Violent Conflict and Inequality

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ABSTRACT

This paper analyzes the distributive impacts of violent conflicts. We use cross-country panel data for the time period 1960-2004 to estimate war-related changes in income inequality. Rather than investigating the specific effect of each conflict, this macro approach allows to assess the average distributional effect of violent conflicts. Our results indicate rising levels of inequality during war and especially in the early period of post-war reconstruction. Lagged distributive effects of conflict, for example through the impact of war on human capital formation and public health, as well as subsequent adjustments of redistributive policies in the period of post-war reconstruction seem to be valid explanations for these patterns of inequality in the course of war. A series of alternative specifications confirms the main findings of the analysis.

INTRODUCTION

The devastating impacts of violent conflicts on key economic and social areas such as growth, poverty, physical infrastructure or social services have increasingly been stressed in recent macro- and microeconomic work. The distributional effects of conflict, however, have rarely been analyzed. Previous studies on the conflict-inequality nexus have focused on the role of inequality in promoting violent conflicts, reporting mixed results. While vertical income inequality was not found to increase the risk of war onset (Collier and Hoeffler, 2004a; Fearon and Laitin, 2003), horizontal inequalities, i.e. social and economic disparities between societal groups, seem to be positively related to the outbreak of conflict (Østby, 2008).

Potential effects in the other direction have been neglected so far and are the focus of this paper. Using cross-country panel data from 151 countries for the time period 1960-2004, we investigate the impact of violent conflict on economic inequality, as measured by the Gini index. Given the uniqueness of each conflict and being aware of the drawbacks of macro-level analyses, the objective of this research is not to determine the individual influence of each conflict, but rather to shed light on average distributional effects of war. Results also contribute to the solution of the causality puzzle between conflict and inequality. Several econometric methods, specifications and definitions of war variables are applied for robustness purposes.

We find that inequality increases during the course of violent conflict, and particularly does so in the early post-war period. Our estimates, however, also point to a decrease in inequality in the late recovery stage and hence to a non-permanent effect of violent conflict on the distribution of incomes. Lingering legacies of war and only subsequent redistributive adjustments are possible candidates to explain these inequality patterns during the period of post-conflict transition. The achievement of sustainable peace and the creation of functioning market structures thereby seem to contribute to decreasing income inequality in post-war societies.

The paper is structured as follows. The next section reviews the existing literature on the determinants of inequality. We then turn to the relationship between conflict and inequality and the transmission channels through which conflict may affect inequality.

This is followed by a section on the data we use and the econometric approach we apply. Finally, we present the results from our econometric estimations and conclude.

INEQUALITY AND VIOLENT CONFLICT

Determinants of Inequality

Inequality in general describes distributional disparities and might refer to resources, opportunities or treatments. In line with most economic analyses, we define inequality as inequality of incomes among individuals within a society. The economic literature has identified several determinants of this type of inequality. Generally, inequality does not show much variation within countries even over long periods of time, but it does show significant cross-country variation. This suggests that country-specific and mostly structural, i.e. slowly-changing, factors play a crucial role in determining a country's level of inequality.

Using different data and methodologies, most studies focus on the relationship between income inequality on the one hand and either economic growth or the level of income on the other. Analyses of the direct effect of growth on income distribution have yielded mixed empirical results. 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. Studies that support the Kuznets hypothesis include Milanovic (1994), Barro (2000), and Higgins and Williamson (1999), while the hypothesis is not supported by Atkinson (1997), Li, Squire and Zou (1998), and Deininger and Squire (1996). Deininger and Squire (1998) show that the 'Kuznets curve' found in cross-sectional studies is driven by middle-income countries from Latin America with relatively high levels of inequality.

According to the political economy argument, the rich minority implements inequality enhancing economic policy, either through its economic power or through direct political control (Bertola, 1993). However, more political liberty and higher education levels constrain such policy making (Li et al., 1998). A further channel through which state institutions can impact on the degree of inequality is social choice. Milanovic (1994) finds that the extent of government transfers is shown to be the primary determinant of inequality in Latin America, Asia, and Africa as compared to the OECD countries.

Similarly, Bulir (2001) provides compelling evidence in support of the significant negative impact of fiscal redistribution on the level of inequality.

The capital markets argument builds on the relevance of productive investments for both overall and individual income growth. When access to credit is constrained and dependent on the ownership of collateral assets, the poor are particularly likely to be prevented from investing in physical and human capital (Tsiddon, 1992). Deininger and Squire (1998) reveal the significant impact of the initial inequality of assets – proxied by the distribution of land – on subsequent growth especially in low income countries. Ceteris paribus, a more unequal distribution of assets implies that a greater number of individuals are credit-constrained, resulting, inter alia, in a reduced effectiveness of educational interventions and, in the long run, in intergenerational persistence of income inequalities (Deininger and Olinto, 1998). The magnitude of this effect of asset inequality on investment behavior is at least partly determined by the level of financial development, whereby it is argued that a more developed financial system is better equipped to deal with credit constraints and market imperfections. Beck et al. (2004) show that higher levels of financial intermediation reduces income inequality by disproportionately boosting the income of the poor. Analyzing the political economy argument and the capital markets argument simultaneously, Li et al. (1998) find significant empirical support for both theories.

The role of openness to trade for inequality has been analyzed by several studies. From a theoretical point of view, the distributive effects of openness depend, among other things, on factor endowments. Wage inequality is expected to decrease in countries that are relatively highly endowed in unskilled labor, as relative wages of unskilled labor will rise. Anderson (2005), however, emphasizes that other factors associated with greater openness also impact on wage differentials and, more generally, on other measures of inequality. Empirical evidence is mixed: while Milanovic and Squire (2005) find little evidence for an impact of tariff liberalization on wage inequality in their literature review, Anderson (2005) refers to several single-country time series studies indicating that greater openness has increased the relative demand for skilled labor. Similarly, Barro (2000) reveals a positive relationship between openness to trade and income inequality in his panel analysis.

Barro (2000) also finds significantly higher levels of inequality both in Latin America and in Africa, even when controlling for the other factors mentioned above. The different experience of colonization is often seen as one explanation for the high levels of inequality in these regions (Acemoglu et al., 2000).

