# The Colonial Origins of Civil War

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**Abstract:**

While differences in per capita income have received considerable attention in the study of civil wars, institutional development has not been addressed in depth. The dominant hypothesis in the empirical literature that studies conflict is that poverty is the main cause of civil wars. We enter into the literature on conflict by analyzing the effect of institutions on civil war. In our set up, institutions are endogenous. Our identification strategy assumes that colonial origins affect contemporaneous outcomes, in our case civil wars, mainly through their legacy on institutions. Our results are robust to the use of different measures of institutions, and indicate that institutions, understood as protection of property rights, rule of law and efficiency of the legal system, are one of the fundamental causes of civil war. Moreover, once institutions are included in the regression of civil wars, per capita income does not have any effect on civil war, either directly or indirectly. The results indicate that if we improve the institutional framework of a country from the value of the median to the percentile 75, the probability of civil war is reduced by 38 percentage points. Our results provide empirical evidence as to the important role of institutions in understanding civil war rather than poverty *per se.*

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## 1. Introduction

What are the fundamental causes of civil war? Although there is little consensus to answer this question, differences in per capita income have received considerable attention. The idea that poverty increases the risk of conflict is clearly exposed in The UN Millennium Project, Investing in Development: Practical Plans to Achieve The Millennium Development Goals (2005):

> "*Poor and hungry societies are much more likely than high-income societies to fall into conflict over scarce vital resources, such as watering holes and arable land…….Poverty increase the risks of conflict through multiple paths*" (Pag. 6)… "*The implications are twofold: Investing in development is especially important to reduce the probability of conflict*" (Pag.8)

Many world leaders agree on this point, and they have stressed the idea that the fight against war, internal war and violence, requires a reduction in poverty. Chancellor Gerhard Schröder of Germany, 2001, in Program Action 2015 said "*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*". Also, the idea that economic development is central to reducing the global incidence of civil war is the main message included in the World Bank report "Breaking the Conflict trap: Civil war and development policy".

The dominant hypothesis in the empirical literature that studies civil wars is that poverty is the main cause of conflict, and the worldwide impact of this theory is at not discussion. These ideas

have been basically driven by two empirical papers: Collier and Hoeffler (2004), and Fearon and Laitin (2003). Collier and Hoeffler (2004) find that political and social variables that are most obviously related to grievances have little explanatory power. By contrast, economic variables, which could proxy some grievances but are perhaps more related to the viability of rebellion, provide considerable explanatory power. Fearon and Laitin (2003) also find that, lower per capita GDP has a significant and negative effect on the onset of civil war[2]. They argue that income per capita is a proxy for the "state's overall financial, administrative, police and military capabilities". Once a government is weak, rebels can expect a higher probability of success.

Institutional development has not been addressed in depth in the study of civil wars. North (1990) emphasizes that, secure property rights and rule of law played an important role in the development of western societies. We investigate whether the quality of institutions could also have played an important role in the development of peaceful societies.

The theoretical literature of conflict [Haavelmo (1954), Grossman (1994, 1996), Skaperdas (1992, 1996, 2001), Garfinkel (1990), Hirshleifer (1995) among others] has stressed the importance of allowing for imperfect institutions of governance and a lack of enforcement, to model conflictive situations on the appropriation of resources. Following the theoretical literature, an imperfect institutional framework, understood as the lack of enforcement and insecure property rights, is a necessary condition for the existence of conflict. Conflict is more probable when less secure property rights exist and enforcement of the law is scarce. We therefore approach the data with the idea that when government cannot enforce the law and protect property rights conflict emerges. The quality of institutions is a proxy of the efficiency of the government in defending property rights. Institutions, which in some sense capture the efficiency in managing and distributing

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[2] They argue that the factors that explain which countries have been at risk of civil war are the conditions that favor insurgency. These include poverty, political instability, rough terrain and large populations.

resources, could therefore be more important in explaining conflict than the scarcity of resources itself, which is captured by per capita income. The idea that strong governments are what matter to prevent conflict is in fact also exposed by Fearon and Laitin, (2003), as explained above. Our hypothesis is that institutional quality is a better measure of the strength of government in implementing the law than per capita income.

We enter into the empirical literature on conflict by analyzing the effect of the quality of institutions on civil war. In our set up, institutions are endogenous. Our paper is also related to the extensive empirical literature that has investigated the role of institutions in development[3]. We analyze the effect of institutions on civil war, using the instruments, which are now common in the literature on the effect of institutions. The common idea in the literature is that there are some historical roots that are based on the European influence during colonization that explain institutional development, and that have nothing to do with contemporaneous factors, in our case civil wars. Therefore, the exclusion restriction implied by our instrumental variable regression is that, conditional on the controls included in the regression, colonial legacy, have no effect on civil wars, other than its effect through institutional development.

Our approach to identification is therefore closely related to some of the approaches in the literature. We follow the work of Acemoglu, Johnson and Robinson (2001), hereafter AJR (2001), who proposed a theory of institutional differences among countries colonized by Europeans based on their colonial experience.  They emphasize the role of European settler mortality rates to estimate the effect of institutions on development. We also observe institutional differences between British colonies and colonies from the other major imperial powers (France, Spain and Portugal). This result basically captures the already documented institutional differences between

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[3] Mauro (1995, 1998), Knack and Keefer (1999), Hall and Jones (1999), Acemoglu et al. (2001, 2002), Easterly and Levine (2003), Djankov et al. (2002, 2003), Alcala and Ciccone (2004), Dollar and Kraay (2003) and Rodrik (2004), among others, show a positive relationship between good institutions and development.

common and civil law countries. In this aspect the result is somehow related with the studies that emphasize the role of the legal transplantation to explain institutional development as in Laporta (1999), Djankov et al. (2002), Djankov et al (2003) and Botero et al. (2004) among others who find significant differences between common law and civil law countries.

Our results are robust to the use of different measures of institutions, and indicate that their quality, understood as secure property rights and enforcement of the law, is one of the fundamental causes of civil war. Moreover, once institutions are included in the regression on civil wars, per capita income does not have any direct effect on civil war. Our results therefore suggest that the direct effect of per capita income found in previous literature was capturing the effect of institutions. Finally, we find that per capita income does not exhibit any indirect effect on civil war through worsening institutions once we include historical factors as instrument of institutions. This result is in line with the recent findings of Acemoglu, Johnson, Robinson and Yared (2006), where they revisit one of the central empirical findings of the literature on political economy (the relationship between income and democracy). They argue that existing studies establish a strong cross-country correlation between income and democracy but do not typically control for factors that simultaneously affect both variables. They show that controlling for such factors removes the statistical association between income per capita and various measures of democracy.

Our results suggest that the emphasis on poverty per se as a determinants of civil war must be carefully examined, and indicate that we should concentrate more on institutions than on economic development itself if we wish to understand the causes of civil war. These results are in line with the theoretical literature where the lack of enforcement and insecure property rights constitute a crucial condition to model conflict situations.

This section is the introduction. The following section summarizes the main empirical literature on institutions and civil wars. Section 3 describes the data. Section 4 explains the empirical strategy and sections 5 and 6 the main results. In sections 7 and 8 we perform different robustness tests. Finally section 9 concludes.

## 2. Institutions and civil war: existing literature

The literature that studies the relationship between institutions and civil war is very scarce, and has only considered the role of democracy in explaining civil wars. Most of the empirical studies show that the level of democracy does not have any explanatory power on the probability of civil wars[4]. Sambanis (2001), Hegre et al. (2001), and Reynal-Querol (2002a, 2002b) find that middle-level democracies are more prone to civil wars than high-level democracies and high-level autocracies. The results of this literature imply that democracies and autocracies have a similar probability of suffering a civil war. Reynal-Querol (2005 and 2002b) analyze theoretically and empirically, whether the type of democracy, rather than democracy *per se,* can explain why some countries have civil war and why others do not. She finds a negative relationship between the level of inclusiveness of political institutions, captured by the number of checks and balances, and the incidence of civil wars. The rationale behind these results is that different levels of political inclusiveness entail different opportunity costs of rebellion. The results suggest that highly inclusive systems, such as the proportional system, have a lower probability of suffering a civil war than low inclusive systems such as the majoritarian and presidential systems. The results on the relationship between democracy and civil wars are in parallel with the literature that studies the relationship between democracy and growth. Barro (1997) and Glaeser et al (2004) find weak

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[4] See Collier and Hoeffler (2004), Fearon and Laitin (2003).

effects of political institutions on growth. Persson (2004) shows that the form of democracy, rather than democracy "per se", has important consequences for the adoption of structural policies that promote growth.

