# Poverty and Civil War: Revisiting the evidence

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**Abstract**

Previous research has interpreted the correlation between per capita income and civil war as evidence that poverty is a main determinant of conflict. In this paper, we find that the relationship between poverty and civil war is spurious, and is accounted for by historical phenomena that jointly determine income evolution and conflict. In particular, the statistical association between poverty and civil wars disappears once we include country fixed effects. Also, using cross-section data for 1960-2000, we find that once historical variables like European settler mortality rates and the population density in

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1500 are included in civil war regressions, poverty does not have an effect on civil wars. These results are confirmed using longer time series from 1825 to 2000.

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## 1. **Introduction**

Progress in stopping war, civil conflict and violence - the argument goes - requires a reduction in poverty. For example, German Chancellor Schröder stated in 2001: "Extreme poverty, growing inequality between countries, but also within countries themselves, are great challenges of our times, because they are a breeding ground for instability and conflict. So reducing worldwide poverty is, not least, essential to safeguarding peace and security."

This "stylized fact," that poverty breeds conflict and war, is supported by two papers. Fearon and Laitin (2003) find that lower income per capita increases the likelihood of civil war. They argue that income per capita is a proxy for the state's overall financial, administrative, police and military capabilities. If the government is weak, rebels can expect success. Collier and Hoeffler (2004) find that income per capita, which could be related to the viability of rebellion, has considerable explanatory power in civil war regressions. Neither study, however, deals with the possible endogeneity of war to economic conditions. This is done in Miguel et al. (2004) in a study of 41 African countries. Miguel et al use rainfall as an instrument for economic growth and find that exogenous economic shocks are strongly related to civil conflict, i.e., civil war is related to sudden changes in income[i].

In this paper, we take another look at the relationship between poverty and civil war. We find that their correlation is spurious, and is accounted for by historical phenomena that jointly determine income evolution and conflict in the post-WWII era. In particular, the statistical association between poverty, as proxied by income per capita, and civil wars disappears once we include country fixed effects. Also, using cross-section data for 1960-2000, we find that once historical variables like European settler mortality rates and the population density in 1500 are included in the civil war regressions, poverty does

not have an effect on civil wars. These results are confirmed using longer time series for 1825 to 2000. The results are in line with Krueger and Malecková (2003), who provide evidence that any relationship between poverty and terrorism is indirect. Abadie (2006) also shows that terrorist risk is not significantly higher in poorer countries, once the effect of other country-specific characteristics, such as the level of political freedom, is taken into account.

Our results can be consistent with Miguel et al. (2004). There, the authors find that sudden changes in income growth affect the probability of conflict. Miguel et al (2004) analyze the effect of one component of income growth, transitory shocks caused by the change in rainfall. One can imagine a situation where a sudden (and exogenous) hit in consumption drives people to violence. Once various such effects cumulate to increase or reduce the level of income, the effect on civil war seems to disappear[ii].

The paper is organized as follows. Section 2 describes the data. Section 3 details the econometric specification. Section 4 presents the main findings. Section 5 shows cross-section results. Section 6 repeats the analysis using a historical sample from 1825 to 2000. Section 7 concludes.

## 2. Data

The data on civil wars come from the Armed Conflict Dataset, a joint project between the Department of Peace and Conflict Studies, Uppsala University and the Center for the Study of Civil War at the International Peace Research Institute, Oslo. An armed conflict is defined as a contested incompatibility that concerns 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 25 battle-related deaths. We call this variable civil war. The dataset also

offers series to construct armed conflicts that generate more than 1000 deaths per year, which we call Civil Wars 1000.

The GDP per capita comes from the 2006 Penn World Tables. The historical GDP per capita and population data come from Maddison (2003), and historical data on civil war comes from the Correlates of War database. The latter takes the definition of civil war from Singer and Small (1982), and it is update using Reid (2000). Singer and Small define civil war as "any armed conflict that involves (a) military action internal to the metropole, (b) the active participation of the national government, and (c) effective resistance by both sides."

The resulting sample includes 211 countries, of which 181 non-OECD countries. Among those, 87 of the non-OECD countries suffered a civil war during the period 1960-2000. Of these 87 civil wars, 54 turned into a major civil war at some point.

## 3. Econometric specification

The explanatory variables follow the basic specifications of the literature on civil war. Collier and Hoeffler (2004) consider population size an additional proxy for the benefits of a rebellion since it measures potential labor income taxation. Fearon and Laitin (2003) indicate that a large population implies difficulties in controlling what goes on at the local level and increases the number of potential rebels that can be recruited by the insurgents.

The basic specification we use is

$$cw_{it} = \alpha ly_{i(t-1)} + \beta lpop_{i(t-1)} + X'_{i(t-1)}\gamma + \delta_t + \lambda_i + \varepsilon_{it} \ ,$$

where $cw_{ti}$ is a dummy that has value 1 if there is a civil in the country and zero otherwise, $ly_{i(t-1)}$ is the lagged value of the natural log of per capita income, $lpop_{i(t-1)}$ is the lagged value of the log of population, X is a vector of all other potential covariates. $\delta_t$ denotes the

full set of time effects that capture common shocks or trends to the civil wars of all countries. We include a full set of country dummies in $\lambda_i$. Finally, the $\varepsilon_{it}$, is an error term.

