, the main FE results for the whole sample are reported in the left column.

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Table 1: Summary Statistics

	Variable	n	Mean	Std. Dev.	Min	Max
	Gini Coefficient (WIID2)	1944	37.91	11.71	15.9	77.6
	Gini Coefficient (Adjusted)	1944	39.86	11.68	15.9	82.3
	War Incidence	6860	.126	.332	0	1
	Post-Conflict Incidence (10 years)	6860	.095	.294	0	1
	War Duration (in months)	6860	13.05	50.55	0	528
	Battle Deaths (in 1000)	6860	.911	8.70	0	322.2
	Countries at War Only					
All	War Duration (in months)	867	103.29	104.42	1	528
All	Battle Deaths (in 1000)	867	4.75	9.77	0	322.2
Cold War	War Duration (in months)	499	75.73	65.55	1	372
Cold War	Battle Deaths (in 1000)	499	6.14	11.56	0	322.2
Post-C.W.	War Duration (in months)	368	140.66	132.16	1	528
Post-C.W.	Battle Deaths (in 1000)	368	2.86	6.10	0	48.0
	Gov. Share of Real GDI	6077	22.01	10.62	2.0	93.7
	Initial Land Gini (1960)	4655	64.26	16.81	29.0	96.4
	M2/GDP	5157	55.17	426.68	.05	18,798
	GDP p.c. (in 1000 US$)	6149	4.891	6.541	0.06	54.286
	Trade/GDP	5991	69.78	41.10	1.5	473.5
	Africa	8084	.325	.468	0	1
	Asia	8084	.174	.379	0	1
	Former East Bloc	8084	.128	.334	0	1
	Latin America	8084	.163	.369	0	1
	Western Europe & North America	8084	.169	374	0	1
	Pacific	8084	.041	.197	0	1

"War Incidence" is coded one if a country is at war and zero otherwise. "Post-Conflict Incidence" is coded one if a country is in the ten year post-war period and zero otherwise.

Table 2: Distribution of Gini Coefficients in Different Phases of War

A. GINI (ADJUSTED)	**All**	
	Obs.	*Mean (S.E.)*
No War *(War is >5 years away)*	1603	39.97 (0.29)
Pre-War *(5 years)*	71	41.78 (1.27)
At War	116	46.89 (0.73)
Early Post-War *(5 years)*	64	47.00 (1.04)
Late Post-War *(5-10 years)*	51	43.50 (1.28)

C. GINI (ADJUSTED)	**Short Wars** *(1-5 years)*		**Long Wars** *(>5 years)*	
	Obs.	*Mean (S.E.)*	*Obs.*	*Mean (S.E.)*
Pre-War *(5 years)*	62	41.10 (1.21)	12	49.50 (3.25)
At War	52	44.38 (1.08)	64	48.93 (0.91)
Early Post-War *(5 years)*	40	44.44 (1.20)	24	51.27 (1.58)
Late Post-War *(5-10 years)*	32	39.19 (1.27)	19	50.76 (1.70)