Two other possible determinants of inequality need to be mentioned. A high natural resource endowment may be associated with higher income inequality due to higher land concentration, higher capital intensity and declining terms of trade (Leamer et al., 1999). Empirical evidence on how natural resource endowment affects inequality is quite rare, with Gupta et al. (2002) finding adverse distributional effects of natural resource abundance especially in countries with high levels of corruption. Another possible determinant of inequality is the level of inflation. Bulir (2001) argues that high levels of inflation would redistribute incomes in favor of a small minority who are able to protect their wages and savings. He finds that a reduction of very high levels of inflation lowers income inequality while further reductions do not bring about additional gains.

Determinants of Violent Conflict

Two prominent economic models of conflict onset have been developed by Collier and Hoeffler (2004a) and Fearon and Laitin (2003). Both studies view rebellion as the outcome of rational decision-making for rent-seeking constrained by the rebels' financing and recruiting opportunities. We focus on how certain determinants of conflict that are identified by these studies interact with inequality at different stages of civil war.

Civil wars are found to be less likely the higher the level of a country's development, which is commonly proxied by real GDP per capita. As economic growth and per capita income indicate earning opportunities for the possible recruits of a rebel group, they directly affect especially those at the lower levels of the economic ladder. Moreover, sluggish economic growth undermines the existing regime and intensifies existing grievances. Hence, lower per capita income and growth rates not only decrease the opportunity cost of rebellion, but they also amplify the role of distributional concerns and facilitate rebel groups to construct a more credible rhetoric based on inequality.

Collier (2000a) argues that primary commodity exports can proxy for the availability of 'lootable' resources due to the fact that "they are by far the most heavily taxed

component of GDP in developing countries, and the reason for this is that they are the most easily taxed component." Other studies highlight that governance and a fair distribution of resources are more instrumental in explaining conflict than the availability of natural resources per se (Fearon and Laitin, 2003). Rebel groups typically aim to grab a share of the tax receipts from primary commodity exporters and engage in forceful appropriation during times of heightened conflict.

Collier and Hoeffler (2004a) and Sambanis (2004) identify the duration since the most recent conflict and previous war prevalence as significant determinants of conflict. For example, the legacy of weapon stocks, skills, and organizational capacity to start war will gradually depreciate in peace times (Collier and Hoeffler, 2004a). The time since the most recent conflict can also be interpreted as an indicator of the rising strength of the peace process, the adherence of the parties involved in the conflict to peace settlements, and the gradual decline of grievances supported by an environment of peace. We would then expect that the history of a conflict matters as much as the incidence itself.

Distributional Effects of Violent Conflict

Violent conflict is likely to affect income inequality through both war-related changes in the structural determinants of inequality discussed above and 'pure' war effects. The structural determinants of inequality are mostly observable from data and they determine the trend level of income dispersion in a country. The pure war effect captures a country's vulnerability to war, which is not directly measurable in the data but is crucial in determining how the inequality level of a country might react during the course of a conflict. In this section, we first argue how such a pure war effect is created and then discuss in detail which parts of an economy are most affected by war.

Conflict-ridden states face violent war economies, which 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 the evolution of such war economies (Endres, 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 most conflict economies being characterized by pillaging, robbery, and the confiscation of private property, the owners of small-sized production facilities and those with private wealth located in remote areas are likely to be the first and most hit by the conflict.

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). With heightened insecurity and destruction of facilities, certain regions might lose ties with the rest of the economy, causing whole groups of people living in these regions to be disadvantaged. However, 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.

These war economies survive into the post-conflict period where parties involved in the conflict can establish permanent business opportunities and continue to take advantage of the unregulated economic environment. 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). These impacts of the pure war effect will continue to be felt until the legacies of war vanish, at which point the economy makes its transition to its regular market structure.

A civil war essentially creates a disruption in the key element of a market economy: prices. Such a disruption leads to price shocks in the goods that a society produces and consumes, which is influenced by the pattern of trade and translated into returns to labor and capital. That conflict destroys international trade is expected[1], causing domestic prices to be further distorted. However, the differential impact of conflict on the prices of the labor-intensive and capital-intensive goods in the economy determines the effects on wages and returns to capital. An increase in the relative price of capital-intensive goods in terms of the price of labor-intensive goods is expected to increase inequality by

[1] See, for instance, Martin et al (2008) who show that a 25% drop in trade is observed in the first year of the conflict, and trade disruption worsens with time.

depressing wages. Hence, the relative destruction and flight of factors of production as well as changes in relative prices are likely to determine the degree of redistribution in an economy hit by a civil war.

During conflict times, agents involve in dissaving and portfolio substitution as they shift their property out of the country, which exacerbates the effect on the destruction of the capital stock. Sectors that are relatively more capital- and/or transaction-intensive thus seem to contract more in the presence of civil war (Collier, 1999). When physical and human capital become relatively scarce in times of war, owners of unskilled labour are exposed to falling wages and the risk of unemployment. 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), for example, 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, and the poorest households particularly concentrated on the production of core staple food (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 causes greater heterogeneity in the income distribution.

An immediate macroeconomic effect of violent conflicts is on economic growth. Productive forces of the economy are destroyed, transaction costs increase and economic activity is disrupted due to an unsafe business environment and the suppression of civil liberties (Collier, 1999). As civil wars gradually lower the stock of the endogenous factor, they reduce not just the level but also the growth rate of GDP. Collier and Hoeffler (2004b) estimate that each year of civil war reduces the growth rate by around 2.2%.

The destruction of educational infrastructure, the absence of teachers and lower government spending on education often impede the maintenance of schooling during war and result in lower overall educational attainment in the society.[2] Likewise, wars frequently lead to the deterioration of public health, caused by the destruction of health

[2] Decreasing enrolment during conflict has been documented for Rwanda (Lopez and Wodon, 2005), Uganda (Deininger, 2003) and Tajikistan (Shemjakina, 2006).

infrastructure, the loss of skilled medical personnel and reductions in government health spending (Iqbal, 2006). Narrowed opportunities for schooling combined with increased incidence of disease particularly among already vulnerable groups often lead to an immediate rise in human capital inequality, which is likely to be amplified the longer and more intense a conflict is. We expect that these changes in the composition of human capital across individuals would affect income distribution even after a war is over.

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). This creates a higher dependency ratio in households, exacerbated by the deteriorating health conditions and the forced drive into subsistence activities in times of conflict, which will leave these households with fewer income-earning opportunities. De Walque (2006), for example, 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.