The standard regression in the literature usually omits country fixed effects ($\lambda_i$). In this context these dummies capture any time-invariant country characteristic that affect the probability of civil war. In the study of the relationship between per capita income and civil war this is important, as some determinants that affect the condition for conflict may at the same time the condition for economic development. If these omitted characteristics are time variant then fixed effect is not enough, so we need to use an instrumental variable approach (which we do in Section 4.1).

## 4. Results using pooled OLS and fixed effects

We first replicate the results reported in the previous literature. We perform a pooled OLS estimation of the effect of per capita income on the incidence and onset of civil war, using panel data from 1960 to 2000. We use three definitions of civil war. First, we use the definition of incidence of civil war which corresponds to more than 25 battle-related deaths per year (Table 1A). In panel B, we use the definition of onset of civil war from the Armed Conflict Dataset, which corresponds to more than 1000 battle-related deaths in at least one year. In Panel C, we perform the analysis using the 1,000-deaths threshold for the definition of the incidence of civil wars.

In columns 1 and 2 we use 5-years cut of the sample. The dependent variable in Panel A is a dummy that has a value of 1 if there has been any civil war of more than 25 battle-related deaths per year, during the 5-years interval period, and zero otherwise. The dependent variable in panel B is a dummy variable that has a value of 1 the year in which a civil war with at least 1,000 battle-related deaths starts. The dependent variable in Panel C

is a dummy that has a value of 1 if there has been any civil war of more than 1,000 battle-related deaths per year, during the 5-years interval period; zero otherwise.

The independent variables are taken at the beginning of each period. For example, for the first period the covariates are taken in 1960, in the second period in 1965, and in the last period in 1995. All regressions include time dummies, and all have robust standard errors clustered at the country level. The results are in line with the literature and show that per capita income has a negative and significant effect on the probability of civil war, either if we use the incidence variable or the onset variable. Also, the results are robust to the use of different thresholds for the definition of civil wars. The estimate indicates that a 10% reduction in poverty (increase in gdp per capita) is associated with a one percentage point reduction in the probability of civil war for the next five years. Given that the probability of having a civil war is 15%, this is a large effect.

(Table 1 here)

In column 2 we perform the same analysis, but controlling for time-invariant country specific variables. Results show that the relationship between per capita income and civil war disappears once fixed effects are included.

In column 3 and 4 we use the 10-years period sample, and in column 5 and 6 we use the 20-years period sample. In all regressions we find that per capita income has a negative and significant effect on civil war, however this effect disappears once we control for country fixed effects.

Finally, we perform the same analysis using annual data (columns 7 and 8). Following Acemoglu et al (2007), we use five lags of the log of per capita income and the log of population in the annual regression. In panels A and B we report the p-values of the F-test of joint significance. In column 7 of Panels A, B and C the p-values of the F-test of joint significance indicate that per capita income predicts civil war. When we include

country fixed effects in column 8, there is no evidence of the joint significance of per capita income on civil wars.

These findings are robust to changes in the sample, and to including other time-variant variables. We check whether the results are robust to dropping specific groups of countries. For example, many of the poorest countries are in Sub-Saharan Africa. These countries also account for a large number of civil wars. We, therefore, do the same analysis without the sample of Sub-Saharan African countries. We find similar qualitative results. Once country fixed affects are included in the specification, per capita income does not have an effect on the probability of civil wars. Since contemporaneous civil wars do not take place in OECD countries, we also confirm that the results are robust to the exclusion of this group of countries from the sample.

Next, many of the usual determinants of civil war are time-invariant, for example the presence of mountains, being a non-contiguous state, having large quantities of oil, or having a high degree of ethnic polarization. Only the democracy variable is time-variant. We hence confirm that the results using country fixed effect are robust to the inclusion of a proxy for democracy.

### 4.1 Instrumenting per capita income

Fixed effects estimators do not necessarily identify a causal relation between income and civil wars. It could be that other determinants that simultaneously affect income and civil war are time-variant. A way of addressing this endogeneity problem is to run an instrumental variable estimation for civil wars, in effect IV-2SLS. Angrist (1991) shows, using a Monte Carlo experiment, that if we ignore the fact that the dependent variable is dichotomous and use the instrumental variables approach, the estimates are similar to the average treatment effect obtained using a bivariate probit model.

When using the IV-2SLS approach, we need to find an instrument for per capita income. We rely on Acemoglu et al (2008). Using a 5-years specification, they take the saving rate in the previous five-year period as an instrument for per capita income in order to analyze the effect of per capita income on democracy. In our model, the corresponding first stage for the log of per capita income, $\ln y_{(t-1)i}$ , is

$$ly_{i(t-1)} = \phi s_{i(t-2)} + \beta^{y} lpop_{i(t-1)} + X'_{i(t-1)}\gamma^{y} + \delta^{y}_{t-1} + \lambda^{y}_{i} + \mu_{it-1},$$

where the only excluded instrument is $s_{i(t-2)}$. The identification restriction is that the correlation between savings and the residuals of the civil war regression is zero. The exclusion restriction in the case of civil war is more difficult to satisfy than in the case of democracy.

