



Munich Personal RePEc Archive

# **Military Burden and the Democracy Puzzle**

Rota, Mauro

25 November 2011

Online at <https://mpra.ub.uni-muenchen.de/35254/>  
MPRA Paper No. 35254, posted 07 Dec 2011 16:33 UTC

# Military burden and the democracy puzzle<sup>§</sup>

First draft 11th April 2011

This draft:25th November 2011

**Mauro Rota<sup>\*\*</sup>**

## **Abstract**

The Kantian thought had advanced the idea that wars and military expenditure should decrease as long as democracy widens across the World. Historical evidence seems to invalidate this wisdom because frequency of wars is increasing over time and a large amount of public resources is still being committed to military spending. This paper contributes to explain this point by considering the effect of polity regimes on the military spending during the period 1880-1938. Indeed, before World War I the more democratic countries spent more for military purposes than autocracies whereas the reverse is true after 1920. This puzzling behaviour is therefore explained by the inconsistent timing between the ability of a state to drain resources by taxation (state fiscal capacity) and the political participation. Thus, the Kantian idea of a democratic and peaceful world seems to hold only for full democracy with large political participation.

Keywords: Military spending, polity regimes, war, political participation

Jel classification: H56 N40

---

<sup>§</sup> This is a preliminary draft before a proof reading by a native speaker. I apologize for possible typos. This paper has been developed during my research period at the Economics Department of the University of Warwick and I thank Mark Harrison for helpful and insightful comments and suggestions. I thank Jari Eloranta for valuable suggestions about Eastern European countries data. I thank also the participants to the Workshop of Economic History and Globalization at the U.K. Leuven in 2011 for useful comments. All the errors remain mine.

<sup>\*\*</sup> Assistant Professor of Economic History, Sapienza-University of Rome, mauro.rota@uniroma1.it

In 1795 Immanuel Kant claimed that the spread of democracy would reduce the opportunity to wage a war, providing an incentive to lower military expenditure (Kant, [1795] 1917). However, historical data show that the frequency of wars is growing over time although democratization as well as other factors, such as trade openness and globalization, has broadened in the last two hundred years (Harrison and Wolf, 2011). Furthermore, a relevant amount of public resources is still being committed to military expenditure in both developed and developing countries.

The aim of this work is to explain why and how had the Kantian (and liberal) hypothesis and the empirical evidence diverged. An early answer hitherto has come from the state fiscal capacity (Harrison and Wolf, 2011). The higher the state fiscal capacity, the larger the amount of public resources to wage a war, and the higher the frequency of war is. A further response stems from the interaction between the state fiscal capacity and the stage of democratization. Albeit several applied studies in economics have found a negative relationship between the upswing of democracy and the military expenditure (Dunne et al. 2003, 2008, Collier and Hoeffler 2004, 2007a, 2007b), they do not provide a final evidence of the Kantian hypothesis of a democratic and peaceful world. The major drawback of those studies is that they focus only on the developing countries neglecting more advanced nations because their polity regimes are not variable enough to test the impact of an increase in democracy on the military expenditure. Furthermore, there was little space in the economic history studies to analyse the effect of a change in the polity regimes on the military spending because of the main focus on the mobilization of the two World Wars (Harrison, 1998, Harrison and Broadberry, 2005, Eloranta, 2007).

The present paper exploits the variability of polity regimes during the period 1880-1938 to evaluate the role of democracy patterns in the military burden formation. As the historical period under scrutiny is characterized by the first wave of democratization (1880-1925) and by the reverse movements towards totalitarianism (1926 onwards), it provides the ideal setting to explore different policies towards the military spending.

By considering the as large as possible set of countries observed in the period 1880-1938, the analysis shows that the diffusion of the democracy was not a 'seal of approval' of low military expenditure. The more democratic countries of the pre- World War I era are those with the higher military burden and only after World War I the democratization reduced military expenditure. In fact, the liberal effect of democracy entered at work during the reverse wave towards autocracy whereas the first wave of democratization brought about a severe increase in the military spending. In order to disentangle this puzzle, many confounding factors at work are to be considered.

The key elements are the state fiscal capacity and the public control in wielding the government decisions. The public control is the result of a larger political participation which in turn is crucial to orient the executive choices about the military spending. Democracies turn out to be fuller when the political participation is large, the regulatory constraints are binding and the recruitment of the executive is competitive. On the contrary, the limited or non-full democracies often have a low degree both in the political participation and regulatory constraints whereas autocracies lack at least of one of them.

Several late nineteenth century countries modernized bureaucracies developing the state capacity to drain resources through taxation but the political participation lagged behind. Thus, the inconsistent timing between the bureaucracy modernization and political participation relaxed the constraints of the policy makers to allocate public funds. From a historical point of view, the outcome was the increase in spending for defence aimed at the consolidation of the borders, competition for colonies, exploitations of foreign resources, maintenance of the regime in charge and feeding the domestic elites. After World War I, the political participation widened throughout enfranchisement, and the demand for social spending dramatically rose. The improvement of democracy throughout a wider political participation reduced the freedom of policy makers and exerted more pressure on the allocation of public resource squeezing the military burden. Indeed, historical analysis suggests that the liberal claim of peaceful democracies holds only if the political participation is wide.

This paper can also have implications for the present. The first one is that non-full democracies spend more for defence than autocracies and full democracies, as several theoretical studies suggest (Hess and Orphanides 2000, Baliga et. alt. 2011 ). A further lesson we can learn is that the current wave of democratization will not necessary drive towards a more peaceful environment unless the democracies in transition open the political participation as much as possible.

The rest of the paper reviews the basic literature in section II and provides readers with the data description in section III. Possible connections between polity regimes and military expenditure are discussed in section IV. Section V presents the democracy puzzle in the historical data. Section VI discusses some general explanations of the puzzlement whereas section VII tests the components of the polity regimes in search of further explanations. Section VIII concludes.

## II

The literature in this field covering the second half of twentieth century history gave much attention to the role of democracy. The emphasis was mainly on the democratization of Africa and Asia in the last forty years. In most of those studies, the democracy turns out to be a

'seal of approval' of low military burden (Collier and Hoeffler, 2004, 2007a, 2007b). The idea is that polity regimes with a high level of competition for power, of constraints to the executive incumbents and of popular participation would reduce military expenditure because democracies generally put greater value on the *peace dividend*. This intuition is not completely satisfactory as the transmission channels from democracy to the military spending (and to wars) are more knotty than one might expect. A possible theoretical explanation is provided by Alesina and Spalatore (2005, 2006) who built a model in which the peace dividend is smaller than one would expect when the democracy spreads. The reason is that whenever both democracy spreads and the number of nations increases there are more chances of conflicts occurring at a regional level. Hess and Orphanides (2001) remarked that democratization does not lead to a more peaceful world and that wars are just as frequent and possible when democracy widens.

In a nutshell, the economic literature is split into two different views. The theory predicts that democratization is not necessarily the road to a peaceful world whereas applied contributions provide us with evidence that democracy is a way of reducing the military burden and the frequency of wars. Recently, some applied works have also raised concerns on the effective strength of democratization. For example, taking a very long run perspective Harrison and Wolf (2011) have found that democratization as well as trade openness and globalization is not an insurance against the outbreak of conflicts. In their view, the key element to understanding the puzzlement is the state capacity to acquire resources through taxation. The argument appears to be: more democracy implies more constraints on government which tend to reduce both the probability of war and hence the military expenditure. At the same time, democratization increases state capacity to raise public finance and thereby the chances of waging a war<sup>3</sup>.

However, democracy is an open-end defined concept that requires some considerations. Recent studies have discussed whether binding term limits to government lead to a higher probability to democracies waging war than democracies without term limits (Conconi et. al., 2008). The non-fully democratic countries also raise some concerns. Indeed, Baliga et al. (2011) show that limited democracies are even more aggressive than autocracies.

Other possible explanations of the military expenditure demand are connected to the arms race framework introduced by Richardson (1960). In fact, empirical tests have proven that the arms race model is inconsistent with data in the majority of cases, such as the US/USSR, India/Pakistan, Iran/Iraq, and Arab/Israel. Oren (1994) has also shown that the arms race effect does not hold whenever the hostility level between two countries is controlled for. Indeed, the dyadic perspective has been replaced by the 'Security Web' concept (Rosh, 1988) and by the external threat of the potential enemies (Dunne and Perlo-Freeman 2003a, 2003b) and of

---

<sup>3</sup> This point is also sustained in a theoretical framework by Besley and Torsten (2009).

neighbours (Collier and Hoeffler, 2004). These improved approaches have found a strong relationship between military expenditure and the external environment.

