

Civil Conflict and Secessions

Enrico Spolaore*
Tufts University

This draft: January 2007

Abstract

This paper studies secessions as the outcome of conflict between regions. We study under what conditions regions will divert costly resources to fight each other over political borders. We derive the probability of secession and the amount of resources diverted to separatist conflict, and show how those variables depend on factors such as heterogeneity costs, economies of scale, relative size, and external threats. We also model civil conflict over types of government, after borders have been determined, and study how this political conflict affects the incentives to secede.

JEL Classification: D74, H10, H56, H77.

Keywords: Secessions, Conflict Technology, Heterogeneity Costs, Economies of Scale, External Threats.

1 Introduction

Since 1990 over twenty new sovereign states have been created through secessions and break up of countries.¹ Today there are 193 internationally

*Department of Economics, Tufts University, Braker Hall, Medford, MA 02155, USA; e-mail: enrico.spolaore@tufts.edu. This paper has been written in memory of Herschel Grossman, and owes much to his inspiration. I am grateful to Michelle Garfinkel, who co-organized a conference in Herschel's honor at Brown in April 2006, for her encouragement and comments.

¹The Soviet Union split into Russia and 14 more sovereign states; Yugoslavia gave way to Serbia and five additional states, plus Kosovo; Czechoslovakia broke into two separate

recognized sovereign states in the world, up from 74 in 1945.² According to Gurr's (2000) *Minorities at Risk* dataset, between 1985 and 1999 secessionist movements were present in at least 52 countries. This dramatic increase in the number of countries and the spreading of separatism have motivated a growing literature on the formation and redrawing of political borders. Students of this important issue include not only historians and political scientists but also, more recently, economists.³ The new economics literature on the number and size of nations has provided formal models in which the borders of states are not taken as exogenous, but are the outcomes of decisions by agents who interact with each other while pursuing their goals under constraints. Recent contributors to this literature include Alesina and Spolaore (1997, 2003, 2005, 2006), Alesina, Spolaore and Wacziarg. (2000, 2005), Bolton and Roland (1997), Bordignon and Brusco (2001), Ellingsen (1998), Findlay (1996), Goyal and Staal (2004), LeBreton and Weber (2003), Spolaore (2004, 2006), and Wittman (2000) among others.⁴

While this literature has provided numerous insights on the incentives to secede and form new countries, less attention has been given to the analysis of secessions as the outcome of civil conflict, in which resources are diverted in order to fight over borders.⁵ However, attempts to secession often entail the threat or actual use of force, the mobilization of vast resources, and huge human and material costs.⁶ Historically, civil conflict has often produced more victims and damage than interstate wars. The American Civil War which followed the secession of eleven Southern states was America's bloodiest conflict, with over 600,000 deaths. Violent conflicts within national

states; Eritrea seceded from Ethiopia; Namibia gained independence from South Africa; and Timor Leste left Indonesia.

²193 is the sum of the 192 members of the United Nations, as of January 2007, plus the Vatican, which is an independent state but not a UN member.

³Influential contributions from a political and historical perspective are Anderson (1983), Gellner (1983), Tilly (1990), and many others. A classic reference on ethnic conflict is Horowitz (1985).

⁴For recent analyses by political scientists on this topic see, for instance, Hiscox (2003) and Lake and O'Mahony (2004).

⁵More attention has been given to the effects of international conflict on the incentives to form political unions (for example, see Alesina and Spolaore, 2005a, 2005b). Unlike those contributions, this paper is not focused on international conflict after borders have been formed, but on civil conflict about borders themselves.

⁶Even when no violence takes place, changes in existing borders happen under the "shadow of power," and are affected by the relative strengths of the groups who benefit or lose from those changes.

borders have been widespread in recent decades.⁷ According to Fearon and Laitin (2003), between 1945 and 1999 "there were roughly 127 civil wars that killed at least 1000, 25 of which were ongoing in 1999. A conservative estimate of the total dead as a direct result of these conflicts is 16.2 million, five time the interstate toll."

This paper's goal is to provide a simple analytical framework in which secessions are the equilibrium outcome of explicit civil conflict, where groups with different preferences invest in costly conflict activities in order to affect the configuration of borders. We will also consider civil conflict over domestic policy after political borders have been formed, and will study how such conflict over domestic policy may affect the incentives to fight over borders. Our analysis is linked to the expanding literature on the effects of conflict and appropriation on economic and political outcomes, which includes contributions by Haavelmo (1954), Hirshleifer (1989, 1991, 1995), Garfinkel (1990), Grossman (1991, 1994), Grossman and Kim (1995), Gershenson and Grossman (2000), Powell (1999), Skaperdas (1992), and many others.⁸

The paper is organized as follows. Section 2 presents the basic framework (a two-region model). Subsection 2.1 derives the incentives to secede and form separate countries in the absence of civil conflict, while Subsection 2.2 presents the technology of conflict. Section 3 derives the total spending on conflict output in the two regions, and the endogenous probability of secession. Those variables and the extent of separatist conflict are a function of the incentives to secede and of the incentives to oppose a secession. We show how those incentives depend on heterogeneity costs associated with different preferences over the type of government, economies of scale in the provision of public goods, and the relative size of the two regions. A special case of economies of scale from a larger size stems from the provision of defense and security against external threats. An analytical illustration of the effects of external threats on secessions is given in Section 4. Interestingly, external threats do not necessarily reduce the intensity of separatist conflict because they increase the larger region's incentives to resist the smaller region's secession, and may therefore lead to more diversion of resources towards civil conflict. Section 5 extends the analysis to civil conflict over the type of government after borders have been determined. In equilibrium, conflict over

⁷Of course, not all civil conflicts are about secessions. In this paper we will also consider civil conflict about "the type of government," and study how it may affect the incentives to break up.

⁸For a recent survey see Garfinkel and Skaperdas (2006).

the type of government reduces the heterogeneity costs and hence the incentives to secede in the smaller region, while it also reduces the benefits from a political union in the larger region. Section 6 concludes.