Table 3: Determinants of Inequality – OLS and FE Regression Results

Dependent Var.: ***Gini Coefficient (Adjusted)***	(1)	(2)	(3)	(4)	(5)
	OLS				**FE**
	Base Case	*Trade IA*	*Decade Dummies*	*IMR*	*Base Case*
Initial Land Gini	0.03*	0.02	0.02	0.03*	
	(0.02)	(0.02)	(0.02)	(0.02)	
GDP p.c.	-0.29***	-0.25***	-0.39***	-0.46***	-0.30***
	(0.04)	(0.04)	(0.05)	(0.06)	(0.05)
Gov. Share of GDI	-0.05	-0.10**	-0.08**	-0.09**	-0.26***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Trade/GDP	0.00	-0.01	-0.01	-0.00	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Interaction: Trade/GDP & Developing Country		0.08***	0.06***	0.06***	0.07***
		(0.01)	(0.01)	(0.01)	(0.02)
Africa[◊]	16.18***	11.83***	10.99***	11.36***	
	(1.22)	(1.24)	(1.27)	(1.50)	
Asia	2.87***	1.17	0.59	0.49	
	(0.77)	(0.79)	(0.78)	(0.80)	
Former East Bloc	-4.17***	-3.55***	-5.50***	-6.43***	
	(1.36)	(1.31)	(1.24)	(1.29)	
Latin America	13.08***	11.99***	10.84***	10.60***	
	(0.70)	(0.72)	(0.76)	(0.81)	
Pacific	3.10***	3.12***	3.36***	3.60***	
	(1.13)	(1.15)	(1.11)	(1.21)	
1970s			-1.05	-0.85	-0.94
			(0.93)	(0.95)	(0.71)
1980s			-2.65***	-2.36**	-1.35*
			(0.91)	(0.94)	(0.73)
1990s			1.64	1.76	2.28**
			(1.00)	(1.08)	(1.00)
2000s			3.07***	3.46***	3.45***
			(1.16)	(1.24)	(1.03)
IMR				-1.03	1.26
				(1.01)	(1.40)
Constant	37.42***	38.98***	40.48***	41.15***	48.14***
	(1.52)	(1.53)	(1.55)	(1.91)	(2.06)
Observations	1189	1189	1189	1160	1524
R-squared	0.57	0.59	0.62	0.62	0.11
No. of Groups					128
Av. Obs. per Group					11.90

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%
[◊] Reference category: "Western Europe & Northern America"

Table 4: FE Regression Results – The War Impact

Dependent Var.: ***Gini Coefficient (Adjusted)***	(6)	(6a)	(7)	(7a)
	War Effects		*War Duration*	
War Incidence † *(Gini covers conflict regions)*	1.85** (0.90)	1.63* (0.98)		
War Incidence - Indirect *(Conflict regions not covered)*		-1.06 (1.50)		-0.93 (1.49)
Post-Conflict Incidence *(Last War less than 10 yrs. ago)*	2.23** (0.90)	2.13** (0.93)	2.32** (0.90)	2.22** (0.93)
War Incidence: Short War *(War Duration < 5 years)*			1.30 (1.08)	1.15 (1.13)
War Incidence: Long War *(War Duration > 5 years)*			2.47** (1.05)	2.23* (1.14)
GDP p.c.	-0.30*** (0.05)	-0.29*** (0.05)	-0.29*** (0.05)	-0.29*** (0.05)
Gov. Share of Real GDI	-0.28*** (0.06)	-0.29*** (0.05)	-0.29*** (0.06)	-0.29*** (0.06)
Trade/GDP	-0.03** (0.01)	-0.03** (0.01)	-0.03** (0.01)	-0.03** (0.01)
Interaction: Trade/GDP & Developing Country	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)
1970s	-1.30* (0.72)	-1.29* (0.72)	-1.31* (0.72)	-1.29* (0.72)
1980s	-1.91*** (0.73)	-1.89*** (0.73)	-2.02*** (0.74)	-2.00*** (0.74)
1990s	1.16 (0.84)	1.17 (0.84)	1.05 (0.86)	1.06 (0.86)
2000s	2.40** (1.01)	2.40** (1.01)	2.27** (1.02)	2.28** (1.02)
IMR	-0.10 (0.58)	-0.06 (0.59)	-0.12 (0.58)	-0.08 (0.59)
Constant	50.19*** (1.63)	50.25*** (1.62)	50.38*** (1.66)	50.41*** (1.65)
Observations	1504	1504	1504	1504
R-squared	0.12	0.12	0.12	0.12
No. of Groups	128	128	128	128
Av. Obs. per Group	11.75	11.75	11.75	11.75

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%
† Reference category: Countries not at War or Post-War.