Finally, Harrison (1998), Broadberry and Harrison (2005), Eloranta (2007) are the main contributions which have adopted a historical perspective to describe military expenditure patterns. They concentrate on the mobilization of the belligerents in the World War II, in the World War I and in the arm race of 1870-1913, respectively. The main results are that the level of available resources, proxied by per capita GDP, mattered in the mobilization of the two World Wars, while the lack of leadership, the external threats from potential enemies and the spillover from allies determined the arms race towards the 1914 events.

If these are the research questions and the results of the existing literature, what remains uncovered? Firstly, the most of the aforesaid papers focuses on either probability or frequency of war, but military expenditure also deserves attention. Secondly, why and in which way do democracies (or autocracies) deploy a different behaviour from the Kantian hypothesis? Thirdly, looking inside democracy patterns in detail, it is possible that some aspects of democracy have tighter links to the military expenditure. Indeed, which component matters more for democracy in the historical context for the proper working of the liberal claim of a peaceful world?

Before discussing possible explanations which can provide a set of answers to the aforementioned questions, it is necessary to present the data used in the quantitative analysis.

### III

The key variable employed in my study is the country's military burden defined as the ratio between military expenditure and GDP. The broadly used dataset in the military burden analysis is the Correlates of War project (COW) originally collected by Singer (1972) and constantly updated<sup>4</sup>. Although other historical data on military expenditure have been recorded (Banks 1976, Hobson 1993, Eloranta 2002), the COW dataset still remains the most complete covering a large number of countries and a wide time span. None of the previous datasets is free of shortcomings and pitfalls but the researcher should choose the lesser evil. In historical researches, the coverage of time and the spatial dimension are the common data constrictions and the COW dataset allows us to relax such constraints<sup>5</sup>.

Moreover, the military expenditure collected by the COW project primarily uses the same sources of other datasets- i. e. the government balance sheets- but adopts a different

---

<sup>4</sup> This paper uses the latest version of National Material Capabilities (version 4.0) released in June 2010.

<sup>5</sup> A characteristic of the COW dataset is that figures of military expenditure are in pound sterling until 1914 and in US dollars afterwards. Indeed, they had to be converted in national currency using the bilateral exchange rates. It required a data intensive process.

way to classifying the military outlays. Because the prime interest of the COW dataset is to weigh out military capability across countries the definitions of military expenditure deals with each outlays aimed at enhancing military power. For these reasons, the appropriations for expenditures on pensions, superannuation payments, relief and subsidies to widows and orphans are excluded as well as the expenditure for the civilian police force which used to be under military control. On the contrary, other appropriations are added to the military budget when related to the national military capability.

Table 1 presents the military burden statistics for the sample countries. For the purpose of comparability I have excluded the figures of the Great War<sup>6</sup>. The sample covers almost all the relevant countries of each period under scrutiny. Unfortunately, data on the nominal GDP of the Ottoman Empire and modern Turkey, Serbia, Chile, Poland and the Soviet Union are not available to build their correspondent military burden. Data for China are also scattered. Unlike previous studies, this paper offers a wider coverage of the independent countries and for the first time compares new political entities and old-established countries in the interwar period<sup>7</sup>. In the pre-World War I era Latin American countries have been added and also observed in the interwar years. Even though Romania and Bulgaria became independent in 1878 and 1908 respectively, they are included in the sample only from the early twenties onward because of data's paucity.

*Table 1 about here*

As the main task of this paper is to better understand the role of the polity regimes in the formation of the military burden, it is worth discussing the polity variable. The definition of a political pattern is ambiguous in the political science literature. Scholars concentrate on two concepts: democracy and autocracy. The former raises more questioned because of the uncertain definitions of what matters for democracy. Competition for power, chances to challenging the official government and political participation are the pillars to build democracy (Lipset 1960 and Sartori 1987). As a consequence, the translation of the concept of democracy

---

<sup>6</sup> The military burden is obviously impressive for the Great Powers during the World War I and it could obscure possible comparisons. Figures for the arms race of First World War are even available upon request. Higher figures appearing in the table are the maximum values for Japan in conjunction with the Russo-Japanese War (1904-1905) and China invasion (1937-1938), Italy in conjunction with the colonial war in Ethiopia (1935-1937) and Germany in conjunction with invasion of Austria (1938).

<sup>7</sup> The studies by Harrison (1998), Broadberry and Harrison (2005) cover respectively six Great Powers in the World War II and eight countries in the World War I (4 allied, 3 central powers and one neutral country, including for the first time the Ottoman Empire). Eloranta (2007) covers sixteen Western countries in the 1870-1913. Hobson (1993) covers only the six Great Powers. The sample countries in my study, including pre and post World War I era, are: Argentina, Hapsburg Empire (AUH), Australia (AUL), Austria (AUS) Belgium (BEL), Brazil (BRA), Bulgaria (BUL), Canada (CAN), Czech-Republic (CZE), Denmark (DEN), Finland (FIN), France (FRN), Germany (GMY), Hungary (HUN), Italy (ITA), Japan (JPN), Mexico (MEX), New Zealand (NEW), Norway (NOR), NTH (Netherlands), Peru (PER), Portugal (POR), Romania (ROM), Tsarist Russia (RUS), Spain (SPN), Sweden (SWD), Switzerland (SWZ), United Kingdom (UKG), Uruguay (URU), United States (USA), Venezuela (VEN), Yugoslavia (YUG).

into a quantitative variable is carefully considered. In the present paper I will rely on a broadly used dataset, the PolityIV project (Marshall et al., 2010). The dataset offers the Polity2 variable which is a composite measure of both the democratic and autocratic features of an authority pattern. Even though Polity2 masks various combinations of democracy and autocracy, it is useful for capturing general changes in the political regimes. In fact, democracy and autocracy are somewhat different representations of authority patterns. They account for regulations, openness and competitiveness of executive recruitment, constraints to executive actions, regulation and competitiveness of political participation. Indeed, the original spirit was to conceive that mixed elements of autocracy and democracy may coexist in any particular regime.

*Table 2 about here*

#### IV

The assumption that more democratic countries allocate fewer resources to military spending is a milestone of the Liberal thought. Liberal and democratic regimes would be more interested in citizens' welfare and the negative effect of an arms race should discourage the waging of a war and military spending. Historical data (Figure 1) and political science literature (Fordham and Walker, 2005) seem to confirm an inverse association between democratization and military burden.

*Figure 1 about here*

From a visual inspection of the unconditional association between polity regime and military burden in my sample, it emerges that the unlikely combination is high autocracy with low military burden. Furthermore, high levels of military expenditure may be possible regardless of whether the regime is autocratic or democratic oriented and only in very few cases low military expenditure is associated with a highly democratic regime as common sense would suggest.

The inverse relation seems to be more evident in the period 1920-1938 whereas the fitted curve is almost flat in the period 1880-1913. The visual inspection of data would also suggest the effectiveness of the liberal claim. However, other historical evidence (war frequency) and an unclear relationship in the years before World War I lead us to consider the hypothesis of several confounding factors at work (Harrison and Wolf 2011).

Moreover, the interwar period is a watershed for the polity pattern across the World. Until the mid-twenties a first wave of democratization struck the World whereas a reverse process toward autocracy took place after 1926 (Huntington 1991, Doorenspleet 2000). The two waves are in principle inconsistent with the evidence of a strong negative association between

democratic polity regime and military burden in the interwar years. Global democratization slackened from 1926 onwards, but the military burden fell. Nonetheless, the spread of democracy of the nineteenth century did not ward off the Great War.

The confounding factors at work were manifold and both democracy and autocracy had elements to influence the military burden in either a positive or negative way.

A common view is that the autocratic regimes usually spend a higher share of public resources for military purpose than democratic countries. The idea is that autocratic regimes are frequently sustained by influential armies which bargain with the political power to raise military expenditure in return for deterrence from external or internal threats. However, this is neither a sufficient nor a necessary condition for an autocratic regime to survive<sup>8</sup>.

