THE BREAKUP OF NATIONS: A POLITICAL ECONOMY ANALYSIS*

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This paper develops a model of the breakup or unification of nations. In each nation the decision to separate is taken by majority voting. A basic trade-off between the efficiency gains of unification and the costs in terms of loss of control on political decisions is highlighted. The model emphasizes political conflicts over redistribution policies. The main results of the paper are i) when income distributions vary across regions and the efficiency gains from unification are small, separation occurs in equilibrium; and ii) when all factors of production are perfectly mobile, all incentives for separation disappear.

I. INTRODUCTION

Following the demise of communism, the entire map of Europe, from the Atlantic coast to the Urals, is being redrawn and issues of separation, unification, and the redrawing of borders are yet again at the forefront of European concerns. Many of the issues raised by this process are primarily of a political, cultural, or linguistic nature. However, there are also economic considerations that bear on this problem. The objective of this paper is to analyze some important economic and political determinants of the process of unification and separation of democratic nations.

The starting point of our analysis is to suppose that from an economic efficiency point of view, separation of nations is never desirable. A unified nation is always more efficient since free trade among regions is guaranteed, duplication costs in defense and law enforcement are avoided, and local public goods provision (such as transportation and communication networks, or common standards) can be coordinated. Furthermore, any benefits of decentralization that might be obtained in a world with several nations may also be achieved within a unified nation by replicating the administrative structure of the world with several

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nations and implementing a suitable degree of decentralization of authority among regions. However, the benefits of unification cannot in general be evenly distributed among all citizens. In each region there may be winners as well as losers from regional independence. In a democratic context the question is then whether there is a majority of winners supporting separation, regional autonomy, or unification.

In this paper we focus on regional conflicts over fiscal policy arising from differences in income distribution across regions. The role of government is reduced to the provision of publicly provided private goods or to redistribution of income financed by linear income tax schedules determined through voting (as in the literature initiated by Foley [1967], Romer [1975], and Roberts [1977]). Poor agents favor high income tax rates, and rich agents favor low rates; the equilibrium tax rate is the one most preferred by the median (income) voter. In general, the income distributions in each region are not identical, and the median voter in each region has different preferred tax rates. The equilibrium tax rate in the union will thus generally not coincide with the tax rate chosen by a majority in each region. In a unified nation regions do not have total freedom in their choice of tax policies. Separation removes any institutional constraints imposed by the union and allows for policies that are closer to the wishes of a majority of voters in the region.

When contemplating a move toward independence, voters in each region must then weigh the efficiency benefits of the union against the benefits of having a *government "closer to the people"* (that is, a redistribution policy closer to the preferences of a majority in the region).

We believe that this is a fundamental trade-off faced by all regions or states involved in a unification or disintegration process. In the European Union, for example, moves toward greater integration on taxation have been hampered by important disagreements; some like the United Kingdom favoring lower taxes and less redistribution, and others like the Netherlands favoring higher taxes to protect their welfare state.

We analyze the process of disintegration of democratic nations in terms of this trade-off. Our analysis encompasses the case of rich regions wanting to separate to stop paying transfers to poorer regions, but it also highlights the possibility that a poorer region may prefer independence even if this involves both efficiency costs and possibly losses of fiscal transfers from richer regions. Such a scenario cannot be explained if one focuses exclusively on the conflict over interregional transfers that has been emphasized in the existing literature (see, e.g., Buchanan and Faith [1987]).

The paper is organized as follows: Section II describes the model and motivates our framework. Section III provides a simple expression for the trade-off faced by a median voter in each region. There are basically three important factors influencing a region's decision to separate:

(i) a political factor that arises from differences in regional preferences over fiscal policy;
(ii) the efficiency losses from separation;
(iii) a tax base factor that emerges whenever per capita income varies across regions.

The most interesting one is the political factor that in our model arises from *differences in income distribution* across regions. The presence of this political factor explains why a region with very low income inequality may want to break away from a nation with high income inequality and high tax rates in order to impose lower tax rates, and vice versa a region with high income inequality may want to separate in order to impose more redistribution than in the unified country.

Section IV considers to what extent the median voter in the union may be prepared to make tax concessions to avoid separation. It is shown that if the problem is only to reduce a positive transfer from a rich to a poor region, then a lower accommodating tax rate can always prevent separation. However, if the problem is to reconcile tax preferences between two regions with similar per capita income but different income distributions, then separation may be unavoidable because of contradictory pressures for tax accommodation.