2 The Set Up

Consider two regions. Region 1 has a population equal to S , while Region 2 has a population equal to $P - S$. Let σ denote the relative size of Region 2 with respect to Region 1

$$\sigma \equiv \frac{P - S}{S} \tag{1}$$

Without loss of generality, we will assume that Region 1 is the larger region ($\sigma < 1$). We will call "union" the *status quo*, in which the two regions form one unified country with population P . When the two regions are unified, they share one public good (the "government"). The total cost of the government is $K > 0$. Hence the cost of the public good per capita in a unified country is

$$k \equiv \frac{K}{P} \tag{2}$$

"Separation" (or "secession") is the state of the world in which a breakup has occurred. Under separation, each region is independent and pays for its own government. Again, we assume that under separation the total cost of government in each independent country is K .⁹ Therefore, under separation people in Region 1 pay a cost per capita equal to $\frac{K}{S}$, while people in Region 2 pay a cost per capita equal to $\frac{K}{P - S}$. Consequently, being part of a larger country brings about economies of scale in the provision of the public good (the government), since its costs can be spread over a larger number of citizens. The higher is the cost of the public good, the higher are the economies of scale..Specifically, for Region 1 the economies of scale can be expressed in

⁹The assumption could be relaxed to allow for a variable cost of government, so that the aggregate cost of government would be higher in larger countries. What matters for our results is that the costs per capita should be decreasing in the size of the country. For example, total government costs in a country of size S may be equal to a fixed cost K plus a variable cost linear in S - with per capita costs being then equal to K/S plus a constant. Without loss of generality, in this paper we assume that the variable cost is zero.

per-capita terms as

$$\frac{K}{S} - \frac{K}{P} = k\sigma \quad (3)$$

while for Region 2 they are

$$\frac{K}{P-S} - \frac{K}{P} = \frac{k}{\sigma} \quad (4)$$

For each region the benefits from scale are positive and increasing in the relative size of the other region. If those economies of scale were the only factor at play, the status quo (union) would dominate separation for both regions. However, being part of a larger country may come with costs as well as benefits. In particular, we will focus on an important set of costs that have received special attention in the economic literature on the size of countries: "heterogeneity costs." These are defined as the costs associated with the need to provide a common public good (i.e., the same government) to populations with diverse preferences over types of government. Differences in preferences may stem from diverse ethnic and cultural characteristics (religion, language, etc.) and/or other political and ideological differences. In our highly stylized model, we will assume that there are only two types of government: type 1 and type 2. All citizens of Region 1 prefer type 1 to type 2, while all citizens of Region 2 prefer type 2 to type 1. We assume that each citizen obtains maximum utility from government services when the government of her country is of her preferred type, and lower utility when the government is of the other type. We normalize each citizen's maximum utility from government services to zero, and assume that each citizen's utility is reduced by $-h$ when the government is of the other type. That is, a citizen of Region 2 who lives in a country with government of type 1 obtains utility from government services equal to $-h$, while if the government is of type 2, her utility from government services is equal to 0.¹⁰

¹⁰An interesting issue is whether average heterogeneity costs in a country depend on population size. In our simple setting we assume that each population *within a region* is perfectly homogeneous - that is, individuals within each region share identical preferences about the type of government. Hence, average heterogeneity costs are a function of the *number of regions* that compose a country. Specifically, heterogeneity costs are zero when a country is composed of only one region, and positive when a country is formed by two regions. A positive relationship between heterogeneity costs and country size will hold insofar as a larger country size is obtained by expanding the number of regions: larger countries, by including more regions, have higher heterogeneity costs. In contrast, an

We assume that all citizens have a fixed endowment equal to y , which they can use for consumption, and to pay for their share of the public good.¹¹ Finally, for each agent i we assume that total utility U_i is linear in consumption c_i and utility from government services g_i :

$$U_i = c_i + g_i \tag{5}$$

where g_i is either 0 or $-h$.

2.1 Costs and Benefits of Union and Separation in the Absence of Civil Conflict

Before we introduce civil conflict, it is useful to consider the case in which there is no conflict by assumption (no "technology of conflict" is available).

Suppose that the type of government is chosen democratically by majority vote.¹² Since Region 1 is the larger region, type 1 will be selected by a majority of citizens. We also assume that taxes are set equally across all citizens.¹³ Consumption will be given by disposable income, which is equal

increase in country size due to an expansion in each region's population, without a change in the number of regions, would not increase heterogeneity costs, as long as the additional citizens in each region have the same preferences (that is, as long as each region remains homogeneous). These assumptions are consistent with the approach to heterogeneity costs discussed in Alesina and Spolaore (1997, 2003) and Spolaore (2006).

¹¹As we will see, the endowment can also be used by each agent to contribute to the resources diverted to civil conflict with the other region over political issues (borders and the type of government). For most of our analysis we will assume that the endowment y is safe, and appropriate activities are taken only in order to affect political outcomes. We will relax this assumption at the end of the paper, when we study external threats. For simplicity, we also assume that the endowment is independent of the choices over conflict, borders etc. This assumption could be relaxed to allow for production and trade, an extension which we do not pursue in this paper.

¹²The analysis here is close to Alesina and Spolaore (1997), Goyal and Staal (2004), and Spolaore (2006).