There could be a number of channels through which savings may be correlated with the residuals of the civil war regression. For example, current conflict may affect saving rates. Also, saving rates could be correlated with changes in the distribution of income which may affect conflict, although there is no empirical evidence on the relationship between inequality and conflict. However, as a robustness exercise, it is still useful to do the analysis. With these in mind, the savings rate variable comes from the Penn World Table data. It is constructed and defined as nominal income minus consumption minus government expenditure divided by nominal income. We performed the analysis using annual, 5-years and 10-years panel data.

As hypothesized, the savings rate has a positive and significant effect on per capita income. The second-stage results indicate that per capita income does not have an effect on the probability of civil war. These results are found using both incidence and onset data, and also incidence data with more than 1,000 battle related deaths.

## 5. Cross-country evidence

The results using fixed country effects indicate that the relationship between income and civil war is possibly spurious. It is likely that the colonization strategies brought by Europeans were important determinants for the economic development and political stability paths taken by colonies.

In this section we show that while the effect of per capita income on civil war is robust to the inclusion of some contemporaneous variables, its effect disappears once we include historical variables that capture colonization strategies. In the cross-section specification, the dependent variable is a dummy that has a value of 1 if the country suffered a civil war during the period 1960-2000, and zero otherwise. In order to reduce the endogeneity problems between per capita income and civil war, the independent variables are taken at the beginning of the period. The specification is

$$cw_{i60-00} = \alpha + \beta_1 \lg dp_{i60} + \beta_2 lpop_{i60} + X'_{i60}\phi + \varepsilon_i ,$$

where c*w* is a dummy variable that has value 1 if the country had a civil war during the period 1960-2000 and zero otherwise, $\alpha$ is a constant, *lgdp* is the log of real per capita income in 1960, *lpop* is the log of the population of the country in 1960. And X is a set of covariates, some of which are time invariant. All regressions have robust standard errors.

In table 2 we analyze the effect of per capita income on civil war including contemporaneous variables, which are traditionally used in the civil war regressions. In panel A we use the definition of civil war with more than 25 battle related deaths, while in Panel B we use the definition of civil war with more than 1,000 battle related deaths. In columns 1 to 4 we use an OLS specification, and in columns 5 to 8 we perform the same analysis using a Probit specification.

The analysis is done using the whole sample of countries and using only the sub-sample of ex-colonies. We show the results with all variables for the whole sample to show

that our results are in line with the results of the literature. For the sub-sample of ex-colonies we show only the results for the variable of interest which is the log of per capita income (included in italics in table 2). The latter shows that the results we obtain in table 3 are not due to the reduction in the sample size, but due to the inclusion of historical variables.

(Table 2 here)

In column 1, we include only the log of per capita income and the log of population as covariates. In line with the previous literature, we find that poor as well as populous countries have a higher risk of conflict in comparison with rich, and small countries. We next check whether the results are maintained when we control for the inclusion of other variables that have been used in different studies of civil wars. Collier and Hoeffler (2004) point out that the existence of natural resources provides an opportunity for rebellion since these resources can be used to finance war and increases the payoff if victory is achieved. Fearon and Laitin (2003) find that oil dependent countries have a higher risk of conflict. Therefore we include the dummy for oil dependent countries from Fearon and Laitin (2003).

Having mountains is another dimension of opportunity since this terrain could provide a safe haven for rebels, an example being the FARC in Colombia. Long distance from the center of state's power (the capital city) also favors the incidence of civil wars, especially if there is a natural frontier between them, like a sea or border. Next, Reynal-Querol (2002) and Montalvo and Reynal-Querol (2005a, b) show that ethnic polarization explains the likelihood of conflicts and civil wars. Finally, many authors control for the contemporaneous level of democracy.

In column 2 we include the dummy for oil countries, in column 3 we include mountains and the non-contiguous state variable, and in column 4 we include ethnic

polarization and democracy. In all the regressions per capita income has a negative and significant effect on the probability of civil war in line with the literature. In columns 5 to 8 we perform the same analysis but using a probit estimation, and we find qualitatively the same results.

In Panel B we perform the same analysis as in Panel A but using the definition of civil war of more than 1,000 battle related deaths, and we find qualitatively the same results: the effect of per capita income on civil war is robust to the inclusion on many contemporaneous variables, as the literature has already showed.

In all the specifications, the effect of per capita income on civil wars using the sub sample of ex-colonies is qualitatively the same as when using the full sample.

**5.1 Results including historical variables**

The results so far suggest that there could be some historical factors that jointly determine the development path and the political stability path of countries, and that could explain the positive correlation we observe between poverty and civil wars. To test this hypothesis, we include variables that capture these historical factors. Following Acemoglu et al. (2007, 2008) we use the log of European settler mortality rates, the population density in 1500 and the European settlement in 1900 as alternative historical variables.