Another way of avoiding full separation may be to allow each region to determine its own redistribution policy independently within a federal state. Section V considers under what circumstances this alternative may be preferred to independence or full unification. It is shown that fiscal competition may sufficiently constrain a region's freedom to set its most desired tax rate to make independence (with capital controls at the borders) preferable.

Differences in per capita income and income distribution across regions persist only if at least one factor of production is not perfectly mobile. Indeed, Section VI establishes that under perfect mobility of all factors, the regions end up setting the same tax rates in equilibrium and have the same per capita and median income (under both autonomy and independence), so that any attempt to break away from the union in order to implement a different redistribution policy is self-defeating. This "homogenizing" effect of mobility stands in contrast with Tiebout [1956]-type results where mobility leads to sorting into heterogeneous juridictions.[1]

Section VII offers some concluding comments. A number of obvious yet powerful insights from our analysis emerge that have implications for the process of European political integration:

(i) European unification is politically facilitated by reducing both differences in per capita income across member states *and* differences in income distribution. Thus, the European Commission's structural funds for regional development may help in harmonizing preferences over fiscal policies across regions, but they may not be enough.

(ii) Greater labor mobility helps in homogenizing regional preferences over fiscal policy and in reducing political obstacles to unification.

(iii) An unpleasant implication of our analysis is that barriers to trade and factor movements between the European Union and neighboring non-Union states play a role in cementing the Union. In the absence of such barriers, a country would be less willing to join the Union if it can obtain most of the economic benefits of the Union by staying out and not paying the political costs in terms of loss of sovereignty.

(iv) Finally, the most important lesson emerging from our analysis is that opt-out clauses for member countries tend to facilitate the unification process by constraining Union policies and thus making them acceptable to joining members.

There is a small but growing literature on the integration and disintegration of nations adopting a political economy approach (see the survey in Bolton, Roland, and Spolaore [1996]). The models in Casella and Feinstein [1990], Wei [1992], and Alesina and Spolaore [1997] consider variants of the Hotelling model where location of individuals coincides with their preferences over public goods. In these papers, too, the main trade-off identi-

1. For an analysis and discussion of the formation of heterogeneous jurisdictions, see, e.g., Bewley [1981], Wooders [1989], Conley and Wooders [1996a, 1996b], Jéhiel and Scotchmer [1997], and Bolton and Roland [1996].

fied is that between the economic advantages of unification and the political costs of policies that are less close to the preferences of local majorities. Our paper differs from this literature in that it focuses primarily on redistribution conflicts and on differences in income distribution across regions as the source of the breakup of nations. Our approach thus ties voter preferences directly to observable economic variables. Also, it focuses on the effects of factor mobility on incentives to secede or to integrate.

II. The Model

We consider a nation with two regions A and B. The boundaries of regions are given exogenously and are immutable.[2] The population and wealth (capital) in region $i = A, B$ are denoted by L_i and K_i. Labor supply is inelastic and is equal to $L = L_A + L_B$. The total capital stock in the nation is $K = K_A + K_B$, and regional output is given by $Y_i = K_i^{\beta} L_i^{1-\beta}$, where $0 < \beta < 1$. We define per capita regional output as $y_i = Y_i/L_i = k_i^{\beta}$, where $k_i \equiv K_i/L_i$.

To keep things as simple as possible, we assume that product, labor, and capital markets behave like competitive markets. When there is factor mobility inside but not across regions, the equilibrium wage rate s_i and the equilibrium return on capital r_i are given by

$$s_i = (1 - \beta)y \quad \text{and} \quad r_i = \beta(y_i/k_i). \tag{1}$$

When there is factor mobility across regions, factor prices (and thus capital-labor ratios and income per capita) are equalized.

There is a continuum of agents who differ in their initial wealth endowments and labor skills. The capital and labor endowments of an individual v in region i are, respectively, K_{vi} and L_{vi}. An individual agent's income (or final wealth) is therefore

$$w_{vi} = s_i L_{vi} + r_i K_{vi}. \tag{2}$$

The income distribution in the whole nation is given by $h(w_v) = h_A(w_v) + h_B(w_v)$ with support $[0,\overline{w}]$, where $h_i(w_v)$ denotes

2. What defines a region in practice is generally a common language and culture as well as natural or historically given boundaries. It is beyond the scope of this paper to ask how ethnic communities emerge and persist. Our paper is primarily concerned with the question of how different ethnic and linguistic communities decide to form a union and live within the same nation. It is worth pointing out here that most nations are multiethnic and multilingual. Indeed, there are roughly 4000 to 6000 languages on this planet but only about 200 nations (see Pinker [1994]).

the income distribution in region $i = A,B$. Total income is equal to total output, so that

$$Y = \int_0^{\bar{w}} w_v h(w_v) dw_v. \tag{3}$$

When the two regions separate and form independent nations, there are inevitable efficiency losses. The simplest way to see this is to observe that any allocation that is achieved under separation can be replicated in the unified nation by introducing the same degree of decentralization as under separation. However, some allocations that are achieved under unification may not be available under separation.