Moreover, the argument of the external threat can be applied to newly established countries regardless of whether they are democratic or autocratic. Countries which reached sudden independence in association with democratization tended to have high military burdens to consolidate the new borders or to prevent the threat of losing independence. Whenever the new country was managed by an autocracy this cost got higher and higher.

A recent strand in the literature has put the emphasis on the state fiscal capacity in order to explain the frequency of wars across the last two centuries (Harrison and Wolf 2011). State fiscal capacity is the bureaucracy's ability to drain resources through taxation. Democratization and modern bureaucracy formation went hand in hand creating a gap of available resources between polity regimes with modern bureaucracies and polity regimes with ancient agrarian bureaucracy. The more the resources were available the larger public expenditure was. Thus, the more democratic the regimes, the larger the government outlays were. From this point of view, the transmission channel from bureaucracy modernization to military expenditure is positive. On the contrary, ancient bureaucracies had limited fiscal capacity and were less prone to burden a high share of public expenditure even for military purposes. Since the ancient bureaucracies were the norm in the autocratic regimes, the pattern of military expenditure could be negatively influenced by autocratic executives.

The prediction of an inverse relationship between democratization associated with bureaucracy's modernization and military expenditure is not the whole story for a comprehensive historical analysis. The link between democratization, higher fiscal capacity and military expenditure depends on the social perception of the war and peace dividend, and on the redistributive policies. In fact, democratic regimes usually sustain social spending (though the intensity varies according the historical period and the political preferences) and an

---

<sup>8</sup> On the reverse, the persistence of the regime at home is sustained in certain periods by paramilitary forces which are excluded by the measure of military expenditure of the COW dataset. Eventually, the military burden is not necessary the main channel through which polity regimes endowed an influential army. The accession to high role of public enterprises or special granting in running private business has been often preferred to the increase of military budget.

increase in military expenditure may be perceived by the citizens in terms of a trade off with social spending. The fulfilment of democracy is the broadest political participation and thereby an increase of democratic control on executive decisions. The democratic control might suggest a reduction in military expenditure throughout the perception of the value of the peace dividend for society and should strengthen the demand for more social spending. Indeed, in the presence of a non-full democracy it may be possible that the association with the military burden is positive and that the Kantian effect of a peaceful world holds only for full democracy, via a wide public control.

## V

The existing literature provides many other variables of interest which test the military burden determinants. I have borrowed a set of suitable controls from early and recent literature in order to isolate as precisely as possible the effect of polity patterns on the military burden formation.

Collier and Hoeffler (2004, 2007a) claimed that the military expenditure of one country is determined by the perceived external threats in the area a country belongs to, and by the internal threats of rebellions. Along the same strand, Dunne et al. (2008) look at the behaviour of developing countries, finding that military expenditure is strongly related to the 'Security Web' (i.e. all neighbours and other security-influencing powers), and to the aggregate military spending of 'Potential Enemies'. The systematic study of Eloranta (2007) for sixteen western countries in the race to World War I clarified that the arms race of individual countries responded to the threats from perceived enemies.

However historical facts suggest that before World War I the bulk of military competition involved the Great Powers and that even in the interwar period the competition often took place in the form of global rivalry with the main competitor rather than with its neighbours. Henceforth, I use the concept of main competitor adapted it to the historical context. The structure of the alliances is quite misleading and, as Eloranta (2007) remarked, the perceived threat went beyond formal arrangements by states. Italy had a treatise of alliances with the Hapsburg Empire but they perceived each other as enemies. After the dismantling of the Empire, the new threat for Italy was the United Kingdom due to the colonial dispute. At other times the choice of the main competitor is more difficult. In the absence of an actual competitor I based on purely geographic proximity using the concept of neighbour's threat such as for Canada and Australia. In other cases the lack of data led me to a compromised choice of the main competitor. Bulgaria perceived Turkey as the main competitor during the interwar period. As data on the Ottoman Empire and Turkey are not available in my sample, I have matched Bulgaria to Yugoslavia which was considered the most dominant country in the Balkan area. Japan is a

similar case. Russia can be considered its main competitor in the years before the Great War and Soviet Union in the interwar period. Due to missing data for the Soviet Union Japan is matched to the US in the interwar years. For countries built on the ashes of the Hapsburg Empire, Germany was the main threat for the border disputes and for the design of a *Pan-Germanism* Empire. On the contrary, Hungary considered Yugoslavia (as well as Romania) as the main rival for boundary disputes.

Another relevant point is the outcome of the arms race. The demand for military expenditure can be determined by the level of hostility in which a country is involved. Military actions have different amount of intensity, and require different resources in order to be mobilized. The large scale wars are an obvious example but other conflicts are also illustrative. With the exclusions of the Great War years, a moderate increase in the degree of hostility in the interwar era can be noted. Episodes of maximum levels of hostility are few but the episodes of blockade, clash, occupation of territory, seizure and attack increased with respect to the pre-World War I era<sup>9</sup>. The idea behind the relationship between military burden and the level of hostilities is that an increase in military expenditure reflects the severity of the dispute. There is neither a remarkable difference between newly established countries and older nations nor any association between the level of hostility and the polity regime.

The bulk of historical studies emphasised that the available resources in a country mattered in the formation of military spending. Figure 2 shows the unconditional relationship between the level of GDP per capita from Maddison (2010) and the military burden<sup>10</sup>. The purpose is to highlight a further control I consider throughout the text. In historical perspective, Harrison (1998), Broadberry and Harrison (2005) stressed that the role of economic development and the scale of employed resources in the mobilization of the two World Wars. The GDP per head counted for the outcomes of the global wars as this identified the resources potentially employable in such large conflicts. Economic resources are viewed as motor for mobilization in an armed conflict. The shorter the time a country has to reach a certain level of military capacity the higher the importance of these economic resources. Moreover, advances in defence technology also emphasize the relevance of GDP per capita as a measure of potential military capabilities.

*Figure 2 about here*

Surprisingly, the previous picture shows a clear-cut negative relationship. The fitted line is steeper in the interwar years than in the period 1880-1913. Hence, two points are to be

---

<sup>9</sup> Data for the levels of hostilities are from the Militarized Interstate Dispute (version 3.10) from Faten G., Palmer G., and Bremer S., (2004).

<sup>10</sup> GDP per capita of the Hapsburg Empire is from Schulze (2000) rescaled at Maddison purchasing power parity

remarked. The first is that the positive association could hold in a highly intensive arm races, such as World Wars but not elsewhere. The second point is that the GDP effect might be different from that of Figure 2 when other determinants are considered.

## VI

The previous concepts are introduced in a simple model to capture the military burden formation over time and across countries. Bearing in mind the more recent advances of the literature, the following dynamic specification for the military burden is considered:

$$\log(MEBUR_{it}) = c + \alpha \log(MEBUR_{it-1}) + \beta POLITY_{it} + \gamma \mathbf{X}_{it} + \eta_i + \varepsilon_{it} \quad (1)$$

where: *MEBUR* is the nominal military expenditure over nominal GDP, *POLITY* is a measure of the polity pattern, *X* is a vector of controls,  $\eta_i$  is the country fixed effect or the unobserved heterogeneity and  $\varepsilon_{it}$  is the error term. The set of controls includes the GDP per capita expressed in real value (GDPPC), the maximum level of hostility each country reaches in one period in a military interstate dispute (HOS), and the military burden of the main competitor (MEBURCOMP). The time dimension *t* covers the period 1880-1938 whereas the cross section units are 32. The panel is unbalanced.

A model like (1) is usually estimated using the GMM estimator designed for dynamic panel data (Arellano and Bond, 1991, Arellano and Bover, 1995, Blundell and Bond, 1998). Even though the aforementioned estimators have received great attention in the literature, I am aware that some concerns in using such techniques have been recently raised. In this light, the best strategy is to use the largest possible set of econometric approaches made available by the literature. The first step is the classical dynamic panel data GMM approach. As the previous estimator is specifically thought for a large cross-section and small time dimension, in the presence of a long time dimension the model has to be rewritten in a convenient way:

$$\log(MEBUR_{it-\tau}) = c + \alpha \log(MEBUR_{it-\tau-1}) + \beta POLITY_{it-\tau-1} + \gamma \mathbf{X}_{t-\tau-1} + \eta_i + \varepsilon_{it} \quad (2)$$

In line with many historical studies that apply a dynamic panel data approach (i. e. Schularick and Solomou, 2011 and the cited literature), I take the average of the variables, setting  $\tau = 4$ . An econometrics review of both system and dynamic GMM estimators points out that instruments proliferation is a problem (Rodman, 2008). The rule of thumb is that instruments cannot outnumber the observed units. By collapsing the matrix of instruments, I am able to set the number of instruments as close as possible to the number of units.