Table 3 shows the results of this analysis. In Panel A we use the definition of civil war with more than 25 battle related deaths, and in Panel B we use the definition of civil war with more than 1,000 battle related deaths. In columns 1 to 6 we use an OLS specification, and in columns 7 to 12 we perform the same analysis using a Probit estimation.

(Table 3 here)

To perform this analysis we use the sample of ex-colonies. In column 1 we only include the log of capita income in 1960 and the log of population in 1960. In line with the previous literature, we find that poor as well as populous countries have a higher risk of civil war compared with rich and small countries. In column 2 we include the log of European settler mortality rate from Acemoglu et al. (2001). In column 3 we include the population density in 1500, and in column 4 we include European settlement in 1900 from Acemoglu et al. (2001, 2002). The effect of per capita income on civil war disappears with the inclusion of the European settler mortality rates or with the inclusion of European settlement in 1900. These results are robust to the inclusion of other historical variables like the identity of the colonizer or date of independence (column 5 and 6). In columns 7 to 12 we perform the same analysis using a Probit estimation, and find qualitatively the same results.

In Panel B we use the definition of civil war of more than 1,000 battle-related deaths. The results maintain. The effect of per capita income on civil war disappears with the inclusion of European settlement in 1900. These results are robust to the inclusion of other historical variables. Overall, these results indicate that once historical variables are included in the civil war regression, per capita income does not have an explanatory effect on civil wars.

**6. Fixed effect estimates using historical sample: 1825-2000**

Up to now we have concentrated the analysis on the period 1960-2000 because it is the period where we have high quality data on per capita income and civil wars. However, it is instructive to know whether the results hold in a longer time-series. The Correlates of War project provides information on the civil wars from 1816 and Maddison (2003) provides estimates for per capita income from 1825. We use these sources to construct a dataset of

25-year periods between 1825 and 2000, 1850-2000, 1875-2000, and 1900-2000. Also we have constructed another dataset of 50-year periods between 1850-2000 and 1900-2000.

Table 4 provides the results of this analysis. Panel A uses the definition of incidence of civil war using the sample of 25-years intervals. We also look at the COW data on extra-systemic wars. The COW divides the extra-systemic wars into two types. The first type are extra-systemic wars of "state conflict with a colony", and the second type are the extra-systemic wars of "state conflict with a non-state actor". We include the latter in the civil war category. In Panel B uses this definition of civil war using the same sample. In columns 1 and 2 we start with the 1825 period, in columns 3 and 4 we start in 1850, in columns 5 and 6 in 1875, and in columns 7 and 8 in 1900.

(Table 4 here)

In column 1, we perform a pooled-OLS analysis and do not include country fixed effects. In line with the literature, we find that per capita income has a negative effect on the probability of civil war. In column 2, we include fixed country effects, which remove the statistical effect of per capita income on civil wars. We perform the same analysis starting in different sample years and find the same result. In Panel C and D, we perform the same analysis dividing the sample into 50-year periods, and the results are qualitatively the same.

We also construct a balanced panel of countries for which per capita income and population are available for every 25$^{th}$ period from 1850 to 2000, from 1875 to 2000 and from 1900 to 2000. The first balanced dataset, which starts in 1850, has only 22 countries. The one that starts in 1875 has 25 countries, and finally the one that starts in 1900 has 33 countries.[iii] The proportion of country-period with civil war using the balanced panel is very similar to the proportion of country- period with civil war when using the unbalanced panel. We also construct a balanced dataset for which per capita income and population are

available for every 50 period from 1850 to 2000 which includes 26 countries, and from 1900 to 2000 which includes 38 countries.[iv]

We perform the same analysis as table 4. The results of the Pooled OLS analysis using the balanced historical data indicate that per capita income does not have an effect on the probability of civil war, while population has a large and significant effect (not reported). This result is obtained without controlling for country fixed effects. Controlling for country fixed effects, we again find no relationship between per capita income and civil war.

## 7. Conclusions

Using several alternatives data sources, and constructing samples of different duration, one going back almost 200 years, this paper casts doubt on the previous findings in the literature on poverty and civil war. In particular, we find no robust association between the two once the possibility of a spurious correlation is accounted for. We suggest that historical variables, which determine both the path to economic prosperity and to peace, are the reason.