We assume that these efficiency losses take the following form: under separation, an individual with income w_v gets αw_v with $\alpha \leq 1$. In other words, no income group gets pretax income gains from separation, so that no income group has an incentive to separate in order to raise its pretax income.[3] One way of interpreting this assumption is that a reduction in trade across regions after separation leads to an increase in production costs and consumer prices which hurts all income groups in proportion to their income under unification.

Agents' preferences in this economy are over both private consumption c_v and consumption of publicly provided private goods g. We make the extreme simplifying assumption that the substitutability between private and publicly provided private goods is perfect. Given this assumption, an individual's utility function takes the following form:

$$U(c_v, g) = U(c_v + g) = c_v + g. \tag{4}$$

The publicly provided private good g can be seen as a lump sum transfer. The purpose of taxation is then pure redistribution.

To keep the model tractable, we assume that the publicly provided private good is financed with a linear income tax.[4] In other

3. We thus exclude from our analysis motives for separation based, for example, on the appropriation of monopoly rents.

4. As is well-known, some restrictions on the set of feasible income tax schedules must be introduced to avoid Condorcet cycles. The restriction to linear income tax schedules, however, is stronger than necessary to rule out Condorcet cycles (see Roberts [1977] and Roëll [1996]). The main advantage of this restriction is that it introduces important simplifications in the voters' objective function and it guarantees that the median voter theorem applies. It is worth pointing out that if we were to allow for nonlinear tax schedules as in Roëll, then the nature of the political conflict would change and become one between the middle classes (including the median voter) and the extremes, the middle classes attempting to redistribute the resources mostly to themselves. The natural constituencies in favor of separation would then be the poor and the rich.

words, there is a unique tax rate t on individual income. Per capita expenditure on the publicly provided private good is thus financed with a per capita tax of $t.y$. Given that (income) taxation usually involves deadweight losses, we assume that there is a "cost of public funds" given by $(t^2/2)y$. With these assumptions, private and public consumption are

$$c_v = (1 - t)w_v; g = (t - t^2/2)y. \tag{5}$$

The most preferred income tax rate for an individual with income w_v in the unified nation is given by the rate which maximizes that individual's total after tax consumption:

$$t^*(w_v) = (y - w_v)/y. \tag{6}$$

Individual preferences over tax rates and redistributive policies are clearly single-peaked here, so that the equilibrium tax rate under majority voting is the median voter's preferred tax rate. Under this equilibrium tax, the median voter's utility is given by

$$U_m = w_m + \frac{1}{2}\frac{(y - w_m)^2}{y}. \tag{7}$$

Any other agent with income w_v has the following utility under the median voter's most preferred tax rate:

$$U(w_v) = w_v + \frac{1}{2}\frac{(y - w_m)}{y}[(y - w_v) + (w_m - w_v)]. \tag{8}$$

The indirect utility functions specified in equations (7) and (8) are useful in computing the utility gain or loss of individual agents under separation, as we shall see in the next section.

III. The Politics of Separation

In this section we determine under what circumstances a majority of voters in a region favors separation. We assume here and in Section IV that there is no factor mobility across regions.

We suppose that separation occurs when a majority of voters is in favor of separation in at least one region. This assumption seems reasonable when the central government is too weak to prevent a secession through military means. It is also the relevant assumption when one considers the symmetric case of political integration that takes place only if it is favored by a majority in each initial nation.

We begin our analysis by asking the following question: assuming that the tax rate in the unified nation is $t = t^*(w_m)$ (the preferred tax rate of the unified nation's median voter), when will a majority in region i prefer to be independent and set its own fiscal policy?