In line with the literature on institutions and development, in the present paper we analyze the effect of a broad measures of the quality of institutions on civil wars considering institutions as an endogenous variable. In general, the literature that analyzes the causes of civil war does not deal with the endogeneity problem. One exception is Miguel et al. (2004) who addresses this issue on the relationship between economic growth and civil conflict in 41 African countries using annual data. They use rainfall as an instrument for GDP growth. They find that low economic growth is strongly related to civil conflicts. Notice that our results do not contradict Miguel's finding, since they analyze the role of changes of per capita income captured by economic growth on the probability of civil wars, rather than the effect of the level of per capita income.

## 3. Data and preliminary results

This section describes the main data used in the empirical analysis.

*Data on civil wars*

Data on civil wars comes 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 (PRIO). 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 use types 3 and 4, which correspond to civil wars.

*Data on Institutions*

The theoretical literature on conflict has stressed the importance of allowing for imperfect institutions of governance and lack of enforcement to model conflictive situations on the appropriation of resources. Since we do not observe the exact characteristics of institutions that are related with conflict as described in the theoretical models of conflict, we need to identify the institutional variables that best capture this imperfect institutional framework, understood as the lack of enforcement and insecure property rights. We start the analysis by using the average protection against expropriation risk as the institutional variable. This variable captures the risk of expropriation of private foreign investment by government, and goes from 0 to 10, where a higher score means less risk. This index is the average between 1985 and 1995. This variable, which comes from AJR (2001), was originally constructed by Political Risk Services, and was used by Knack and Keefer (1995). Although this measure captures the risk of expropriation by government, as AJR (2001) explains, it is very related with a broad class of measures of institutions that capture other dimensions of the quality of institutions which includes property rights enforcement. As a first look, Table 1 lists the ranking of the fifteen countries with the lowest and the highest protection against expropriation risk. Since the main empirical analysis will be basically focused on ex-colonies, following the literature on institutions and development, we consider a sample of ex-colonies. The conclusions considering the whole sample are very similar. The civil war variable indicates whether the country suffered any civil war during the period 1960-2005. All of the fifteen countries with the lowest scores suffered a civil war, while only seven of the fifteen countries with the strongest protection suffered a civil war.

Our second proxy for institutions is a measure of law and order. The law and order index measures the strength and impartiality of the legal system, and the popular observance of the law. The source for this variable is the International Country Risk Guide (ICRG)[5]. It provides information as of 1984. The law and order variable can take values from 0 to 6. Higher numbers indicate a stronger legal system. We believe that law and order indices are also very appropriate to analyze the role of institutions on conflict, because they capture the ability of the government to implement law and order in the country, and this seems to matter greatly when we think about preventing and avoiding conflict. For example, Fearon and Laitin, (2003), argue that they use per capita income as a measure of the "state's overall financial, administrative, police and military capabilities". Law and order could better capture the strength of government in implementing the law than per capita income *per se*.

Other variables of the ICRG are military presence in politics, quality of bureaucracy, corruption and democratic accountability. The results will be robust to the use of all these other variables[6].

Table 2 lists the ranking of the fifteen countries with the weakest law and order system, and the fifteen countries with the strongest legal system. The law and order index is the average of the law and order indicator from 1984 to 1999. All of the fifteen countries with the lowest scores suffered a civil war, while only four of the fifteen countries with the strongest legal system suffered a civil war.

The rankings mentioned in the previous paragraphs are simply descriptive since they are subject to the endogeneity of institutions. However, they provide some evidence of the correlation between

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[5] The ICRG provides assessments of political, economic, and financial risks. These assessments are based on the analysis of a worldwide network of experts and are subject to a peer review process at subject and regional levels to ensure coherence and comparability across countries.

[6] We do not provide the results with these variables due to space restrictions. Results are available upon request.

imperfect institutions and the existence of conflict. In the next section we present a proper analysis of the statistical relationship between institutions and civil war.

## 4. Empirical strategy

In this section we describe the methodology used to analyze the empirical relationship between institutions and civil wars. We have a sample of 211 countries among which 113 are ex-colonies. Between 1960 and 2005, 94 countries suffered civil war, 72 of them ex-colonies. Moreover, only 22 of the 96 non ex-colonies suffered a civil war. In order to analyze the effect of institutions on civil war we basically follow the literature that studies institutions and development. For this reason our specification is a cross-section of countries. There are other important advantages that favor the use of a cross-section in this type of analysis.

First of all, in the study of the causes of civil wars, researchers have used three alternative measures: the onset of civil wars, their incidence and their duration. Obviously these three analyses are complementary but deal with different sides of the civil war phenomenon. We can create an analogy with the analysis of macroeconomic cycles. Researchers in that field distinguish between shocks and their propagation mechanism as two different and independently interesting issues. For instance, a cycle could be caused by a productivity shock that it is propagated through many alternative mechanisms. In the case of civil wars, the situation is similar although identification is more difficult. In principle some factors that may affect the onset of a civil war could have no impact on its duration. For instance, in many situations civil wars start by random acts, which trigger, given a particular propagation mechanism, fully-fledged conflicts. Conflict onset is a very unpredictable event. In many conflicts the onset is related with some unpredictable shocks like, for instance, the original trigger of the genocide in Rwanda. In addition, if we are dealing with rare

(infrequent) events there is a strong statistical argument in favor of analyzing incidence or duration instead of onset. In a cross-sectional analysis, incidence and onset are the same. The dependent variable is a dummy that has a value of 1 if the country suffered a civil war during the period 1960-2005, and zero otherwise. Moreover, we are interested in analyzing the effect of variables that are very stable over time. We are interested in analyzing whether institutions are a propagation mechanism for conflict. Therefore cross-sectional analysis is the appropriate specification to be used to answer this question. Finally, with cross-sectional estimation, we can use the per capita income in 1960, and therefore, we reduce the endogeneity problem between per capita income and civil war. Nevertheless, in the robust analysis we show how results are robust to consider per capita income as an endogenous variable. We are aware, however, of the disadvantage of using cross-sectional instead of panel data. Our main problem of using a cross-section is that we cannot control for cross-country heterogeneity.

The explanatory variables follow the basic specifications of the literature on civil war, Montalvo and Reynal-Querol (2005), Fearon and Laitin (2003), Collier and Hoeffler (2002), and Doyle and Sambanis (2000). Fearon and Laitin (2003) argue that income per capita is a proxy for the "state's overall financial, administrative, police and military capabilities". Once a government is weak, rebels can expect a higher probability of success. In addition, a low level of income per capita reduces the opportunity cost of engaging in conflict. Recently Miguel et al. (2004) argued that the measurement of the impact of GDP growth on civil wars is complicated since there are endogeneity issues. Their set-up is very different from ours. They use annual data and GDP growth. In this situation the potential endogeneity problem of GDP growth with respect to conflict is very high. For this reason Miguel et al. (2004) use rainfall as an instrument for GDP growth. We use a cross-

section for civil wars and the GDP per capita at the beginning of the period. This set-up reduces the potential endogeneity problem.

The size of the population is another common suspect in the explanation of conflict. Collier and Hoeffler (2002) consider that the size of the population is 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.

Population and per capita income are the only two variables that researchers have agreed as being potential causes of civil war and, their effect on civil war is probably one of the most robust (See Hegre and Sambanis (2006)). Therefore the explanatory variables for the core specification of the probability of civil wars includes the log of real GDP per capita in 1960 (lgdp60) and the log of the population in 1960 (lpop60). Using this core specification we start the analysis by checking the empirical performance of institutions. We calculate the mean of the institutional variable of the period in which data is available. In the case of the ICRG, the period is 1984-1999 and for the protection against expropriation risk we have the average for the 1985 -1995 period. The results on the effect of Institutions on civil war are robust to the inclusion of many other variables that have been studied in the literature such as mountains, non-contiguous state, natural resources or ethnic polarization among others.

We first show some preliminary results using the logit specification, and then we analyze the relationship between institutions and civil war addressing the endogeneity problem between institutions and conflict, using the IV-2SLS approach.

## 5. Results using a logit specification

In this section we present the estimation of a logit model for the probability of civil wars. We use a sample of 211 countries. The logit equation is the following:

$$\Pr ob(conflict_{i60-05} = 1) = \Lambda(\alpha + \beta_1 \lg dp_{i60} + \beta_2 lpop_{i60} + \beta_3 av\_inst)$$

where *conflict* is a dummy variable that has a value of 1 if the country had a civil war during the period 1960-2005 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, *av_inst* is the average of the institutional measure between 1985 and 1995 for the protection against expropriation risk, between 1984 and 1999 for the ICRG law and order measure. The ideal set-up would be to have information on the quality of institutions before the 60s, however data is not available for that period. In this context this should not be a problem, since it is well known that institutions persist, and the correlation between institutions of the 60s and institutions today is high. In any case, we address the endogeneity issue in the next section. Following AJR (2001) which finds that poor quality of institutions explains poor economic development, then in this equation per capita income should capture any effect of per capita income that does come from institutional development.