Table 3 shows results of the baseline model for the whole sample (columns 1 and 2) and for the subsample 1880-1913 (columns 3 and 4), and 1920-1938 (columns 5 and 6). The main result is that the move towards democracy makes the military burden lower. One more point in the polity score reduces the military expenditure of 2.63 up to 8.44 per cent, other things being equal. According to the estimations in Table 3 the liberal claim of democratization for a peaceful world is verified into the data.

However, some disclaimers have to be applied. The model performs well in the whole sample and in the interwar years, but it is poor in the subsample 1880-1913. A look at columns 3 and 4 reveals that the polity regime had no impact on the military burden in the years before World War I. Some concerns are raised to the extent that the coefficient of the polity score for 1880-1913 has different signs according to the method of estimation, even though it is not significant. On the contrary, the results for the other samples are quite robust and the method of estimation does not alter the main finding.

Table 3 also addresses some interpretations of the control variables. The military burden is by and large not explained by the mobilization capacity, as the existing literature would expect. In fact, the per capita GDP has the predicted sign in four out of six specifications but it is significant only in the DGMM of the whole sample. Again, the model for the subsample 1880-1913 displays poor results. Here the GDP per capita is not significant and it is negative.

Other classical variables of the military burden function are the hostility level (HOS) and the military burden of the main competitor (MEBURCOMP). The hostility level (HOS) enters into all the specifications with the expected sign and it is significant during the whole period. Indeed, the model seems to confirm the relationship between military expenditure and the severity of the interstate military disputes. Moreover, the model provides us with evidence of the arm race effect captured by the military burden of the main rival. For the 1880-1938 and for the 1920-1938 MEBURCOMP is significant and positive confirming that on average a country responds to the moves of its main competitor.

The argument of the main rival does not hold during the years before World War I since the coefficient is not significant and negative. The last result is a further proof of the poor explicative power of the model for the subsample 1880-1913. In fact, although the model by and large works in a proper way for the whole sample and for the interwar years, it fails to shed light on the military burden formation in the decades before World War I.

One explanation of the poor performance of the GMM estimator is the loss of information. The averaging procedure cuts the time dimension which is crucial to apply the dynamic GMM estimator but the information is dramatically reduced. On the contrary, annual data would allow for more information and for the chance to model both the short run and the long run relationship. To address the previous concerns and to exploit the information inside

the annual frequency, the pooled mean group estimator (PMG) is employed (Pesaran et al. 1999). In a nutshell this method estimates an autoregressive distributed lag (ARDL) model in a panel data environment using an Error Correction Representation:

$$\Delta(MEBUR)_t = \sum_{j=1}^{p-1} \gamma_j^i \Delta(MEBUR)_{t-j} + \sum_{j=1}^{q-1} \delta_j^i \Delta(X_i)_{t-j} + \varphi^i [(MEBUR)_t - (\beta_0^i + \beta_1^i (X_i)_{t-1})] + \varepsilon_{it}$$

where X is a set of control variables which includes the polity variable. The error term has to be *i.i.d*<sup>11</sup>

*Table 3 about here*

The long run effect proves to be of interest because changes in the polity regimes reflect the historical pattern of institutions and need to be thought as of a slow process with possible deviation from the long run path. Table 4 is organized to show for each sample only the long run relationships. It is worth nothing that Pesaran et al. (1999) derive conditions of stability regardless of the order of integration of the variables. I exploit this finding as the stochastic properties of military burden are often unclear. The stability of the model and the existence of a long run relationship among the variables are confirmed by the sign and significance of  $\varphi$  where it is the loading parameter of the long run relationship.

Most of the results obtained from GMM estimators are also confirmed. I noticed a positive long run relationship of domestic military burden with the hostility level (HOS) and the military burden of the main rival (MEBURCOMP). These results broadly hold in all the subsample. On the contrary GDP per capita is irrelevant in the specification for the period 1920-1938 whereas displays a negative association in the years before World War I.

*Table 4 about here*

What about polity regimes? The existence of a long run relationship between military burden and democracy is largely accepted. According to the findings in Table 4, in the long run the spread of democracy would lead to committing fewer resources in the arms race supporting the Kantian claim of a perpetual peace. When the panel is split into two sub-periods, before 1914 and after 1919, the hypothesis that more democratic regimes spend less in defence expenditure is no longer confirmed for the long run relationship. The polity score in the long run relationship is not significant in the period 1880-1913 and even has the wrong sign while it is strong and negative for the interwar years.

---

<sup>11</sup> The PMG estimator is consistent if the orthogonality condition among the residuals and the regressors holds. However, Pesaran (1997) shows that the long run estimator is also consistent whenever the regressors admit a finite autoregressive representation. The consistency is also reinforced by the introduction of more lags of the dependent variable.

The uncertain results of the polity pattern testify the contemporaneous effect of confounding factors at work. Section IV mentioned different possible channels of transmission from both democracy and autocracy to the military burden formation. Positive and negative effects come from the features of the polity pattern and they work simultaneously. Indeed, in the subsample 1880-1913, the positive effect of both democracy and autocracy seem to prevail, even though they appear to be not significant. On the contrary, the negative effect is clear in the subsample 1920-1938. Indeed, the previous results provide us a democracy puzzle. Since democracy displays its effects in different ways in different subsamples, we could wonder whether the working of democratic institutions has changed comparing pre and post-World War I eras. We may also wonder how autocratic features of polity regimes enter the puzzle.

The composite measure of polity pattern I used is likely to hide the different institutional routes towards the military burden formation. In fact, one main shortcoming of the polity index is the masking of different polity patterns under the same score. This flaw has driven political scientists to look at the distinct element of political structure, testing alternatively democracy and autocracy in empirical studies (Doorspleet, 2000; Marshall et al., 2010). The exercise is developed in Table 5.

*Table 5 about here*

The outcomes are not surprisingly consistent with our arguments in section IV and with the baseline results of Table 4. The democracy puzzle turns out to be robust to different measures of democracy and autocracy. In fact, democracy features of a polity regime provide powerful explanations of the military burden formation in the whole sample and in the interwar years but they fail to explain the military spending in the period 1880-1913. On the other side of the story, the autocratic feature seems to also play a role before World War I.

Both democratic and autocratic elements of a polity regime could positively and negatively influence military burden. State fiscal capacity, defined as the capacity to acquire resources through taxation, plays a central role. Let us consider that in the nineteenth century the transformation of state bureaucracies led to an increase of state fiscal capacity. More resources became available to increase public expenditure. In most cases bureaucracy's modernization went hand in hand with democratization. Thus, state capacity is the first channel through which polity regimes influence the military burden formation. The availability of a larger amount of resources allowed policy makers of more democratic countries to allocate more funds to military expenditure than the policy makers of autocratic regimes could afford. The countries in which the autocratic regimes prevailed maintained less efficient bureaucracies and low state capacity. Indeed, two forces were at work in the period 1880-1913. The first is the

positive channel through which democracy affected the military burden via the modernization of bureaucracy increasing resources for military expenditure. The second one is the prevailing positive effect of autocratic regimes in shaping the military burden. Hence, the ancient agrarian bureaucracies had lesser funds than modern democracies squeezing military expenditure. However, this effect was more than offset by the attitude of autocratic countries to spend more than democratic ones, as suggested by common sense.

Moreover, since the democratic elements of the polity regimes deploy their effect in lowering military spending in the interwar period, this means that the positive effect of bureaucracy's modernization had been offset and overwhelmed by other elements of the democratization process which came to the fore after World War I.

## VI

From the previous section it has emerged that most of the puzzle is explained by bureaucracy modernization along with a clear effect of autocracy towards an increase of military expenditure. Since different forces were at work during the 1880-1913 and 1920-1938 some historical considerations on the links between democracy and the functioning of the economy shed light on the puzzling results.