Table 5: FE Regression Results – The Post-War Impact

Dependent Var.: ***Gini Coefficient (Adjusted)***	(8)	(8a)	(9)	(9a)
	Early and Late Recovery		*Post-Conflict Duration*	
War Incidence † *(Gini covers conflict regions)*	1.94** (0.91)	1.74* (0.99)	1.79** (0.87)	1.56* (0.94)
War Incidence - Indirect *(Conflict regions not covered)*		-0.94 (1.50)		-1.17 (1.48)
Post-Conflict: Early Recovery *(Last War less than 5Years ago)*	2.89*** (1.04)	2.77** (1.08)		
Post-Conflict: Late Recovery *(Last War is 5-10 Years ago)*	1.60* (0.93)	1.53 (0.95)		
Post-Conflict Duration *(Time passed since last War, in Years)*			1.25*** (0.43)	1.21*** (0.44)
Post-Conflict Duration *Squared*			-0.13*** (0.05)	-0.12*** (0.05)
GDP p.c.	-0.30*** (0.05)	-0.29*** (0.05)	-0.30*** (0.05)	-0.29*** (0.05)
Gov. Share of Real GDI	-0.28*** (0.06)	-0.29*** (0.05)	-0.29*** (0.05)	-0.29*** (0.05)
Trade/GDP	-0.03** (0.01)	-0.03** (0.01)	-0.03** (0.01)	-0.03** (0.01)
Interaction: Trade/GDP & Developing Country	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)	0.07*** (0.02)
1970s	-1.32* (0.72)	-1.30* (0.72)	-1.30* (0.72)	-1.29* (0.72)
1980s	-1.89*** (0.73)	-1.88*** (0.73)	-1.86** (0.73)	-1.85** (0.73)
1990s	1.15 (0.84)	1.15 (0.84)	1.18 (0.84)	1.18 (0.84)
2000s	2.42** (1.01)	2.42** (1.01)	2.47** (1.01)	2.47** (1.00)
IMR	-0.10 (0.58)	-0.06 (0.59)	-0.05 (0.58)	-0.01 (0.59)
Constant	50.21*** (1.63)	50.26*** (1.62)	50.26*** (1.62)	50.31*** (1.61)
Observations	1504	1504	1504	1504
R-squared	0.12	0.12	0.12	0.12
No. of Groups	128	128	128	128
Av. Obs. per Group	11.75	11.75	11.75	11.75
Joint Signif. Post-War Variables‡			0.01	0.02

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

† Reference category: Countries not at War or Post-War.

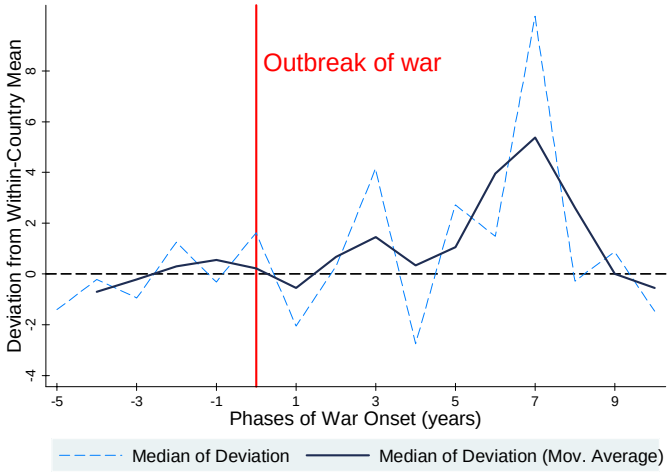
‡ Test of the joint significance of the Post-War Variables. H0: The coefficients are jointly not significantly different from 0.