¹³That is, we assume that it is not possible to set different taxes in the two regions, but that all citizens contribute equally to the public good. Since we assume identical income per capita, this is a reasonable benchmark assumption. A different outcome would occur if the inhabitants of region 1 could impose higher taxes on the inhabitants of region 2 (regional redistribution). We abstract from this possibility. We also rule out the possibility of transfers (side payments) from Region 1 to Region 2 in order to keep Region 2 in the union when secessions are possible. On these issues see LeBreton and Weber (2003) and Alesina and Spolaore (2003, chapter 4).

to the endowment y minus the per-capita cost of the public good. Each citizen of Region 1 obtains the following utility from a political union of size P

$$U_{1u} = y - \frac{K}{P} \quad (6)$$

Utility for each individual in Region 2 is given by

$$U_{2u} = y - h - \frac{K}{P} \quad (7)$$

When the two regions form independent countries, all citizens of Region 1 will select a government of type 1, while all citizens of Region 2 will select type 2. Therefore, utility from separation in Region 1 is

$$U_{1s} = y - \frac{K}{S} \quad (8)$$

while utility from separation in Region 2 is

$$U_{2s} = y - \frac{K}{P - S} \quad (9)$$

Clearly, all individuals in Region 1 strictly prefer union to separation. They are the median voter in the unified country, where they can enjoy their preferred type of government while spreading the costs over a larger population. Let Δ_1 denote region 1's benefits per capita from union over separation. They are

$$\Delta_1 = U_{1u} - U_{1s} = \frac{K}{S} - \frac{K}{P} = k\sigma > 0 \quad (10)$$

By contrast, the citizens of Region 2 face a trade-off. In the unified country they pay less for the government because of economies of scale (equal to $\frac{k}{\sigma}$ in per-capita terms), but get less utility out of it because of heterogeneity costs, which are measured by h in per-capita terms. Let Δ_2 denote Region 2's per-capita benefits (costs, if negative) from separation over union

$$\Delta_2 = U_{2s} - U_{2u} = h + \frac{K}{P} - \frac{K}{P - S} = h - \frac{k}{\sigma} \quad (11)$$

When the heterogeneity costs h are low enough compared to the economies of scale $\frac{k}{\sigma}$, people in Region 2 prefer to be part of a unified country and

would not want to secede and form an independent country. In other words, when $h < \frac{k}{\sigma}$ there is no potential for conflict over borders between regions. Union is unanimously preferred over secession by all citizens. Of course, citizens in the unified country still differ over the type of government. The inhabitants of Region 2 prefer type 2 to type 1, but accept to stay in a unified country with a type-1 government because the economies of scale in public-good provision compensate them for the heterogeneity costs. In contrast, when $h > \frac{k}{\sigma}$, separation is preferred to union by Region 2's citizens because the heterogeneity costs they face are higher than the economies of scale. This is the most interesting case, as it implies conflicting preferences over the configuration of borders. The citizens of Region 1 prefer to keep a union, while the citizens of Region 2 prefer secession. This is the case that we will study in the rest of the paper, where borders are decided through an explicit conflict technology, which we are going to introduce in the following subsection.¹⁴

2.2 The Technology of Conflict

At the heart of this paper is a model of explicit conflict over borders. In the rest of our analysis we are going to assume that borders are not decided peacefully (say, through majority vote or other "nonconflictual" mechanism), but are determined by a contest between the two regions.¹⁵ Consistently with the economic literature on conflict, we assume that the probability of winning the contest depends on the amount of resources that each region diverts towards "separatist conflict." We will denote those levels of "conflict inputs" by F_1 and F_2 (for "eFfort" or "Force"). The winner of the contest will be able

¹⁴In other terms, $h > \frac{k}{\sigma}$ (Region 2's obtaining positive benefits from secession) is a necessary condition for conflict, which we will define as a positive diversion of resources into conflict activities. In general, whether conflict actually takes place in equilibrium depends on the costs of conflict, on the technology of conflict, and on the extensive form of the game.

¹⁵We will assume that each Region can act as a unified agent, overcoming any collective-action problem among its citizens. An interesting extension would be to consider free riding within each region, and the provision of selective incentives to individuals in order for them to contribute to separatist and anti-separatist activities. Free riding and collective-action issues may open additional channels through which the relative size of the two regions may play a role in equilibrium.

to decide the configuration of borders - that is, whether the country should remain unified or there should be two separate countries (secession). Given our assumption that $h > \frac{k}{\sigma}$, we have that if Region 1 wins the contest, there will be one country, while if Region 2 wins there will be two countries. We denote with π the probability that Region 2 wins (probability of secession), while $1 - \pi$ is the probability that the country will remain unified. In general, the probability of secession is increasing in Region 2's force F_2 and decreasing in Region 1's force F_1

$$\pi = \pi(F_1, F_2) \quad (12)$$

where $\frac{\partial \pi}{\partial F_1} < 0$ and $\frac{\partial \pi}{\partial F_2} > 0$. In order to simplify the analysis and obtain tractable closed-form solutions, we assume the following specification, which has been widely used in the economic literature¹⁶

$$\pi = \frac{F_2}{F_1 + F_2} \quad (13)$$

This is a special case of the more general specification

$$\pi = \frac{\Phi(F_2)}{\Phi(F_1) + \Phi(F_2)} \quad (14)$$

where $\Phi(\cdot)$ is a non-negative and increasing function.¹⁷ In particular, our technology of conflict is a special case of a "ratio" contest success function in which Region 2's probability of success is a function of the ratio $\frac{F_2}{F_1}$.¹⁸ Formally, a general ratio contest success function is obtained for $\Phi(F) = F^m$, $m > 0$. An alternative specification, which has also been used in the economic literature, is the "logistic" or "difference" function, characterized by $\Phi(F) = \exp(\beta F)$, where Region 2's probability of success is a function of the difference $F_2 - F_1$ (see Hirshleifer, 1989).

¹⁶If $F_1 = F_2 = 0$ we have $\pi = 1/2$. Alternative assumptions for this case would not change our results.

¹⁷See Garfinkel and Skaperdas (2006) and the references they cite for a discussion of alternative specifications. The function could be generalized to allow for asymmetry. For example, if Region 2's effort were more effective than Region 1's, we could write $\pi = \frac{\psi \Phi(F_2)}{\Phi(F_1) + \psi \Phi(F_2)}$ with $\psi > 1$. We abstract from those asymmetries in our analysis.

¹⁸See Tullock (1980).