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**Table 1**: The Effect of Poverty on the Incidence and Onset of Civil War
(Pooled OLS, and OLS Fixed Effects, from 1960-2000)

| | 5-years | 5-years | 10-years | 10-years | 20-years | 20-years | Annual | Annual |
|---|---|---|---|---|---|---|---|---|
| | Pooled OLS | OLS FE | Pooled OLS | OLS FE | Pooled OLS | OLS FE | Pooled OLS | OLS FE |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A | Dependent variable: Incidence of civil wars 25 deaths | | | | | | | |
| Lngdp(t-1) | -0.08 | -0.09 | -0.10 | -0.06 | -0.14 | 0.12 | [0.0009] | [0.035] |
| | (-4.19) | (-1.74) | (-4.69) | (-0.87) | (-4.98) | (0.45) | | |
| Lpop(t-1) | 0.06 | 0.02 | 0.06 | -0.00 | 0.07 | 0.56 | [0.0001] | [0.3731] |
| | (5.63) | (0.19) | (5.54) | (-0.02) | (4.36) | (1.28) | | |
| Time dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Obs | 1169 | 1169 | 576 | 576 | 254 | 254 | 5308 | 5308 |
| R-sq | 0.15 | 0.55 | 0.16 | 0.59 | 0.18 | 0.74 | 0.13 | 0.53 |
| Panel B | Dependent variable: Onset of war (ACD, 1,000+ deaths) | | | | | | | |
| Lngdp(t-1) | -0.02 | 0.03 | -0.04 | 0.08 | -0.07 | 0.05 | [0.0026] | [0.2660] |
| | (-3.83) | (1.19) | (-3.82) | (1.44) | (-3.59) | (0.24) | | |
| Lpop(t-1) | 0.01 | 0.07 | 0.03 | 0.11 | 0.04 | -0.18 | [0.0008] | [0.4224] |
| | (4.61) | (1.95) | (4.71) | (1.54) | (3.73) | (-0.54) | | |
| Time dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Obs | 1169 | 1169 | 576 | 576 | 254 | 254 | 5308 | 5308 |
| R-sq | 0.04 | 0.24 | 0.07 | 0.38 | 0.11 | 0.65 | 0.02 | 0.05 |
| Panel C | Dependent variable: Incidence of civil war 1,000 deaths per year | | | | | | | |
| Lngdp(t-1) | -0.05 | -0.03 | -0.07 | -0.01 | 0.09 | -0.004 | [0.0063] | [0.1782] |
| | (-4.27) | (-0.91) | (-4.45) | (-0.20) | (-4.13) | (-0.03) | | |
| Lpop(t-1) | 0.02 | 0.03 | 0.04 | 0.09 | 0.05 | 0.25 | [0.0007] | [0.0910] |
| | (4.96) | (0.77) | (5.02) | (1.38) | (4.19) | (0.87) | | |
| Time dummies | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Obs | 1169 | 1169 | 576 | 576 | 254 | 254 | 5308 | 5308 |
| R-sq | 0.09 | 0.43 | 0.13 | 0.59 | 0.14 | 0.77 | 0.06 | 0.36 |

Note: Pooled OLS regressions in columns 1, 3, 5 and 7 with robust standard-errors clustered at the country level. The t-statistics are in parentheses. Fixed effects OLS regressions in columns 2, 4, 6 and 8, with country dummies and robust standard-errors clustered at the country level. The t-statistics are in parentheses. Time dummies are included in all regressions. In Panel A and C the dependent variable is the incidence of civil war. In Panel B the dependent variable is the onset of civil war from ACD of more than 1000 battle related deaths. The base sample is an unbalanced panel, 1960-2000, with data at 5-years intervals in columns 1 and 2, 10-years intervals in columns 3 and 4, 20-years intervals in columns 5 and 6. T-1 refers to the beginning of each period. Columns 7 and 8 use annual data from the same sample. In columns 7 and 8, each right hand side variable has five annual lags, following Acemoglu et al (2008); we report the p-values from the F-test for their joint significance.