In column 1 of Table 3 we first analyze the effect of the two core variables, population and per capita income on the probability of civil war. In line with the previous literature, we find that poor countries have a higher risk of conflict, as well as highly populated countries in comparison with rich, small countries. In column 2 we include our first proxy for institutions, the protection against the risk of expropriation. The results show that countries with high protection against expropriation risk have a lower probability of civil wars than countries with low protection. When we include the

core variables in civil war regression, in column 3, this result is maintained, and per capita income loses its significant effect, while population keeps its positive and significant effect on civil wars. In columns 4 and 5, we include the law and order institutional variable. The results indicate that countries with a weak legal system have a higher probability of civil war than countries with strong legal system. In column 5, we include together per capita income, population and law and order. Once we include institutions and the two core variables together, we find that per capita income is no longer significant, whereas law and order is still significant.

## 5.1. Robust to the inclusion of other theories

In this section we check whether the main 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 (2002) 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. We include variables that capture the percentage of world gold, iron, silver, zinc and oil reserves. Following Fearon and Laitin (2003) mountains are another dimension of opportunity since this terrain could provide a safe haven for rebels. And long distances from the center of the state's power also favors the incidence of civil wars, specially if there is a natural frontier between them, like a sea or other countries. Montalvo and Reynal-Querol (2005a 2005b) show theoretically and empirically that ethnic polarization matters in the explanation of the likelihood of conflicts and civil wars. Finally many authors controlled for democracy.

From columns 1 to 5 of table 4, we include these variables together with our core variables. From columns 6 to 10 we perform the same exercise but including the institutional variable. As before,

the results indicate that once the institutional variable is included, per capita income loses its significant effect on civil wars, while institutions keep their negative and significant effect.

## 5.2 Robust to the use of ex-colonies sample

Since the analysis using 2SLS is restricted to the sample of ex-colonies, due to the availability of the instruments used in the identification strategy, in table 5 we perform the same analysis as for table 3 but using the sample of 113 ex-colonies, to show that the results are robust. The results are similar to the ones obtained using the whole sample. In particular, if we go from the median of the avexp variable to the percentile 75, the probability of suffering a civil war is reduced by 15 percentage points. In all the specifications, institutions exhibit the expected effect and sign, and per capita income turns out to be insignificant when included together with institutions.

Overall these results suggest that institutions could matter in explaining conflict, and that they probably matter more than poverty *per se*. However, logit estimation is very problematic in this type of specifications due to the possibility of reverse causality between institutions and civil wars, especially when the institutional variable is calculated at the end of the period. Although the data on institutions is very persistent, we perform the same analysis considering institutions as an endogenous variable.

## 6. Institutions and civil war: an Instrumental variable approach

One way of looking at the endogeneity problem is to run an instrumental variable estimation for civil wars disregarding the fact that this is a 0-1 variable that is an 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 very close to the average treatment effect obtained using a bivariate probit model. Therefore this approach has sound theoretical support. Moreover, following Angrist and Krueger (2001), the IV-2SLS method is typically preferred even in cases in which the dependent variable is dichotomous since strong specification assumptions are required to justify the Achen and related Rivers and Vuong (1988) methods.

When using the IV-2SLS approach, we need to find an instrument for institutions. As always, the choice of instruments is a complicated matter. We have to find variables correlated with institutions and uncorrelated with the residual of the regression for civil wars. To start with, we follow the literature on institutions and development that provide very useful instruments for institutions. The work of Acemoglu, Johnson and Robinson (2001), emphasizes the role of European settler mortality rates to estimate the effect of institutions on development. In places where Europeans faced high mortality rates, they could not settle and were more likely to set up extractive institutions. These institutions persist at present. We also consider differences between British colonies and colonies from the other big imperial powers (French, Spanish and Portuguese colonies). This last group of colonies basically comprises civil law countries. AJR (2001) find that colonial identity was not an important determinant of institutional development, although legal origin was. In their set up, they include a dummy for the British and a dummy for the French colonial origin. The other colonial origin was the omitted dummy variable. We include the colonial dummies using a different grouping cluster from AJR (2001). We aggregate the original dummies for colonial origin into three groups. Col_br is a dummy that has a value of 1 if the country was an old British colony and zero otherwise. The Col_frsppor variable has a value of 1 whether the country was an old colony of France, Spain or Portugal, and zero otherwise. Col_oth is a dummy

variable that has a value of 1 whether the country was a colony of the other colonial powers, and zero otherwise. In this aspect, the way we include colonial origin is closely related with the studies that emphasize the role of the legal transplantation to explain institutional development as in Laporta (1999), Djankov et al. (2002), Djankov et al (2003) and Botero et al. (2004) among others, who find significant differences between common law and civil law countries. They argue that as "European powers conquered much of the world, they brought with them their institutions, including their laws. During his war, Napoleon exported the French legal system to Spain, Portugal and Holland". They argued that "through colonial conquest, it was transplanted to Latin America, to large parts of Europe and North and West Africa, and part to the Caribbean and Asia. The common law tradition was transplanted by England to the US, Canada, Australia, New Zealand, East Africa, to large parts of Asia, including India, and to parts of the Caribbean". They conclude that having a tradition of common law or a civil law is the main determinant of economic institutions today. Laporta et al. (1999) and Djankov et al. (2002, 2003) divide national legal traditions into Common law, French civil law, German civil law, Scandinavian law, and socialist law.

We analyze the effect of institutions on civil war, using the instruments provided by the literature for the institutional variable: log of European settler mortality from AJR (2001) and the dummies for the colonial origin from AJR(2001) but using the grouping criteria explained above. The common idea in the literature is that there are some historical roots that are based on the European influence during colonization that explain institutional development, and that have nothing to do with contemporaneous factors, either economic development or civil wars as in our case. The exclusion restriction implied by our instrumental variable regression is that, conditional on the

controls included in the regression, settler mortality and colonial origin have no effect on civil wars other than their effect through institutional development.

$$conflict_{i60-05} = \alpha + \beta_1 \lg dp_{i60} + \beta_2 lpop_{i60} + \beta_3 av\_inst + \varepsilon_i$$

$$av\_inst_i = \delta_1 col\_orig + \delta_2 \ln mortal + \omega_i$$

Where col_orig is the set of dummy variables for colonial origin, and *lnmortal* is the log of European settler mortality. The omitted dummy variable is the British colonial origin. Our main sample is the 113 ex-colonies.

### 6.1 Empirical results

In Table 6 we analyze the effect of the average protection against expropriation risk on the probability of civil wars using the IV-2SLS specification. The first eight columns do not include per capita income and population. In the first column we use the log of European settler mortality as an instrument for institutions. As in AJR (2001), first stage results suggest that countries where Europeans faced large settler mortality rates have lower protection against expropriation risk than countries where Europeans faced a healthier environment. Results of civil war regression indicate that the higher the protection against expropriation risk, the lower the probability of civil war. Following AJR (2001), settlements were affected by European settler mortality rates. Therefore, in order to obtain more observations, we include the percentage of European population or of European descendents in 1900, instead of the European settler mortality, as an alternative instrument. Results are in columns 2 and 3. In column 2 the analysis is restricted to the sample for which we have mortality data to show that results when using European settlement in 1900 are

similar to when using settler mortality data, and in column 3 we do not restrict the sample in order to have more observations. As expected, European settlement in 1900 exhibits a positive and significant effect in explaining protection against expropriation risk. In column 4 we include the dummies of colonial origin as an instrument for institutions. First stage results indicate that countries with French, Spanish or Portuguese colonial origin have lower protection against expropriation risk than countries of English colonial origin[7]. Since countries of French, Spanish and Portuguese colonial origin are related with civil law countries, we include alternatively, a dummy for French legal origin instead of colonial origin variables. Results indicate that countries with French legal origin have weaker institutions than countries with English legal origin. This result is in line with Djankov et al. (2002, 2004), Botero et al (2003) among others, who find that countries of French legal origin have worse institutions than countries of English legal origin. In column six, we include both instruments together, European settler mortality and dummies for colonial origin. The first stage relationship between institutions, colonial origin and European settler mortality is strong. The F test for excluded instruments is large (F= 8.74), which implies that the instruments do not seem to be weak. In columns 7 and 8 we substitute the settler mortality variable with the European settlement in 1900 in order to have more observations, and qualitatively we obtain the same results. In column 7, the analysis is restricted to the sample for which we have mortality data to show that results when using European settlement in 1900 are similar to when using mortality data. In column 8 we use all observations. The first stage relationship between institutions, colonial origin and European settlement in 1900 is stronger, and the F test for excluded instruments is larger than when using mortality data (F=12.19). In all specifications, the results of civil war regression show the negative and significant effect of protection against expropriation risk on the probability of civil wars.