The concept of democracy is built upon two great categories. The first is the way in which the recruitment of government is carried out and the constraints a government faces in terms of checks and balances. The second is the popular participation in policy making decisions and to the elections. Both of these are strongly linked as wider participation ushers more binding constraints to executive. Indeed, an ultimate determinant of the policy decisions comes from the extent to which the citizens are enfranchised and they are able to influence government decisions both directly and indirectly.

XIX Century democratic countries limited popular participation in many ways by restricting the voting right to some clusters of the population. Limits to women participation and enfranchising by wealth or by level of schooling were the norm in the democratic countries of the nineteenth century as well as of the first half of twentieth century.

In fact, public control is a component of democracy and it did not evolve at the same pace as bureaucracy modernization. The transformation of bureaucracy often preceded the widening of political participation. The policy makers of democracies in transition with modern bureaucracies had more freedom in allocating public resources than autocracies with olden agrarian bureaucracies.

Indeed, I believe that the inconsistent timing between modernization and full democratization in the four decades before World War I explains the controversial behaviour of democratic institutions. Since political participation was restricted to elite classes and cases of

public involvement in political activity were infrequent, the interests of policy makers matched the interests of the enfranchised elite classes (Acemoglu et al.2005). This feature of the democracy mattered to the extent that popular participation can affect policy decisions and thereby public resource allocation. In the case of enfranchising by wealth, upper classes often share economic interests in wars with the government in charge thus increasing military burden. This happens when the wealthy class gains from public outlays and shares the costs with the rest of citizens through non progressive taxation or debt issues.

A look at the historical data on social transfers seems to confirm the previous arguments. Lindert (2004) argues that before 1945 fuller democracies spent more on social spending than autocracies and incomplete democracies. In principle, because democracies become fuller by enfranchising the lower income population, a wider political participation increases the support of redistributive programs. Moreover, the fostering of social spending implies a change in the preferences of policy makers via political participation. This happened in the aftermaths of World War I when popular participation increased<sup>12</sup>. After World War I the working and middle classes perceived wars as a source of costs and as a loss of welfare. Indeed they posed more binding constraints to government decisions in allocating public resources for military purposes.

Furthermore, the effect of democratization can be viewed by considering the government utility function. The executives maximize their behaviour under both the state fiscal capacity and the social consensus constraints. Let us suppose that governments assumed that the national utility would be increased by the consolidation of borders (especially for newly established countries and small countries), by the acquisition of overseas lands (old and new colonial powers) and by a hegemony design (Latin American and Asian hegemonic countries). Let us also suppose that governments derive utility from social spending<sup>13</sup> which the working and perhaps middle classes were more interested in. Thus, the idea is that the lower the constraint to government policies the higher the degrees of freedom in the allocation of public resources. Whenever governments prioritize the consolidation of borders, acquisition of overseas lands and the hegemony design, military expenditure should increase at the expense of social spending. This hypothesis cannot be directly tested since neither the annual social spending or the total public expenditure is available for all the countries in the sample. However I can test whether the social consensus constraint, proxied by the political participation, mattered for determining military burden.

---

<sup>12</sup> Nine countries out of the total number of countries observed in both of the periods worsened their popular participation, fourteen did better, and five kept the rate of participation unchanged. The newly established countries in the interwar years did not better and they maintained a high degree of exclusion.

<sup>13</sup> It is reasonable to assume that all the aforementioned elements contribute to the national utility function with different weights for the policy makers.

The degree of democratization is measured by two components. The first is public participation and the second is executive constraints. The increase in public participation brings about a tighter constraint to the government's decision. In turn, executive constraints are also fixed by the current law which reflects past institutional changes. Although they are indistinguishable elements of democracy, political participation virtually captures public control over the government decisions and the executive constraints pick up the regulatory setup for the government in charge.

Table 6 uses the pooled mean group estimator to test the different components of democracy, public participation and regulatory executive constraints<sup>14</sup>.

*Table 6 about here*

Let me note that over the whole period under scrutiny both public control and regulatory constraints to the executives lowered the military burden. However, from a statistical point of view the coefficient of political participation is larger and more significant than regulatory constraints. Fundamentally, the role of public participation is emphasised by a comparison between the pre-World War I era and the interwar years. Before 1914, the democracy puzzle was still alive. None of the democracy components deploy effects over the military burden, even though the political participation has a negative sign. The width of enfranchisement and a more conscious involvement of people in the political process during the interwar years triggered the Kantian effect of democratization over the military burden.

Indeed, the empirical exercise provides us with suggestions for further interpretations of the democracy puzzle. Why did political participation and regulatory constraints to the executives determine a new attitude of governments towards military expenditure? The upheavals of the Great War compelled executives to widen political participation by enfranchising a larger share of the population. The new voters asked for more social spending (Linderet, 2004) reinforcing the non-regulatory constraints to policy makers' choices. Since the political voice is expected to be more persuasive after World War I than it was in the years before, the executives faced tighter constraints on allocating public resources. Even though this pattern was in the making in some countries before 1914, it is relevant just after 1919.

The dramatic aftermaths of the Great War modified the social consensus about the choice to engage in conflicts and they defined a new equilibrium between state and citizen expectations. A new perspective in the public resources allocation emerged by the combined effect of building the social welfare and larger public control. Governments which satisfied an

---

<sup>14</sup> Even though the specification is the same of Tables 4 and 5, I adopt a lower order for the autoregressive component. This is due to technicalities with respect to the convergence of the Maximum Likelihood estimator which prevent to use two lags in the autoregressive component for the subsample 1880-1913 and 1920-1938.

increasing demand for public goods lost freedom in allocating public resources. Public control proceeded hand in hand with the improvement of democracy reducing the discretion of governments and applying a stronger pressure on politicians. Moreover, the Great War encouraged government to control public opinion and to contextually take account of the citizens' feelings.

On the contrary, the public control was weak, the social spending was lower and the military expenditure was higher where the disequilibria of World War I led to the autocratization, such as in Italy or in the early 1930s in Germany.

The explanation of a perverse effect of democratization before World War I lies in the same line of argument. The more democratic countries differed from ancient agrarian bureaucracies by their capacity to drain resources through fiscal capacity. A better organized bureaucracy was more efficient in collecting taxes but political participation was too weak to trigger the Kantian effect. This result strengthens the hypothesis that only a full democracy associated with wide political participation can, in the long run, reduce military expenditure. On the contrary non-full or limited democracies tend to spend more on defence purposes. This conclusion confirms recent theoretical findings that predict a higher probability to wage a war for the non-full democratic regimes (Hess and Orphanides 2001, Baliga et al. 2011).

## VII

In the last two hundred years the historical evidence had questioned the idea that the widespread of democracy should reduce the frequency of war and thereby the military spending across the world. In this paper the role of democratization on the military expenditure has been considered using the as large as possible sample of countries observed in the period 1880-1938. The first wave of democratization (1880-1926) and the reverse phase of autocratization (1926 onwards) provide the ideal setting to test the Kantian hypothesis that the more democratic countries spend less for military purposes than autocratic regimes. The first result of the paper is the existence of a democracy puzzle. The Kantian claim seems to hold in the interwar years but not in the first era of democratization, thus questioning a widely accepted stylized fact in the political science literature. The puzzle is explained by considering both the state fiscal capacity and the political participation. In the nineteenth century, countries on the way of democratization ameliorate their bureaucracies which in turn increased the capacity to gain resources throughout taxation. However, at that stage democratization failed in the enlargement of political participation. Thus, the inconsistent timing between the bureaucracy modernization and enlargement of political participation facilitate the freedom of policy makers in allocating public funds for military purposes. After World War I, the political participation widened and the demand for social spending rose dramatically. The improvement of

democracy throughout a wider political participation reduced the freedom of policy makers, making the trade-off between social and military spending more costly in terms of social consensus. Hence, the second result of this paper is that a necessary condition to trigger the Kantian effect of a democratic and thereby peaceful world is the enlargement of the political participation.