Table 6: Robustness Tests – Estimated Coefficients of the War Variables

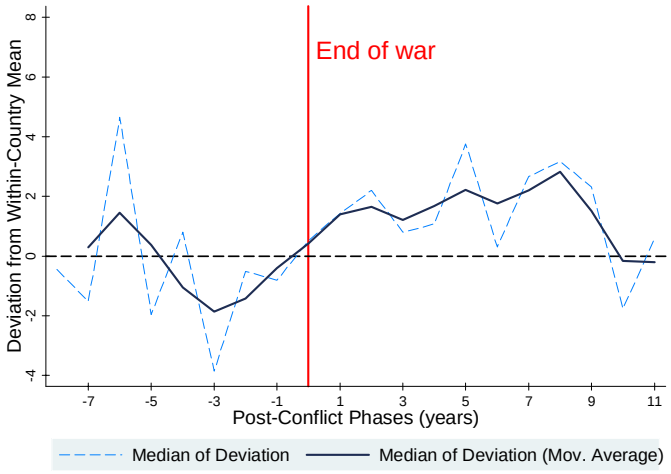
Explanatory Variables	(Base) *Table 4*	(1) *25+ Battle Deaths Threshold*	(2) *OLS*	(3) *M2/GDP & Inflation Included*	(4) *Developing Countries*	(5) *Five Year Averages*
War Incidence (Gini covers conflict regions)	1.63*	0.79	3.29***	1.75	2.59*	0.25
	(0.98)	(0.75)	(0.86)	(1.06)	(1.32)	(1.60)
War Incidence: Short War (War Duration < 5 years)	1.15	0.60	2.29*	1.11	2.97**	1.71
	(1.13)	(0.87)	(1.39)	(1.22)	(1.36)	(1.80)
War Incidence: Long War (War Duration > 5 years)	2.23*	1.04	3.93***	2.58**	1.96	-0.50
	(1.14)	(0.90)	(0.87)	(1.22)	(1.59)	(1.86)
Post-Conflict Incidence (Last War less than 10 yrs. ago)	2.13**	1.25**	2.12**	1.56	1.74	4.07**
	(0.93)	(0.58)	(0.84)	(0.99)	(1.34)	(1.59)
Post-Conflict: Early Recovery *(Last War less than 5Years ago)*	2.77**	1.59**	3.76***	2.05*	2.37	4.26*
	(1.08)	(0.68)	(1.13)	(1.12)	(1.58)	(2.18)
Post-Conflict: Late Recovery *(Last War is 5-10 Years ago)*	1.53	0.83	0.47	1.10	1.34	3.88**
	(0.95)	(0.63)	(1.05)	(1.04)	(1.35)	(1.67)
Post-Conflict Duration *(Time passed since last War, in Years)*	1.21***	0.83***	1.23**	0.96**	1.18**	1.08
	(0.44)	(0.28)	(0.53)	(0.46)	(0.59)	(0.73)
Post-Conflict Duration *Squared*	-0.12***	-0.09***	-0.14**	-0.10**	-0.12**	-0.08
	(0.05)	(0.03)	(0.06)	(0.05)	(0.06)	(0.08)
Observations	1504	1504	1160	1163	514	595

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%
The reported coefficients are drawn from those regressions where we also control for the indirect war impact (i.e. in Table 4, this would refer to regressions 6a and 7a).

Graph 1: Within-Country Variations of Inequality in the War Onset-Period



Graph 2: Within-Country Variations of Inequality in the Post War-Period



APPENDIX

Table A1: Adjustment of Gini Coefficients

Dependent Var.: ***Gini Coefficient)***	(1) **Country FE** *Gini Adjustment*
Disposable Income[◊]	-2.47*** (0.46)
Expenditure / Consumption	-8.42*** (0.94)
1970s	-1.59*** (0.58)
1980s	-3.92*** (0.55)
1990s	-0.01 (0.54)
2000s	1.14** (0.60)
Constant	41.03*** (0.54)
Observations	2010
R-squared	0.16
No. of Groups	151
Av. Obs. per Group	13.3

Robust standard errors in parentheses
[◊] Reference category: Gross Income per Capita
* significant at 10%; ** significant at 5%; *** significant at 1%

Table A2: Availability of Gini Coefficients

Gini Coefficients Available *(Mean estimation, in %)*	**Africa**	**Asia**	**Latin America**	**Former East Bloc**	**Western Europe**	**Pacific**	**Total**
Total Sample	8.8	24.4	34.6	56.0	48.3	29.9	27.8
In Peace Times (A)	9.3	27.1	34.4	56.2	48.7	29.9	29.4
In War Times (B)	6.1	16.5	36.1	52.0	34.3	---	16.9
t-test: A = B (p-Value)	*0.03*	*0.00*	*0.71*	*0.69*	*0.09*	---	*0.00*