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[7] If we include the dummies in the same way as AJR(2001), we also find no significant effect.

The regression of civil wars includes only the institutional variable and the results show that countries with strong protection against expropriation risk have a lower probability of civil war than countries with low protection. From columns (9) to (11) we perform the same analysis but we include our core variables in the civil war regression: per capita income and population. The results of civil war regression show that protection against expropriation risk affects the probability of civil war negatively and significantly. Improving the institutional framework of a country from the value of the median to the percentile 75, the probability of civil war is reduced by 38 percentage points. Notice that the magnitude of this effect doubles the magnitude of the effect when we do not use instruments. When we include the institutional variable in the regression, per capita income becomes insignificant in all specifications. As before, first stage results show that colonial origin matters in explaining institutional development. In this specification, the log of European settler mortality is not significant. However, in columns 10 and 11 we substitute the log of European settler mortality with the percentage of Europeans or European descent in 1900. In this case settlement is not significant either when we restrict the analysis to the sample for which there are mortality data (column 10). However in column 11, when we use all the data available, European settlement in 1900 has a significant and positive effect in explaining institutional development, together with the colonial origin. This means that the insignificant effect of European settler mortality on institutional development is due to the reduced sample size, since European settlement in 1900 is also insignificant with the reduced sample, but becomes significant with the extended sample for which we do not have enough data on European settler mortality. Notice that while per capita income does not have any direct effect on civil wars, it has an indirect effect through worsening institutions, when we use the reduced sample in columns 9 and 10. However, once we include European settlement in 1900 with all the data available (column 11), per capita income

does not have any effect on institutions. This result indicates that what matters in explaining institutions is not the per capita income, but some other historical characteristics of colonization that are captured in the European settlement in the 1900 variable. This result is related to the results of AJRY (2006), where they revisit one of the central empirical findings of the literature on political economy (the relationship between income and democracy). They argue that existing studies establish a strong cross-country correlation between income and democracy but do not typically control for factors that simultaneously affect both variables. They show that controlling for such factors removes the statistical association between income per capita and various measures of democracy.

In Table 7, we perform the same analysis as table 6 but using the law and order index from ICRG. We show the main results, which correspond to columns 6, 8, 9 and 11 of table 6. When using the ICRG variable, the results are very similar to the ones in table 5 where we use the protection against expropriation risk. The stronger the legal system, the lower the probability of civil war. Moreover, in all specifications, per capita income does not exhibit any effect on civil war. The first stage results are also in line with the results in table 6. Colonial origin and European settlement in 1900 exhibits a significant effect on the law and order variable. Once European settlement in 1900 is included as instrument, per capita income does not exhibit any indirect effect.

Overall, these results indicate that institutions matter in understanding the causes of civil war, and that once institutions are included in civil war regression, per capita income does not have any significant effect, which suggest that we should move on to a theory on civil wars which gives an important role to institutions rather than poverty.

## 6.2. Over-identification tests

In this section we investigate the validity of our exclusion restriction condition. Following our approach, the exclusion restriction implied by our instrumental variable regression is that, conditional on the controls included in the regression, European settlement in 1900 and colonial origin have no effect on civil wars other than their effect through institutional development. The Sargan test for over-identification cannot reject the null hypothesis that the instruments satisfy the orthogonality conditions (p=0.74).

Another issue of importance is to consider the European Settlement in 1900 and colonial origin as included instruments, and therefore incorporate them into civil war regression and analyze whether they have any direct effect on civil wars. We approach the problem with two different strategies. In the first we add no new instrument. Therefore, to analyze the direct effect of colonial origins on civil wars, we assume that European settlement in 1900 is exogenous and therefore satisfies the orthogonality condition, and to analyze the direct effect of the European Settlement in 1900 on civil wars, we assume that colonial origin satisfies the orthogonality condition. Results are shown in columns 1 and 2, and 4 and 5 of Table 8. In columns 1 and 2 we use the protection against expropriation risk as our institutional variable, and in columns 4 and 5 we use the law and order. In columns 1 and 4 we check the validity of the colonial origin instrument, and in columns 2 and 5 the validity of the European settlement in 1900. The results indicate that colonial origin and the European settlement in 1900 have no significant direct effect on civil war.

Our second approach to the problem consists of using additional variables as instruments, and considering our variables of interest, (European settlement in 1900 and colonial origin), as included instruments together. The excluded instruments we use are a set of dummy variables that describe

the quality of the soil, and are dummies for steppe (low latitude), desert (low latitude), steppe (middle latitude), desert (middle latitude), dry steppe wasteland, desert dry winter, and highland. Results are shown in columns 3 and 6 of table 8. In this exercise we investigate the validity of the colonial origin and European settlement in 1900 as instruments together. Results indicate that colonial origin and European settlement in 1900 have no direct effect on civil war, and they only affect conflict through its effect on institutions.

## 6.3. Robustness to the use of additional instruments

In Table 9 we test the robustness of our results to the inclusion of some additional instruments[8]. We run four different specifications for each of the two institutional variables. From columns 1 to 4 we use protection against expropriation risk, and from columns 5 to 8 we use law and order. In the first specification, we include the absolute value of the latitude of the country. This variable measures the distance from the equator and is scaled to take values between 0 and 1, where 0 is the equator. Although it is not clear why latitude should have any effect on institutions, many authors such as Laporta et al. (1999) have used it as a determinant of institutional development. In the second specification we include the time since independence, which is constructed subtracting the year of independence from 1995. The idea is that the longer the period with independence, the greater the probability that institutions will be stronger and more stable. In the third specification we include a variable that captures the health environment in 1900. We choose yellow fever. This is a dummy that equals 1 if there are yellow fever epidemics before 1900 and 0 otherwise. Finally in the fourth specification we include some variables that capture the quality of the soil. As before, in all four specifications, second stage results show the negative and significant effect of institutions on civil wars, and the lack of significance of per capita income. Moreover, first stage results indicate that

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[8] This variable has been provided by AJR (2001).

colonial origin and European settlement in 1900 keep their expected significant effect and sign, while they reinforce the idea that once historical variables are controlled for, per capita income does not exhibit any indirect effect through institutions.

### 6.4 Robustness to regional samples.

In Table 10 we check the robustness of our results using different samples. From columns 1 to 2 we use the protection against expropriation risk as the institutional variable, and from columns 3 to 4 we use the law and order variable. For each of the institutional variables we run two specifications. In the first case we drop the ex-colonies that have been identified as Neo-Europes, which are Australia, Canada, United States and New Zealand. Columns 1 and 3 show that the results of the effect of institutions on civil wars found in previous sections are not driven by the inclusion of the Neo-Europes in the sample. In the second specification, columns 2 and 4, we show that our results are robust to the elimination of African countries from the sample of ex-colonies. In all specifications the institutional variable exhibits the expected effect and sign in the civil war regression, while per capita income does not exhibit any significant effect. Moreover, first stage results show that colonial origin and European settlement in 1900 exhibit their expected effect and sign.

## 7. Contracting Institutions and civil war

Finally we check the validity of our results using another type of data on institutions, in particular a variable that captures the efficiency of the legal system. Our purpose is to show that even the efficiency of the government in solving disputes between private agents affects conflict. The methodology of this data is described in Djankov et al (2003). Table 11 lists the ranking of

countries with the lowest and the highest index of efficiency of the judicial (or administrative) system in the collection of overdue debt. The index has been standardized between 0 and 100. Column 1 indicates the number of procedures mandated by law or court regulation that demand interaction between the parties, or between them and the judge (or administrator) or court officer, which are recorded. Twelve of the fifteen less efficient countries had a civil war during the 1960-05 period. On the other hand, only five of the fifteen countries with the most efficient legal system suffered conflict.

Data on economic institutions come from the Doing Business project database of the World Bank[9]. The Doing Business database provides objective measures of business regulations and their enforcement. The Doing Business indicators are comparable across 155 economies. They indicate the regulatory costs of business and can be used to analyze specific regulations that enhance or constrain investment, productivity and growth. We obtain a similar ranking if we use other data on regulation, such as rigidity of employment, entry procedures or bankruptcy indicators.