**Table 2**: Poverty, Contemporaneous Factors and Civil Wars

| Sample of all countries between 1960-2000 Cross-section | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | OLS | OLS | OLS | OLS | Probit | Probit | Probit | Probit |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A | Dependent variable: civil war 1960-2000, with at least 25 deaths per year | | | | | | | |
| Lgdp60 | -0.20 | -0.23 | -0.21 | -0.18 | -0.59 | -0.72 | -0.67 | -0.59 |
| | (-4.73) | (-5.06) | (-4.49) | (-2.99) | (-3.92) | (-4.00) | (-3.74) | (-2.71) |
| *Sample of ex-colonies* | *[-0.15 (-2.27)]* | *[-0.18 (-2.93)]* | *[-0.16 (-2.65)]* | *[-0.16 (-2.17)]* | *[-0.50 (-2.30)]* | *[-0.70 (-2.69)]* | *[-0.66 (-2.46)]* | *[-0.73 (-2.23)]* |
| Lpop60 | 0.07 | 0.05 | 0.05 | 0.02 | 0.20 | 0.18 | 0.16 | 0.06 |
| | (2.75) | (1.72) | (1.46) | (0.42) | (2.34) | (1.55) | (1.26) | (0.41) |
| Oil | | 0.46 | 0.44 | 0.43 | | 1.82 | 1.74 | 1.76 |
| | | (5.15) | (4.86) | (4.38) | | (3.29) | (3.14) | (3.34) |
| Mountain | | | 0.00 | 0.00 | | | 0.005 | 0.00 |
| | | | (0.90) | (0.29) | | | (0.82) | (0.29) |
| Ncontig | | | -0.07 | 0.04 | | | -0.14 | 0.17 |
| | | | (-0.57) | (0.28) | | | (-0.36) | (0.38) |
| Ethpol | | | | 0.43 | | | | 1.32 |
| | | | | (2.00) | | | | (2.05) |
| Democ | | | | -0.003 | | | | -0.001 |
| | | | | (-0.22) | | | | (-0.03) |
| Const | 1.03 | 1.38 | 1.29 | 1.39 | 1.48 | 2.65 | 2.52 | 2.86 |
| | (2.00) | (2.50) | (2.08) | (1.61) | (0.99) | (1.53) | (1.25) | (1.09) |
| Obs | 128 | 116 | 113 | 97 | 128 | 116 | 113 | 97 |
| R-squared | 0.1937 | 0.2228 | 0.2224 | 0.2290 | | | | |
| Pseudo R-sq | | | | | 0.1534 | 0.1933 | 0.1914 | 0.1957 |
| Panel B | Dependent variable: civil war 1960-2000, with at least 1,000 deaths over the conflict | | | | | | | |
| Lgdp60 | -0.13 | -0.15 | -0.15 | -0.16 | -0.42 | -0.45 | -0.45 | -0.48 |
| | (-3.08) | (-3.36) | (-3.24) | (-2.41) | (-3.02) | (-3.03) | (-2.90) | (-2.35) |
| *Sample excolonies* | *[-0.11 (-2.05)]* | *[-0.14 (-2.44)]* | *[-0.13 (-2.24)]* | *[-0.17 (-2.25)]* | *[-0.39 (-2.19)]* | *[-0.46 (-2.41)]* | *[-0.43 (-2.25)]* | *[-0.55 (-2.23)]* |
| Lpop60 | 0.08 | 0.09 | 0.100 | 0.08 | 0.28 | 0.26 | 0.29 | 0.23 |
| | (3.96) | (3.04) | (2.82) | (1.71) | (3.34) | (2.70) | (2.47) | (1.65) |
| Oil | | 0.28 | 0.26 | 0.27 | | 0.82 | 0.78 | 0.79 |
| | | (2.37) | (2.16) | (1.95) | | (2.33) | (2.18) | (1.92) |
| Mountain | | | 0.00 | 0.00 | | | 0.00 | 0.00 |
| | | | (0.25) | (0.35) | | | (0.22) | (0.33) |
| Ncontig | | | -0.09 | -0.01 | | | -0.27 | -0.02 |
| | | | (-0.75) | (-0.09) | | | (-0.72) | (-0.04) |
| Ethpol | | | | 0.40 | | | | 1.22 |
| | | | | (2.03) | | | | (2.07) |
| Democ | | | | 0.008 | | | | 0.02 |
| | | | | (0.58) | | | | (0.52) |
| Const | 0.003 | 0.05 | -0.09 | -0.00 | -1.66 | -1.18 | -1.63 | -1.20 |
| | (0.01) | (0.09) | (-0.15) | (-0.00) | (-1.10) | (-0.72) | (-0.86) | (-0.49) |
| Obs | 128 | 116 | 113 | 97 | 128 | 116 | 113 | 97 |
| R-squared | 0.1500 | 0.1414 | 0.1539 | 0.1608 | | | | |
| Pseudo R-sq | | | | | 0.1317 | 0.1132 | 0.1230 | 0.1284 |

Note: Pooled OLS regression in columns 1, 2, 3 and 4 with robust standard-errors. The t-statistics are in parentheses. Probit regressions in columns 5, 6, 7 and 8, reported with robust standard errors. The Z-statistics are in parentheses. In Panel A the dependent variable is the probability of civil war with more than 25 battle related deaths. In Panel B the dependent variable is probability of civil war with more than 1,000 battle related deaths. The independent variables, which are time variant, are taken at the beginning of the period, 1960, and for democracy 1965.

