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## Political geography and income inequalities



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### ABSTRACT

We analyze political geography and the size of governments in the presence of income inequality. The social planner solution implies that income inequality is neutral on the size of countries but reduces the optimal provision of public goods within each country. Under additional conditions, a politico-economic equilibrium geography is characterized by suboptimal size of nations, but there may not be a stable equilibrium when inequality is high enough. Finally, we introduce globalization showing that inequality can increase the size of countries, reduce public good provision and, at the same time, decrease their degree of openness.

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### 1. Introduction

We study the determinants of the size of nations and of the level of public good provision in function of income heterogeneity. We develop a model of political geography where population is characterized by a double heterogeneity: individuals are located on a segment representing the world and they differ in income levels. Our purpose is to check the robustness of the results displayed by [Alesina and Spolaore \(1997\)](#) and [Etro \(2006\)](#) after the introduction of income inequalities. As already suggested by [Alesina and Spolaore \(1997\)](#) themselves (p. 1046): “*differences in income...may be crucial determinants...of the equilibrium size and number of countries*”. More generally, this work is intended to discuss the effects of income heterogeneity on public spending and political instability from a theoretical point of view.

Political geography has been already explored under many perspectives. The pathbreaking works by [Friedman \(1977\)](#) and [Buchanan and Faith \(1987\)](#) were focused on country formation and secessions. Further theoretical analysis emerged in the median voter theorem-based literature started by [Meltzer and Richard \(1981\)](#),<sup>1</sup> contemporaneously with an increase in the number of nations around the world, associated with country borders redrawn to an extent that is absolutely exceptional for a peacetime period. In the model by [Alesina and Spolaore \(1997\)](#) the size of nations is endogenously determined by a trade-off between scale economies and preference heterogeneity, population is uniformly distributed, geographical and preference dimensions coincide, and public spending is exogenous and independent from size. In [Etro \(2006\)](#) public spending is endogenous, provides utility as a public good and is financed with distortive taxes under budget balance. Our analysis focuses on the effects of the introduction of income heterogeneity on country size and public good provision in this more general model.

The effects of income heterogeneity have been already explored in similar contexts by [Bolton and Roland \(1997\)](#) and [Haimanko et al. \(2005\)](#). [Bolton and Roland \(1997\)](#) analyze how income differences between regions can influence the break-up or unification of countries. Their model emphasizes political conflicts over redistribution policies in jurisdictions where

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<sup>1</sup> See also [Meltzer and Richard \(2015\)](#) for an important “come back” in this Issue of *Research in Economics*.

the decision to separate or to unify is taken by majority voting. A trade-off between efficiency gains of unification and costs in terms of loss of control on political decisions is highlighted. [Haimanko et al. \(2005\)](#) focus on threats of secession in a model where population is not uniformly distributed. They emphasize how efficiency implies stability only if the differences in citizens' preferences due to the geographical distribution of population are sufficiently small. If such differences are great enough efficient countries are not stable and redistribution schemes are needed in order to prevent secessions. Notice that both [Bolton and Roland \(1997\)](#) and [Haimanko et al. \(2005\)](#) focus on threats of secession within a single country, while we deal with global political geography.

Our model considers a plurality of countries. Heterogeneity is in terms of both individuals' location and income distribution. Population is continuously and uniformly distributed along a map of unitary length, and individuals are not mobile across locations, in contrast with the literature that follows [Tiebout \(1956\)](#); the issue of multidimensional heterogeneity in a context with a large number of jurisdictions has been already analyzed within the framework of [Tiebout \(1956\)](#) by [Perroni and Scharf \(2001\)](#).<sup>2</sup> In related research, [de Donder et al. \(2012a\)](#) and [de Donder et al. \(2012b\)](#) have considered agents that are heterogeneous in terms of both income and location and vote both on the provision of public goods financed with lump sum or proportional taxation and on the location of the public goods in a country, but, again, they do not provide a general analysis of political geography.

Our analysis focuses initially on the social planner solution for the optimal political geography<sup>3</sup> through a two stage process: in the first stage, the social planner chooses the size of countries and the amount of public good within each country;<sup>4</sup> in the second stage, the social planner chooses the location of public good in order to minimize the “costs of distance” from it within each country. The social planner solution implies that, for a given public spending, higher inequality increases the average distortion of the taxes without affecting the social benefits of public good provision, which makes it more convenient to exploit scale economies through a reduction of the number of countries. However, this result ignores the impact on public spending: inequality does not affect the marginal social benefits from public goods, but it increases the marginal cost of production because it increases the average distortion of taxes, which reduces the optimal level of public spending. This, in turn, tends to reduce the optimal size of nations. We show that, at the global optimum, income inequality is neutral on the size of countries but reduces the optimal provision of public goods within each country: if the distribution of income changes, the social planner “adjusts” public spending instead of changing country borders.

We then check for the existence of stable equilibria under standard rules for border redrawing. In case of perfect substitutability between private and public goods we show that any stable equilibrium geography is characterized by suboptimal size of nations, but there is not a stable equilibrium if the income differential between rich and poor individuals is high enough. Finally, we introduce globalization as in [Etro \(2006\)](#) and show that inequality can increase the size of countries and at the same time decrease both their provision of public good and their openness. Compared to the voting model of [de Donder et al. \(2012b\)](#) and [de Donder et al. \(2012b\)](#), our framework introduces distortive taxation and allows us to examine the impact of income inequality on the optimal and equilibrium size of nations in a very simple way. Moreover, our model allows us to highlight the effects of different degrees of substitutability between public and private goods and the relation with globalization.

The work is organized as follows. [Section 2](#) presents the model, [Section 3](#) derives the optimal political geography. [Section 4](#) defines and characterizes the equilibrium geography. [Section 5](#) extends the model with globalization. [Section 6](#) concludes.

## 2. The model

Consider a world with total population of unitary mass. Individuals are continuously and uniformly distributed on the segment  $[0, 1]$  and they are not mobile. They are divided in two groups, “poor” and “rich”. There is no income heterogeneity within groups:  $y_p = 1$  is the income of poor individuals which is normalized to 1 without loss of generality and  $y_R = k$  is the income of rich individuals, where  $k > 1$  measures income differential between groups. The parameter  $\alpha$  represents the share of poor individuals and  $1 - \alpha$  is the share of rich individuals. We assume that  $\alpha > 0.5$  in order to guarantee the skewness to the right of income distribution as it is empirically observed ([Meltzer and Richard, 1981](#)). Hence, the average income is

$$\bar{y} = \alpha + (1 - \alpha)k \quad (1)$$

and the median income is

$$y_m = 1 \quad (2)$$

In every point of the segment  $[0, 1]$  there are  $\alpha$  poor individuals and  $1 - \alpha$  rich individuals.

<sup>2</sup> See [Epple and Romano \(2015\)](#) in this Issue of *Research in Economics* for the most comprehensive treatment of optimal and equilibrium provision of public goods with mobility of the citizens.

<sup>3</sup> The social planner solution can be considered as a “constrained optimum”, given that we assume the presence of a distortionary (proportional) taxation scheme.

<sup>4</sup> Beyond different assumptions on individuals' mobility, the model by [Perroni and Scharf \(2001\)](#) does not consider the social planner solution and focuses on a locational model of local fiscal choices where jurisdictions consist of open-membership coalitions of individuals and the levels of local public good provision are selected by majority voting.

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