Violent conflict is also expected to have a negative impact on social spending and civil liberties, which have been found to be important determinants of inequality. Isham et al. (1996) show that the suppression of civil liberties tends to reduce the efficiency of public expenditure. Hence, any redistributive policies targeted at improving income distribution within the society might be hindered by a domineering political system. Moreover, the government's ability to engage in public investment and raise revenue for redistribution is limited in war-affected societies through reasons such as a sluggish economy, adverse investment environment, and the hardships associated with collecting taxes and protecting state property. A directly related observation is that military spending rises significantly during a violent conflict. According to Collier and Hoeffler (2002), this rise is around 1.8 % of GDP, and is likely to cut into the social spending of governments and interfere with redistributive policies in a negative way.

To summarize, we expect rising levels of income inequality during the course of a conflict, with the individual redistributive effects of war being dependent on conflict- and

country-specific circumstances. The extent to which a civil war affects income distribution in a country also seems to be influenced by the duration of war. The number of individuals and regions affected by violent conflict is likely to increase as the war gets longer. Moreover, 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-war period thus depends greatly on the legacies of war. In general, the average level of GDP is significantly lower after a civil war compared with the pre-war period, and this loss is significant even if the war is brief, and it increases gradually with the war's duration (Chen et al., 2007). A long-lasting peace following the end of a conflict then creates room for economic recovery and sustained growth, as predicted by neoclassical growth theory. Collier (1999) finds that the economy recovers rapidly after long violent conflicts, whereas it continues to decline after short ones. He thus concludes that whether there is a peace dividend or not is contingent upon the duration of war. Chen et al. (2007), however, show that in the post-war period, both GDP per capita and the growth rate of GDP have a positive trend whose slope is diminished with the duration of war.

Peace time can have a negative effect on inequality as governments may try to enact more distributive policies and invest in underdeveloped regions where economic activity starts to pick up following the end of a conflict. 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 even when some form of peace agreement has been reached. The risk of conflict relapse is especially high within five years of the end of a previous conflict (Chalmers, 2005), and governments tend to maintain a much higher level of military spending in the first decade following a ceasefire (Collier and Hoeffler, 2006). Hence, the ruling government in a post-war country may not have the political incentive or the budgetary allowance to engage in redistribution.

We 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. Outside interventions, e.g. UN peace operations, contribute to the post-conflict democratization process and the containment of violence (Doyle and Sambanis, 2000), though this is often a process that 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.

DATA AND ECONOMETRIC APPROACH

Data

Our data include annual observations from 128 countries for the period 1960-2004. We do not restrict our sample to a subset of (developing) countries, but include all nations for which data is available. The time period is chosen for two reasons: as mentioned before, the nature of violent conflicts has changed dramatically 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 that most relevant variables are 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 often used five year averages, we also present results obtained from this type of data for comparison and robustness.

Data on inequality are taken from the UNU-WIDER World Income Inequality Database (WIID) version 2.0b (WIID, 2007). Based on the Deininger-Squire data (Deininger and Squire, 1996), the Luxembourg Income Study (LIS, 2007), the TransMonee Project (TransMonee, 1999) and several other sources, WIID2 provides around 5,000 Gini coefficients[3] for a total of 156 countries in the period 1867-2005. Since these 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

[3] The Gini coefficient is a widely used concept to measure the inequality of an income distribution. The value of the Gini index ranges between 0 and 100, where a value of 0 corresponds to perfect equality and a value of 100 corresponds to perfect inequality.

observation is assigned a quality rating ranging from 1 to 4,[4] 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 quite unreliable, are excluded from our analysis.

When multiple estimates were available for a particular country in a particular year, we retained (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 fulfilled these criteria, we derived the median from the remaining observations. To ensure comparability, we followed the standard approach in the literature and applied 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 1. 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 2 shows the availability of Gini coefficients for different regions and further distinguishes between countries at war and those not at war. We see the obvious pattern that data on income inequality is particularly difficult to obtain from war-affected countries. Moreover, the percentage of countries for which the Gini coefficient is available even during peace times show disparities across continents. Since these observations imply that there might be multiple factors affecting the availability of Gini coefficients, we account for sample selection in our econometric framework to avoid possible biases in the results.

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

Data on conflict come from the 1946-2006 UCDP/PRIO Armed Conflict Dataset Codebook Version 4-2007[5] (Gleditsch et al, 2002). This dataset contains annual observations of all members of the international system, as defined by Gleditsch and Ward (1999), between 1946 and 2006. UCDP defines conflict as: "a contested incompatibility that concerns the government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least twenty-five battle-related deaths." For the purposes of this study, we focus our attention to civil wars, which require that 1,000+ battle deaths in at least one year during the course of the conflict are observed.[6] 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 a total of five years in the total course of the conflict, and a long war is understood to have lasted more than a total of 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. This variable is defined so as to capture the impact of the civil war on income inequality during the post-conflict phase, which might observe a period of sustained peace or a relapse back into conflict. Lastly, we define the variable "post-conflict duration," which measures the time passed since the last war incidence in terms of years.

As civil wars are not necessarily spread throughout the whole country, but might be confined to a few regions, we compare the area coverage of the Gini estimate to the regions affected by conflict for each war observation. Whenever the underlying survey of the Gini coefficient did not cover the regions affected by violent conflict, we recoded the war incidence variable to 0 and classified this country year observation as "being indirectly affected by war". In cases where the area coverage of the Gini estimate was not

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[5] 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/

[6] 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.

clear, we left the war incidence variable unchanged. In doing so, we recoded twenty-two out of 140 war observations to finally obtain our modified war incidence variable.[7] Table A1 in the Appendix lists all the conflicts for which war observations on inequality are available, Table A2 all the conflicts for which post-war observations on inequality are available.

We further use a set of control variables that has been compiled from the World Development Indicators and the Penn World Tables. Table 3 provides summary statistics of the explanatory variables included in the analysis; Table A3 in the appendix defines the variables and gives the data sources.

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:

$$Y_{it} = W_{it}\alpha + X_{it}\beta + \varepsilon_{it} \qquad (1)$$

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 for various reasons (Greene, 2007). First, 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 fixed effects models. The introduction of country-fixed effects allows us to capture a substantial

[7] 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.

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, to which we wish to compare our results, and to highlight the difference between OLS estimates and fixed effects estimation.