The previous results have further implications for current times. First of all, they empirically support recent theoretical results that non full democracies spend more for defense than autocracies and full democracies (Hess and Orphanides 2000, Baliga et al. 2011). Secondly, our results raise some concerns about recent changes in the XX Century agrarian bureaucracies which modernized bureaucracies and increased their state capacity but are failing to build a wide and effective political participation.

## References

- Alesina, A., Spolaore, E., (2005). War, peace, and the size of countries, *Journal of Public Economics*, 89, pp. 1333–1354.
- Alesina, A., Spolaore, E., (2006). Conflict, defence spending, and the number of nations, *European Economic Review*, 50, pp. 91-120.
- Arellano M., Bond S., (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations, *Review of Economic Studies*, 58, pp. 277-297.
- Arellano M., Bover O., (1995). Another look at the instrumental variable estimation of error-components models," *Journal of Econometrics*, vol. 68(1), pages 29-51.
- Baliga, S., D. Lucca, and T. Sjöström, (2011). Domestic Political Survival and International Conflict: Is Democracy Good for Peace?, *Review of Economic Studies*, vol. 78, pp.458-486.
- Besley T., Persson, T., (2009). The Origins of State Capacity: Property Rights, Taxation, and Politics, *American Economic Review*, vol. 99(4), pages 1218-44.
- Blundell R., Bond S., (1998). Initial conditions and moment restrictions in dynamic panel data models, *Journal of Econometrics*, vol. 87(1), pages 115-143.
- Broadberry S., Harrison, M., (2005). *The Economics of World War I*. Cambridge, Cambridge University Press.
- Collier, P., Hoeffler A., (2004). Aid, policy and peace: reducing the risks of civil conflict, *Defence and Peace Economics*, Vol. 13, pp. 435–450.
- Collier, P., Hoeffler A., (2007a). Unintended Consequences: Does Aid Promote Arms Races?, *Oxford Bulletin of Economics and Statistics*, 69: 1-28.
- Collier, P., Hoeffler A., (2007b). Military spending and the risk of coup d'Etat, *Centre for the Study of African Economies*, Department of Economics, Oxford University
- Conconi, P., Sahuguet N., Zanardi M, (2008). Democratic Peace and Electoral Accountability. *CEPR Discussion Papers*, N. 6908.
- Doorenspleet R., (2000). Reassessing the three waves of democratization, *World Politics*, 52 (3) pp. 384-406.
- Dunne, P., Perlo-Freeman, S. (2003). The demand for military spending in developing countries, *International Review of Applied Economics*, Vol. 17, pp. 23–48.
- Dunne, P., Perlo-Freeman, S. (2003). The demand for military spending in developing countries: Hostilities versus capabilities, *Defence and Peace Economics*, 2008, 19(4), pp. 293–302.
- Dunne, J. P., Perlo-Freeman, S., Smith, R. P., (2008). Determining Military Expenditures: Arms Races and Spill-Over Effects in Cross-Section and Panel Data, *mimeo*.

- Eloranta, J. (2002). External security by domestic choices: military spending an impure public good among eleven European states, 1920–1938, *Department of History and Civilisation*, Florence, Italy: European University Institute.
- Eloranta J., (2007), From the great illusion to the Great War: Military spending behaviour of the Great Powers, 1870–1913, *European Review of Economic History*, 11, 255–283.
- Faten G., Palmer G., and Bremer S., (2004) The MID3 Data Set, 1993–2001: Procedures, Coding Rules, and Description, *Conflict Management and Peace Science*, Vol. 21, pp.133-154.
- Fordham B. O., Walker T. C. (2005). Kantian Liberalism, Regime Type, and Military Resource Allocation: Do Democracies Spend Less?, *International Studies Quarterly*, 49, pp. 141–157
- Gerring J., Bond P., Barndt W. T., Moreno C., (2005). Democracy and Economic Growth: A Historical Perspective, *World Politics*, 57 (3), pp. 323-364.
- Harrison, M., (1998) *The Economics of World War II: Six Great Powers in International Comparison*. Cambridge: Cambridge University Press,
- Harrison, M., Wolf, N., (2011). The Frequency of Wars, *The Economic History Review*, forthcoming
- Hess, G. D., Orphanides, A., (2001). War and Democracy, *The Journal of Political Economy*, 109 (4), pp. 776-810.
- Huntington S. P., (1991). *The third wave: democratization in the late Twentieth Century*, Norman: University of Oklahoma Press.
- Kant I., [1795] (1917). *Perpetual Peace*, London: George Allen & Unwin Ltd.
- Lindert P. H., (2004). *Growing Public, Social Spending and Economic Growth since the Eighteenth Century*, Cambridge University Press
- Lipset, S. M. (1959). Some Social Requisites of Democracy: Economic Development and Political Legitimacy, *American Political Science Review*, 53 (1), pp. 69-105.
- Marshall M. G., Gurr T. R., Jagers K., (2010). *Polity IV Project: Political Regime Characteristics and Transitions, 1800-2009*, Center for Systemic Peace
- Maddison A., (2010). *Historical Statistics of the World Economy: 1-2008 AD*, available at <http://www.ggdc.net/MADDISON/oriindex.htm>
- Pesaran, M. H., Smith, R., (1995). Estimating long-run relationships from dynamic heterogeneous panels, *Journal of Econometrics*, vol. 68(1), pp. 79-113.
- Pesaran, M. H., Shin, Y., Smith, R. P., (1999). Pooled Estimation of Long-run Relationships in Dynamic Heterogeneous Panels, *Journal of the American Statistical Association*, vol. 94 (446), pp.621-634.
- Pesaran, M. H., Shin, Y., Smith, R. J., (2001). Bounds testing approaches to the analysis of level relationships, *Journal of Applied Econometrics*, vol. 16(3), pages 289-326.
- Richardson, L. F., (1960). *Arms and Insecurity*, The Boxwood Press, Chicago.

Sartori, G. (1987). *The Theory of Democracy Revisited*. Chatham, NJ: Chatham House

Schulze, M. S., (2000), Patterns of growth and stagnation in the late nineteenth century Habsburg economy, *European Review of Economic History*, vol. 4, pp. 311-340.

Singer, J. David, Stuart Bremer, and John Stuckey. (1972). Capability Distribution, Uncertainty, and Major Power War, 1820-1965, in Bruce Russett (ed) *Peace, War, and Numbers*, Beverly Hills: Sage, 19-48.

Singer, J. David. (1988). Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816-1985, *International Interactions*, 14: 115-32.