Alternative formalizations of the contest success function have different analytical implications, especially at the "corners" in which one side makes no effort while the other chooses a positive effort. Clearly, the ratio function implies that the side making no effort must face a zero probability of success so long as the other side commits any finite amount of resources to the fight. By contrast, the logistic specification implies that a side could face a positive probability of winning even when investing no resources in conflict.¹⁹ Therefore, the ratio function can be viewed as more appropriate to study situations in which both parties must actively engage in conflict in order to gain any "prize," while the logistic function can capture cases in which a side that makes no effort would not "lose everything" (Hirshleifer, 1989). In our framework winning the contest for Region 2 means having a successful secession, while "not winning" would not mean "losing everything" (say, losing all one's income, land etc.), but just keeping the *status quo* (a political union with Region 1). It seems then reasonable to assume that a secession, when opposed by the other region, can occur only through active separatist efforts. In this respect, a ratio function appears to be more realistic than a logistic function.²⁰

¹⁹Consequently, as pointed out by Hirshleifer (1989), when the two agents choose their levels of efforts noncooperatively and simultaneously in a Cournot-Nash equilibrium, the logistic technology is consistent with corner solutions ($F_1 = 0$ and/or $F_2 = 0$) while the ratio technology always implies positive equilibrium levels ($F_1 > 0$ and $F_2 > 0$). In order to obtain corner solutions with a ratio contest function, one might consider non-simultaneous games with a more complex extensive form. For example, Region 1 could invest in force at an earlier stage in order to deter Region 2 from investing in secessionist activities at a later stage ("submission"). We do not pursue those dynamic extensions in this paper.

²⁰An interesting extension of our analysis would be to model the separatist conflict as regarding (a) the military control of Region 2's territory (*de facto* separation), and (b) "forcing" Region 1's formal recognition of Region 2's independence (*de jure* separation). If the inhabitants of Region 2 enjoy asymmetric advantages due to geography, better knowledge of the territory etc., they might achieve and maintain control over part of their territory even in the absence of explicit investment in conflict activities, consistently with a logistic specification. However, it seems implausible that a seceding government could obtain *de jure* sovereignty and recognition from the other region without a positive commitment of resources. A formalization of conflict over *de facto* control as well as conflict over *de jure* sovereignty might then include both "logistic" and "ratio" contests. We can interpret the simple ratio specification of this paper as a "reduced form," in which "winning" entails complete (*de facto* and *de jure*) control over Region 2. Another extension/re-interpretation, which we do not pursue here, would be to include lobbying and other "persuasion" activities in our analysis of separatist conflict. Some of those activities may target the citizens of Region 1 (to "persuade" them to let Region 2 go),

3 Separatist Conflict

We are now ready to consider the choices of the two regions regarding separatist conflict.²¹ Specifically, F_1 will be chosen to maximize the expected utility of each citizen in Region 1, which is²²

$$EU_1 = (1 - \pi)(y - \frac{K}{P}) + \pi(y - \frac{K}{S}) - \frac{F_1}{S} = y - k - \pi\Delta_1 - \frac{F_1}{S} \quad (15)$$

and the first-order condition for maximization of the above expected utility, for given F_2 , is

$$\frac{F_2\Delta_1}{(F_1^* + F_2)^2} = \frac{1}{S} \quad (16)$$

where the left-hand side is the marginal benefit from an extra unit of force and the right-hand side is the marginal cost per capita. Hence, Region 1's best-response function to Region 2's level of force is

$$BR_1(F_2) = \sqrt{\Delta_1 S F_2} - F_2 \quad (17)$$

Analogously, Region 2's expected utility is

$$\begin{aligned} EU_2 &= (1 - \pi)(y - h - \frac{K}{P}) + \pi(y - \frac{K}{P - S}) - \frac{F_2}{P - S} = \\ &= y - h - k + \pi\Delta_2 - \frac{F_2}{P - S} \end{aligned} \quad (18)$$

and the citizens of Region 2 (to "persuade" them to stay), while other activities may target external agents (foreign powers, international organizations), which we do not model in this paper. See Skaperdas and Vaidya (2005) for a discussion of "persuasion as a contest."

²¹We will focus on simultaneous Cournot games, and use a standard Cournot-Nash equilibrium solution. An interesting topic for further research is the study of more complex dynamic games, in which a region may influence future decisions of the other region by precommitting to a given level of effort. For example, Region 1 may be able to choose a very high level of effort and therefore induce the other region not to invest in conflict (unilateral "submission"). For an interesting analysis of a dynamic civil war (over resources, not over secessions and borders) see Gershenson and Grossman (2000). As we have already mentioned, "corner" solutions in which one or both sides invest nothing in conflict are possible as Cournot-Nash equilibria of simultaneous games when the technology of conflict is logistic (Hirshleifer, 1989).

²²In this analysis we will abstract from a further cost of conflict: the direct destruction of human lives and properties (the "havoc of war"). Depending on the specification of the extensive form and on the values of the parameters, direct costs from destruction might induce one or both regions *not* to fight in equilibrium. In the case of fight, direct destruction obviously increases the welfare losses from conflict.

The first-order condition for a maximum is

$$\frac{F_1 \Delta_2}{(F_1 + F_2^*)^2} = \frac{1}{P - S} \quad (19)$$

Consequently, Region 2's best-response function is

$$BR_2(F_1) = \sqrt{\Delta_2(P - S)F_1} - F_1 \quad (20)$$

At the Nash equilibrium $F_1^* = BR_1(F_2^*)$ and $F_2^* = BR_2(F_1^*)$, which imply

$$\frac{F_2^*}{F_1^*} = \frac{\Delta_2}{\Delta_1} \sigma = \frac{h}{k} - \frac{1}{\sigma} \quad (21)$$

The equilibrium levels of resources devoted to conflict over secession in the two regions are

$$\frac{F_1^*}{S} = \frac{\sigma \Delta_1^2 \Delta_2}{(\Delta_1 + \sigma \Delta_2)^2} = \frac{(\sigma k)^2 (\sigma h - k)}{[\sigma h - (1 - \sigma)k]^2} \quad (22)$$

and

$$\frac{F_2^*}{P - S} = \frac{\sigma \Delta_1 \Delta_2^2}{(\Delta_1 + \sigma \Delta_2)^2} = \frac{k(\sigma h - k)^2}{[\sigma h - (1 - \sigma)k]^2} \quad (23)$$