Second, while OLS estimation requires exogeneity of the regressors to yield unbiased results, the measures of war W might be suspected to be endogenous in this framework, i.e. $E(W'\varepsilon)\neq 0$. There are two possible reasons: on the one hand, if unobserved factors exist that jointly determine inequality and war, an omitted variable bias occurs. This problem can be resolved by fixed effects estimation, since the fixed effects estimator deals with endogeneity problems that can be traced to unobservable time-invariant country-fixed effects. On the other hand, 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 unfavourable 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, 2004a; Fearon and Laitin, 2003). Sambanis (2005) notes that the reason that inequality is dismissed as nonsignificant in most quantitative analyses of war can be attributed to the construction of the Ginis 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. For robustness

purposes, we replicate three prominent empirical studies on the determinants of violent conflict with our enlarged dataset to analyze whether the Gini coefficient is a predictor of violent conflict.[8] We fail to find strong evidence in favor of an impact of income inequality on either war onset or war incidence. An additional concern is whether there might be some reverse causality from inequality to war duration. Collier et al (2001) find that the duration of a civil war is affected by high inequality. Under our presumption that there might also be a causal link from war duration to inequality, we run a set of 3SLS regressions where we simultaneously estimate the determinants of war duration and inequality. While civil war duration significantly affects the level of inequality, inequality does not appear to predict war duration.[9]

Finally, given the relatively sparse availability of Gini coefficients, a problem of sample selection arises if the observability of Gini coefficients is non-random and dependent on factors that affect the degree of inequality itself, as for example the income level or 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 (Heckit), which requires the calculation of an inverse Mills ratio from a pooled Probit regression and the inclusion of the inverse Mills ratio (IMR)[10] in the primary equation of interest. We implement this methodology when we estimate equation (1) with OLS.

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[8] The studies that are replicated are Fearon and Laitin (2003), Collier and Hoeffler (2004), and Sambanis (2004). We use yearly data to replicate the Fearon and Laitin (2003) and Sambanis (2004) studies, but 5-yearly averaged data to replicate the Collier and Hoeffler (2004) study to remain loyal to the original methodology employed by the authors. Results are available upon request.

[9] To test a possible two-way interaction between war onset or incidence and inequality, we also run a set of 3SLS regressions with our war onset and incidence variables in addition to the war duration variable. We do not report our results from 3SLS estimation here – results are available upon request.

[10] 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.

In the context of panel data, the fixed effects estimator is consistent if the selection bias operates purely through the individual effects,[11] 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 to correct for selection bias in fixed effects 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:

$$Y_{it}^{*} = W_{it}\alpha + X_{it}\beta + \mu_i + \xi_t + e_{it} \quad (2)$$

$$d_{it}^{*} = z_{it}\gamma + \delta_i + \psi_t + \nu_{it} \quad (3)$$

$$d_{it} = 1 \text{ if } d_{it}^{*} > 0 \quad (4)$$

$$Y_{it} = Y_{it}^{*} * d_{it} \quad (5)$$

where Y_{it}, W_{it}, and X_{it} are defined as above, z_{it} is a matrix of covariates that determine the selection of the Ginis, and the Ginis in the primary equation of interest, (2), are observed only for the observations that satisfy the selection rule given in (3) (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 we 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 we use to estimate:

$$Y_{it} = \zeta + W_{it}\alpha + X_{it}\beta + \rho\lambda_{it} + \eta_{it} \quad (6)$$

by fixed effects over the sample for which the Ginis are observed.

We start by building our model on the variables used by Li et al. (1998) and Barro (2000) as a 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

[11] For other forms of selection bias which are eliminated by fixed effects estimators, see Verbeek and Nijman (1992a, b).

selection bias, we turn to the impact of war on inequality. We provide both OLS and fixed effects estimation results to study how violent conflict has affected income inequality.

RESULTS

Table 3 provides summary statistics for the variables included in the analysis. Focusing on the characteristics of violent conflicts, we observe that the duration of a typical violent conflict has been increasing steadily since 1960, while its intensity has decreased over the same period. Conflicts in the Cold War period were, on average, remarkably shorter (6.3 years) than conflicts after 1990 (11.7 years).[12] However, the number of annual battle deaths in violent conflicts has decreased by half from around 6,000 in the earlier period to around 3,000 since the end of the Cold war. We have thus been witnessing longer but less fatal wars in the last two decades.

Descriptive statistics also point to a change in the course of inequality during war over the last decades. Table 4 presents the means of Gini coefficients in different phases of war. 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. 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.

Dividing the sample into Cold War and Post-Cold War observations suggests different post-war pattern of inequality over time. While after 1990 average post-war inequality has remained high and has even increased in the late recovery phase, we observe a return of the average Gini coefficient to pre-war levels in late post-war countries during the Cold War. When looking at differences between short wars and wars that have lasted

[12] This is despite the facts that the time span of observations on civil wars is much shorter in the post-1990 period and that this time span includes currently ongoing conflicts. We thus even tend to underestimate the average length of violent conflicts since 1990.

longer than five years, we find larger average increases in inequality during war and early post-war times in short wars. 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.

As to control for such country characteristics and to disentangle the effects of war from other factors that determine inequality, we turn to the multivariate analysis and start with a simple OLS framework. Table 5 presents our base model. 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. We do not include variables on schooling and financial development. Li et al. (1998) use the initial mean years of secondary schooling in 1960 for their sample of 49 countries. Large-scale, comparable national data on education especially for developing countries though is available only from 1990 onwards. As initial schooling and per capita GDP are highly correlated (correlation: 0.55), we believe that the effect of schooling is largely captured by our measure of per capita income. Moreover, the time-invariant impact of initial schooling would finally be absorbed by FE estimation. Financial development is excluded as again data especially from developing countries and especially from the 1960s is relatively scarce. The proxy we use, the ratio of M2 over GDP, is far from being significant in most of our regressions and the exclusion increases our sample in a notable way. However, rerunning our models for the purpose of robustness with M2/GDP included does not alter our main findings.[13]

Column 1 in Table 5 presents the results of our first regression. The coefficients in the first regression show the expected signs and are in line with the findings in the literature. While initial land Gini 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. In the second regression, we augment the replication

[13] Regressions including M2/GDP are not reported. Results available upon request.

regression by adding decade dummies to control for global trends in inequality over time. Results point to increasing income inequalities in the last two decades and suggest the role for globalization and technical change in shaping inequality. We finally include in the third regression the IMR derived from a probit regression on the availability of Gini coefficients (not reported) to correct for sample selection bias. The main findings are unaffected. Based on regression (3), we now introduce different sets of war variables to assess the impact of violent conflict on income inequality.