Table A3: Conflict and Post-Conflict Periods

Country	**Type of war experienced**			**Gini Observations available from…**	
	Interstate War	*Civil War*	*Internationalized Civil War*	*Conflict*	*Post-C.*
Algeria		1991-		·	
Argentina		1973-77		·	·
Azerbaijan		1993-95	1992-93	·	·
Bosnia		1992-95			·
Burundi		1991-92, 1994-		·	·
Cambodia		1967-98		·	·
Colombia*		1966-		·	
El Salvador*		1979-91		·	·
Ethiopia		1996-	1975-83	·	
France		1961-62		·	·
Georgia*		1991-93		·	·
Guatemala		1965-95		·	·
Hungary		1956			·
India		1961-68, 1978-		·	·
Indonesia*		1965-69, 1975-1992, 1999-		·	·
Iran	1980-88	1966-68		·	·
Iraq			2004-	·	
Korea, South	1949-53				·
Morocco		1980-89	1975-79	·	·
Mozambique		1991-92	1985-1990		·
Nepal		1996-		·	
Nicaragua		1981-89			·
Nigeria		1966-1970		·	·
Pakistan		1971, 1990		·	·
Peru*		1981-99		·	·
Philippines	1969-75	1972-		·	·
Russia		1990-91, 1993-96, 1999-		·	·
Rwanda		1997-2002		·	·
Sierra Leone		1991-1999	2000		·
Somalia		1981-96			·
South Africa		1966-88		·	·
Sri Lanka*		1983-2001		·	·
Sudan*		1963-72		·	
Tajikistan		1992-96, 1998			·
Turkey		1984-		·	·
U.S.A.*			2001-	·	
Uganda*		1981-91, 1994-		·	·
Yemen		1994			·
Yugoslavia (Serbia)		1991	1998-99	·	·

Based on the UCDP/PRIO Armed Conflict Dataset, Version 4-2007. For each (post-)conflict period, at least one Gini observation is available.
* War variable modified, as the Gini coefficient does not cover the conflict area.

Table A4: Definition of Explanatory Variables and Data Sources

Variable	Definition	Source
Gov. Share of Real GDI	Government Share of Real Gross Domestic Income (RGDPL adjusted for Terms of Trade Changes)	Penn World Tables 6.2.
Initial Land Gini (1960)	Gini Index of Land Inequality	World Development Indicators 2006
M2/GDP	Money and Quasi Money (M2) as % of GDP	World Development Indicators 2006
GDP p.c. (in 1000 US$)	Real Gross Domestic Product per Capita	Penn World Tables 6.2.
Trade/GDP	Sum of Exports and Imports of Goods and Services as % of GDP	World Development Indicators 2006

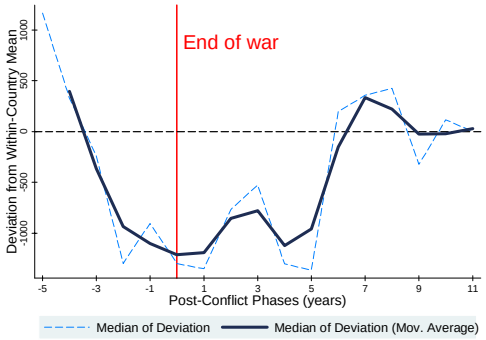
Table A5: Heckman Selection – Probit Regression on the Availability of Gini Coefficients

Dependent Var.: ***Gini Coefficient Available?***	**Probit**
War Affected	-0.41*** (0.07)
GDP p.c.	0.03*** (0.00)
Polity Index	0.04*** (0.00)
Trade/GDP	0.00* (0.00)
Population Size (log)	0.33*** (0.02)
Africa[◊]	-0.46*** (0.09)
Asia	-0.38*** (0.08)
Former East Bloc	0.96*** (0.11)
Latin America	0.25*** (0.07)
Pacific	-0.25** (0.12)
Decade Dummies Included?	*Yes*
Constant	-6.07*** (0.37)
Observations	4872
Pseudo-R2	0.25

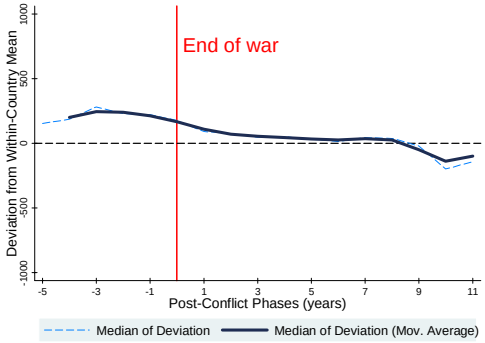
Robust standard errors in parentheses
[◊] Reference category: "Western Europe & Northern America"
* significant at 10%; ** significant at 5%; *** significant at 1%