In equilibrium the probability of secession is

$$\pi^* = \frac{F_2^*}{F_1^* + F_2^*} = \frac{h - \frac{k}{\sigma}}{h - \frac{k}{\sigma} + k} \quad (24)$$

The economic interpretation of the above expression is as follows:

(1) the probability of separation is higher when Region 2 faces high incentives to secede because of high heterogeneity costs (high h) and low economies of scale (low k). As we have seen, the term $h - \frac{k}{\sigma}$, which is positive by assumption, captures the benefits to Region 2 of separating (gross of conflict costs). The probability of secession is increasing in those benefits.;

(2) high economies of scale (high k) reduce the probability of separation not only by dampening Region 2's incentives to break up, but also by increasing Region 1's incentives to fight against the secession.

(3) finally, secessions are more likely for higher σ 's - that is, when the seceding region is relatively large.

Results (1) and (2) are quite intuitive. Result (3) is less obvious. A higher σ increases Region 2's net benefits from a secession (a larger Region 2 can finance its own public good more cheaply). However, a larger σ also means higher benefits from a union for Region 1, because a larger Region 2 is associated with larger economies of scale for Region 1 when the two regions form a unified country. Hence, a higher σ strengthens both the incentives to secede in Region 2 and to resist secession in Region 1, with potentially ambiguous results. However, a higher σ also means that "force per capita" is relatively cheaper in Region 2 and relatively more expensive in Region 1. This additional effect unambiguously increases the probability of secession. It turns out that the effects on the relative cost of force per capita in the two regions, when added to the effects of a higher σ on Region 2's incentives to secede, are sufficient to offset the effects of a larger σ on Region 1's incentives to fight the secession,. Therefore, on net, a higher σ is associated with a *higher probability* of secession.²³

Since people devote valuable resources to unproductive conflict inputs, the equilibrium outcome is Pareto inefficient: all agents would be strictly better off if they could jointly commit to a different allocation of resources, in which each region i chooses a level of force equal to a fraction λ of its equilibrium level, with $\lambda < 1$.²⁴ Then the probability of secession would not be affected, but each agent would have higher consumption. However, this solution is not an equilibrium (the best response to F_1' is not F_2' but a level of force higher than F_2^*). This is the standard inefficiency associated with a ratio contest success function - that is, with conflict and rent-seeking activities in which each agent's payoff is a function of the agent's relative effort, and everybody could be better off if all were to reduce their effort proportionally.

However, an equilibrium outcome with a positive level of "separatist conflict" does not necessarily provide lower average welfare than a "peaceful"

²³This is consistent with the intuitive view that, historically, the increase in the relative population of the colonies with respect to the colonizing powers reduced the colonizers' incentives to oppose decolonization. See Grossman and Iyigun (1997).

²⁴That is, an allocation with $F_1' = \lambda F_1^*$ and $F_2' = \lambda F_2^*$.

equilibrium in which borders are determined by majority vote, and hence union prevails. While a separatist conflict is socially wasteful, it might represent a "second best" if it brings about the breakup of an inefficient union. Specifically, it can be shown that in the conflict equilibrium aggregate expected utility is higher than in the "peaceful" equilibrium studied in Section 2.1 if and only if²⁵

$$\frac{h}{k} > \frac{2 + \sigma}{\sigma} \quad (25)$$

The above condition shows that conflict is "welfare-improving" over a union without conflict when the relative heterogeneity costs $\frac{h}{k}$ are above the critical value $\frac{2 + \sigma}{\sigma}$, which is decreasing in σ (conflict is more likely to be "welfare-improving" when the secessionist region is larger). The critical value $\frac{2 + \sigma}{\sigma}$ is higher than the critical value $\frac{1 + \sigma}{\sigma}$ above which secessions without conflict are socially preferable to unions.²⁶

A good measure of the extent to which resources are diverted to socially wasteful uses is aggregate spending in conflict activities $F_1 + F_2$. In equilibrium aggregate conflict spending per capita is given by

$$\frac{F_1^* + F_2^*}{P} = \frac{P - S}{P} k \frac{\frac{h}{k} - \frac{1}{\sigma}}{\frac{h}{k} - \frac{1}{\sigma} + 1} = \sigma(1 - \sigma)k\pi^* \quad (26)$$

This measure can be interpreted as the extent of separatist conflict in this society. *Ceteris paribus*, higher heterogeneity costs (a higher h) are associated with higher separatist conflict. This is intuitive, since higher heterogeneity costs, for given economies of scale, increase the incentives to secede in Region 2. On the other hand, the effect of higher economies of scale on aggregate separatist conflict is ambiguous. The equation above implies that an increase

²⁵The details of the derivation are available upon request.

²⁶Hence there exists a range of parameters $\frac{1 + \sigma}{\sigma} < \frac{h}{k} < \frac{2 + \sigma}{\sigma}$ for which an "inefficient union" without conflict is socially preferable to the conflict equilibrium.

in k leads to an increase in conflict if and only if²⁷

$$k \frac{\partial \pi^*}{\partial k} + \pi^* > 0$$

that is, if and only if the elasticity of the probability of separation with respect to the economies of scale is larger than one²⁸:

$$\left| \frac{k}{\pi^*} \frac{\partial \pi^*}{\partial k} \right| > 1$$

In other words, an increase in k reduces separatist conflict only when it has a *big* dampening effect on the relative force of Region 2 compared to the force of Region 1. This result is an example of a more general point: factors that *reduce* the probability of separation may *increase* the extent of separatist conflict. The probability of separation is determined not only by the incentives to secede faced by the separatist region, but also by the incentives to resist separation faced by the larger region. Economies of scale reduce the incentives to secede but also strengthens the incentives to repress separatism. If the effects on anti-separatist activities is high enough, an increase in economies of scale might be associated with higher aggregate resources devoted to separatist conflict, while the probability of separatism is lower.