Under unification, an agent with income w_v gets a payoff $U(w_v)$, as defined in equation (8). Under separation, she ends up in region $i = A, B$, where the equilibrium tax rate t_i prevails and obtains a payoff:

$$U_i(w_v) = \alpha\left[w_v + \tfrac{1}{2}t_i[(y_i - w_v) + (w_m - w_v)]\right]. \tag{9}$$

It is straightforward to verify that $U_i(w_v) - U(w_v)$ is either always increasing or always decreasing in w_v. When it is increasing, all agents in region i with income w_v above the median income in that region w_{mi} are in favor of separation whenever the latter prefers separation, and all agents with income below the median income are in favor of unification whenever the median income agent is in favor of unification. When the difference in utilities is decreasing in income, the reverse is true. Thus, to see when separation arises in equilibrium, it suffices to determine when the median (income) voter in at least one region prefers the outcome under separation to that under unification. Now, under separation the equilibrium tax rate in region i, t_i, is that most favored by the median voter in that region, $t_i^* = (y_i - w_{mi})/y_i$. With this tax rate the median voter in region i gets the following payoff under separation:

$$U_i(w_{mi}) = \alpha\left[w_{mi} + \frac{1}{2}\frac{(y_i - w_{mi})^2}{y_i}\right]. \tag{10}$$

On the other hand, his payoff under unification is given by

$$U(w_{mi}) = w_{mi} + \frac{1}{2}\frac{(y - w_m)}{y}[(y - w_{mi}) + (w_m - w_i)]. \tag{11}$$

Thus, the median voter in region i prefers separation to unification whenever $\Delta = U_i(w_{mi}) - U(w_{mi}) > 0$. Substituting for $U_i(w_{mi})$ and $U(w_{mi})$, separation arises whenever

$$\Delta = \frac{1}{2}\frac{(w_m - w_{mi})^2}{y} + \frac{1}{2}\left[\left(\alpha y_i - \frac{w_{mi}^2}{y}\right) - \left(y - \frac{\alpha w_{mi}^2}{y_i}\right)\right] > 0. \tag{12}$$

Inspection of equation (12) reveals that there are three important effects determining a region's choice of separation.

(i) A *political effect* corresponding to the first term in the equation reflecting the difference in preferences over fiscal policy between the median voter in region i and the median voter in the unified nation.

(ii) An *efficiency effect* that is partially reflected in the second term of the equation; it is easy to see from this term that a reduction in α has a negative impact on Δ. In other words, the bigger the efficiency loss from separation, the lower the benefits from separation to the median voter in region i.

(iii) A *tax base effect* that is reflected in the difference between y_i and y. When $y_i < y$, there is an additional cost of separation for region i that is due to the smaller tax base following separation. Vice versa, when $y_i > y$, there is tax benefit from separation since then richer region i no longer provides a tax transfer to the poorer region.

To see the pure political effect at work, assume that there are no efficiency losses from separation ($\alpha = 1$) and that both regions have the same income per capita. In this special case one immediately obtains the following simple but striking result.

PROPOSITION 1. If $y_A = y_B = y$ and $\alpha = 1$, then $\Delta > 0 \Leftrightarrow |w_m - w_{mi}| > 0$, and separation arises whenever the income distributions in the two regions are such that the median incomes differ.

Proposition 1 is striking because it implies that in the absence of any efficiency losses, separation would (almost) always occur in a democracy *even* when there are no net tax transfers between the two regions. Moreover, a majority in *each* region is in favor of separation. The reason is that each region would prefer a tax policy closer to the most preferred policy of the median voter in its region. In the more inegalitarian region, the majority of poor are in favor of separation in order to obtain more redistribution, whereas in the more egalitarian region, the majority of rich want to separate to pay less taxes. Thus, Proposition 1 can be seen as a simple illustration of the well-known notion of *government closer to the people.*

Assume now that $\alpha < 1$, but maintain the assumption that $y_A = y_B = y$. It is, then, easy to see that the gain from separation is moderated by the efficiency loss given by the second term in equation (12), which under our new assumptions becomes $(\alpha - 1)$

$(1 + w_{mi}^2/y^2)y < 0$. A comparison of the two terms in equation (12) then reveals the obvious but important implication that the bigger the differences in income distribution across regions, the higher the tolerance for efficiency losses from separation. Also, our analysis suggests that it is quite possible that a majority in at least one region may gain from separation despite an overall efficiency loss to the nation and, more importantly, to each separating region.

