

The Economics of Political Borders

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1 Introduction

What determines the formation and breakup of sovereign states? This question has been at the center of historical, philosophical and political analyses for centuries.¹ In recent decades, a dramatic increase in the number of independent states and the spreading of separatism have renewed interest in the redrawing of borders. As of June 2014, the United Nations included 193 member states, up from 51 in 1946. Since 1990, over twenty new states have become independent following the breakups of the Soviet Union, Czechoslovakia, and Yugoslavia, and separations from Ethiopia (Eritrea), South Africa (Namibia), and Indonesia (Timor Leste). Vocal demands for autonomy or independence have spread all over the world, from the Basque Countries and Catalonia to Quebec, from Ireland and Scotland to Belgium, Corsica and Italy, from the Middle East to Kashmir, Thailand, and Indonesia. According to Gurr's (2000) *Minorities at Risk* dataset, secessionist movements were present in at least 52 countries. These events have motivated a growing literature on political borders. Students of these issues include not only historians and political scientists but also, more recently, economists.

The new economic literature on political integration and disintegration has provided analyses where the borders of national states are not taken as given (exogenous), but are the endogenous outcomes of decisions by agents

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¹For instance, see Dahl and Tufte (1973), Anderson (1983), Gellner (1983), Tilly (1975, 1990), among many others.

who interact with each other while pursuing their goals under constraints.² In other words, these studies recognize that borders are not a fixed, given feature of the geographical landscape, but human-made institutions, affected by the decisions and interactions of individuals and groups, and can be analyzed as part of the growing field of political economy. In general, contemporary political economy studies the interaction between economic and political variables: how economic forces affect political processes, and how political institutions, conversely, affect economic outcomes. While the interplay between economic forces and political institutions has been at the core of this field for a long time, the focus in more recent years has shifted towards the deeper determinants of economic outcomes and political institutions - that is, the emphasis is now on the historical and cultural roots of institutions.³ Sovereign states continue to be the world's most powerful political institutions. The economic literature on endogenous borders, which studies the interactions of economic and non-economic (political, ethnic, cultural) variables in the formation and breakup of states, is therefore part of this broader research agenda on the deep determinants of political-economy outcomes. Contributions to the economic literature on national borders and secessions include Alesina and Spolaore (1997, 2005, 2006), Alesina, Spolaore and Wacziarg (2000), Bolton and Roland (1997), Bordignon and Brusco (2001), Ellingsen (1998), Findlay (1996), Friedman (1977), Goyal and Staal (2003), Le Breton and Weber (2003), Spolaore (2008, 2012), and Wittman (2000) among others.⁴ General discussions are provided in Alesina and Spolaore (2003), Bolton, Roland and Spolaore (1996), and Spolaore (2006, 2012).

Questions addressed in this literature are: Why do countries break up? What are the costs and benefits of secessions? Do these costs and benefits depend on international openness? Are secessions efficient or inefficient from an economic perspective? Is political disintegration related to democratization? Do decentralization and federalism reduce or increase the incentives to secede? How are the number and size of nations affected by conflict and wars? These are complex questions, and economic analysis alone is no substitute for careful historical and political investigations of specific case

²In economic analysis it is common to distinguish between endogenous variables, determined within the model, and exogenous variables, determined outside the model.

³For a recent discussion of culture and institutions by a prominent political economist see, for instance, Tabellini (2008). A general discussion of long-term historical determinants of economic and political outcomes is provided by Spolaore and Wacziarg (2013).

⁴A closely related literature focuses on the endogenous formation of supranational unions, such as the European Union. For a recent discussion, see for instance Spolaore (2013).

studies and events. Rather, the economics approach to political borders is complementary to more traditional methods. Economists, by using tools and methods that are relatively simplified and abstract but also powerful and general, can provide novel insights on these difficult and important questions. In a way, the economic analysis of political borders is a bold application of the two steps of economics according to Ed Leamer (2012, p. 2), who borrowed them from Matt Miller's description of journalism: "simplify and exaggerate." In this chapter we review how some concepts and results from economic analysis ("simplifications" and "exaggerations") can shed light on the formation and breakup of nations. Section 2 discusses the key trade-off between economies of scale in the provision of public goods and political costs from heterogeneity of preferences. Section 3 presents four economic perspectives on the formation of political borders: efficient borders, borders as democratic outcomes, borders in a world of rent-seeking Leviathans, and borders as outcomes of conflict and wars. Section 4 provides an analytical illustration of the basic ideas within a simplified framework.

2 Economies of Scale and Heterogeneity Costs

Governments supply public goods to their citizens: a legal and judicial system, general administration and policy coordination, foreign policy, defense and security, police and crime prevention, a monetary and financial system, infrastructure for communications, public health, and so on. Providing public goods comes with economies of scale: bigger is cheaper. This is because public goods, unlike private goods, are typically non-rival in consumption. This means that each citizen can benefit from them without reducing the benefits for other citizens. Even when total costs of publicly provided services increase with the size of the population, typically their average cost is still decreasing in size because of large fixed costs that must be borne independently of population's size. Therefore, public goods tend to be cheaper per person when more taxpayers pay for them. In the data, government spending as a share of gross domestic product is indeed decreasing in population: smaller countries tend to have proportionally larger governments (see Alesina and Wacziarg, 1998 and Alesina and Spolaore, 2003, chapter 10). Significant economies of scale have also been found for public goods provided at the subnational level - for instance, Hayashi, Nishikawa and Weese (2011) find large economies of scale in the provision of local public goods by Japanese municipalities. Larger political jurisdictions can also internalize

cross-regional externalities - an issue extensively studied in the literature on decentralization and fiscal federalism (e.g., Oates 1999). A special role in the literature on endogenous borders has been played by national defense and security, which, historically, are among the most important public goods provided by governments. In principle, by taking advantage of economies of scale, larger states can provide cheaper and more effective security to their citizens. Empirically, the relation between defense spending and state size is complex for several reasons, such as the existence of international alliances and the fact that some larger states (e.g., the United States) provide defense for smaller states.⁵ At the same time, larger, more powerful states may obtain additional economic and political benefits from their leading position.⁶ In sum, the provision of public goods - including defense and foreign policy - is associated with actual or potential benefits from a larger size.

If economies of scale were the only factor in the formation of jurisdictions, larger polities would always be more efficient than smaller ones, and overall efficiency would be maximized with one world government. However, the economic literature on borders has pointed out that a larger size may come with significant costs as well as benefits. As jurisdictions become larger, administrative costs and congestion may overcome some of the scale benefits. Moreover, an expansion of national borders is likely to bring about more diversity of preferences for public policies and types of governments across different groups of citizens.