4 External Threats

An interesting application of our analysis arises in relation to the effects of external threats on the cohesion of countries and political unions. In general,

²⁷Of course, this is under the assumption that, after the increase in k , Region 2 still wants to secede. If the increase were to be so large as to reverse the inequality $h > \frac{k}{\sigma}$ and turn it into $h < \frac{k}{\sigma}$, all separatist conflict would stop, since both regions would prefer union to separation.

²⁸The condition is equivalent to

$$\frac{h}{k} - \frac{1}{\sigma} < \frac{1}{\sqrt{\sigma}}$$

that is, the incentives to secede cannot be too large.

security and national defense are public goods with large economies of scale. External threats increase the incentives to form larger political unions for protection, and hence tend to reduce the probability of separatism. Should one then infer that secessionist conflicts would be reduced when the country is faced with external threats? Should we expect to observe a reduction in the *extent* of civil conflict over borders when a country faces threats from outside?²⁹ Not necessarily. In fact, it is possible that, when faced with the perspective of future external threats, and hence a stronger incentive to fight separatist tendencies, the anti-separatist region will increase the resources it spends on fighting secession. In principle, this increase may be larger than the reduction in conflict activities by the separatist region. Hence, whether an external threat will reduce the level of resources diverted to separatist conflict will depend on the value of the parameters: only a very large effect of the threat on the probability of separatism will be associated with a reduction in the extent of separatist conflict.

A simple illustration of this principle can be provided by an extension of our basic model to include external threats. We will sketch the extension below, and leave the details of the analysis to the reader. We can model an external threat as the existence of a predatory "enemy" with exogenous power E , which can extract a fraction of aggregate income equal to $\frac{M}{M+E}yZ$ from a country of size Z (in our set up, Z can take values P , S , and $P-S$), where M denotes the level of military defense of the country.³⁰³¹ After borders have been set, the government of the country chooses the level of M that maximizes income per capita net of defense costs, which we will denote by x .³²

²⁹For recent analyses of the relationship between conflict within groups and conflict across groups in a different context (appropriative conflict over resources) see Garfinkel (2004a, 2004b, 2004c) and Münster and Staal (2005). The relationship between endogenous group formation and out-group hostility is studied by Lester (2005) within a model of trust and trade.

³⁰For simplicity we assume that the power of the enemy is the same for all countries. The model could be extended to allow for the endogenous determination of the enemy's resources diverted to attack each country. For general-equilibrium models of country formation and breakup with endogenous external threats see Alesina and Spolaore (2005, 2006). In those analyses, however, there is no civil conflict over borders.

³¹We also abstract from the possibility that the two regions, if separate, may engage in an interstate war between themselves.

³²We assume that the resources that were diverted to civil conflict over borders have

$$x = \frac{M}{M + E}y - \frac{M}{Z} \quad (27)$$

The optimal M^* is

$$M^*(Z) = \sqrt{EyZ} - E \quad (28)$$

and net income per capita in equilibrium is given by

$$x^* = y - 2\sqrt{\frac{Ey}{Z}} + \frac{E}{Z} \quad (29)$$

Note that net income x is increasing in country size Z . In other words, external threats introduce an additional source of economies of scale - specifically, net benefits from a larger size associated with the cheaper provision of security. A bigger threat (a larger E) leads to higher benefits from size - an effect that is qualitatively similar to a larger k . Hence, *mutatis mutandis*, the above analysis can be extended to the case of external threats. The details of the analysis are left to the reader.

In the following Section we will abstract from external threats, but pursue a separate extension: What are the implications for conflict over borders when the citizens of the two regions can also fight over the type of government after borders have been determined?

5 Conflict over the Type of Government and Incentives to Secede

So far we have assumed that civil conflict takes place before borders are set, in order to determine whether there should be one country or two. But we have also assumed that there is no civil conflict after borders have been set.³³ After conflict over borders is resolved, decisions over governments are

been all used and cannot be employed for national defense after borders have been set. The model could be extended to allow for some "economies of scope" between regional force used in civil conflict and national force used against external threats. This extension would create an additional mechanism through which external threats may increase civil conflict.

³³We have allowed conflict with external enemies in the extension sketched at the end of the previous section, but no civil conflict within a unified country.

taken democratically, without direct or indirect use of resources as "conflict inputs.". In particular, we have assumed that, when a union is formed, the citizens of the larger region (Region 1) can impose their preferred type of government to the citizens of the smaller region (Region 2). Hence, the citizens of Region 2 can obtain their preferred type of government only by forming an independent country. This is a useful benchmark hypothesis to study secessions, but it abstracts from the possibility that the citizens of Region 2 may influence domestic-policy decisions even when the country is unified. In this Section we will extend the analysis to consider the case in which the determination of the type of government in a union is not exclusively in the hands of the majority (Region 1), but is itself the outcome of a conflict between Region 1 and Region 2 *after* borders have been determined. In other words, we will investigate the case in which Region 1 and Region 2 can use "domestic conflict activities" to affect political decisions. We will assume that, as in the case of conflict over borders, conflict over government policies requires the use of costly resources.³⁴ In particular, let D_1 and D_2 denote the levels of "domestic conflict inputs" that Region 1 and Region 2 use, respectively, in order to affect the decision over the type of government in the unified country. In analogy with our formalization above, assume that the unified country will have the type of government preferred by the citizens of Region 1 with probability³⁵

$$\rho = \frac{D_1}{D_1 + D_2} \quad (30)$$

and the type preferred in Region 2 with probability $1 - \rho$.