In table 12 we perform the basic analysis using the efficiency of the legal system as the institutional variable. In the first four columns we perform the logit analysis done in tables 4 and 5, and from columns 4 to 8 we perform the IV analysis using the specification of table 7. In columns 1 and 2 we use the whole sample of countries, and in columns 3 and 4 we use the sample of ex-colonies. The results indicate that the less efficient the legal system, the higher the probability of conflict. Once we include this index together with the core variables, we find that per capita income, together with population and regulation have a significant effect on conflict. The only result which is different from the results when using the protection against expropriation risks and law and order, is that per capita income is significant when included together with the variable that captures contracting

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[9] Doing Business database is available at http://www.doingbusiness.org. We use the 2004 version.

institutions, although this result is not robust once we take into account the reverse causality between institutions and civil wars. This analysis considering the reverse causality is shown from columns 5 to 8 .When using the efficiency of the legal system as our institutional variable, we use the legal origin instead of the colonial origin following Djankov et al (2003) who find strong effects of legal origin on the efficiency of the legal system. Results are robust to the use of colonial origin. The first stage shows that while the legal origin is a strong instrument for contracting institutions, the log of European settler mortality is not significant when we include per capita income in the civil war regression. The insignificant effect of the settlement variables on the efficiency of the legal system is in line with the results of Acemoglu et al. (2005).  In the civil war regression, contracting institutions exhibits a significant and positive effect on civil war which indicates that the larger the number of procedures needed to collect a check in court, that is to say, the less efficient the legal system, the higher the probability of a civil war. Per capita income does not have any significant direct or indirect effect on civil war.

## 8. Endogeneity of per capita income.

Although the use of a cross-section specification considerably reduces the endogeneity problem between per capita income and civil war, we wish to check whether our results are robust if we consider per capita income in 1960 as an endogenous variable. We analyze this in table 13. In models with two endogenous variables, instruments can be weak. Stock and Yogo (2003) provide a framework that allows testing the hypothesis of weak instruments in models with more than one endogenous variable. Although we are aware of these tests, we approach this issue in a more intuitive, although probably less rigorous, way: First of all, we identify an instrument which affects per capita income but does not affect institutions. At the same time, we need to find an instrument

that explains institutions but not per capita income, which is a difficult task. Fortunately we find that while colonial origin is a strong predictor of the quality of institutions, it does not predict per capita income besides its effect on institutions. Moreover, Landlocked is a strong predictor of per capita income but not of institutions. These two instruments are practically uncorrelated. The correlation between Landlocked and Col_frsppor origin is 0.01, and the correlation between Landlocked and British colonial origin is –0.04.

Before considering institutions and per capita income as endogenous variables together, we first analyze the results considering only per capita income as an endogenous variable. One could think that the results in previous sections may be bias because, while we address the endogeneity problem between institutions and civil war, we do not address the endogeneity problem between per capita income and civil war. Because of this, in the first two columns we consider only per capita income as an endogenous variable. In column 1 we do not include institutions. The instruments for per capita income are Landlocked and European settlement in 1900. There is a strong relationship between Landlocked, European settlement in 1900 and per capita income. Moreover the instruments are strong. The F of excluded instruments is above the usual threshold (F=20). Second stage results indicate that per capita income has a negative and significant effect on civil war, in line with the results we obtained in column 1 of table 4. In columns 2 and 4 we include institutions as an exogenous variable, and per capita income as an endogenous variable. In column 2 we use the protection against expropriation risk, and in column 4 we use law and order. While first stage results are similar to results in column 1, second stage results are not. Once institutions are included, per capita income does not have any effect on civil wars, while institutions negatively and significantly affect civil wars. In columns 3 and 5 we consider institutions and per capita income as endogenous variables. In column 3 we use the protection against expropriation risk and

in column 5 we use law and order. The instruments for institutions are colonial origin and European settlement in 1900. The instruments for per capita income are European settlement in 1900 and Landlocked. Although European settlement affects both endogenous variables, we assume that Landlocked only affects per capita income, and colonial origin only affects institutions.

First stage results indicate that while European settlement is a good predictor for per capita income and for institutions, colonial origin is a good instrument only for institutions, and Landlocked is a good instrument only for per capita income. Results of the civil war regression corroborate that per capita income does not affect civil war in the presence of institutions, while institutions keeps its negative and significant effect on civil wars.

## 9. Conclusions

The dominant idea in the empirical literature on civil wars is that poverty is the main cause of conflict. However, the literature pays little attention to the role of institutions on conflict. In this paper we analyze the effect of institutions on civil wars. To estimate the impact of institutions on the probability of suffering a civil war, we follow the literature that analyzes the role of institutions on development.

The main innovation of this paper is to consider the role of the quality of institutions in explaining civil war. We use a broad measure of the quality and efficiency of institutions as our basic variable and we address the potential endogeneity between institutions and conflict. Using a cross-section of countries and data on civil war from 1960-2005, the results of this paper indicate that the quality of institutions is an important determinant of the likelihood of a conflict. Moreover, once institutions are considered, per capita income does not have any significant direct or indirect effect in

explaining civil wars. This indicates that what matters for conflict could be institutional development rather than poverty *per se*.

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Table 1: Ranking of the fifteen excolonies with the lowest and the highest average protection of expropriation risk.

| Countryname | Avexpr | countryname | avexpr |
|---|---|---|---|
| **Iraq** | 1.63 | United States | 10 |
| **Somalia** | 3 | New Zealand | 9.72 |
| **Congo, Dem. Rep.** | 3.5 | Canada | 9.72 |
| **Haiti** | 3.72 | Singapore | 9.31 |
| **Sudan** | 4 | Auatralia | 9.31 |
| **Mali** | 4 | **Israel** | 9.54 |
| **Burkina Faso** | 4.45 | **Cyprus** | 8.4 |
| **Uganda** | 4.45 | **Gambia, The** | 8.27 |
| **Madagascar** | 4.45 | **India** | 8.27 |
| **Guinea-Bissau** | 4.54 | Hong Kong | 8.13 |
| **Congo, Rep** | 4.68 | Bahrain | 8 |
| **El Salvador** | 5 | **Malaysia** | 7.95 |
| **Niger** | 5 | Brazil | 7.90 |
| **Guatemala** | 5.13 | **Chile** | 7.81 |
| **Bangladesh** | 5.13 | **Gabon** | 7.81 |

Table 2: Ranking of the fifteen excolonies with the lowest and the highest law and order index.

| Countryname | laworder | countryname | ICRGlaworder |
|---|---|---|---|
| **Guinea-Bissau** | 1 | Australia | 6 |
| **Congo, Dem.Rep** | 1.06 | United States | 6 |
| **Colombia** | 1.43 | New Zealand | 6 |
| **Iraq** | 1.62 | Canada | 6 |
| **Haiti** | 1.62 | Singapore | 5.37 |
| **Bolivia** | 1.81 | Hong Kong | 4.93 |
| **Guatemala** | 1.81 | Namibia | 4.8 |
| **Sri Lanka** | 1.81 | Botswana | 4.73 |
| **Angola** | 1.87 | Bahrain | 4.62 |
| **El Salvador** | 1.87 | **Saudi Arabia** | 4.43 |
| **Bangladesh** | 1.87 | **Chile** | 4.37 |
| **Peru** | 1.87 | Qatar | 4.26 |
| **Sudan** | 2. | Malta | 4.21 |
| **Somalia** | 2 | **Malaysia** | 4.18 |
| **Nigeria** | 2.06 | Oman | 4.12 |

Table 3: Logit analysis. Sample all countries.

|  | PRIOCW (1) | PRIOCW (2) | PRIOCW (3) | PRIOCW (4) | PRIOCW (5) |
|---|---|---|---|---|---|
| Lngdp60 | -1.13 | | 0.29 | | 0.32 |
| | (-4.05) | | (0.71) | | (0.81) |
| Lpop60 | 0.33 | | 0.37 | | 0.33 |
| | (2.17) | | (1.89) | | (1.60) |
| Avexpr | | -0.99 | -1.28 | | |
| | | (-5.66) | (-4.71) | | |
| ICRGlaword | | | | -1.24 | -1.67 |
| | | | | (-6.28) | (-5.12) |
| | | | | | |
| Constant | 3.63 | 7.62 | 2.06 | 4.75 | -0.79 |
| | (1.46) | (5.71) | (0.53) | (6.14) | (-0.19) |
| | | | | | |
| N | 128 | 121 | 110 | 140 | 110 |
| R-squared | 0.1691 | 0.3083 | 0.3884 | 0.2944 | 0.4263 |

z-statistics between parenthesis.