An obvious example of separation consistent with our analysis is the case of a rich region that wants to separate to stop paying transfers to a poor region. Tax transfers from region to region seem to be an important motive for separation in practice; thus, social security transfers are an important reason why, in Belgium, Flanders may want to separate from Wallonia. Similarly, large positive net tax transfers have often been invoked by Punjabi separatists as an important benefit of separation. A less obvious example that emerges from our analysis is that of a *poorer* region wanting to separate to obtain a higher level of redistribution, despite a smaller tax base. Our analysis also highlights that smaller efficiency losses from separation, in a world where free trade can be enforced credibly across countries, will increase the incentives for separation. Thus, a country like Belgium is more likely to break up when it is an integral part of a single European market since the economic cost of separation of Flanders and Wallonia is likely to be smaller than in the absence of participation in the European single market.

IV. Fiscal Policy under the Threat of Secession

Our analysis in Section III has overstated the incentives toward separation to the extent that it has not allowed for changes in tax policy in the unified nation to forestall separation. In this section we do allow for such changes and ask (a) how the equilibrium tax rate in the unified nation changes in response to a threat of secession, and (b) whether separation occurs despite possible accommodating changes in tax policy.

To address these questions, we consider a two-stage game. In the first stage of the game, the unified nation votes over a tax rate t. In the second stage, the regions choose whether to separate or not, taking t as given. If they choose separation, they get to choose the tax rate in their respective regions. There may be two types of (subgame perfect) equilibria: one where unification is the final outcome and the other where separation occurs. The main question we are concerned with here is for what parameter constellations there exists no accommodating tax rate that prevents separation.

A necessary condition for nonseparation is that a majority of voters in each region prefers unification with tax rate t over separation. In other words, the following nonseparation constraint (NSC) must hold for a majority of voters:

$$\text{(13)}\qquad \text{(NSC)}(1-t)w_v + \left(t - \frac{t^2}{2}\right)y \geq \alpha\left[w_v + \frac{1}{2}\left(\frac{y_i - w_{mi}}{y_i}\right)(y_i - 2w_v - w_{mi})\right].$$

This condition is satisfied for a majority as long as it holds for the median voter in region i. Indeed, the gain from separation for any given individual in region i is either monotonically increasing or decreasing in individual income for any given tax rate $t \in [0, 1]$.[5] Therefore, the (NSC) of the median income in region i is pivotal in determining separation and the necessary condition for nonseparation reduces to

$$\text{(14)}\qquad (1-t)w_{mi} + \left(t - \frac{t^2}{2}\right)y \geq \alpha\left[w_{mi} + \frac{1}{2}\frac{(y_i - w_{mi})^2}{y_i}\right] \qquad i = A,B.$$

It turns out that condition (14) is also sufficient for unification to obtain under an accommodating tax t. Indeed, any tax rate that does not satisfy this condition will be defeated against t by a majority of voters in the first stage. All those voters in favor of unification at tax rate t will anticipate that a tax rate which does not satisfy (NSC) will lead to separation and, therefore, will vote against it. In sum, when (14) holds for some t, then only unification can obtain in equilibrium, and only tax rates that satisfy condition (14) can be candidate equilibrium tax rates. Given that unification obtains, the usual logic leads to the result that the equilibrium tax rate will be the most preferred tax rate of the median voter under unification subject to (NSC) being satisfied.

It is easy to see that in some cases there does not exist a t satisfying (14). This would be the case, for example, if the maxi-

5. If $(1 - t) > \alpha(1 - t_i)$, where t_i is the equilibrium tax rate under separation in region i, then the gain from separation decreases with income and if $(1 - t) \leq \alpha(1 - t_i)$, it increases (weakly) with income.

mum payoff under unification for either median voter A and B was less than the payoff under separation. A maximum payoff under unification is achieved with a tax rate $(y - w_{mA})/y$ for w_{mA} and with a tax rate $(y - w_{mB})/y$ for w_{mB} separation then occurs if

$$\text{(15a)} \qquad w_{mA} + \frac{1}{2}\frac{(y - w_{mA})^2}{y} \leq \alpha\left[w_{mA} + \frac{1}{2}\frac{(y_A - w_{mA})^2}{y_A}\right];$$

$$\text{(15b)} \qquad w_{mB} + \frac{1}{2}\frac{(y - w_{mB})^2}{y} \leq \alpha\left[w_{mB} + \frac{1}{2}\frac{(y_B - w_{mB})^2}{y_B}\right].$$

Suppose now that separation involves no inefficiencies ($\alpha = 1$) and that per capita income is the same in both regions ($y_A = y_B = y$), then, for unification to obtain, inequalities (15a) and (15b) must be reversed. But this would require that $t = (y - w_{mA})/y = (y - w_{mB})/y$, which is impossible as soon as $w_{mA} \neq w_{mB}$. Separation may thus occur in equilibrium even if one allows for preemptive accommodating taxation in the unified nation. The basic point here is that an accommodating tax for region B may not be one for region A. The main conclusions of Section III thus remain broadly valid even when one allows for accommodating taxes.