Graph A1: Potential Drivers of Inequality in the Post-Conflict Period

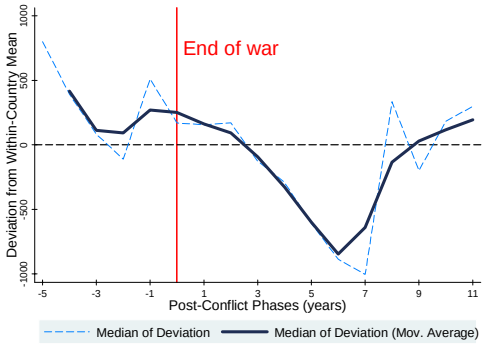
A. TAX REVENUES (current LCU)



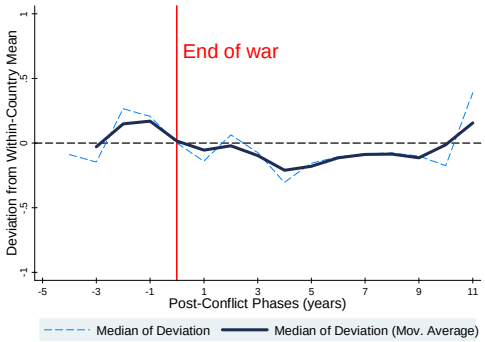
B. MILITARY EXPENDITURE (current LCU)



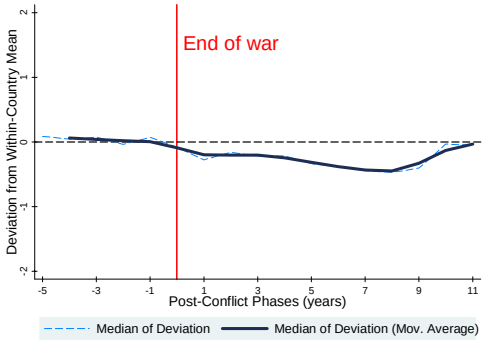
C. SOCIAL CONTRIBUTIONS (current LCU)



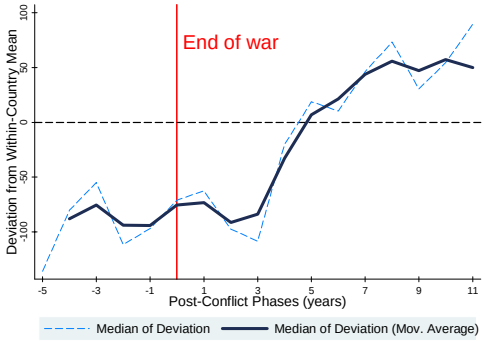
D. PUBLIC SPENDING ON EDUCATION (% GDP)



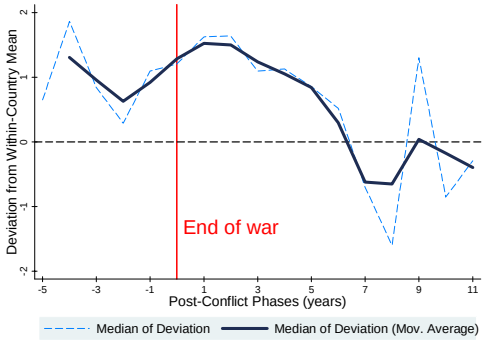
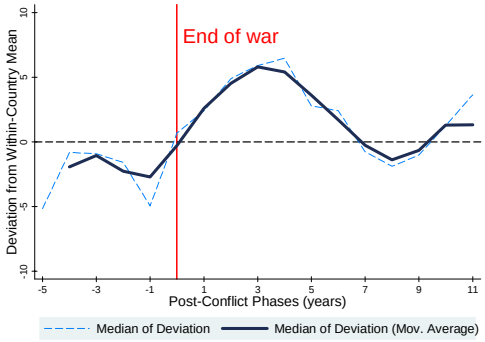
E. LABOR FORCE PARTICIPATION RATE



F. LAND UNDER CEREAL PRODUCTION (1.000 ha)



G. AGE DEPENDENCY RATIO



H. AID PER CAPITA (current US-Dollar)