Table 4 : Logit analysis. Sample all countries.

| | PRIOCW (1) | PRIOCW (2) | PRIOCW (3) | PRIOCW (4) | PRIOCW (5) | PRIOCW (6) | PRIOCW (7) | PRIOCW (8) | PRIOCW (9) | PRIOCW (10) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Avexpr** | | | | | | **-1.29** | **-1.31** | **-1.40** | **-1.30** | **-1.41** |
| | | | | | | **(-4.06)** | **(-4.05)** | **(-3.99)** | **(-3.95)** | **(-4.49)** |
| Lngdp60 | -1.31 | -1.26 | -1.22 | -1.14 | -1.12 | 0.11 | 0.18 | 0.13 | 0.13 | 0.09 |
| | (-4.10) | (-3.93) | (-3.69) | (-3.44) | (-2.59) | (0.20) | (0.33) | (0.25) | (0.25) | (0.14) |
| Lpop60 | 0.37 | 0.31 | 0.35 | 0.43 | 0.27 | 0.50 | 0.55 | 0.46 | 0.55 | 0.47 |
| | (2.30) | (1.73) | (1.78) | (2.02) | (0.96) | (1.93) | (1.91) | (1.56) | (1.70) | (1.16) |
| Goldm | 0.11 | 0.10 | 0.10 | 0.10 | 0.08 | 0.07 | 0.07 | 0.07 | 0.06 | 0.05 |
| | (2.57) | (2.52) | (2.42) | (2.22) | (2.04) | (1.87) | (1.75) | (1.83) | (1.61) | (1.19) |
| Iron | -0.69 | -0.66 | -0.69 | -0.87 | -0.79 | -0.85 | -0.82 | -0.73 | -0.78 | -0.79 |
| | (-1.66) | (-1.60) | (-1.60) | (-1.93) | (-1.87) | (-1.90) | (-1.82) | (-1.59) | (-1.74) | (-1.60) |
| Silv | 0.15 | 0.13 | 0.11 | 0.01 | -0.01 | -0.16 | -0.14 | -0.09 | -0.13 | -0.14 |
| | (0.76) | (0.67) | (0.55) | (0.05) | (-0.08) | (-0.88) | (-0.74) | (-0.50) | (-0.74) | (-0.71) |
| Zinc | 0.01 | 0.01 | 0.04 | 0.14 | 0.17 | 0.41 | 0.37 | 0.30 | 0.30 | 0.32 |
| | (0.02) | (0.04) | (0.13) | (0.46) | (0.64) | (1.25) | (1.12) | (0.90) | (0.94) | (1.03) |
| Oilres | 0.000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | (1.65) | (1.58) | (1.53) | (1.97) | (2.10) | (1.95) | (2.03) | (2.13) | (2.50) | (2.49) |
| Mount | | 0.01 | 0.01 | 0.002 | -0.004 | | -0.012 | -0.01 | -0.02 | -0.03 |
| | | (0.54) | (0.47) | (0.29) | (-0.34) | | (-0.65) | (-0.57) | (-0.75) | (-1.08) |
| Ncontig | | | -0.36 | 0.01 | -0.04 | | | 0.92 | 1.3 | 1.00 |
| | | | (-0.54) | (0.02) | (-0.05) | | | (1.13) | (1.48) | (0.89) |
| ETHPOL | | | | 2.85 | 3.38 | | | | 2.75 | 3.22 |
| | | | | (2.79) | (2.81) | | | | (2.09) | (2.12) |
| Democ1965 | | | | | 0.01 | | | | | 0.06 |
| | | | | | (0.13) | | | | | (0.52) |
| Constant | 4.39 | 4.85 | 4.04 | 0.48 | 2.77 | 1.26 | 0.28 | 2.49 | -1.07 | 1.01 |
| | (1.35) | (1.41) | (1.05) | (0.12) | (0.48) | (0.22) | (0.05) | (0.42) | (-0.17) | (0.13) |
| N | 120 | 115 | 115 | 114 | 96 | 106 | 104 | 104 | 103 | 90 |
| R-squared | 0.2336 | 0.2163 | 0.2181 | 0.2679 | 0.2819 | 0.4297 | 0.4293 | 0.4373 | 0.4651 | 0.4894 |

Table 5: Logit analysis. Sample of Excolonies

| | PRIOCW (1) | PRIOCW (2) | PRIOCW (3) | PRIOCW (4) | PRIOCW (5) |
|---|---|---|---|---|---|
| Lngdp60 | -0.92 (-2.28) | | 0.09 (0.20) | | 0.13 (0.32) |
| Lpop60 | 0.66 (2.89) | | 0.42 (2.22) | | 0.43 (1.91) |
| Avexpr | | -0.88 (-4.20) | -1.00 (-3.19) | | |
| ICRGlaword | | | | -1.35 (-4.66) | -1.30 (-3.71) |
| Constant | -2.49 (-0.60) | 6.88 (4.54) | 0.83 (0.21) | 5.31 (4.94) | -2.14 (-0.49) |
| N | 95 | 87 | 80 | 88 | 81 |
| R-squared | 0.1887 | 0.1880 | 0.2613 | 0.2542 | 0.3004) |

z-statistics between parenthesis.

Table 6  IV –2SLS  analysis.

| | PRIOCW (1) | PRIOCW (2) | PRIOCW (3) | PRIOCW (4) | PRIOCW (5) | PRIOCW (6) | PRIOCW (7) | PRIOCW (8) | PRIOCW (9) | PRIOCW (10) | PRIOCW (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Avexpr | -0.27 (-4.24) | -0.22 (-5.95) | -0.20 (-4.44) | -0.35 (-2.44) | -0.28 (-2.58) | -0.26 (-4.42) | -0.22 (-7.86) | -0.24 (-7.37) | -0.36 (-2.98) | -0.33 (-2.58) | -0.38 (-4.35) |
| Lngdp60 | | | | | | | | | 0.17 (1.23) | 0.14 (0.87) | 0.20 (1.58) |
| Lpop60 | | | | | | | | | 0.09 (1.81) | 0.08 (1.42) | 0.07 (1.71) |
| Constant | 2.50 (6.11) | 2.23 (8.68) | 1.97 (6.59) | 2.96 (3.22) | 2.52 (3.58) | 2.44 (6.43) | 2.24 (11.25) | 2.28 (10.17) | 0.51 (0.52) | 0.72 (0.64) | 0.59 (0.66) |
| N | 67 | 66 Sample of mortality | 86 | 87 | 87 | 67 | 66 Sample of mortality | 86 | 66 | 65 Sample of mortality | 79 |
| First Stage | Avexpr | Avexpr | Avexpr | Avexpr | Avexpr | Avexpr | Avexpr | Avexpr | Avexpr | Avexpr | Avexpr |
| Lngdp60 | | | | | | | | | 0.94 (4.35) | 0.79 (2.69) | 0.38 (1.44) |
| Lpop60 | | | | | | | | | 0.06 (0.65) | 0.06 (0.59) | -0.02 (-0.25) |
| Col_frspport | | | | -0.79 (-2.42) | | -0.62 (-1.82) | -0.96 (-3.17) | -0.91 (-3.18) | -0.72 (-2.35) | -0.84 (-2.78) | -0.79 (-2.54) |
| Col_other | | | | -1.05 (-1.65) | | -0.68 (-1.10) | -0.62 (-1.07) | -0.73 (-1.30) | 0.13 (0.22) | 0.01 (0.01) | -0.09 (-0.14) |
| Legor_fr | | | | | -0.94 (-3.02) | | | | | | |
| LnACmortality | -0.59 (-4.70) | | | | | -0.51 (-3.89) | | | -0.16 (-1.13) | | |
| Euro1900 | | 0.031 (5.19) | 0.03 (4.88) | | | | 0.03 (5.29) | 0.03 (5.26) | | 0.01 (1.20) | 0.02 (2.90) |
| constant | 9.25 (15.21) | 5.98 (33.29) | 6.09 (37.02) | 6.92 (30.22) | 7.01 (29.98) | 9.24 (15.39) | 6.55 (26.03) | 6.55 (30.67) | -0.08 (-0.03) | 0.10 (0.04) | 4.13 (1.60) |
| R-squared | 0.2538 | 0.2962 | 0.2209 | 0.0770 | 0.0967 | 0.2940) | 0.3947 | 0.3084 | 0.4639 | 0.4653 | 0.3379 |

z-statistics between parenthesis.