Next, to determine when separation occurs in equilibrium and how accommodating taxes are set when it does not arise, consider the following case. Suppose that region A is richer than region B ($y_A > y_B$) and that the income distributions in the regions are such that $w_{mA}/y_A > w_m/y > w_{mB}/y_B$. This implies that $t_A < t^* < t_B$. The median voter in the union is willing to make tax concessions only if the rich in region A and the poor in region B are most in favor of separation. One verifies easily that this will be the case in region B if $t_A < t_B$, and in region A if $t > \alpha t_A + (1 - \alpha)$.[6] The analysis of the game can be carried out straightforwardly by considering Figure I.

The different tax policies are plotted on the horizontal axis, and the payoffs under unification to the respective median voters ($(1 - t)w_{mi} + (t - t^2/2)y$) are plotted on the vertical axis. Note that for a tax policy of $t = 1$, all median voters obtain the same payoff under unification. On the other hand, for $t = 0$, the ranking of payoffs reflects the assumed ranking of incomes, $w_{mA} > w_m > w_{mB}$.

6. For $t < \alpha t_A + (1 - \alpha)$, one verifies that the poor in region A are the most in favor of separation. If the country's median voter lives in region A, he will belong to the poor of that region and will not be ready to make tax concessions to prevent separation.

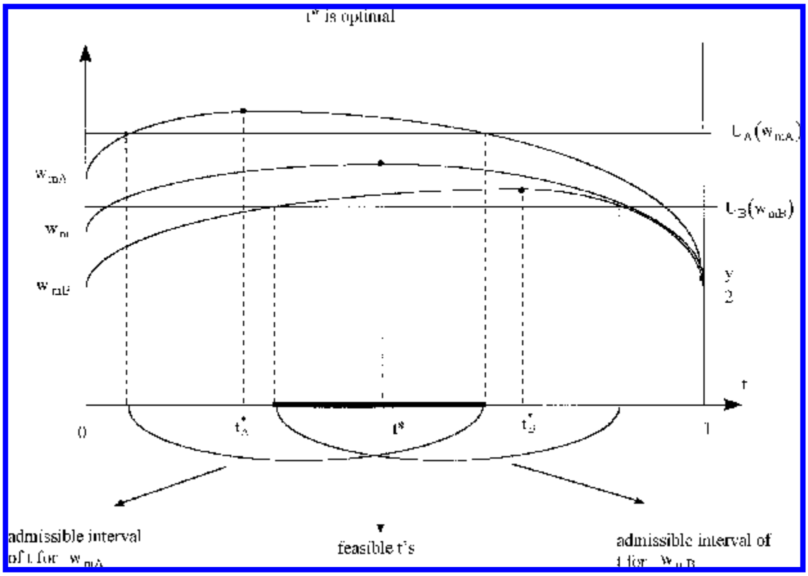

FIGURE Ia

Finally, the curves joining the end points on the two vertical axes represent the payoff functions of the three median voters under unification. The preferred tax rates of the three median voters under unification are, respectively, t_A^*, t^*, and t_B^*. The lines $U_A(w_{mA})$ and $U_B(w_{mB})$ represent the payoffs under separation to, respectively, the median voter in region A and region B. Figure Ia depicts a situation where t^* can be set without either median voter in regions A or B preferring separation over unification. Such an outcome would obtain when the inefficiencies of separation are large.

A reduction in the inefficiencies of separation (an increase in α) would induce an upward shift in $U_A(w_{mA})$ and $U_B(w_{mB})$ with the effect that unification may no longer be sustainable without a preemptive accommodating tax change. We define by $t_A^{\max}$ and $t_B^{\min}$, respectively, the highest (lowest) tax rates at which the median voter in region A (in region B) is indifferent between separation and union. It is then straightforward to establish the next proposition given our assumptions on income distribution in A and B.