Regression results from pooled OLS are presented in Table 6. The coefficients of the control variables are significant, show the expected signs and give values of reasonable magnitude. While initial land Gini and trade openness have positive coefficients (i.e. increasing the level of the Gini) significant at the 10% level, GDP per capita and the government's share of real GDI have negative coefficients that are highly significant. The reference category in all war regressions is "countries not at war and not in the post-war period". In regression (4), we start with dummy variables for being either at war or in the post-war decade. In regression (4a), we also control for those observations where the civil war was fought only in certain regions of the country but where the Gini estimate was derived from regions not directly affected by violence. This variable might be interpreted 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 highly significant inequality-increasing effect. War incidence raises the Gini coefficient by an estimated 3.4 points, while at the same time being in the post-war recovery stage raises the Gini coefficient by 2.7 points. We find that inequality also increases in those areas which were not directly affected by the conflict throughout all our OLS regressions. The 'indirect impact' of war is estimated to be around 3 points, but statistically significant only at the 10% level.

In regression (5), we split the war incidence dummy variable into short war and long war incidence to assess the impact of war duration. We include two interaction terms 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 war that lasts more than a total of five years has an estimated impact of increasing the Gini coefficient by 4.4 points. In contrast, a war that is short does not have a significant effect on income distribution.

Regressions (6) and (7) focus more on the evolution of inequality in the post-war period. We split the post-war dummy into early and late recovery observations and include them in the regression along with the war incidence variable. We find that inequality is predicted to be particularly high in the first five post-conflict years (regression 6), while it is no longer significantly different from inequality in countries not affected by war in the late recovery stage. This result is confirmed by regression (7), where the post-war dummies are replaced by the continuous post-conflict duration variable and its square term. Columns (7) and (7a) of Table 6 suggest that there is an inverted-U relationship between post-conflict duration and the Gini coefficient. Both the level and the squared term for post-conflict duration enter the regression highly significantly, with a positive and a negative coefficient, respectively. The post-war rise in inequality is estimated to peak 4.6 years after the war has ended.

These results from pooled OLS should, however, be interpreted with caution. Given the crucial role that structural and mostly unobserved factors play in determining the level of inequality in a given country, controlling only for continent fixed effects might not be sufficient and the estimated coefficients are susceptible to omitted variable bias. In addition, OLS has the potential to overestimate the coefficients on war variables if it is already highly unequal countries that experience most of the violent conflicts. This might be the case especially with some Latin American and African countries which experienced sustained periods of violent conflict. Moreover, we are primarily interested in how the incidence of a violent conflict will redistribute income *within* a conflict-ridden country, which calls for studying the within-country variation of the variable of interest. We therefore run the same regressions again using the FE method. We apply the correction method suggested by Wooldridge (1995) to correct for sample selection bias in the panel data context, including the IMR to our baseline regression from *T*-period probit estimates. Table 7 provides the results.

All time-invariant explanatory variables drop out in the FE framework, the remaining control variables show the expected signs, and most of them are still statistically significant. Compared to pooled OLS, FE estimates of the war coefficients are all smaller in magnitude, though still significant, indicating that the OLS war estimates have absorbed some of the time-invariant, unobserved country characteristics. This also

confirms our suspicion that countries that mainly experience violent conflicts might be those with traditionally unfavorable income distributions. War incidence is estimated to increase within-country inequality by 1.8 Gini points, and post-conflict incidence is estimated to increase inequality by 2.5 Gini points (regression (8), Table 7). In contrast to the OLS estimates, the FE estimates indicate that post-conflict incidence is more instrumental in affecting inequality than the current war incidence. Being indirectly affected by war has now a slightly negative, though insignificant, impact on inequality. This suggests that controlling for unobserved country-specific characteristics, violent conflicts affect the income distribution of a country primarily through their impact on the regions where the conflict takes place. Controlling for the Gini coverage of the war observations in regression (8a), we find that countries at war experience an estimated increase in the Gini coefficient of around 1.5 points, while this effect is larger in magnitude and highly significant for post-war countries (around 2.4 points).

Regressions (9) and (9a) report the results for the effect of war duration on inequality under the FE framework. While the estimated coefficient on post-conflict incidence is similar in size to the OLS estimate, the estimated coefficient on the interaction term between war incidence and long war is smaller in size, though still significantly positive. We see a similar decrease in the size of the coefficients while retaining significance also for regressions (10) and (11) where we look at the post-conflict period. Different from the OLS setup, however, is that the post conflict late recovery variable is now statistically significant and positive, which suggests that the adverse effects of a violent conflict may continue to be realized even after five years of relative peace (regressions (10) and (10a)). According to the coefficient estimates on the duration of the post-conflict period from regression (11), inequality is highest five years after the end of the conflict, with an estimated increase in the Gini of around 3.3 points.

There are different possible explanations for why the estimated impact of war on inequality is highest in the early post-war period. On the one hand, the reason for finding a relatively lower impact during war might lie in the data. It is a challenging task to collect data in conflict regions and as we do not know for all of Gini observations from war-torn countries whether the regions affected are represented in the data, we might underestimate the impact of being at war on inequality. On the other hand, inequality is

quite persistent and changes only slowly over time. War related impacts on inequality might thus become fully apparent only in the post-war period. Some individuals, groups or regions might benefit more than others especially in the early process of post-war economic reconstruction. This will be the case especially for those conflicts which were motivated by redistributive concerns among rent-seeking political and/or ethnic groups. Additionally, the effects of the destruction of physical capital and property, including government facilities such as hospitals and schools, are likely to be realized on a more pronounced level in the medium term. A violent conflict's impact on the human capital inequality of the country and the composition of the population by gender and age will be felt even in the longer term. Hence, as wars get longer and more destructive, we might expect to see that inequality keeps rising in the late recovery period as well.

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 over a long period of time and depending on the probability of reverting back to war. Given the often remaining high levels of insecurity after a ceasefire has been signed, a cut-back in military spending in favor of social spending can often be observed only at later stages of reconstruction. In addition, international aid is likely to reach urban areas first, with badly accessible, rural areas being excluded initially.