## Figures and Tables

*Table 1 Summary statistics of the Military burden in selected countries*

State	1880-1913					1920-1938				
	<i>Observed since</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Min</i>	<i>Max</i>	<i>Observed since</i>	<i>Mean</i>	<i>Standard Deviation</i>	<i>Min</i>	<i>Max</i>
ARG	1884	0.0159	0.0059	0.0099	0.0319	1920	0.0034	0.0010	0.0022	0.0056
AUH	1880	0.0218	0.0024	0.0180	0.0301	.	.	.	.	.
AUL	.	.	.	.	.	1920	0.0034	0.0014	0.0021	0.0079
AUS	.	.	.	.	.	1924	0.0108	0.0052	0.0067	0.0223
BEL	1880	0.0107	0.0011	0.0085	0.0125	1920	0.0082	0.0067	0.0020	0.0196
BRA	1880	0.0297	0.0099	0.0158	0.0522	1920	0.0225	0.0101	0.0062	0.0435
BUL	.	.	.	.	.	1924	0.0305	0.0139	0.0185	0.0546
CAN	1880	0.0032	0.0019	0.0018	0.0122	1920	0.0038	0.0014	0.0024	0.0067
CZE	.	.	.	.	.	1920	0.0337	0.0093	0.0240	0.0509
DEN	1880	0.0142	0.0029	0.0106	0.0211	1920	0.0077	0.0026	0.0048	0.0141
FIN	.	.	.	.	.	1921	0.0276	0.0045	0.0207	0.0362
FRN	1880	0.0350	0.0068	0.0266	0.0436	1920	0.0190	0.0111	0.0068	0.0422
GMY	1880	0.0242	0.0033	0.0201	0.0347	1920	0.0280	0.0422	0.0015	0.1738
HUN	.	.	.	.	.	1925	0.0227	0.0091	0.0145	0.0403
ITA	1880	0.0322	0.0073	0.0220	0.0519	1920	0.0634	0.0380	0.0275	0.1614
JPN	1885	0.0577	0.0567	0.0134	0.2589	1920	0.0542	0.0338	0.0278	0.1434
MEX	1900	0.0085	0.0020	0.0065	0.0143	1920	0.0187	0.0049	0.0119	0.0293
NEW	.	.	.	.	.	1920	0.0025	0.0019	0.0001	0.0064
NOR	1884	0.0152	0.0025	0.0113	0.0207	1920	0.0092	0.0011	0.0072	0.0122
NTH	1880	0.0278	0.0033	0.0207	0.0341	1920	0.0151	0.0038	0.0100	0.0247
PER	1900	0.0085	0.0017	0.0043	0.0107	1920	0.0102	0.0040	0.0005	0.0165
POR	1880	0.0200	0.0057	0.0103	0.0334	1920	0.0238	0.0056	0.0138	0.0365
ROM	.	.	.	.	.	1926	0.0256	0.0056	0.0157	0.0326
RUS	1885	0.0154	0.0066	0.0083	0.0434	.	.	.	.	.
SPN	1880	0.0177	0.0022	0.0134	0.0237	1920	0.0304	0.0081	0.0161	0.0415
SWD	1880	0.0228	0.0042	0.0173	0.0320	1920	0.0160	0.0032	0.0123	0.0236
SWZ	1880	0.0119	0.0021	0.0093	0.0194	1920	0.0212	0.0126	0.0112	0.0569
UKG	1880	0.0264	0.0103	0.0161	0.0613	1920	0.0321	0.0143	0.0185	0.0697
URU	1900	0.0082	0.0027	0.0010	0.0117	1920	0.0106	0.0009	0.0095	0.0117
USA	1880	0.0073	0.0028	0.0043	0.0183	1920	0.0100	0.0035	0.0057	0.0191
VEN	.	.	.	.	.	1920	0.0145	0.0038	0.0073	0.0227
YUG	.	.	.	.	.	1924	0.0480	0.0153	0.0133	0.0696

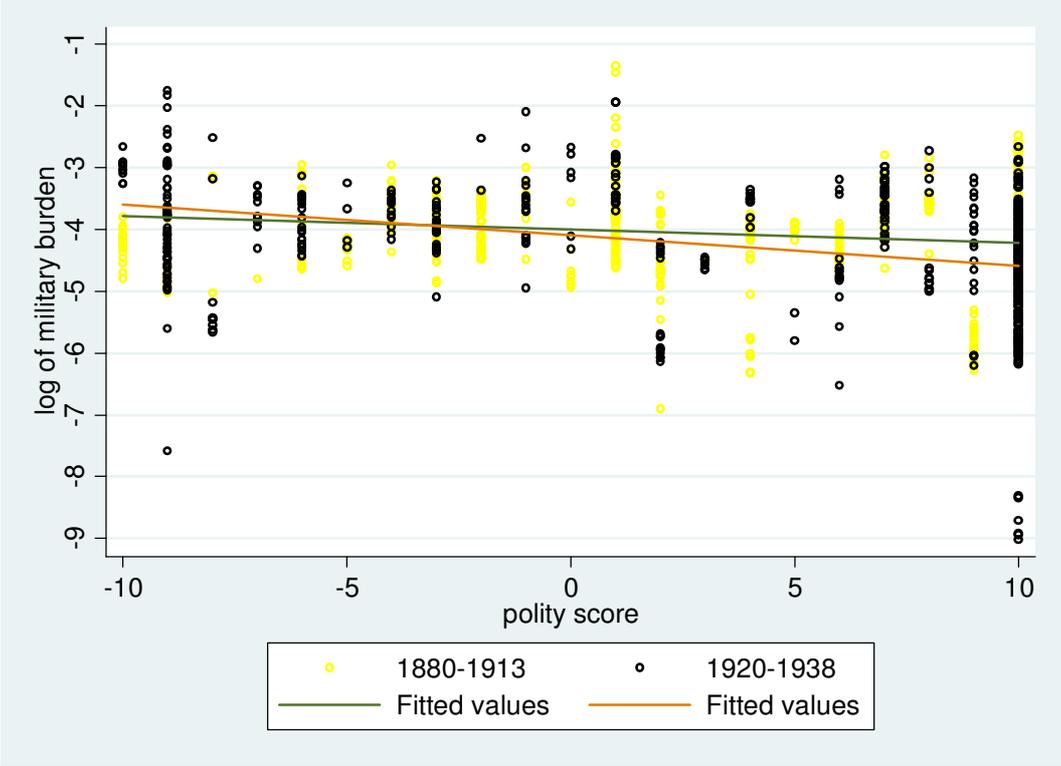
Source: see text and footnotes

Table 2 Summary statistics of the Polity score (polity2) in selected countries

State	1880-1913				1920-1938			
	Mean	Standard Deviation	Min	Max	Mean	Standard Deviation	Min	Max
ARG	1.06	0.24	1	2	-1.37	5.28	-8.00	5.00
AUH	-4.00	0.00	-4	-4	.	.	.	.
AUL	.	.	.	.	10.00	0.00	10.00	10.00
AUS	.	.	.	.	3.53	7.15	-9.00	8.00
BEL	6.03	0.17	6	7	9.47	0.51	9.00	10.00
BRA	-3.79	1.34	-6	-3	-4.53	1.81	-7.00	-3.00
BUL	.	.	.	.	-4.68	2.96	-10.00	-3.00
CAN	7.82	2.15	4	9	9.95	0.23	9.00	10.00
CZE	.	.	.	.	7.00	0.00	7.00	7.00
DEN	-0.68	3.51	-3	8	10.00	0.00	10.00	10.00
FIN	.	.	.	.	7.32	2.98	4.00	10.00
FRN	7.47	0.51	7	8	9.47	0.51	9.00	10.00
GMY	-0.32	2.43	-4	2	1.26	7.16	-9.00	6.00
HUN	.	.	.	.	-1.00	0.00	-1.00	-1.00
ITA	-2.76	1.50	-4	-1	-6.89	3.05	-9.00	-1.00
JPN	1.00	0.00	1	1	1.00	0.00	1.00	1.00
MEX	-8.21	2.59	-9	0	-4.00	2.08	-6.00	-1.00
NEW	9.62	0.49	9	10	10.00	0.00	10.00	10.00
NOR	3.41	6.33	-4	10	10.00	0.00	10.00	10.00
NTH	-2.26	0.45	-3	-2	10.00	0.00	10.00	10.00
PER	1.38	1.68	-3	2	-4.58	5.17	-9.00	2.00
POR	-2.59	3.89	-9	7	-2.26	7.41	-9.00	7.00
ROM	-6.35	0.98	-7	-4	-4.11	0.46	-6.00	-4.00
RUS	-9.00	1.72	-10	-6	.	.	.	.
SPN	4.97	0.94	4	6	1.63	6.36	-7.00	7.00
SWD	-2.97	2.41	-4	5	10.00	0.00	10.00	10.00
SWZ	10.00	0.00	10	10	10.00	0.00	10.00	10.00
UKG	7.38	0.49	7	8	9.79	0.63	8.00	10.00
URU	-1.88	1.84	-3	2	2.21	1.36	0.00	3.00
USA	10.00	0.00	10	10	10.00	0.00	10.00	10.00
VEN	.	.	.	.	-8.32	1.42	-9.00	-5.00
YUG	.	.	.	.	-4.72	4.79	-10.00	0.00