In general, societal heterogeneity is associated with both costs and benefits. Higher heterogeneity may generate direct benefits through learning, specialization, and exchange of ideas, and societies can benefit economically and culturally when people have different preferences and characteristics. For example, diversity of preferences over *private goods* can be beneficial because it may allow a better use of resources - a society where some people prefer turkey sandwiches while others prefer chicken sandwiches can be better off than a society where everybody likes just one type of sandwich. But diversity of preferences over *public goods* are much harder to reconcile, exactly because public goods are non-rival: all citizens of a sovereign state must share that state's government, laws, and public policies, whether they like them or not. As national borders include more diverse populations - with different values, norms, habits, cultures, languages, ethnicities,

⁵The classic reference here is Olson and Zeckhauser (1966). For a recent discussion of conflict, defense, and national size see Spolaore (2012).

⁶A further complication arises if the returns to foreign aggression are increasing in a state's size - as in Thomson's (1976) classic analysis of optimal defense spending and taxation.

religions - disagreements over the fundamental characteristics of the state (legal system, official language, foreign policy) are more likely to emerge. In a nutshell, being part of the same country implies sharing jointly-supplied public goods and policies in ways that cannot always satisfy everybody's preferences. Successful societies manage to minimize the political costs of heterogeneity while maximizing the benefits from a diverse pool of preferences, skills, and endowments. Nonetheless, all other things being equal, heterogeneity and political costs tend to increase as states become larger and expand their borders. Therefore, on balance, there is a trade-off between economies of scale and heterogeneity of preferences over public policies. This trade-off has played a central role in the economics literature on endogenous borders (e.g., in Alesina and Spolaore 1997, 2003; Le Breton and Weber 2003; Wittman 2000). When economies of scale become more prominent compared to heterogeneity costs, larger political systems tend to emerge. In contrast, a decrease in the benefits from size or an increase in heterogeneity costs can bring about political disintegration.

The association between heterogeneity costs and size does *not* imply that all small countries in the world are necessarily more homogeneous and must face lower political costs while all large countries in the world are necessarily more heterogeneous and face higher political costs. The economic approach to borders predicts that size responds endogenously to heterogeneity costs. Consequently, there may be no empirical relation between size and heterogeneity after border have adjusted. In some circumstances, we may even observe relatively *smaller* states in regions of the world with relatively higher heterogeneity, because people will have formed smaller polities exactly in order to reduce those high heterogeneity costs. In contrast, regions where populations are on average more homogeneous can "afford" larger political jurisdictions. The prediction is not about an empirical relation between average size and average heterogeneity, but about the effects of a larger size on heterogeneity costs *at the margin*. No matter what the level of heterogeneity is in a given country within a given region of the world, increasing the size of that country by including additional, more diverse regions will tend to raise that country's heterogeneity at the margin. A useful analogy is the relationship between temperature and size of dwellings in preindustrial societies (without modern heating and air conditioning systems). If we assume that a larger dwelling is colder and more expensive to heat, on average we would observe smaller dwellings in colder climates and larger dwellings in warmer climates. But those smaller dwellings in colder climates may very well be *colder* on average than the larger dwellings built in warmer climates. This does not mean that there is no marginal relation between size and internal

temperature: those small dwellings in cold climates would be even colder if they were larger.

The political costs associated with larger, more heterogeneous polities have been debated since classical times. Concerns about the costs of size informed, for instance, the classical Greek view that polities should not be larger than a size where everybody knows everybody else, as argued by Aristotle, who wrote in *The Politics* (350 B.C.E.) "experience has shown that it is difficult, if not impossible, for a populous state to be run by good laws." (In contrast, Aristotle's most famous pupil, Alexander the Great, created one of the largest, most heterogeneous empires in history, showing how limited is a teacher's influence on one's students!).⁷ The political costs of large states were also stressed by modern philosophers, such as Montesquieu (1748), who wrote: "In a large republic, the common good is sacrificed to a thousand considerations. It is subordinated to various exceptions. It depends on accidents. In a small republic, the public good is more strongly felt, better known, and closer to each citizen," and Cesare Beccaria (1764), who wrote: "To the extent that society increases, each member becomes a smaller part of the whole, and the republican sentiment becomes proportionally smaller, if the laws do not take care to reinforce it. Societies, like human bodies, have their circumscribed limits, and if they grow beyond them their economy is necessarily disturbed. The size of a state must necessarily be inversely proportional to the sensitivity [sensibilità] of those who comprise it." During the Constitutional Convention in 1787 the Antifederalists referred directly to such views when they contended that "a republic with such a large territory inhabited by such a heterogeneous population was an absurdity, and contrary to the whole experience of mankind" (cited in Dahl and Tufte, 1973, pp. 9-10). To this criticism James Madison (1787), in *Federalist Paper no. 10*, opposed the famous counterargument that in a larger, more heterogeneous community it would be more difficult for a majority to impose its will on the minority.⁸

The nature, extent and implications of the political costs associated with more heterogeneous jurisdictions remain very important and controversial issues today. Studies at the microeconomic level connect ethnic heterogeneity to underprovision of local public goods (Alesina and La Ferrara 2005), and there is macroeconomic evidence of negative correlations between ethnolinguistic fractionalization and public outcomes, even though causality and ro-

⁷More seriously, Alexander's creation of a large empire is consistent with the "Leviathan's view" of state formation which we discuss in Sections 3 and 4.

⁸For a critical discussion of these arguments, see Alesina and Spolaore (2003), pp. 5-6.

bustness are not clear-cut (Alesina et al. 2003). Montalvo and Reynal-Querol (2005) and Esteban, Mayoral and Ray (2012) show that ethnic polarization is associated with civil conflict. Desmet, Ortuño-Ortín and Wacziarg (2012) show that linguistic distances between major linguistic families predict civil conflict, while even finer distinctions between languages have a negative impact on public goods provision. Arbatli, Ashraf and Galor (2013) find that deep measures of heterogeneity within populations- such as genetic diversity - are associated with more civil and ethnic conflict. The broad conclusions of this empirical literature is that measures of ethnic, linguistic, and cultural heterogeneity have significant effects on policy outcomes, civil conflict, and the provision of public goods.

While there exists an important and growing empirical literature on the relation between ethnic/cultural heterogeneity and political and economic outcomes, the empirical study of the relations between measures of heterogeneity, political institutions, and the formation of national borders is still in its infancy. A difficult task is to define and measure relevant heterogeneity of preferences and characteristics across individuals, groups, and regions. Valuable information is provided by measures of ethnolinguistic fractionalization (an earlier use of these measures in the economic literature is found in Mauro, 1995). Studies at the microeconomic level connect ethnic heterogeneity to underprovision of local public goods (Alesina and La Ferrara 2005), and there is macroeconomic evidence of negative correlations between ethnolinguistic fractionalization and public outcomes, even though causality and robustness are not clear-cut (Alesina et al. 2003). Montalvo and Reynal-Querol (2005) and Esteban, Mayoral and Ray (2012) show that ethnic polarization is associated with civil conflict. However, variables such as ethnic fractionalization and polarization proxy only imperfectly for the extent and intensity of preference heterogeneity that affect the determination of national borders. More recent economic contributions have considered measures of long-term historical differences across populations, including measures of genetic, linguistic and religious distance, that have been shown to act as barriers to the diffusion of innovations and development across societies (Spolaore and Wacziarg, 2009, 2012, 2013). Desmet, Ortuño-Ortín and Wacziarg (2012) show that linguistic distances between major linguistic families predict civil conflict, while even finer distinctions between languages have a negative impact on public goods provision. Arbatli, Ashraf and Galor (2013) find that deep measures of heterogeneity within populations- such as genetic diversity - are associated with more civil and ethnic conflict. Spolaore and Wacziarg (2012) study the effects of historical relatedness (measured by genetic distance) on international conflicts and wars. An interesting

analysis that directly connects genetic, linguistic and cultural distances to the stability of national borders in Europe is provided by Desmet, Le Breton, Ortuño-Ortíz and Weber (2011), who find that those distances shed light on the timing and patterns of secession in former Yugoslavia and on other aspects of European borders.