In order to test the robustness of these results, we apply a series of alternative specifications.[14] First, we add further control variables to our basic model. The inclusion of both M2/GDP as a proxy for financial development and of inflation has no major impact on the size and significance of our war coefficients, although the sample size drops remarkably by more than 300 observations due to missing data. Second, we use the 25+ battle deaths threshold war variable to test whether our results are sensitive to different definitions of violent conflict. With this definition, those periods of violence which are not classically defined as civil war are also included to our war variables. While there is high correlation between the observations drawn from the threshold levels of 1000+ battle deaths and the 25+ battle deaths definitions of violent conflict (around 0.85), the latter variable indicates lower intensity types of conflict which were not necessarily fought over long years. Using this alternative definition, we find that the

[14] Results from all these regressions are not shown, but available from the authors upon request.

significant impact of being at war on inequality basically diminishes, while post-war increases in inequality are maintained. This finding seems to be rather intuitive, as we would expect the redistributive impact of war to be dependent on its intensity. Finally, we also introduce five year averages instead of annual data to our analysis. Our major 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 when we use five year averages. This finding suggests that the incidence of civil war does not have a significant permanent effect on inequality but it leads to a temporary worsening of the income distribution in the post-conflict period. As the five-yearly data observations indicate an incidence of civil war for the whole five-year episode even if the conflict starts in the later stage of that episode, the change in inequality does not anticipate the incidence of conflict. This reveals that the causal direction is stronger from conflict to inequality than vice versa.

CONCLUSION

The determinants of violent conflict and income inequality have been studied thoroughly in theoretical and empirical contexts and investigated both by cross-country analyses and by individual case studies. There is also a growing literature on the economic and social effects of violent conflicts with the focus being on policy practice in the post-conflict environment and on individual country analyses. In this paper, we bring together two literatures that have not been studied in the same context before in a cross-country setting. Using OLS and FE estimation and implementing several robustness checks, we find that violent conflicts increase income inequality as measured by the Gini coefficient. Our estimates indicate that income inequality is around 1.7 Gini points higher in countries at war compared to countries not affected by violent conflict. More strikingly, the redistributive effect of a violent conflict is magnified at the post-conflict stage, where countries at this stage see their Gini coefficient 2.7 points higher on average than countries that experience no war or countries that have not had a war in the last ten years. We find that inequality is highest five years after the end of a conflict, at which point it starts diminishing gradually from its peak point if peace is sustained.

War-related changes to the national income distribution thus seem not to be permanent, but of temporary nature. While the disruption of the economy, the breakdown of markets,

the destruction of social facilities, and cutbacks in social redistribution during violent conflict may all contribute to rising levels of inequality, we would expect a similar decrease in inequality once the legacies of war vanish. The rebuilding of security and infrastructure, the revival of business activities and a strengthening of distributive politics seem to be the crucial drivers of this process. Post-conflict recovery efforts should foster these developments especially by applying regionally disaggregated policies that account for spatial disparities.

We argue here that there might be a menu of factors for the lagged effect of conflict on the income distribution of a country. These factors and the time it takes for their effects to be realized are likely to depend on country- and conflict-specific properties. Further research based on case-study methodology or on the type of conflict can thus help to explain the most important avenues through which violent conflicts and inequality interact with each other following a cease-fire. As both the conflict and the inequality literatures are surprisingly weak on measures of 'horizontal' inequality and inter-regional comparisons, we have a lot to benefit from studies that are able to differentiate between regional disparities in income and the occurrence of violence.

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Table 1: Adjustment of Gini Coefficients

Dependent Var.: Gini Coefficient (WIID2)	**(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 2: Availability of Gini Coefficients

Gini Coefficients Available (in %)…	*Africa*	*Asia*	*Latin America*	*Former East Bloc*	*Western Europe*	*Pacific*	*Total*
In War Times	*6.0*	*16.0*	*35.8*	*51.9*	*32.4*	*---*	*16.5*
In Peace Times	*9.1*	*26.3*	*32.6*	*55.7*	*47.9*	*29.2*	*28.7*
Total	*8.6*	*23.6*	*33.8*	*54.7*	*47.2*	*29.2*	*27.2*

Table 3: 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	82.31
	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	322.23
	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	322.23
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	322.23
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	48.03
	Gov. Share of Real GDI	6077	22.01	10.62	2.07	93.72
	Initial Land Gini (1960)	4655	64.26	16.81	29.04	96.41
	M2/GDP	5157	55.17	426.68	.05	18,798.8
	GDP p.c. (in 1000 US$)	6149	4.891	6.541	0.061	54.286
	Trade/GDP	5991	69.78	41.10	1.53	473.51
	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 4: Distribution of Gini Coefficients in Different Phases of War

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)

Gini (adjusted)	**Before 1990**		**Since 1990**	
	Obs.	Mean (S.E.)	Obs.	Mean (S.E.)
No War *(War is >5 years away)*	789	39.17 (0.42)	814	40.75 (0.41)
Pre-War *(5 years)*	47	42.69 (1.71)	24	41.71 (1.53)
At War	63	47.41 (1.02)	53	46.28 (1.03)
Early Post-War *(5 years)*	23	45.63 (1.52)	41	47.77 (1.38)
Late Post-War *(5-10 years)*	23	38.64 (1.33)	28	47.49 (1.75)

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 5: Determinants of Inequality – OLS Regression Results

Dependent Var.: *Gini Coefficient (Adjusted)*	(1)	(2)	(3)
	OLS		
	Base Case	**Decade Dummies**	**IMR**
Initial Land Gini	0.03*	0.03	0.04**
	(0.02)	(0.02)	(0.02)
GDP p.c.	-0.29***	-0.47***	-0.52***
	(0.04)	(0.05)	(0.06)
Gov. Share of GDI	-0.05	-0.05	-0.06
	(0.04)	(0.04)	(0.04)
Trade/GDP	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)
Africa[◊]	16.18***	13.64***	12.99***
	(1.22)	(1.31)	(1.52)
Asia	2.87***	1.51*	1.17
	(0.77)	(0.78)	(0.78)
Former East Bloc	-4.17***	-6.59***	-7.14***
	(1.36)	(1.23)	(1.30)
Latin America	13.08***	11.07***	10.66***
	(0.70)	(0.77)	(0.81)
Pacific	3.10***	3.32***	3.07**
	(1.13)	(1.10)	(1.20)
1970s		-0.89	-0.57
		(0.94)	(0.95)
1980s		-2.09**	-1.69*
		(0.92)	(0.93)
1990s		2.78***	3.15***
		(0.98)	(1.04)
2000s		4.67***	5.10***
		(1.12)	(1.18)
IMR			-0.03
			(1.02)
Constant	37.42***	39.52***	39.22***
	(1.52)	(1.53)	(1.92)
Observations	1189	1189	1160
R-squared	0.57	0.60	0.61