PROPOSITION 2. For low values of α, unification obtains with no tax accommodation ($t = t^*$). For intermediate values of α unification may obtain only under tax accommodation; the equilibrium tax rate in the union is then either $t_A^{\max}$ or $t_B^{\min}$, with the relevant tax rate being $t_A^{\max}$ when $t^* > t_A^{\max} > t_B^{\min}$; and $t_B^{\min}$, when $t^* < t_B^{\min} < t_A^{\max}$. Separation occurs for intermediate values of α, when $t_B^{\min} > t_A^{\max}$. Finally, for high values of α (close to one) separation always occurs.

Proof. Obvious from the discussion and from Figures Ia and Ib.

Figure Ib illustrates the case where separation is inevitable. Similarly, we can illustrate the cases where $t_A^{\max}$ and $t_B^{\min}$ obtain.

Several conclusions may thus be drawn from our analysis. The most important is that contradictory pressures for tax accommodation may make separation inevitable. If we take the case of Belgium, less redistributive policies may prevent the more right-wing Flanders from separation, but these may induce a revival of separatism in the more left-wing Wallonia. This model also fits quite well to the Czechoslovak example where no compromise on policy could be found between the more right-wing Czech majority and the more left-wing Slovak majority. Another conclusion is that the threat of separation does not necessarily always lead to lower accommodating taxes, contrary to the analysis in Buchanan and Faith [1987]. In the early sixties the then strong left-wing in the nationalist movement in Wallonia threatened separa-

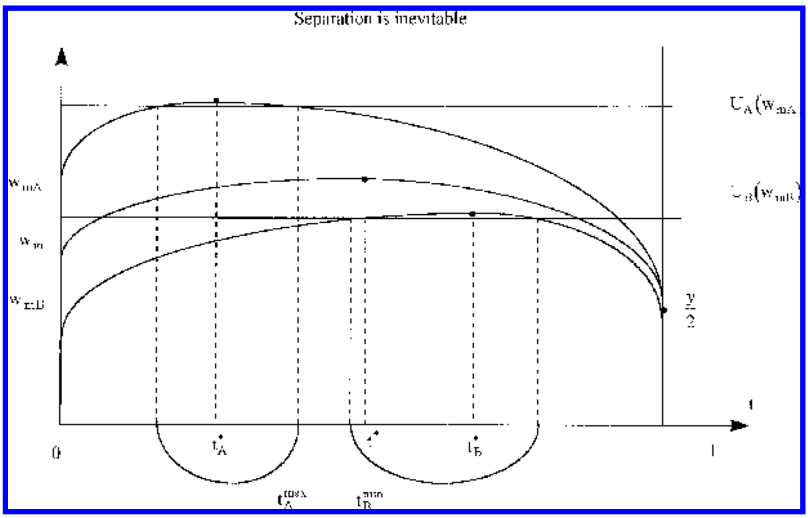

FIGURE Ib

tion unless *more* redistributive policies were put in place in Belgium. Similarly, higher rather than lower accommodating taxes may be necessary in some cases to fight separation—Scotland or perhaps even Québec being possible cases in point.

Finally, our analysis sheds light on one potential role of opt-out clauses in the European integration process. If one adds a stage 0 to our two-stage game, in which the independent countries A and B can vote on unification, then our analysis can account for outcomes in which unification takes place (each country has a majority in favor of unification in stage 0) only if each country has the right to separate again at any time as long as a majority of voters in the country are in favor (the so-called opt-out clause). The opt-out clause would actually never be exercised. Its only role is to constrain fiscal policy in the union (in our model, equilibrium taxes in the union could be either $t_A^{\max}$ or $t_B^{\min}$ under the opt-out clause, but would always be t^* with no opt-out clause). By facilitating exit from the union, it may be easier to achieve unification in the first place.

We have focused our analysis in this section on the case in which the constituencies supporting separation are the rich in region A and the poor in region B. There are other relevant cases, where the constituencies in favor of separation are the poor in region A and the rich in region$B$, or where the poor or the rich in both regions favor separation. We leave the analysis of these cases to the interested reader.

To close this section, we report another type of comparative statics exercise. Instead of varying the inefficiency from separation holding the income distributions in each region fixed, we vary the income distributions, holding the inefficiency loss from separation fixed. Specifically, we consider the effect of an increase in the cross-regional differences in income inequality, as measured by w_{mA}/y_A and w_{mB}/y_B, keeping per capita income fixed. The overall effect of this is to make separation more likely as the following proposition indicates.[7]

PROPOSITION 3. An increase in the difference in income inequality across regions, holding per capita income fixed, reduces $t_{\max}^A$ and increases $t_{\min}^B$ for any given efficiency loss from separation as long as $t > \alpha t_A + (1 - \alpha)$.