Indirect evidence on heterogeneity costs and national borders is provided in Alesina, Easterly and Matuszeski (2011). They define artificial states as "those in which political borders do not coincide with a division of nationalities desired by the people on the ground." They propose two measures of the degree to which borders may be artificial: one measuring how borders split ethnic groups into two separate adjacent countries, and the other measuring the straightness of land borders, assuming that straight borders are more likely to be artificial. They show that these two measures are correlated with several indicators of political and economic success. Michalopoulos and Papaioannou (2011) consider the long-term effects of the "scramble for Africa" by colonial powers. They find that partitioned ethnic groups have suffered significantly longer and more devastating civil wars. Overall, this evidence is consistent with substantial heterogeneity costs.

An important issue - and a challenge for both theoretical and empirical research - is that, in the long run, heterogeneity of preferences and relevant cultural cleavages and identities are themselves endogenous, and affected by economic and political forces (for a discussion from a political-science perspective, see Fearon 2006). For example, religious identities (Protestant vs. Catholic) played an important historical role in the determination of borders in the Lower Countries, but became much less salient in more recent times, while cultural/linguistic dimensions (Dutch-speaking vs. French-speaking) have taken the centerfold in contemporary Belgium. Moreover, the nature and relevance of these different dimensions might respond endogenously to changes in the configuration of borders and to specific public policies.⁹ A promising direction for future research is to link more closely the literature on endogenous borders to the growing literature on the economics of cultural transmission and change (for an overview of that literature, see Bisin and Verdier 2010).

While cultural and political variables play a key role in affecting the trade-off between benefits and costs of national size, the trade-off is also dependent on the economic environment. In particular, it is a function

⁹Theoretical Analyses of border formation when policy-makers endogenously affect heterogeneity can be found in Alesina and Spolaore (2003, pp. 76-78) and Alesina and Reich (2013).

of the degree of international economic integration (Alesina and Spolaore, 1997; Alesina, Spolaore and Wacziarg, 2000; 2004; Hiscox, 2003; Spolaore and Wacziarg, 2005; Wittman, 2000). This is because international openness affects the economic impact of a country's domestic size. The literature on gains from trade and economic development stresses how the extent of the market is an important determinant of economic prosperity.¹⁰ However, the size of the market does not necessarily coincide with the political size of a sovereign state as defined by its national borders. Larger states mean larger markets when political borders imply barriers to international exchange. In contrast, market size and political size would be uncorrelated in a world of perfect free trade in which political borders imposed no costs on international exchanges. Hence, market size depends both on political size (how large a sovereign state is) and the degree of international openness. Small states can prosper in a world of free trade and high economic integration, whereas a large political size is more important for economic success in a world of trade barriers and protectionism.

These relations are consistent with the empirical evidence from cross-country regressions. The effect of size on economic performance (income per capita, growth) tends to be higher for countries that are less open, and the effect of openness is much larger for smaller countries (Alesina, Spolaore and Wacziarg, 2000; 2004, and Spolaore and Wacziarg, 2005). This fact has important consequences for the endogenous formation and breakup of states. As international economic integration increases, the benefits of a large political size are reduced, and the formation of smaller political units (political disintegration) becomes less costly. Consequently, the trade-off between size and heterogeneity shifts in favor of smaller and more homogeneous countries. The reverse source of causality can also play a role. Smaller countries have a particularly strong interest in maintaining free trade, because so much of their economy depends upon international markets. When both borders and international openness are endogenous, multiple equilibria can occur: a world where states are large and relatively closed, and remain large because close and close because large, and a different world where there are more numerous, smaller, and more open economies (Spolaore, 2004). In sum, economic integration and political disintegration tend to go hand in hand.

¹⁰For a general discussion, see Alesina, Spolaore and Wacziarg (2004).

3 Four Economic Perspectives on Endogenous Borders

How do costs and benefits from size and heterogeneity affect the formation and breakup of polities? The economic literature on endogenous borders has investigated this question from four different perspectives:

- I) Efficient borders.
- II) Borders as democratic outcomes.
- III) Borders in a world of rent-seeking Leviathans.
- IV) Borders as the outcomes of conflict and wars.

We consider these four perspectives below.

3.1 Efficient Borders

A natural question to ask, from an economic perspective, is what configuration of borders would emerge in an ideal world where the number and size of nations were determined to maximize total benefits minus total costs (the "size of the pie"). If costless transfers across individuals and groups were economically and politically feasible, everybody could in principle be made better off by moving from a world of inefficient borders to a world with efficient borders that maximize the sum of everybody's utilities. In such a world, optimal borders would be set such that the social marginal benefits from scale would be equal to the social marginal costs from heterogeneity. Of course this analysis is about optimal borders in an ideal world, not a claim about reality. Most economists who study optimal borders do *not* believe that we actually live in a Panglossian world where political borders are indeed set efficiently. Political economists, while deriving the efficiency conditions for borders as an ideal benchmark, have also forcefully stressed the numerous reasons why borders are *unlikely* to satisfy those efficiency conditions in the real world (Alesina and Spolaore, 1997, 2003).¹¹ At the core of contemporary political economy is the realization that benevolent social planners do not exist. Actual borders are set through imperfect mechanisms, which may lead to substantial inefficiencies. The efficiency analysis of borders is a necessary step in order to assess how *far* from that ideal benchmark actual political boundaries are in reality. Empirical analyses

¹¹For a more optimistic view, see Wittman (2003).

have shown that actual borders are indeed set inefficiently, even at the sub-national level - for instance, Hayashi, Nishikawa and Weese (2011) find that there are *too many* Japanese municipalities from an efficiency perspective.

If borders are not set optimally in the real world, how are they determined? Below we discuss three perspectives that focus on three different - and imperfect - real-world mechanisms: voting, actions by rent-seeking governments, and wars.