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

Table 6: OLS Regression Results for Different War Variables

Dependent Var.: *Gini Coefficient (Adjusted)*	(4)	(4a)	(5)	(5a)	*Dependent Var.:* *Gini Coefficient (Adjusted)*	(6)	(6a)	(7)	(7a)
	War Effects		**War Duration**			**Early and Late Recovery**		**Post-Conflict Duration**	
War Incidence [†] *(Gini covers conflict regions)*	3.44*** (0.87)	3.56*** (0.87)			War Incidence [†] *(Gini covers conflict regions)*	3.55*** (0.85)	3.69*** (0.85)	3.49*** (0.86)	3.62*** (0.86)
War Incidence - Indirect *(Conflict regions not covered)*		3.23* (1.87)		3.22* (1.86)	War Incidence - Indirect *(Conflict regions not covered)*		3.46* (1.84)		3.39* (1.85)
Post-Conflict Incidence *(Last War is less than 10 yrs. ago)*	2.66*** (0.88)	2.60*** (0.86)	2.84*** (0.87)	2.78*** (0.86)	Post-Conflict: Early Recovery *(Last War is less than 5Years ago)*	4.25*** (1.19)	4.27*** (1.17)		
War Incidence: Short War *(War Duration < 5 years)*			2.32 (1.42)	2.45* (1.42)	Post-Conflict: Late Recovery *(Last War is 5-10 Years ago)*	1.07 (1.08)	0.92 (1.08)		
War Incidence: Long War *(War Duration > 5 years)*			4.36*** (0.89)	4.47*** (0.90)	Post-Conflict Duration *(Time passed since the last War, in Years)*			1.53*** (0.55)	1.54*** (0.55)
					Post-Conflict Duration *Squared*			-0.16** (0.07)	-0.17** (0.07)
Initial Land Gini	0.04* (0.02)	0.03* (0.02)	0.04* (0.02)	0.03* (0.02)	Initial Land Gini	0.04* (0.02)	0.03* (0.02)	0.04** (0.02)	0.03* (0.02)
GDP p.c.	-0.49*** (0.06)	-0.50*** (0.06)	-0.48*** (0.06)	-0.49*** (0.06)	GDP p.c.	-0.50*** (0.06)	-0.51*** (0.05)	-0.50*** (0.06)	-0.51*** (0.06)
Gov. Share of Real GDI	-0.08** (0.04)	-0.08* (0.04)	-0.09** (0.04)	-0.08** (0.04)	Gov. Share of Real GDI	-0.09** (0.04)	-0.08** (0.04)	-0.08* (0.04)	-0.08* (0.04)
Trade/GDP	0.01* (0.01)	0.01** (0.01)	0.01* (0.01)	0.02** (0.01)	Trade/GDP	0.01* (0.01)	0.02** (0.01)	0.01 (0.01)	0.01* (0.01)
Africa[◊]	13.90*** (1.55)	14.00*** (1.56)	14.10*** (1.55)	14.20*** (1.55)	Africa[◊]	13.96*** (1.55)	14.07*** (1.55)	13.93*** (1.55)	14.03*** (1.55)
Asia	0.29 (0.80)	0.21 (0.80)	0.31 (0.80)	0.24 (0.80)	Asia	0.31 (0.79)	0.23 (0.79)	0.46 (0.79)	0.39 (0.79)
Former East Bloc	-7.66*** (1.12)	-7.75*** (1.11)	-7.42*** (1.14)	-7.51*** (1.13)	Former East Bloc	-7.75*** (1.11)	-7.85*** (1.10)	-7.57*** (1.15)	-7.66*** (1.14)
Latin America	10.94*** (0.82)	10.90*** (0.82)	11.05*** (0.82)	11.01*** (0.81)	Latin America	10.93*** (0.82)	10.89*** (0.82)	10.91*** (0.82)	10.87*** (0.82)
Pacific	3.63*** (1.21)	3.82*** (1.21)	3.68*** (1.21)	3.87*** (1.21)	Pacific	3.68*** (1.21)	3.88*** (1.21)	3.59*** (1.21)	3.80*** (1.21)
1970s	-0.95 (0.95)	-0.98 (0.96)	-1.02 (0.96)	-1.05 (0.96)	1970s	-0.96 (0.95)	-1.00 (0.95)	-0.92 (0.95)	-0.96 (0.95)
1980s	-2.27** (0.92)	-2.30** (0.92)	-2.50*** (0.94)	-2.53*** (0.95)	1980s	-2.22** (0.92)	-2.25** (0.92)	-2.21** (0.92)	-2.24** (0.92)
1990s	2.10** (1.04)	2.05** (1.04)	1.85* (1.06)	1.80* (1.06)	1990s	2.06** (1.04)	2.00* (1.04)	2.13** (1.04)	2.07** (1.04)
2000s	3.72*** (1.16)	3.71*** (1.16)	3.43*** (1.20)	3.42*** (1.20)	2000s	3.75*** (1.16)	3.74*** (1.16)	3.92*** (1.15)	3.91*** (1.15)
IMR	-0.66 (1.03)	-0.91 (1.05)	-0.72 (1.03)	-0.97 (1.04)	IMR	-0.71 (1.03)	-0.98 (1.04)	-0.64 (1.03)	-0.90 (1.05)
Constant	39.95*** (1.93)	40.29*** (1.93)	40.07*** (1.93)	40.40*** (1.93)	Constant	40.09*** (1.92)	40.46*** (1.92)	39.89*** (1.92)	40.26*** (1.93)
Observations	1160	1160	1160	1160	Observations	1160	1160	1160	1160
R-squared	0.62	0.62	0.62	0.62	R-squared	0.62	0.63	0.62	0.62
					Joint Significance Post-War Variables[‡]				0.01

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

[†] Reference category: Countries not at War or Post-War. / [◊] Reference category: "Western Europe & Northern America"