Region 1 will choose D_1 - for given D_2 - in order to maximize

$$EU_{1u} = y - k - (1 - \rho)h - \frac{D_1}{S} \quad (31)$$

³⁴For conceptual reasons - in order to isolate the effects of the different kinds of conflict - we will assume that the "conflict inputs" mobilized and used to affect borders are different from those used to affect domestic policy. This is a reasonable assumption, insofar as the timing of the two conflicts is distinct, and the mechanisms through which decisions and policies are affected are different. However, in practice, some "conflict inputs" could be used towards both goals. For example, a secessionist movement could use its strength to affect a break up and, if unsuccessful, could use those same resources to affect domestic policy within the union. These "economies of scope" in conflict activities would give larger incentives to invest in those activities.

³⁵Again, if $D_1 = D_2 = 0$ we have $\rho = 1/2$.

while Region 2 will choose D_2 - for given D_1 - in order to maximize

$$EU_{2u} = y - k - \rho h - \frac{D_2}{P - S} \quad (32)$$

At the Nash equilibrium we have

$$\rho^* = \frac{1}{1 + \sigma} \quad (33)$$

Region 1 will be more likely to impose its will to Region 2 the smaller Region 2 is relative to Region 1. The equilibrium levels of domestic power per capita in the two regions are

$$\frac{D_1^*}{S} = \frac{D_2^*}{P - S} = \frac{\sigma h}{(1 + \sigma)^2} \quad (34)$$

Region 1's expected utility under a union is higher than utility from separation if and only if

$$EU_{1u}^* = y - k - \frac{\sigma h}{1 + \sigma} - \frac{\sigma h}{(1 + \sigma)^2} > y - k \frac{P}{S} \quad (35)$$

which implies

$$\frac{h}{k} < \frac{(1 + \sigma)^2}{2 + \sigma} \quad (36)$$

This condition shows that Region 1 will prefer union over separation when relative heterogeneity costs $\frac{h}{k}$ are below the critical value $\frac{(1 + \sigma)^2}{2 + \sigma}$. This critical value is increasing in σ (the larger is Region 2 relative to Region 1, the more appealing is unification for Region 1). It is worth noting that, with domestic conflict over the type of government, Region 1 will now bear parts of the heterogeneity costs associated with having citizens with diverse preferences, and will take that into account when deciding whether it is worth fighting over borders.

Conversely, Region 2's expected utility within a union is higher than utility from separation if and only if

$$EU_{2u} = y - k - \frac{h}{1 + \sigma} - \frac{\sigma h}{(1 + \sigma)^2} > y - k \frac{P}{P - S} \quad (37)$$

which implies

$$\frac{h}{k} < \frac{(1 + \sigma)^2}{2\sigma^2 + \sigma} \quad (38)$$

Again, unification is preferred at lower levels of the key trade-off ratio $\frac{h}{k}$, that is, when heterogeneity costs are low relative to economies of scale. The critical value of $\frac{h}{k}$ below which union is preferred is decreasing in σ (a larger Region 2 faces smaller incentives to be part of a union). Civil conflict over the type of government affects the two regions' incentives to form a union or two separate countries. Overall, conflict over the type of government, by bringing the government closer (in expected value) to Region 2's preferences, makes a union more attractive to Region 2, even though more resources will have to be spent on conflict. Formally, there exists a range of parameters $\frac{1}{\sigma} < \frac{h}{k} < \frac{(1 + \sigma)^2}{2\sigma^2 + \sigma}$ for which Region 2 prefers separation when the type of government is chosen by majority vote, but union when the type of government is chosen through conflict. On the other hand, Region 1 will find a union less attractive than in the absence of civil conflict over the type of government. This is due to two reasons: the government will be a bit farther (in expected value) from its preferred type, and consumption will be lower because of the need to divert resources towards civil conflict over the government. In fact, there exists a range of parameters for which Region 1 now prefers a secession while Region 2 prefers a union! The range is given by values of $\frac{h}{k}$ such that

$$\frac{(1 + \sigma)^2}{2 + \sigma} < \frac{h}{k} < \frac{(1 + \sigma)^2}{2\sigma^2 + \sigma} \quad (39)$$

In this case, civil conflict over governments brings about a "reversal" of civil conflict over borders: the larger region prefers a breakup, while the smaller region prefers a union. From Region 1's perspective, civil conflict gives so much power to the smaller region that a union becomes unattractive.

The total amount of resources on conflict per capita

$$\frac{D_1^* + D_2^*}{P} = h \frac{S}{P} \frac{P - S}{P} \quad (40)$$

is maximized at $\frac{S}{P} = \frac{P - S}{P} = \frac{1}{2}$.³⁶

³⁶This is consistent with empirical results showing that conflict is higher in countries

6 Concluding Remarks

This paper has established a link between the literature on the formation and breakup of countries and the literature on the economic consequences of conflict and appropriation within countries. The paper has been inspired by the work of Herschel Grossman and other scholars who have developed formal models in which conflict and appropriation are economic activities that require the diversion of resources from consumption and production. In particular, we have studied the endogenous determination of secessions when borders are the outcome of a contest between regions that have an interest to maintain a union and regions that prefer to breakup the country in order to choose types of government that are closer to their preferences. We have analyzed the effects of heterogeneity costs, economies of scale, external threats, and conflict over domestic policies on the incentives to fight for and against secessions. Further extensions and analyses - including a general-equilibrium study of the relationship between civil conflict, secessions, and international conflict.- are left for further research

that are roughly equally split between two ethnic groups. On the theory and empirics of ethnic conflict see Horowitz (1985), Collier (2001), and Caselli and Coleman (2006).