3.2 Borders as Democratic Outcomes

What if borders are determined directly by voters? What configuration of political borders would emerge if people could freely and democratically decide whether to form a larger political union with their neighbors or secede from existing polities? Direct democratic voting over borders is historically exceptional, but it is becoming increasingly relevant in a world where voters in specific regions are asked to vote over independence (e.g., in Quebec in 1995 or in Scotland in 2014). Even when the determination of national borders by democratic voting is not a realistic description of actual border formation, it provides a useful benchmark to compare actual outcomes, analogously to the efficient solution discussed above. More generally, an analysis of endogenous borders as democratic outcomes can shed valuable insights on the way the trade-off between economies of scale and heterogeneity costs can affect the formation and breakup of states and other jurisdictions, in a world where citizens' preferences matter and have a direct or indirect impact on national formation and secessions.

Voters with preferences that are distant from the central government bear higher heterogeneity costs from living in a larger, more diverse country. If they perceive that such heterogeneity costs are higher than economies of scale, they may prefer to form smaller, more homogeneous political units. Those breakups may lead to a lower sum of everybody's utilities (inefficiency). In other words, democratic outcomes may lead to equilibria with excessive political fragmentation (too many countries).¹²

In general, inefficient outcomes tend to occur under the assumption that citizens contribute to the public good as a function of their income, not of their preferences for public policies - that is, people do not pay less taxes

¹²For a formal analysis, see Alesina and Spolaore (1997).

if they disagree more with the central government. An important question is whether appropriate compensations and sidepayments may change the voters' calculation and affect the stability of national borders. The response depends on whether transfers are preference-based or income-based.¹³ Preference-based transfers are payments to regions that are distant from the central government in terms of preferences over public policies. In contrast, income-based transfers are redistributive transfers from richer regions to poorer regions, based on income differences. These two different kinds of transfers have very different effects on border stability.

In theory, preference-based transfers could compensate regions that would otherwise secede, and therefore ensure efficiency and stability. If a breakup is inefficient, the sum of everybody's utilities is lower after a breakup. Resources could be transferred from those who would lose from a secession (people closer to the central government in terms of preferences for public policies) to those who would benefit from the secession (people far from the central government). With these transfers, everybody -or at least a large enough majority - could be better off in the unified country, therefore ensuring efficiency and stability. Transfer schemes as means to prevent secessions and implement efficient borders have been studied by Alesina and Spolaore (1997, 2003), Le Breton and Weber (2003), Haimanko, Le Breton and Weber (2005), and others. For example, Le Breton and Weber (2003) explore the case in which a nonlinear transfer scheme, where individuals are compensated for the heterogeneity costs they suffer, can prevent secessions in a state of optimal size.

Are preference-based transfers observed in practice, and do they work? In some cases, border regions with different ethnic/linguistic/cultural characteristics from the rest of a country receive a relatively favorable fiscal treatment. Examples are special-status regions in Italy, Northern regions in Sweden, and some provinces of Canada and Argentina. However, pure preference-based transfers seem to be relatively rare. There are several reasons why preference-based redistribution is not widespread: feasibility and administrative costs; political credibility; and incompatibility with other social goals.

Preference-based transfers may be expensive to implement because of administrative costs and distortions. The relevant preferences are defined in terms of individuals' utility or disutility from belonging to countries with different characteristics (cultural, linguistic, religious, etc.). These costs and

¹³For general discussions, see Alesina and Spolaore (2003, chapter 4) and Spolaore (2010).

benefits are mostly non-pecuniary, and very hard to observe and measure objectively. And even if such heterogeneity costs could be perfectly observed or 'revealed,' redistributive compensations would require an expensive administrative setup, implying high taxes and tax distortions (disincentives to work, save and invest). In summary, in most real-world cases preference-based transfers are likely to be either unfeasible or economically costly. Moreover, the implementation of preference-based transfers is likely to face a more subtle obstacle: political credibility. Suppose that a region is enticed to remain within a larger country with the promise of a more favorable tax treatment. Once the region has accepted to remain within the country, the central government can break its promises. Borders are hard to change, whereas taxes and transfers can be changed more easily. Regions that accept to be part of a given country face the risk that transfer policies might be changed in the future, when the option of secession is no longer available, or available only at a higher cost. In order to be credible, preference-based transfers must be backed by some "commitment technology" - for example, an international treaty protecting the country's minority. An example of international guarantee for a minority region is the 1971 treaty between Italy and Austria about the German-speaking Italian province of Bozen/Bolzano, following serious separatist disturbances (including some acts of terrorism) in the 1960s. The 1971 treaty stipulated that the province of Bozen/Bolzano should receive greater autonomy within Italy, including significant fiscal autonomy, and that disputes in the province would be submitted for settlement to the International Court of Justice in The Hague. Finally, even if preference-based transfers were perfectly feasible and credible, they could be in conflict with other social and political objectives. Since preference-based transfers, by definition, abstract from income differences, they may imply substantial transfers of resources from poorer to richer regions and individuals. This is likely to clash with goals of interpersonal equity or other social objectives and constraints, therefore making a preference-based transfer scheme difficult to implement politically. Similar issues emerge when considering efficient borders at the subnational level. For instance, Weese (2011), in his study of political mergers as coalition formation, considers an application to Japanese municipalities, and finds that the national government could increase welfare via a "counter-intuitive policy involving transfers to richer municipalities conditional on their participation in a merger."

Unlike preference-based transfers, income-based transfers are widespread and much easier to implement economically and politically. However, their efficiency properties and effects on the stability of borders are quite different from those of preference-based transfers. In general, these transfers will not

ensure optimality or stability of borders, because there is no guarantee that poorer regions would be those farther from the central government in terms of preferences for public policies and types of government. It is at least as likely that income-based redistribution would *add* to heterogeneity costs within a country. Redistribution can henceforth generate additional sources of political conflict across regions, and provide incentives for richer regions to secede. Even in the absence of any other form of preference heterogeneity, interregional disagreements over income-based redistribution may be sufficient to induce country breakup. For instance, Bolton and Roland (1997) present a model where differences in income distributions across region are at the roots of all differences in preferences over public policies, and can generate incentives to break up, even in the absence of other forms of heterogeneity. In general, income-based redistribution has three effects on the incentives to secede in a given region: (i) a political effect, capturing the difference in desired fiscal policy between the region's median voter and the median voter in a unified country; (ii) a tax-base effect, capturing the difference between average income in the region and in the unified country, and (iii) an efficiency/economies of scale effect, capturing a reduction in average income because of country breakup¹⁴. Unless the regional median voter shares identical preferences with the national median voter (which is unlikely), the political effect is centrifugal: any region would prefer to breakup and implement its own favored fiscal policy, other things being equal. In contrast, the tax-base effect is centrifugal for richer regions (which, therefore, are more likely to prefer separation, other things being equal), and centripetal for poorer regions, which benefit on average from income-based redistribution. Obviously, the economies-of-scale effect is centripetal for all regions. Consequently, when the economies-of-scale effect is small, richer regions are likely to prefer separation, given effects (i) and (ii), and even poorer regions may prefer separation, when effect (i) dominates effect (ii). On balance, income-based redistribution tends to reduce the stability of national borders.