## **Table 3**: The Historical Roots of Poverty and Civil Wars

| | Sample of ex-colonies between 1960-2000 Cross-section | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OLS | | | | | | Probit | | | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Panel A | Dependent variable: civil war 1960-2000, with at least 25 deaths per year | | | | | | | | | | | |
| Lgdp60 | -0.15 | -0.11 | -0.15 | -0.02 | -0.15 | -0.06 | -0.50 | -0.33 | -0.32 | -0.04 | -0.48 | -0.07 |
| | (-2.27) | (-1.47) | (-2.12) | (-0.35) | (-1.62) | (-0.49) | (-2.30) | (-1.24) | (-1.34) | (-0.16) | (-1.52) | (-0.20) |
| Lpop60 | 0.11 | 0.10 | 0.09 | 0.11 | 0.08 | 0.10 | 0.37 | 0.35 | 0.30 | 0.44 | 0.33 | 0.40 |
| | (3.85) | (3.30) | (3.00) | (4.30) | (2.32) | (3.00) | (3.17) | (2.82) | (2.45) | (3.80) | (2.32) | (2.98) |
| Logmort | | 0.11 | | | 0.09 | | | 0.42 | | | 0.44 | |
| | | (2.84) | | | (1.79) | | | (2.23) | | | (1.76) | |
| Popdens1500 | | | 0.003 | | | | | | 0.17 | | | |
| | | | (1.22) | | | | | | (1.80) | | | |
| Euro1900 | | | | -0.005 | | -0.01 | | | | -0.02 | | -0.02 |
| | | | | (-2.92) | | (-2.16) | | | | (-2.67) | | (-2.21) |
| Ind.time | | | | | -0.00 | 0.00 | | | | | -0.002 | -0.00 |
| | | | | | (-0.36) | (0.04) | | | | | (-0.48) | (-0.18) |
| Ident col. | | | | | Yes | Yes | | | | | Yes | Yes |
| Const | 0.05 | -0.54 | 0.24 | -0.79 | 0.09 | -0.47 | -1.63 | -4.26 | -2.17 | -5.47 | -3.89 | -4.99 |
| | (0.07) | (-0.59) | (0.32) | (-1.20) | (0.08) | (-0.50) | (-0.72) | (-1.25) | (-0.99) | (-2.24) | (-0..95) | (-1,61) |
| Obs | 95 | 76 | 81 | 93 | 70 | 80 | 95 | 76 | 81 | 93 | 67 | 77 |
| R-squared | 0.2044 | 0.2878 | 0.1976 | 0.2325 | 0.2487 | 0.2340 | | | | | | |
| Pseudo R-sq | | | | | | | 0.1811 | 0.2561 | 0.2555 | 0..2139 | 0.2183 | 0.1958 |
| Panel B | Dependent variable: civil war 1960-2000, with at least 1,000 deaths over the conflict | | | | | | | | | | | |
| Lgdp60 | -0.11 | -0.21 | -0.12 | -0.04 | -0.09 | -0.05 | -0.39 | -0.76 | -0.45 | -0.10 | -0.37 | -0.16 |
| | (-2.05) | (-3.34) | (-2.15) | (-0.50) | (-1.26) | (-0.43) | (-2.19) | (-2.88) | (-2.36) | (-0.41) | (-1.45) | (-0.44) |
| Lpop60 | 0.12 | 0.09 | 0.12 | 0.13 | 0.13 | 0.13 | 0.40 | 0.33 | 0.43 | 0.43 | 0.45 | 0.45 |
| | (5.03) | (3.49) | (4.54) | (5.27) | (3.73) | (3.94) | (4.17) | (3.17) | (3.84) | (4.23) | (3.22) | (3.29) |
| Logmort | | -0.04 | | | | | | -0.15 | | | | |
| | | (-0.96) | | | | | | (-1.02) | | | | |
| Popdens1500 | | | -0.00 | | 0.001 | | | | -0.01 | | 0.004 | |
| | | | (-0.33) | | (0.24) | | | | (-0.51) | | (0.30) | |
| Euro1900 | | | | -0.00 | | -0.003 | | | | -0.,015 | | -0.02 |
| | | | | (-1.84) | | (-1.03) | | | | (-1.70) | | (-1.30) |
| Ind.time | | | | | -0.001 | -0.001 | | | | | -0.00 | -0.004 |
| | | | | | (-1.27) | (-0.89) | | | | | (-1.27) | (-0.94) |
| Ident col. | | | | | Yes | Yes | | | | | Yes | Yes |
| Const | -0.61 | 0.70 | -0.59 | -1.21 | -0.63 | -1.01 | -3.53 | 0.79 | -3.58 | -5.90 | -3.80 | -5.13 |
| | (-0.96) | (0.82) | (-0.92) | (-1.67) | (-0.91) | (-0.94) | (-1.80) | (0.27) | (-1.73) | (-2.34) | (-1.44) | (-1.49) |
| Obs | 95 | 76 | 81 | 93 | 75 | 80 | 95 | 76 | 81 | 93 | 72 | 77 |
| R-squared | 0.1907 | 0.2184 | 0.1886 | 0.1986 | 0.2809 | 0.2945 | | | | | | |
| Pseudo R-sq | | | | | | | 0.1633 | 0.1928 | 0.1673 | 0.1735 | 0.1981 | 0.2226 |

Note: Pooled OLS regressions in columns 1-6 are reported with robust standard-errors. The t-statistics are in parentheses. The Probit regressions in columns 7-12 are reported with robust standard errors. The Z-statistics are in parentheses. In Panel A the dependent variable is the probability of civil war with more than 25 battle related deaths. In Panel B the dependent variable is probability of civil war with more than 1,000 battle related deaths. The independent variables, which are time variant, are taken at the beginning of the period, 1960.