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

Table 7: FE Regression Results for Different War Variables

Dependent Var.: *Gini Coefficient (Adjusted)*	(8)	(8a)	(9)	(9a)
	War Effects		**War Duration**	
War Incidence †	1.82**	1.64*		
(Gini covers conflict regions)	(0.90)	(0.98)		
War Incidence - Indirect		-0.86		-0.71
(Conflict regions not covered)		(1.50)		(1.49)
Post-Conflict Incidence	2.52***	2.44***	2.61***	2.54***
(Last War is less than 10 yrs. ago)	(0.90)	(0.94)	(0.91)	(0.94)
War Incidence: Short War			1.21	1.09
(War Duration < 5 years)			(1.06)	(1.11)
War Incidence: Long War			2.51**	2.33**
(War Duration > 5 years)			(1.05)	(1.14)
GDP p.c.	-0.34***	-0.34***	-0.33***	-0.33***
	(0.05)	(0.05)	(0.05)	(0.05)
Gov. Share of Real GDI	-0.25***	-0.25***	-0.26***	-0.26***
	(0.06)	(0.06)	(0.06)	(0.06)
Trade/GDP	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
1970s	-1.34*	-1.33*	-1.34*	-1.33*
	(0.72)	(0.72)	(0.72)	(0.72)
1980s	-1.89***	-1.88**	-2.02***	-2.00***
	(0.73)	(0.73)	(0.75)	(0.75)
1990s	1.41*	1.42*	1.29	1.30
	(0.84)	(0.84)	(0.86)	(0.86)
2000s	2.73***	2.74***	2.59**	2.60**
	(1.01)	(1.01)	(1.02)	(1.02)
IMR	0.04	0.08	0.02	0.05
	(0.59)	(0.59)	(0.59)	(0.59)
Constant	49.06***	49.10***	49.27***	49.30***
	(1.70)	(1.70)	(1.73)	(1.73)
Observations	1505	1505	1505	1505
R-squared	0.11	0.11	0.11	0.11
No. of Groups	128	128	128	128
Av. Obs. per Group	11.76	11.76	11.76	11.76

Dependent Var.: *Gini Coefficient (Adjusted)*	(10)	(10a)	(11)	(11a)
	Early and Late Recovery		**Post-Conflict Duration**	
War Incidence †	1.91**	1.75*	1.73**	1.53*
(Gini covers conflict regions)	(0.90)	(0.98)	(0.86)	(0.93)
War Incidence - Indirect		-0.74		-0.99
(Conflict regions not covered)		(1.49)		(1.48)
Post-Conflict: Early Recovery	3.16***	3.07***		
(Last War is less than 5Years ago)	(1.06)	(1.10)		
Post-Conflict: Late Recovery	1.89**	1.84*		
(Last War is 5-10 Years ago)	(0.93)	(0.95)		
Post-Conflict Duration			1.35***	1.31***
(Time passed since the last War, in Years)			(0.43)	(0.44)
Post-Conflict Duration *Squared*			-0.13***	-0.13***
			(0.05)	(0.05)
GDP p.c.	-0.34***	-0.34***	-0.34***	-0.34***
	(0.05)	(0.05)	(0.05)	(0.05)
Gov. Share of Real GDI	-0.25***	-0.25***	-0.25***	-0.26***
	(0.06)	(0.06)	(0.06)	(0.06)
Trade/GDP	0.00	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
1970s	-1.35*	-1.34*	-1.33*	-1.32*
	(0.72)	(0.72)	(0.72)	(0.72)
1980s	-1.87**	-1.86**	-1.85**	-1.83**
	(0.73)	(0.73)	(0.73)	(0.73)
1990s	1.41*	1.41*	1.43*	1.44*
	(0.84)	(0.84)	(0.84)	(0.84)
2000s	2.76***	2.76***	2.81***	2.81***
	(1.01)	(1.01)	(1.01)	(1.00)
IMR	0.05	0.08	0.09	0.13
	(0.59)	(0.59)	(0.59)	(0.59)
Constant	49.08***	49.11***	49.12***	49.16***
	(1.70)	(1.70)	(1.70)	(1.70)
Observations	1505	1505	1505	1505
R-squared	0.11	0.11	0.11	0.11
No. of Groups	128	128	128	128
Av. Obs. per Group	11.76	11.76	11.76	11.76
Joint Significance Post-War Variables‡			0.01	0.01

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 zero.

Appendix A1: Conflict Periods

Country	Type of war experienced		
	Interstate War	Civil War	Internationalized Civil War
Algeria		1991-	
Argentina		1973-77	
Azerbaijan		1993-95	1992-93
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	
India		1961-68, 1978-	
Indonesia*		1965-69, 1975-1992, 1999-	
Iran	1980-88	1966-68	
Iraq			2004-
Morocco		1980-89	1975-79
Nepal		1996-	
Nigeria		1966-1970	
Pakistan		1971, 1990	
Peru*		1981-99	
Philippines	1969-75	1972-	
Russia		1990-91, 1993-96, 1999-	
Rwanda		1997-2002	
South Africa		1966-88	
Sri Lanka*		1983-2001	
Sudan*		1963-72	
Turkey		1984-	
U.S.A.*			2001-
Uganda*		1981-91, 1994-	
Yugoslavia (Serbia)		1991	1998-99

Based on the UCDP/PRIO Armed Conflict Dataset, Version 4-2007. For each conflict, at least one Gini observation is available.

Appendix A2: Post-Conflict Periods

Country	Type of war experienced		
	Interstate War	Civil War	Internationalized Civil War
Argentina		1973-77	
Azerbaijan		1993-95	1992-93
Bosnia		1992-95	
Burundi		1991-92	
Cambodia		1967-98	
El Salvador		1979-91	
France		1961-62	
Georgia		1991-93	
Guatemala		1965-95	
Hungary		1956	
India		1948-51, 1961-68	
Indonesia		1958-61, 1965-69, 1975-1992	
Iran		1966-68, 1990-93	
Korea, South	1949-53		
Lebanon		1958	
Morocco		1971, 1980-89	1975-79
Mozambique		1991-92	1985-1990
Nicaragua		1981-89	
Nigeria		1966-1970	
Pakistan		1971, 1974-77, 1990	
Peru		1981-99	
Philippines		1946-54	
Russia		1990-91, 1993-96	
Rwanda		1990-94	
Sierra Leone		1991-1999	2000
Somalia		1981-96	
South Africa		1966-88	
Sri Lanka		1971, 1983-2001	
Tajikistan		1992-96, 1998	
Turkey		1984-	
Uganda		1981-91, 1994-	1978-79
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

Appendix A3: 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)		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