3.3 Borders in a World of Rent-seeking Leviathans

Even though voters' voice has become increasingly important in a more democratic world, national borders are still far from being the outcomes of

¹⁴For a formal treatment and discussion of these separate effects, see Alesina and Spolaore (2003, chapter 4).

democratic elections and processes, even in well established democracies. For instance, citizens of the European Union have only occasionally been consulted directly about issues of political integration, and even in those cases their votes have been often disregarded. A more realistic understanding of border formation and redrawing can be obtained by focusing on the remaining two perspectives (which are connected): borders as outcomes of the actions of rulers (not necessarily democratic), and borders as the outcomes of conflict and wars. Historically, decisions about border formation and redrawing have been in the hands of rulers - monarchs, dictators, colonial powers. These rulers have pursued their own political and economic objectives, taking their subjects' preferences into account only up to a point, often in response to actual or potential threats to their own rule (riots and insurrections).¹⁵ Following a tradition that goes back to Hobbes (1651), and includes Buchanan (1975) and others, we can call these rent-maximizing rulers "Leviathans." An earlier economic contribution on the shape and size of nations from this "Leviathan" perspective is in Friedman (1977), who argued that, in equilibrium, borders maximize the rents of Leviathans, because territories tend to end up with the Leviathans who have more to gain from holding them - a sort of Coase theorem for Leviathans. Hence, from this perspective, border configurations are going to be efficient from the point of view of the Leviathans, not from the point of view of their subjects.

Alesina and Spolaore (1997 and 2003, chapter 5) formalize the determination of the number and size of states in a world of Leviathans. They show that rent-seeking dictators, less concerned with the preferences of their subjects, may pursue expansionary policies leading to the formation of inefficiently large countries and empires. In contrast, democratization leads to secessions and formation of smaller countries. The effects of democratization on equilibrium borders operate even when citizens do not vote directly on borders. Citizens' preferences can have an effect on the decision of rent-seeking governments about policies and borders indirectly, because in a more democratic world rulers need a broader consent for their political survival. Democratically-constrained Leviathans can obtain higher rents by forming smaller, more homogeneous polities - in other words, the breakup of states and empires may be in the Leviathans' self-interest, when they must become more responsive to their citizens' preferences. As a result, in more democratic (that is, less dictatorial) societies, Leviathans' rents are more strongly impacted by heterogeneity costs, because Leviathans must take

¹⁵For an analysis of the goals and constraints of rulers from a political-survival perspective see Bueno de Mesquita et al. (2003).

those costs in account when setting policies and borders. Therefore, more democratic Leviathans have a stronger interest in reducing heterogeneity of preferences among their citizens, violently (repression) and/or peacefully (national homogenization via education and propaganda). In this context, heterogeneity becomes an endogenous variable, which can be affected, up to a point, by Leviathans' policies.¹⁶ These effects can shed light on some actual historical developments. For instance, a traditionally autocratic rulers such as the Ottomans could tolerate widely ranging heterogeneous minorities in their empire. In contrast, the process of democratization in the past two centuries has often been accompanied by attempts at cultural, linguistic and ethnic homogenization and nation-building by relatively smaller central governments.

The analysis of borders in a world of Leviathans brings us closer to a more realistic analysis of the historical forces and mechanisms behind state formation and breakup. These processes have often involved the explicit use of violence in conflict and wars. Historically, Leviathans have often agreed to peaceful reconfigurations of borders. However, the logic of rent maximization and expansion of empires is also consistent with more bellicose processes and outcomes.¹⁷ And even in a more democratic world, defense and security issues may continue to play a key role in border formation and redrawing. The relation between conflict and borders is the subject of our fourth and last perspective.

3.4 Borders as the Outcomes of Conflict and Wars

State formation and disintegration have always been closely linked to security concerns and wars. As the prominent historian Charles Tilly (1992, p. 67) remarked, "wars made states, and vice versa." Historians and political scientists have pointed to military threats and challenges as central factors in the formation of sovereign states and federations, including the United States (e.g., Riker, 1964), Switzerland, and Germany, whose borders, according to Otto von Bismarck(1862), were determined "not by speeches and

¹⁶For a simple formalization of these ideas, see Alesina and Spolaore, 2003, pp. 76-78. A more recent contribution is Alesina and Reich (2013), where Leviathans reduce heterogeneity costs not in order to maximize their rents, but to pursue their own preferences over types of public goods.

¹⁷For example, Friedman (1977) explicitly mentions wars as possible mechanisms leading to the allocation of territories to the Leviathans who obtain the highest rents from them.

the decisions of majorities [...] but by iron and blood."¹⁸ Foreign threats have often been viewed as a force for political union and domestic cohesion. For instance, Niccolò Machiavelli (1517) in the *Discourses on Livy* (II, 2) wrote that "the cause of the disunion of republics is usually idleness and peace; the cause of union is fear and war." This view is sometime referred to as "Sallust's Theorem" (Evrigenis 2008), after the Roman historian who argued that fear of an external enemy explained the internal cohesion of the Roman Republic before the destruction of Carthage. A more recent expression of this view was given by President Reagan (1987) in his speech to the United Nations General Assembly (42nd General Assembly, September 21, 1987), when he said: "Cannot swords be turned to plowshares? Can we and all nations not live in peace? In our obsession with antagonisms of the moment, we often forget how much unites all the members of humanity. Perhaps we need some outside, universal threat to make us recognize this common bond. I occasionally think how quickly our differences worldwide would vanish if we were facing an alien threat from outside this world."

A few contributions to the economic literature on endogenous borders have explicitly modeled the role of conflict, military spending, and wars, building on the formal literature on conflict and appropriation pioneered by Haavelmo (1954), Tullock (1980), Hirshleifer (1989, 1991) and Grossman (1991).¹⁹ For instance, international conflict and defense are at the center of the analyses of state formation and breakup in Alesina and Spolaore (2005, 2006) and Spolaore (2004). In those contributions borders are affected by the fact that a country's military power matters in the settlement of international disputes. As we have mentioned in Section 2, defense and national power are public goods, and, in principle, larger countries can provide better and cheaper security for their citizens. In a more bellicose world, larger, more centralized countries have an advantage, whereas a reduction in international conflict reduces the incentives to form larger political unions. However, a decrease in the importance of military force may not reduce the total number of violent conflicts in the world. When borders are formed endogenously, a lower role for defense and security, by bringing about the formation of more numerous countries, can paradoxically increase the number of observed conflicts in the world. This is because, even if the use of force is less likely in each specific international dispute, the higher number of countries raises the probability that some of those countries will enter into a

¹⁸See Colomer (2007) for a recent discussion from a political-science perspective.