Table 7.  IV-2SLS.

| | PRIOCW | PRIOCW | PRIOCW | PRIOCW |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| | | | | |
| Laword | -0.36 | -0.32 | -0.45 | -0.43 |
| | (-5.26) | (-6.65) | (-3.06) | (-5.02) |
| Lngdp60 | | | 0.14 | 0.16 |
| | | | (1.11) | (1.73) |
| Lpop60 | | | 0.05 | 0.05 |
| | | | (1.44) | (1.52) |
| Constant | 1.87 | 1.71 | 0.25 | 0.15 |
| | (9.22) | (11.21) | (0.25) | (0.20) |
| | | | | |
| N | 67 | 87 | 66 | 80 |
| | | | | |
| First Stage | laword | laword | laword | laword |
| Lngdp60 | | | 0.71 | 0.31 |
| | | | (3.96) | (1.70) |
| Lpop60 | | | -0.03 | -0.10 |
| | | | (-0.33) | (-1.44) |
| Col_frspport | -0.43 | -0.81 | -0.55 | -0.73 |
| | (-1.52) | (-3.95) | (-2.14) | (-3.46) |
| Col_other | -0.38 | -0.43 | 0.33 | 0.08 |
| | (-0.73) | (-1.07) | (0.67) | (0.18) |
| LnACmortality | -0.38 | | -0.13 | |
| | (-3.51) | | (-1.11) | |
| Euro1900 | | 0.02 | | 0.02 |
| | | (5.68) | | (3.43) |
| | | | | |
| Constant | 5.09 | 3.23 | -0.75 | 2.50 |
| | (10.29) | (21.51) | (-0.34) | (1.42) |
| | | | | |
| R-squared | 0.2437 | 0.3501 | 0.4122 | 0.3843 |

z-statistics between parenthesis.

Table 8. IV-2SLS. Overidentification analysis.

| | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Avexpr | -0.37 | -0.40 | -0.27 | | | |
| | (-2.73) | (-2.57) | (-2.51) | | | |
| Laword | | | | -0.44 | -0.44 | -0.031 |
| | | | | (-3.49) | (-3.17) | (-2.29) |
| Lngdp60 | 0.19 | 0.20 | 0.23 | 0.17 | 0.16 | 0.13 |
| | (1.08) | (1.53) | (1.89) | (1.37) | (1.70) | (1.44) |
| Lpop60 | 0.07 | 0.07 | 0.08 | 0.05 | 0.05 | 0.06 |
| | (1.73) | (1.62) | (1.79) | (1.29) | (1.61) | (1.62) |
| Col_frspport | 0.02 | | 0.08 | 0.006 | | 0.10 |
| | (0.15) | | (0.57) | (0.04) | | (0.74) |
| Col_other | 0.00 | | 0.05 | 0.07 | | 0.06 |
| | (0.01) | | (0.25) | (0.37) | | (0.36) |
| Euro1900 | | 0.00 | -0.00 | | 0.00 | -0.00 |
| | | (0.14) | (-1.16) | | (0.01) | (-0.83) |
| Constant | 0.57 | 0.71 | -0.41 | 0.12 | 0.15 | -0.22 |
| | (0.65) | (0.52) | (-0.37) | (0.15) | (0.19) | (-0.25) |
| | | | | | | |
| N | 79 | 79 | 79 | 80 | 80 | 80 |
| First Stage | avexpr | avexpr | avexpr | Laword | laword | Laword |
| Lngdp60 | 0.38 | 0.38 | 0.63 | 0.31 | 0.31 | 0.28 |
| | (1.44) | (1.44) | (1.78) | (1.70) | (1.70) | (1.43) |
| Lpop60 | -0.03 | -0.03 | 0.08 | -0.10 | -0.10 | -0.12 |
| | (-0.25) | (-0.25) | (0.65) | (-1.44) | (-1.44) | (-1.63) |
| Col_frspport | -0.79 | -0.79 | -0.69 | -0.73 | -0.73 | -0.74 |
| | (-2.54) | (-2.54) | (-1.90) | (-3.46) | (-3.46) | (-3.42) |
| Col_other | -0.09 | -0.09 | -0.20 | 0.08 | 0.08 | 0.18 |
| | (-0.14) | (-0.14) | (-0.29) | (0.18) | (0.18) | (0.37) |
| Euro1900 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| | (2.90) | (2.90) | (1.46) | (3.43) | (3.43) | (3.08) |
| Geography | | | Included | | | Included |
| | | | | | | |
| Constant | 4.13 | 4.13 | 1.01 | 2.50 | 2.50 | 2.92 |
| | (1.60) | (1.60) | (0.33) | (1.42) | (1.42) | (1.56) |
| | | | | | | |
| R-squared | 0.3379 | 0.3379 | 0.4546 | 0.4233 | 0.4233 | 0.4694 |

z-statistics between parenthesis

Table 9. IV –2SLS. Robust to additional instruments

| | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW |
|---|---|---|---|---|---|---|---|---|
| Institutional variable used | Avexpr | Avexpr | Avexpr | Avexpr | ICRGlaword | ICRGlaword | ICRGlaword | ICRGlaword |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Institutional variable | -0.38 | -0.41 | -0.34 | -0.35 | -0.38 | -0.38 | -0.38 | -0.40 |
| | (-4.32) | (-3.52) | (-4.42) | (-4.71) | (-5.04) | (-4.92) | (-4.82) | (-5.92) |
| Lngdp60 | 0.20 | 0.26 | 0.16 | 0.17 | 0.12 | 0.14 | 0.12 | 0.14 |
| | (1.58) | (1.85) | (1.48) | (1.58) | (1.45) | (1.51) | (1.40) | (1.74) |
| Lpop60 | 0.07 | 0.08 | 0.07 | 0.07 | 0.05 | 0.04 | 0.05 | 0.05 |
| | (1.71) | (1.44) | (1.79) | (1.78) | (1.65) | (1.34) | 1.67) | (1.57) |
| Constant | 0.59 | 0.23 | 0.62 | 0.62 | 0.22 | 0.23 | 0.23 | 0.19 |
| | (0.66) | (0.21) | (0.76) | (0.74) | (0.31) | (0.30) | (0.33) | (0.27) |
| | | | | | | | | |
| N | 79 | 69 | 79 | 79 | 80 | 70 | 80 | 80 |
| | | | | | | | | |
| First Stage | Avexpr | Avexpr | Avexpr | Avexpr | ICRGlaword | ICRGlaword | ICRGlaword | ICRGlaword |
| Lngdp60 | 0.39 | 0.60 | 0.32 | 0.32 | 0.24 | 0.21 | 0.24 | 0.28 |
| | (1.42) | (1.79) | (1.14) | (1.10) | (1.30) | (0.88) | (1.30) | (1.43) |
| Lpop60 | -0.02 | 0.02 | -0.04 | 0.03 | -0.13 | -0.09 | -0.12 | -0.12 |
| | (-0.21) | (0.22) | (-0.40) | (0.25) | (-1.81) | (-1.11) | (-1.66) | (-1.63) |
| Col_frspport | -0.79 | -0.79 | -0.78 | -0.78 | -0.67 | -0.63 | -0.73 | -0.74 |
| | (-2.51) | (-2.24) | (-2.53) | (-2.42) | (-3.21) | (-2.44) | (-3.49) | (-3.42) |
| Col_other | -0.11 | -0.04 | -0.04 | -0.44 | 0.27 | 0.06 | 0.14 | 0.18 |
| | (-0.16) | (-0.07) | (-0.06) | (-0.58) | (0.57) | (0.13) | (0.29) | (0.37) |
| Euro1900 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| | (2.87) | (1.58) | (2.96) | (2.71) | (3.20) | (3.15) | (3.54) | (3.08) |
| Latitude | -0.16 | | | | 1.55 | | | |
| | (-0.11) | | | | (1.65) | | | |
| Ind. time | | -0.00 | | | | -0.00 | | |
| | | (-0.10) | | | | (-0.55) | | |
| Yellow | | | -0.32 | | | | -0.32 | |
| | | | (-0.92) | | | | (-1.34) | |
| Soil | | | | included | | | | Included |
| Constant | 4.06 | 1.94 | 5.10 | 3.94 | 3.13 | 2.98 | 3.46 | |
| | (1.52) | (0.66) | (1.83) | (1.40) | (1.76) | (1.38) | (1.83) | |
| | | | | | | | | |
| R-sqaured | 0.3380 | 0.3958 | 0.3456 | 0.3691 | 0.4440 | 0.4520 | 0.4371 | 0.4694 |