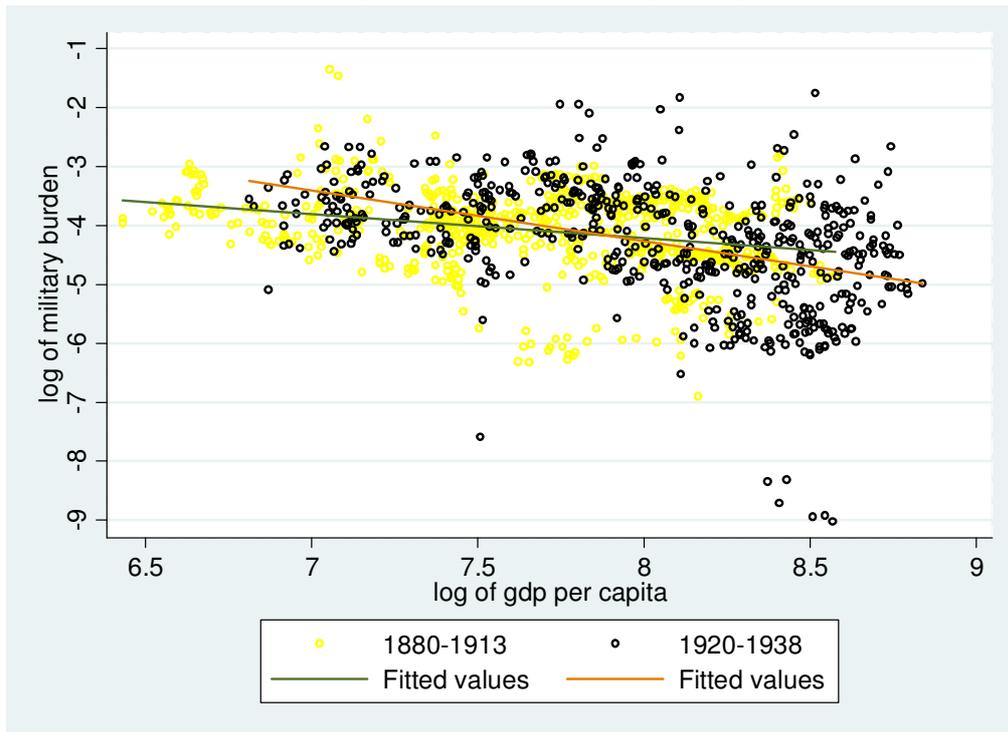
Source: see text and footnotes

Figure 1 Association between Military Burden and Polity score in two sub-sample 1880-1913 and 1920-1938 (WWI year are excluded. Log scale).



Source: see text and footnotes for details.

Figure 2 Association between Military Burden and GDP per capita in two sub-sample 1880-1913 and 1920-1938 (WWI year are excluded. Log scale).



Source: see text and footnotes for details.

Table 3. Dynamic and System GMM estimations. Dependent variable: Log of Military Burden

	1880-1938		1880-1913		1920-1938	
	(1) SGMM	(2) DGMM	(3) SGMM	(4) DGMM	(5) SGMM	(6) DGMM
Log of military burden (t-1)	0.169** (0.0743)	0.0403 (0.0835)	0.526*** (0.101)	-0.0442 (0.141)	0.150 (0.109)	-0.0145 (0.119)
Log of GDP per capita	0.334 (0.228)	0.452* (0.233)	-0.0272 (0.302)	-0.366 (0.323)	0.926 (0.604)	0.192 (0.698)
Polity Score	-0.0571*** (0.0121)	-0.0704*** (0.0239)	-0.0263 (0.0160)	0.0476 (0.0360)	-0.0773*** (0.0213)	-0.0844** (0.0384)
MEBURCOMP	0.139*** (0.0503)	0.133** (0.0643)	-0.0202 (0.199)	-0.265 (0.359)	0.154** (0.0675)	0.112 (0.0883)
HOS	0.137*** (0.0368)	0.145*** (0.0555)	0.0594* (0.0339)	0.0356 (0.0438)	0.168** (0.0683)	0.151 (0.0924)
Constant	-5.462*** (1.880)		-1.806 (2.916)		-10.18** (4.910)	
m1	-5.04 0.00	-7.85 0.00	-4.38 0.00	-3.32 0.00	-3.61 0.00	-5.31 0.00
m2	1.27 0.42	0.97 0.33	2.48 0.01	1.33 0.18	0.72 0.47	0.08 0.94
Sargan	25.75 0.42	20.74 0.71	30.78 0.01	10.13 0.81	17.52 0.62	14.52 0.95
# instruments	31	30	21	20	30	26
Observations	308	276	155	133	153	143
Number of countries	32	32	22	22	30	30

Standard errors in parentheses \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Table 4. Pooled mean group estimator. Dependent variable: log of Military burden. ARDL (2, 1, 1, 1, 1)

	1880-1938 WWI excluded (4)	1880-1913 (2)	1920-1938 (3)
Log of Mebur (t-2)	-0.365*** (0.0946)	0.178*** (0.0646)	-0.299*** (0.0775)
Polity score	-0.0287*** (0.00526)	0.00797 (0.00757)	-0.0274*** (0.00580)
Log of GDP per capita	0.140* (0.0768)	-0.476*** (0.0805)	0.0888 (0.115)
MEBURCOMP	0.328*** (0.0517)	0.117** (0.0571)	0.315*** (0.0559)
HOS	0.0545*** (0.0192)	0.0472*** (0.0121)	0.192*** (0.0345)
$\varphi$	-0.255*** (0.0360)	-0.285*** (0.0758)	-0.321*** (0.0467)
Constant	-1.348*** (0.187)	0.184*** (0.0352)	-1.511*** (0.233)
Countries	32	22	30
Observations	1,165	626	539

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Short run variables omitted to save space. Available upon request.

Table 5. Pooled mean group estimator. Dependent variable: Log of Military burden (Mebur). Long run relationships

	(1)	(2)	(3)	(4)	(5)	(6)
	1880-1938 WWI excluded	1880-1913	1920-1938	1880-1938 WWI excluded	1880-1913	1920-1938
Log of Mebur (t-2)	-0.391*** (0.0926)	-0.339** (0.167)	-0.301*** (0.0774)	-0.331*** (0.0912)	-0.260* (0.146)	-0.509*** (0.0890)
Democracy	-0.0596*** (0.00998)	0.0215 (0.0167)	-0.0667*** (0.0114)			
Autocracy				0.0611*** (0.0101)	0.106*** (0.0290)	0.0556*** (0.00890)
log of GDP per capita	0.109 (0.0789)	0.0349 (0.0898)	-0.174 (0.149)	0.135* (0.0753)	0.0795 (0.0871)	-0.353** (0.144)
MEBURCOMP	0.270*** (0.0487)	-0.0705 (0.0694)	0.241*** (0.0482)	0.291*** (0.0470)	0.0846 (0.0744)	0.0524* (0.0279)
HOS	0.0573*** (0.0192)	0.0427*** (0.0122)	0.127*** (0.0327)	0.0525*** (0.0184)	0.0476*** (0.0143)	0.0609*** (0.0234)
$\Phi$	-0.255*** (0.0404)	-0.269*** (0.0618)	-0.318*** (0.0493)	-0.257*** (0.0383)	-0.241*** (0.0646)	-0.268*** (0.0522)
Countries	32	22	30	32	22	30
Observations	1,165	626	539	1,165	626	539

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Short run variables omitted to save space. Available upon request.

Table 6. Pooled mean group estimator. Dependent variable: Log of Military burden (Mebur). ARDL (1, 1, 1, 1, 1, 1) in columns (1) (2) and (3), ARDL (2, 1, 1, 1, 1, 1) in column (4).

	(1)	(2)	(3)	(4)
	1880-1938 WWI excluded	1880-1913	1920-1938	1880-1938 WWI excluded
Log of Mebur (t-2)				-17.74*** (3.491)
political participation	-0.0499*** (0.0129)	-0.102 (0.0758)	-0.178*** (0.0425)	-0.0598*** (0.0129)
regulatory constraints	-0.0167 (0.0302)	0.0252 (0.0655)	-0.0285 (0.0198)	-0.0182 (0.0388)
log of GDP per capita	0.265*** (0.0874)	-0.279** (0.119)	-1.247*** (0.169)	0.152* (0.0842)
MEBURCOMP	0.327*** (0.0430)	0.432*** (0.102)	0.193*** (0.0229)	0.376*** (0.0558)
HOS	0.0706*** (0.0208)	0.107*** (0.0214)	0.0174 (0.0166)	0.0562*** (0.0214)
$\varphi$	-0.310*** (0.0461)	-0.263*** (0.0578)	-0.331*** (0.0593)	-0.249*** (0.0378)
Countries	32	22	30	32
Observations	1,165	626	539	1,165

Standard errors in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Short run variables omitted to save space. Available upon request. Columns 1, 2, 3 adopt an ARDL (1, 1, 1, 1, 1, 1) model while column 4 adopts an ARDL (2, 1, 1, 1, 1, 1) model. See footnote 13 for more details.