¹⁹For an overview of the economics of conflict see Garfinkel and Skaperdas (2007). A discussion of the economic literature on national borders and conflict is provided in Spolaore (2012).

military confrontation. Alesina and Spolaore (2006) show that a *lower* probability of having to use force in international relations increases the number of nations in equilibrium, and can lead to an increase in the number of international interactions that are resolved by force. Hence, a reduction in global conflict between larger political units may lead to an increase in more localized conflict between smaller political units. Analogously, improvements in the enforcement of national "control rights" through a more effective rule of international law reduces the need for defense and force, and may therefore cause breakups of nations, possibly leading to more rather than less conflicts in equilibrium (Alesina and Spolaore, 2005).

Some of these contributions also connect conflict to borders in a world of rent-maximizing Leviathans. For example, Alesina and Spolaore (2003, p. 106) find that the effect of conflict on borders is bigger when Leviathans are less democratic (dictators), but the effect becomes smaller when Leviathans face tighter democratic constraints.

The above-mentioned papers are explicitly about international conflict. A related line of research focuses on the relation between civil conflict and endogenous borders. Civil and ethnic conflicts have been extensively studied by sociologists and political scientists (e.g., Horowitz 1985; Fearon and Laitin 2003) and, increasingly, by economists (e.g., Collier 2001; Montalvo and Reynal-Querol 2005). While most of these studies consider conflict within given borders, a few have explicitly focused on the relations among ethnic conflict, border redrawing, and political partitions. For example, Sambanis (2000) finds that partitions do not seem to prevent recurrence of ethnic wars, and writes that "[e]ven if this solution reduces the incidence of internal war, it will almost certainly increase the incidence of international war," an observation which is consistent with the predictions of the models of international conflict and national borders discussed above (for a discussion from a political-science perspective see also Fearon, 2004).

A few contributions focus on the interplay between civil conflict and international conflict. Theoretical analyses of the interactions between conflict within groups and across groups are provided by Garfinkel (2004a, 2004b) and Münster (2007). A formal analysis where secessions are the direct outcome of civil conflict is provided by Spolaore (2008). In that context, the probability of secession and the resources spent on conflict are endogenous variables, which are a function of the periphery's incentives to secede and on the center's incentives to oppose a secession. Those incentives depend on heterogeneity costs, economies of scale in the provision of public goods, and the relative size of the two regions. Separatist conflict is more intense when the two regions are of roughly equal size, consistently with historical

evidence (Horowitz, 1985, and Collier, 2001). External threats may reduce the probability of secession - for reasons that would not have surprised Salust and Machiavelli. However, foreign threats do not necessarily reduce the intensity of separatist conflict within a country. They reduce the incentives to secede in the smaller region, but also increase the larger region's incentives to resist the smaller region's secession, and may therefore lead to more diversion of resources towards conflict in the aggregate. Finally, the possibility that conflict about government policies may occur *after* borders have been determined reduces both the incentives to secede in the smaller region and the benefits from union in the larger region. The perspective of conflict over government policies within a unified country can even induce the center itself to prefer a country breakup.

An important question related to the issue of civil and ethnic conflict is whether federalism and decentralization lead to border stability or instability.²⁰ Generally, federalism has been viewed as border-stabilizing and conflict-reducing, especially in societies that are very heterogenous. For example, Lijphart (1990) stresses the benefits of regional autonomy as a "power-sharing approach," Weingast (1995) emphasizes the positive effects of checks on the central government associated with federalism, and Bermeo (2002) argues that federal states tend to do better than unitary states when accommodating ethnic conflict and minority discrimination. Inman and Rubinfeld (2005) analyze the benefits of federative arrangements in a diverse, multiethnic society (South Africa). Less successful cases of decentralization, however, have provided counterarguments against federalism as a stabilizing force. For example, the Civil War in the United States has been viewed by many as an instance when federalism provided the means for a costly attempt to secede. A costly case of destabilizing decentralization was the creation of a safe haven for guerrilla rebels (FARC) in Colombia in the late 1990s. It has also been suggested that power decentralization and federal arrangements greatly facilitated the breakups of Yugoslavia and the Soviet Union, with substantial costs and disruptions (Roeder, 1991, and Suny, 1993).

Spolaore (2010) discusses the relations among federalism, redistribution and country stability, and provides a simple analytical model of the interplay between centrifugal and centripetal effects of decentralization and federalism. In that model, decentralization reduces the incentives to secede if and only if it is high enough. When decentralization is low, more decentralization may actually increase the incentives to breakup. In other words, an increase

²⁰For an extensive discussion, see Bakke and Wibbels (2007).

in decentralization is more likely to have a stabilizing effect in societies that are already highly decentralized, whereas it may have a centrifugal effect in more centralized societies. The threshold above which decentralization has stabilizing effects depends on the effectiveness of conflict activities. When conflict and force have less impact on outcomes, decentralization tends to ensure more stable polities. In sum, increasing decentralization is likely to have a positive effect on stability and efficiency in societies where institutions and norms ensure that conflict capabilities (weapons, violence) are *not* effective at determining national borders.

4 A Simple Analytical Illustration

This section provides an analytical framework to illustrate a few basic ideas from the economic literature on borders. We are not going to derive general results, but present a few simple examples. For detailed analytical derivations in more general settings, the reader is referred to the contributions cited in the previous sections.

4.1 Economies of Scale and Heterogeneity Costs

Consider three regions, North, Center and South, each with a population equal to $P > 0$. The total cost of setting up an independent government in each region is

$$C_i = F + cP \tag{1}$$

where $F > 0$ is the fixed cost of public-good provision (which does not depend on population size), cP is the variable cost, increasing in population size, and the parameter $c \geq 0$ is the marginal cost of government. If the three regions form a unified government, the total cost of public-good provision is

$$C_u = F + c(3P) \tag{2}$$

The cost per capita is $\frac{C_i}{P} = \frac{F}{P} + c$ when each region is independent, and $\frac{C_u}{3P} = \frac{F}{3P} + c$ in a political union.²¹ To simplify notation, define $\frac{F}{P} \cong f$.

²¹To simplify the exposition, and without much loss of generality, we assume that there are only two possible configurations of borders: a union of the three regions or full inde-

The difference between the two per-capita costs is

$$\frac{C_i}{P} - \frac{C_u}{3P} = (f + c) - \left(\frac{f}{3} + c\right) = \frac{2f}{3} \quad (3)$$

Therefore, $\frac{2f}{3}$ captures the economies of scale associated with the provision of public goods to a larger population.

We assume that people in different regions have different preferences over types of public goods.²² When each region chooses its preferred type of government, each individual's utility from government services is

$$g_i = g^* \quad (4)$$

In contrast, if the Center's preferred type of government is selected in a political union, each individual in the Center gets his/her first-best utility from government services g^* , but citizens in the North and South obtain a lower utility

$$g_u = g^* - h < g_i \quad (5)$$

where the parameter $h > 0$ captures heterogeneity costs. If the North's preferred type of government is selected in the union, each citizen in the North gets g^* , but each citizen in the Center gets $g^* - h$, and each citizen in the South gets $g^* - 2h$. That is, we assume that the South is "more distant" in preferences from the North than from the Center. Symmetrically, a union where the South's preferred type of government is selected would give utility g^* to everyone in the South, $g^* - h$ to those in the Center, and $g^* - 2h$ to those in the North.