z-statistics between parenthesis

Table 10. IV –2SLS. Robust to other samples

| | PRIOCW | PRIOCW | PRIOCW | PRIOCW |
|---|---|---|---|---|
| Institutional variable used | Avexpr | Avexpr | ICRGlaword | ICRGlaword |
| Sample | Without Neo-Europes | without African countries | Without Neo-Europes | without African countries |
| | (1) | (2) | (3) | (4) |
| Institutional variable | -0.40 | -2.55 | -0.56 | -0.34 |
| | (-2.69) | (-4.13) | (-2.48) | (-3.97) |
| Lngdp60 | 0.21 | 0.07 | 0.17 | 0.17 |
| | (1.57) | (0.66) | (1.45) | (1.24) |
| Lpop60 | 0.08 | 0.10 | 0.03 | 0.07 |
| | (1.49) | (2.38) | (0.63) | (1.66) |
| Constant | 0.65 | 0.35 | 0.81 | -0.57 |
| | (0.51) | (0.34) | (0.72) | (-0.44) |
| | | | | |
| N | 75 | 45 | 76 | 45 |
| | | | | |
| First Stage | Avexpr | Avexpr | ICRGlaword | ICRGlaword |
| Lngdp60 | 0.37 | 0.31 | 0.28 | 0.49 |
| | (1.33) | (0.90) | (1.58) | (2.05) |
| Lpop60 | -0.05 | 0.05 | -0.14 | -0.04 |
| | (-0.44) | (0.40) | (-1.89) | (-0.47) |
| Col_frspport | -0.68 | -1.21 | -0.50 | -0.97 |
| | (-1.94) | (-2.97) | (-2.17) | (-3.44) |
| Col_other | -0.05 | 0.96 | 0.18 | 0.27 |
| | (-0.0) | (0.70) | (0.38) | (0.28) |
| Euro1900 | 0.02 | 0.02 | 0.01 | 0.02 |
| | (1.71) | (2.92) | (1.14) | (3.14) |
| | | | | |
| Constant | 4.60 | 3.68 | 3.19 | 0.18 |
| | (1.68) | (1.06) | (1.77) | (0.08) |
| | | | | |
| R-squared | 0.1421 | 0.4464 | 0.1790 | 0.5743 |

z-statistics between parenthesis

Table 11: Ranking of the fifteen colonies with the lowest and the highest enforcing contracts procedure index. Normalized between 1-100

| Countryname | enfcontproc | Countryname | enfcontproc |
|---|---|---|---|
| **Cameroon** | 100 | Australia | 18.96 |
| **Sierra Leone** | 100 | **Tunisia** | 24.13 |
| **Egypt** | 94.82 | **Uganda** | 25.86 |
| **Laos** | 91.37 | Malawi | 27.58 |
| United Arab Emirates | 91.37 | Hong Kong | 27.58 |
| **Chad** | 89.65 | Zambia | 27.58 |
| Kuwait | 89.65 | United States | 29.31 |
| **Congo, Dem. Rep.** | 87.93 | Canada | 29.31 |
| **Burundi** | 87.93 | **Sri Lanka** | 29.31 |
| **Lesotho** | 84.48 | **Morocco** | 29.31 |
| **Algeria** | 84.48 | **Nicaragua** | 31.03 |
| Benin | 84.48 | Jamaica | 31.03 |
| **Syrian Arab Rep.** | 82.75 | New Zealand | 32.75 |
| **Angola** | 81.03 | Bhutan | 34.48 |
| **Congo, Rep.** | 81.03 | Tanzania | 36.20 |

Table 12.  IV-2SLS.

|  | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW | PRIOCW |
|---|---|---|---|---|---|---|---|---|
|  | All sample OLS | All Sample OLS | Ex-colonies OLS | Ex-colonies OLS | IV | IV | IV | IV |
|  | (3) | (4) | (1) | (2) | (5) | (6) | (7) | (8) |
| enfcontcont | 4.38 | 5.87 | 3.79 | 0.06 | 1.42 | 1.74 | 1.22 | 1.86 |
|  | (3.99) | (3.69) | (2.50) | (3.15) | (3.00) | (4.06) | (2.29) | (3.76) |
| Lngdp60 |  | -0.85 |  | -0.78 |  |  | -0.12 | -0.05 |
|  |  | (-2.62) |  | (-2.00) |  |  | (-1.72) | (-0.87) |
| Lpop60 |  | 0.41 |  | 0.72 |  |  | 0.07 | 0.10 |
|  |  | (1.54) |  | (2.30) |  |  | (1.85) | (2.72) |
| Constant | -2.16 | -2.72 | -1.18 | -7.39 | -0.05 | -0.29 | -0.10 | -1.56 |
|  | (-3.71) | (-0.67) | (-1.46) | (-1.42) | (-0.19) | (-1.19) | (-0.10) | (-1.88) |
|  |  |  |  |  |  |  |  |  |
| N | 145 | 105 | 84 | 78 | 66 | 83 | 64 | 77 |
| R.squared | 0.1040) | 0.2622 | 0.0891 | 0.2555 |  |  |  |  |
| First Stage |  |  |  |  | enfcontproc | enfcontproc | enfcontproc | enfcontproc |
| Lngdp60 |  |  |  |  |  |  | -0.08 | -0.01 |
|  |  |  |  |  |  |  | (-2.10) | (-0.27) |
| Lpop60 |  |  |  |  |  |  | 0.004 | -0.003 |
|  |  |  |  |  |  |  | (0.26) | (-0.17) |
| Legor_fr |  |  |  |  | 0.20 | 0.18 | 0.22 | 0.19 |
|  |  |  |  |  | (3.97) | (4.56) | (4.17) | (4.46) |
| LnACmortality |  |  |  |  | 0.02 |  | -0.02 |  |
|  |  |  |  |  | (0.87) |  | (-0.62) |  |
| Euro1900 |  |  |  |  |  | -0.002 |  | -0.002 |
|  |  |  |  |  |  | (-2.67) |  | (-1.34) |
|  |  |  |  |  |  |  |  |  |
| Constant |  |  |  |  | 0.36 | 0.50 | 0.99 | 0.60 |
|  |  |  |  |  | (4.03) | (15.11) | (2.14) | (1.57) |
|  |  |  |  |  |  |  |  |  |
| R-squared |  |  |  |  | 0.2642 | 0.2643 | 0.3113 | 0.2773 |

z-statistics between parenthesis.

Table 13: IV  Institutions and per capita income endogenous.

| | PRIOCW (1) | PRIOCW (2) | PRIOCW (3) | PRIOCW (4) | PRIOCW (5) |
|---|---|---|---|---|---|
| Avexpr | | -0.08 (-2.39) | -0.41 (-2.76) | | |
| laword | | | | -0.15 (-3.04) | -0.40 (-3.92) |
| Lngdp60 | -0.29 (-4.02) | -0.17 (-1.69) | 0.27 (1.20) | -0.13 (-1.30) | 0.12 (0.93) |
| Lpop60 | 0.09 (3.41) | 0.05 (1.90) | 0.08 (1.64) | 0.05 (1.99) | 0.05 (1.59) |
| Constant | 1.31 (1.79) | 1.66 (2.00) | 0.25 (0.22) | 1.30 (1.68) | 0.38 (0.44) |
| N | 93 | 79 | 79 | 80 | 80 |
| First stage | Lngdp60 | Lngdp60 | Lngdp60 | Lngdp60 | Lngdp60 |
| Lpop60 | -0.07 (-1.85) | -0.07 (-1.65) | -0.05 (-1.06) | -0.07 (-1.57) | -0.05 (-1.17) |
| avexpr | | 0.07 (1.43) | | | |
| laword | | | | 0.13 (1.98) | |
| Col_frspport | | | -0.17 (-1.34) | | -0.18 (-1.43) |
| Col_other | | | -0.96 (-3.60) | | -0.96 (-3.64) |
| Euro1900 | 0.02 (8.49) | 0.02 (6.46) | 0.02 (8.18) | 0.02 (6.02) | 0.02 (8.20) |
| Landlocked | -0.54 (-3.21) | -0.52 (-2.35) | -0.60 (-2.91) | -0.57 (-2.64) | -0.61 (-2.96) |
| Constant | 8.01 (13.55 | 7.63 (9.91) | 7.78 (11.51) | 7.62 (10.42) | 7.85 (11.87) |
| R-squared | 0.5082 | 0.5228 | 0.5854 | 0.5318 | 0.5844 |
| First Stage | | | avexpr | | Laword |
| Lpop60 | | | -0.05 (-0.49) | | -0.11 (-1.58) |
| Col_frspport | | | 0.03 (5.18) | | -0.80 (-3.76) |
| Col_other | | | -0.83 (-2.71) | | -0.20 (-0.44) |
| Euro1900 | | | -0.49 (-0.76) | | 0.025 (6.17) |
| Landlocked | | | -0.61 (-1.24) | | 0.02 (0.07) |
| Constant | | | 7.28 (4.45) | | 4.85 (4.36) |
| R-squared | | | 0.3330 | | 0.4007 |

z-statistics between parenthesis