**Table 4**: Pooled OLS, and OLS Fixed Effects, from 1825-2000

| | Pooled OLS | OLS FE | Pooled OLS | OLS FE | Pooled OLS | OLS FE | Pooled OLS | OLS FE |
|---|---|---|---|---|---|---|---|---|
| | From 1825 to 2000 | | From 1850 to 2000 | | From 1875 to 2000 | | From 1900 to 2000 | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Panel A | Dependent variable: Incidence of War (intra), 25 years period | | | | | | | |
| Lngdp(t-1) | -0.06 | -0.06 | -0.07 | -0.08 | -0.07 | -0.09 | -0.07 | -0.07 |
| | (-2.32) | (-0.56) | (-2.37) | (-0.71) | (-2.57) | (-0.72) | (-2.49) | (-0.53) |
| Lpop(t-1) | 0.08 | 0.02 | 0.08 | -0.01 | 0.08 | -0.04 | 0.08 | 0.04 |
| | (5.77) | (0.26) | (5.71) | (-0.08) | (5.92) | (-0.34) | (5.84) | (0.28) |
| Time dummies | Included | Included | Included | Included | Included | Included | Included | Included |
| Obs | 419 | 419 | 413 | 413 | 386 | 386 | 362 | 362 |
| R-sq | 0.11 | 0.53 | 0.11 | 0.54 | 0.11 | 0.53 | 0.10 | 0.55 |
| Panel B | Dependent variable: Incidence of War (intra and non-colonial extra-systemic wars), 25 years period | | | | | | | |
| Lngdp(t-1) | -0.07 | -0.06 | -0.07 | -0.08 | -0.08 | -0.08 | -0.08 | -0.08 |
| | (-2.48) | (-0.57) | (-2.55) | (-0.66) | (-2.77) | (-0.60) | (-2.92) | (-0.59) |
| Lpop(t-1) | 0.09 | 0.02 | 0.09 | 0.003 | 0.09 | 0.05 | 0.08 | 0.05 |
| | (6.88) | (0.26) | (6.87) | (0.04) | (7.22) | (0.38) | (7.01) | (0.32) |
| Time dummies | Included | Included | Included | Included | Included | Included | Included | Included |
| Obs | 419 | 419 | 413 | 413 | 386 | 386 | 362 | 362 |
| R-sq | 0.13 | 0.53 | 0.13 | 0.53 | 0.13 | 0.54 | 0.13 | 0.54 |
| Panel C | Dependent variable: Incidence of War (Intra), 50 years period | | | | | | | |
| Lngdp(t-1) | | | -0.07 | -0.29 | | | -0.08 | -0.42 |
| | | | (-2.01) | (-1.00) | | | (-2.19) | (-0.97) |
| Lpop(t-1) | | | 0.10 | 0.04 | | | 0.10 | 0.36 |
| | | | (0.16) | (0.17) | | | (6.11) | (0.42) |
| Time dummies | | | Included | Included | | | Included | Included |
| Obs | | | 205 | 205 | | | 178 | 178 |
| R-sq | | | 0.16 | 0.76 | | | 0.15 | 0.79 |
| Panel D | Dependent variable: Incidence of War (intra and non-colonial extra-systemic wars), 50 years period | | | | | | | |
| Lngdp(t-1) | | | -0.08 | -0.26 | | | -0.09 | -0.36 |
| | | | (-2.18) | (-0.89) | | | (-2.63) | (-0.83) |
| Lpop(t-1) | | | 0.11 | 0.09 | | | 0.10 | 0.42 |
| | | | (7.10) | (0.36) | | | (6.70) | (0.49) |
| Time dummies | | | Included | Included | | | Included | Included |
| Obs | | | 205 | 205 | | | 178 | 178 |
| R-sq | | | 0.17 | 0.76 | | | 0.17 | 0.81 |

Note: The pooled OLS regressions in columns 1, 3, 5 and 7 are reported with robust standard-errors clustered at the country level. The t-statistics are in parentheses. The fixed effects OLS regressions in columns 2, 4, 6 and 8, are reported with country dummies and robust standard-errors clustered at the country level. The t-statistics are in parentheses. Time dummies are included in all regressions. In Panel A and C the dependent variable is the incidence of civil war, which includes intra-wars category. In Panel B and D the dependent variable is incidence of civil war, which includes intra war category and the non-colonial wars from extra-systemic war category. The sample is an unbalanced panel, 1825-2000 in columns 1 and 2, 1850-2000 in columns 3 and 4, 1875-2000 in columns 5 and 6, and 1900-2000 in columns 7 and 8. The table has data at 25-years intervals in panel A and B, and 50-years intervals in panel C and D. T-1 refers to the beginning of each period.

[i] Also using the sample of 41 African countries, Brückner and Ciccone (2007) find that lower income growth makes civil war more likely in non-democracies. Instead of using rainfall as an instrument for economic growth, they use international commodity prices.

[ii] We would like to thank Antonio Ciccone for very helpful discussions on this

[iii] These countries are Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Colombia, Denmark, Finland, France, Germany, Greece, India, Indonesia, Italy, Japan, Mexico, Netherlands, New, Zealand, Norway, Peru, Portugal, Spain, Sri Lanka, Sweden, Switzerland, United Kingdom, United States, Uruguay, Venezuela and Yugoslavia.

[iv] These are the 33 countries listed in footnote ii plus Albania, China, Poland, Romania, and the USSR.