Each individual has income equal to y , and taxes are proportional to income, with the tax rate denoted by τ .²³ To keep things simple, income y is given, and equal across regions. In a more realistic setting, income would endogenously respond to taxes, and, possibly, also to changes in borders if there are barriers to international trade, as discussed in Section 2. Here we ignore these effects.

pendence for each region. To simplify, we rule out a union of two regions, while the third is independent. Typically, the literature on endogenous borders considers models with many regions - often a continuum - which can be partitioned in several possible configurations (see Alesina and Spolaore, 1997 and 2003).

²²For simplicity, we assume that people within each region have the same preferences. What matters, more generally, is that preferences within each region tend to differ less than preferences across regions.

²³We assume that income per capita is high enough to pay for government services per capita under independence (and, *a fortiori*, in a union): $y > f + c$.

Each individual j obtains overall utility from his/her disposable income $[1 - \tau(j)]y$ and from government services $g(j)$:

$$U(j) = [1 - \tau(j)]y + g(j) \quad (6)$$

where $\tau(j)$ is the tax rate paid by individual j , and $g(j)$ is equal to g^* under independence, and equal to g^* or $g^* - h$ or $g^* - 2h$ in a union, depending on individual j 's location (North, Center, South), and on which type of government is chosen.

4.2 Voting and Efficiency

Consider now a democratic world where taxes, type of government and borders are determined by majority vote. Taxes are going to be high enough to pay for government services (since everybody has the same income, there is no demand for redistribution from rich to poor). If the three regions are independent, each region must raise enough taxes to pay for $F + cP$, and therefore total taxes in each region must be

$$\tau_i y P = F + cP \quad (7)$$

which imply the following tax rate

$$\tau_i = \frac{f}{y} + c, \quad (8)$$

while in a political union total taxes are

$$\tau_u 3y P = F + c3P \quad (9)$$

and the tax rate is

$$\tau_u = \frac{f}{3y} + c \quad (10)$$

Because of economies of scale in public-good provision, obviously taxes are higher in an independent state than in a union

$$\tau_i - \tau_u = \frac{2f}{3y} > 0 \quad (11)$$

If each region is independent, its citizens unanimously choose their preferred type of government and obtain utility $g_i = g^*$ (no heterogeneity costs). In a union, the Center's type of government is the median choice: 2/3 of the

total population (Center and North) prefer the Center's type of government to the South's type, and $2/3$ of the population (Center and South) prefer the Center's type to the North's type. Hence, we assume that the Center's type is going to be selected by a majority of voters (median voter's theorem). Therefore, the citizens in the Center get utility g^* from government services, but the citizens in the North and South get a lower utility $g_u = g^* - h$ (they bear heterogeneity costs).

Now, we can ask the key question: will a majority of people prefer independence or a union? Center's citizens always prefer a union, where they would enjoy their preferred type of government while also paying lower taxes because of economies of scale. But North's and South's citizens face a trade-off between economies of scale (lower taxes) and heterogeneity costs (a government farther from their preferences). They favor a political union if and only if their utility is higher in a union than with independence:

$$(1 - \tau_u)y + g_u \geq (1 - \tau_i)y + g_i \quad (12)$$

that is, if and only if the benefits from lower taxes are higher than the heterogeneity costs:

$$(\tau_i - \tau_u)y = \frac{2f}{3} \geq g_i - g_u = h \quad (13)$$

which holds if and only if

$$\frac{h}{f} \leq \frac{2}{3} \quad (14)$$

the key ratio $\frac{h}{f}$ captures the trade-off between heterogeneity costs (h) and economies of scale (f). In this simple setting, voting over borders obeys a straightforward and intuitive rule: a majority of voters (in fact, all voters) favor a political union if and only if the key ratio $\frac{h}{f}$ is small than a critical threshold ($\frac{2}{3}$). Otherwise, a majority of voters ($2/3$ of them) prefer independence.

Does majority voting lead to efficient outcomes in this setting? The sum of everybody's utilities in a union is

$$\sum_j U_u(j) = 3(1 - \tau_u)yP + 3g^*P - 2hP \quad (15)$$

while the sum of everybody's utilities under independence is

$$\sum_j U_i(j) = 3(1 - \tau_i)yP + 3g^*P \quad (16)$$

By definition, a political union is efficient if and only if

$$\sum_j U_u(j) \geq \sum_j U_i(j) \quad (17)$$

which holds if and only if

$$\frac{h}{f} \leq 1 \quad (18)$$

Again, the condition, quite intuitively, is expressed in terms of the key ratio $\frac{h}{f}$ - heterogeneity costs over economies of scale must be low enough for a political union to be efficient. However, this efficiency threshold is *higher* than the threshold which is required for the union to be an equilibrium under majority vote. This means that there exists a range of parameters ($\frac{h}{f}$ smaller than 1 but larger than $\frac{2}{3}$) for which a union is efficient but politically unstable under majority voting. Within that range, 2/3 of voters prefer to break up an efficient union. We can call this the "inefficiency range":

$$\frac{2}{3} \leq \frac{h}{f} \leq 1 \quad (19)$$

The source of this inefficiency is that North and South voters do not take into account the net costs that a breakup would impose on the Center, and are willing to break up the union, even though the breakup generates costs for the Center that are larger than the net benefits to themselves. The fundamental source of inefficiency here is that people pay the same taxes but obtain different benefits in the union. Hence, the North and the South do not fully internalize the benefits from economies of scale and the Center does not internalize the political costs from heterogeneity. In contrast, everybody would fully internalize social benefits and social costs from a political union if the following tax-and-transfer scheme - unrelated to income but a function of different preferences for public goods - could be implemented. Each citizen in the Center should pay an extra tax equal to

$$t = \frac{2h}{3} \quad (20)$$

and each citizen in the North and the South should receive a transfer equal to

$$r = \frac{h}{3} \quad (21)$$

Under this tax-and-transfer scheme, everybody's utility in a union would be identical - i.e., everybody would get the average utility in the union AU_u :

$$AU_u = (1 - \tau_u)y + g^* - \frac{2h}{3} \quad (22)$$

Now, voters would chose a union if and only if average utility AU_u is larger than utility under independence, which is $(1 - \tau_i)y + g^*$:

$$AU_u = (1 - \tau_u)y + g^* - \frac{2h}{3} \geq (1 - \tau_i)y + g^* \quad (23)$$

The above condition holds if and only if $\frac{h}{f} \leq 1$. Therefore, voters would unanimously break up a union if and only if it is inefficient - the above-described preference-based transfer scheme would align voting outcomes with efficient outcomes. However, as we have discussed in Section 3, such preference-based transfers face problems of feasibility and credibility. For instance, we could have that $(1 - \tau_u)y < \frac{2h}{3}$ - meaning that disposable income (after the public good is paid for) could be insufficient to provide resources for the required "optimal" transfer from the Center to the peripheries. More importantly, the scheme faces a credibility problem if borders must be set *before* taxes and transfers are decided. Then, North and South voters may not believe that the Center will continue to transfer resources to them after they have agreed to form a political union.