References

- Alesina, A. and E. Spolaore (1997) On the number and size of nations. *Quarterly Journal of Economics* 112(4): 1027-1056
- Alesina, A. and E. Spolaore (2003) *The Size of Nations*. MIT Press, Cambridge, MA
- Alesina, A. and E. Spolaore (2005) War, peace and the size of countries. *Journal of Public Economics* 89(7): 1333-1354
- Alesina, A. and E. Spolaore (2006) Conflict, defense spending, and the number of nations. *European Economic Review* 50(1): 91-120
- Alesina, A., E. Spolaore and R. Wacziarg (2000) Economic integration and political disintegration. *American Economic Review* 90(5): 1276-1296
- Alesina, A., E. Spolaore and R. Wacziarg (2005) Trade, growth, and the size of countries. In P. Aghion and S. Durlauf (eds) *Handbook of Economic Growth*. North Holland, Amsterdam
- Anderson, B. (1983) *Imagined Communities*. Verso, London
- Bolton, P. and G. Roland (1997) The breakups of nations: A political economy analysis. *Quarterly Journal of Economics* 112(4): 1057-89
- Bordignon, M. and S. Brusco (2001) Optimal secession rules. *European Economic Review*, 45: 1811-34
- Caselli F. and W. J. Coleman, (2006) On the theory of ethnic conflict. NBER Working Paper No. W12125, Cambridge, MA
- Collier, P. (2001) The economic causes of civil conflict and their implications for policy. In: C. A. Crocker, F. O. Hampson, and P. R. Aall (eds.) *Turbulent Peace: The Challenges of Managing International Conflict*. U.S. Institute of Peace Press, Washington D.C
- Collier, P. and A. Hoeffler (1998) On economic causes of civil war. *Oxford Economic Papers* 50(4): 563-573
- Ellingsen, T. (1998) Externalities and internalities: A model of political integration. *Journal of Public Economics* 68(2): 251-68
- Fearon, J. and D. Laitin (2003) Ethnicity, insurgency, and civil war. *American Political Science Review* 97(1): 75-90
- Findlay, R. (1996) Towards a model of territorial expansion and the limits of empires. In M. Garfinkel and S. Skaperdas (eds.) *The Political Economy of Conflict and Appropriation*. Cambridge University Press, Cambridge UK

- Garfinkel, M. R. (1990) Arming as a strategic investment in a cooperative equilibrium. *American Economic Review* 80: 50-68
- Garfinkel, M. R. (2004a) Stable alliance formation in distributional conflict. *European Journal of Political Economy* 20: 829-852
- Garfinkel, M. R. (2004b) On the stable formation of groups: Managing the conflict within. *Conflict Management and Peace Science* 21: 43-68
- Garfinkel, M. R. (2004c) Global threats and the domestic struggle for power. *European Journal of Political Economy* 20: 495-508
- Garfinkel, M. R. and S. Skaperdas (2006) Economics of conflict: An overview. In K. Hartley and T. Sandler (eds) *Handbook of Defense Economics*, Volume 2, North Holland, Amsterdam (forthcoming)
- Gellner, E. (1983) *Nations and Nationalism*. Cornell University Press, Ithaca, NY
- Gershenson, D. and H. I. Grossman (2000), Civil conflict: Ended or never ending? *Journal of Conflict Resolution* 44(6): 807-821
- Goyal, S. and K. Staal (2004) The political economy of regionalism. *European Economic Review* 48: 563-593
- Grossman, H.I. (1991) A general equilibrium model of insurrections. *American Economic Review* 81: 912-21
- Grossman, H.I. (1994) Production, appropriation, and land reform. *American Economic Review* 84: 705-712
- Grossman, H.I. and M. F. Iyigun (1997) Population increase and the end of colonialism. *Economica* 64: 483-93
- Grossman, H.I. and M. Kim (1995) Swords or plowshares? A theory of the security of claims to property. *Journal of Political Economy* 103: 1275-1288
- Gurr, T. R. (2000). *Peoples Versus States: Minorities at Risk in the New Century*. Washington D.C.: U.S. Institute of Peace Press
- Haavelmo, T. (1954) *A Study in the Theory of Economic Evolution*. North Holland, Amsterdam
- Hiscox, M. (2003) Political integration and disintegration in the global economy. In: M. Kahler and D. Lake (eds) *Globalizing Authority*. Princeton University Press, Princeton, NJ
- Hirshleifer, J. (1989) Conflict and rent-seeking success functions: Ratio versus difference models of relative success. *Public Choice* 63: 101-112

- Hirshleifer, J. (1991) The technology of conflict as an economic activity. *American Economic Review* 81(2): 130-134
- Hirshleifer, J.(1995) Anarchy and its breakdown. *Journal of Political Economy* 103(1): 26-52
- Horowitz, D .L. (1985) *Ethnic Groups in Conflict*. University of California Press, Berkeley, CA
- Lake, D. and A. O'Mahony (2004) The Incredible Shrinking State: Explaining the Territorial Size of Countries. *Journal of Conflict Resolution* 48(5): 699-722
- LeBreton, M. and S. Weber (2003), The Art of making everybody happy: How to prevent a secession. *IMF Staff Papers* 50(3): 403-435
- Lester, A. (2005) Trade and the end of trust: Endogenous group formation and inter-group hostility, Brown University.
- Münster, J. and K. Staal (2005) War with outsiders make peace inside. Discussion Paper No. 75, University of Mannheim
- Powell, R. (1999), *In the Shadow of Power: States and Strategies in International Politics*. Princeton University Press, Princeton, NJ
- Skaperdas, S. (1992) Cooperation, conflict and power in the absence of property rights. *American Economic Review* 82(4): 720-39
- Skaperdas, S. and S. Vaidya (2005) Persuasion as a contest. University of California, Irvine
- Spolaore, Enrico (2004), Economic Integration, international conflict and political unions. *Rivista di Politica Economica* 94: 3-50
- Spolaore (2006) National borders and the size of nations. In B. R. Weingast and D. A. Wittman (eds) *The Oxford Handbook of Political Economy*. Oxford University Press, Oxford
- Tilly, C. (1990), *Coercion, Capital and European States, AD 990-1990*. Blackwell, Cambridge, MA
- Tullock, G. (1980) Efficient rent seeking. In: J. M. Buchanan, R.D. Tollison, and G. Tullock (eds) *Toward a Theory of the Rent-Seeking Society*. Texas A&M University Press, College Station
- Wittman, D. A. (2000) The wealth and size of nations. *Journal of Conflict Resolution* 6: 885-895