4.3 Leviathans and Rents

Above we have compared efficient borders to borders chosen through majority voting. Now, we are going to consider how borders would be selected by a rent-maximizing Leviathan. Under a union, the Leviathan's rents would be equal to the costs of running the government $F + c3P$ minus the taxes that the government can extract from its subjects. How much can the government extract? In this extremely simplified example, where income is exogenous, and there are no deadweight losses or other costs from higher taxation, the Leviathan could extract *all* incomes as taxes, and obtain rents equal to

$$R_u = 3yP - F - 3cP = 3(y - c)P - F \quad (24)$$

Clearly, those rents are higher than the sum of the rents of three Leviathans in charge of three independent states, each of size P , which are

$$3R_i = 3(yP - F - cP) = 3(y - c)P - 3F \quad (25)$$

Hence, the sum of Leviathans' rents is maximized by a union, even when that union is grossly inefficient from the perspective of its citizens, and would be broken up by its citizens by majority vote. In this simple example, the Leviathans can completely ignore heterogeneity costs because they face no constraints when setting taxes and borders. However, even dictators typically need the support of at least part of the population to survive in power. For instance, they may need to provide a minimum utility to at least a fraction δ of the population in order not to be overturned. In more general analyses, when these political constraints are taken into account, one can show that Leviathans continue to prefer inefficiently large countries as long as δ does not include a majority of the population ($\delta < \frac{1}{2}$).²⁴ In our simple setting, consider, for instance, a Leviathan who can survive in power by gathering to the needs of $\delta = 1/3$ of the population (or less). That Leviathan could obtain higher rents by forming a union, even if it is inefficient, as long as sufficient utility is provided to the Center, at the cost of high disutility for the periphery (North and South). As democratic constraints become more binding (δ increases, and becomes larger than $1/3$), and the periphery regions gain political power, such Leviathan-ruled union becomes politically unstable (democratization leads to secessions).

4.4 Conflict and Breakup

In our example, when heterogeneity costs are high enough, the Center and the periphery regions (North and South) have very different views about borders. The Center benefits from a political union, while North and South prefer independence if heterogeneity costs are higher than economies of scale. So far, we have considered peaceful mechanisms through which this potential conflict can be resolved: voting, efficient transfers (if available), and the peaceful rule of Leviathans. Now, we are going to consider the case when borders are the outcomes of explicit conflict and wars. Suppose that the three regions are in a political union, but $\frac{h}{f} > \frac{2}{3}$, and no transfers and compensations are available. Consequently, the North and the South would like

²⁴For a formal derivation, see Alesina and Spolaore (1997 and 2003, chapter 5).

to secede, and form their own independent states.²⁵ However, the citizens of the Center resist the breakup of the union, because they do not want to lose the benefits from economies of scale. A civil war ensues, where the Center fights against the joint forces of the North and the South (the Rebels).²⁶ If the Rebels win, there will be a breakup. If the Center wins, the union will be preserved. Let W_R denote the military capabilities (weapons) that the rebels acquire in order to fight this secessionist war. W_C are the Center's military capabilities. The probability of a breakup π is given by

$$\pi = \frac{W_R}{W_R + W_C} \quad (26)$$

This is a *contest success function*.²⁷ The probability that the Rebels win is increasing in their military capabilities (W_R) and decreasing in the Center's military capabilities (W_C). The Rebels will chose W_R in order to maximize their expected utility per capita, which is

$$EU_R = \pi[(1 - \tau_i)y + g^*] + (1 - \pi)[(1 - \tau_u)y + g^* - h] - \frac{W_R}{2P} \quad (27)$$

while the Center will choose W_C to maximize

$$EU_C = \pi[(1 - \tau_i)y + g^*] + (1 - \pi)[(1 - \tau_u)y + g^*] - \frac{W_C}{P} \quad (28)$$

When selecting W_R , the Rebels take the level of W_C as given and, conversely, when selecting W_C , the Center takes the level of W_R as given (Nash equilibrium). The first order conditions are

$$\frac{dEU_R}{dW_R} = \frac{d\pi}{dW_R} [h - (\tau_i - \tau_u)y] - \frac{1}{2P} = \frac{W_C}{(W_C + W_R)^2} (h - \frac{2f}{3}) - \frac{1}{2P} = 0 \quad (29)$$

$$\frac{dEU_C}{dW_C} = -\frac{d\pi}{dW_C} (\tau_i - \tau_u)y - \frac{1}{P} = \frac{W_R}{(W_C + W_R)^2} \frac{2f}{3} - \frac{1}{P} = 0 \quad (30)$$

which imply the following equilibrium levels W_R^e and W_C^e

$$W_R^e = \frac{h - \frac{f}{3}}{h - \frac{2f}{3}} P \quad (31)$$

²⁵For simplicity, we assume that we are back to a world without rent-seeking Leviathans.

²⁶To simplify exposition and notation, we assume that the North and the South form a military alliance against the Center. The insights would be similar, but the analysis more complicated, if they were to fight separately.

²⁷See Tullock (1980), Hirshleifer (1989, 1991) Garfinkel and Skaperdas (2007), and Spolaore (2012). Spolaore (2008) provides a discussion of different specifications of contest success functions applied to the determination of political borders.

$$W_C^e = \frac{\frac{f}{3}(h - \frac{f}{3})}{(h - \frac{2f}{3})^2} P \quad (32)$$

Therefore, the equilibrium probability of a breakup is

$$\pi^e = \frac{W_R^e}{W_R^e + W_C^e} = \frac{\frac{h}{f} - \frac{2}{3}}{\frac{h}{f} - \frac{1}{3}} \quad (33)$$

The probability of breakup is increasing in the key ratio $\frac{h}{f}$

$$\frac{d\pi^e}{d(\frac{h}{f})} = \frac{1}{3(\frac{h}{f} - \frac{1}{3})^2} > 0 \quad (34)$$

This is because higher heterogeneity costs and/or lower economies of scale raise the incentives for the Rebels (North and South) to fight for secession, while lower economies of scale also reduce the Center's incentives to fight to preserve the union. Therefore, this simple example confirms the paramount role of the trade-off between heterogeneity costs and economies of scale even when borders are not determined peacefully, but by "iron and blood."

If the costs of security and defense against external threats (i.e., from foreign states outside the three regions) are included in the overall costs of public-good provision - and, therefore, in f -, a reduction in external threats would imply a lower f , and, henceforth, a higher probability of secession. This can be viewed an illustration of *Sallust's theorem*, which we mentioned in Section 3: a reduction in foreign threats decreases domestic cohesion and may bring about civil conflict and breakup.

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