7. There are of course other changes in income inequality that leave median/average income ratios unchanged.

Proof. An increase in the differences in income inequality across regions, keeping per capita income fixed, entails an increase in w_{mA} or a decrease in w_{mB} or both. The effect on $t_B^{\min}$ and $t_A^{\max}$ is not obvious a priori. Indeed, an increase in w_{mA} increases separation utility $U_A(w_{mA})$ but also increases $U(w_{mA})$ for any given t and vice versa for w_{mB}. Define

$$\begin{aligned}\phi(w_{mi},t) &\equiv U(w_{mA}) - U_A(w_{mA})\\ &\equiv (1-t)w_{mi} + \left(t - \frac{t^2}{2}\right)y - \alpha\left[w_{mi} + \frac{1}{2}\frac{(y_i - w_{mi})^2}{y_i}\right].\end{aligned}$$

$t_B^{\min}$ is then the solution to $\phi(w_{mB},t) = 0$. Differentiating, $d\phi = 0$ yields

$$\frac{dt_B^{\min}}{dw_{mB}} = \frac{\partial\phi(w_{mB},t_B^{\min})/\partial w_{mB}}{\partial\phi(w_{mB},t_B^{\min})/\partial t} > 0,$$

since $\partial\phi/\partial t(w_{mB},t_B^{\min}) > 0$ at $t_B^{\min}$ and

$$\frac{\partial\phi(w_{mB},t_B^{\min})}{\partial w_{mB}} = 1 - t_B^{\min} - \alpha\frac{w_{mB}}{y_B} = 1 - t_B^{\min} - \alpha(1 - t_B) > 0$$

given that $t_B^{\min} < t_B$.

Similarly, one finds that

$$\frac{dt_A^{\max}}{dw_{mA}} = \frac{-\partial\phi(w_{mA},t_A^{\max})/\partial w_{mA}}{\partial\phi(w_{mA},t_A^{\max})/\partial t} < 0,$$

since $\partial\phi/\partial t(w_{mA},t_A^{\max}) < 0$ at $t_A^{\max}$ and

$$\frac{\partial\phi}{\partial w_{mA}} = 1 - t_A^{\max} - \alpha\frac{w_{mA}}{y_A} = 1 - t_A^{\max} - \alpha(1 - t_A) < 0,$$

when our assumption in this section that $t > \alpha t_A + (1 - \alpha)$ holds.

QED

V. Independence or a Federal Constitution?

The analysis so far assumes that factors of production are immobile. In this section we weaken this assumption by allowing for perfect capital mobility in the unified nation while keeping labor immobile and ask how the choice between unification and separation is affected by capital mobility. We also consider a third alternative to unification and independence: autonomy with a federal state.

Given our assumptions on technology and factor markets, perfect capital mobility implies that $r_A = r_B$. Given that $r_i = \beta\, y_i/k_i = \beta k_i^{\beta-1}$, this implies equal capital-output ratios, $k_A = k_B$, equal per capita incomes, $y_A = y_B = y$, and equal wages, $s_A = s_B$ in equilibrium. It is important to note, however, that even though income per capita is now equal across regions, income distributions remain different, and therefore, w_{mA}/y and w_{mB}/y are generally different.

Assuming that as a result of separation capital mobility across borders is reduced or eliminated, the analysis of the two previous sections carries over to the case of capital mobility in the unified nation but little or no capital mobility across separate nations. The main change here is that there is no "tax base" motive for separation, since per capita incomes are now equalized across regions. The only reason why separation may occur is to implement a fiscal policy closer to the preferences of a majority in the region. Also, the only cost of separation is the efficiency loss.

The case of perfect capital mobility (and no labor mobility) allows us to analyze in a nontrivial way a third alternative between unification and independence: autonomy within a federal state. If the efficiency losses from separation can (at least partly) be avoided by acquiring fiscal autonomy within a federal state, then it would seem that autonomy will always be preferred to independence. Indeed, the most important inefficiencies from separation (due to trade barriers, to separate currencies, or to problems of contract enforcement across borders, etc.) are absent within a federal state. Autonomy will then dominate independence if capital is immobile across regions. However, when capital is mobile within a federal state, fiscal autonomy will trigger capital movements across regions and generate fiscal competition among regions. Interesting trade-offs between unification, autonomy, and independence then arise.

In a nutshell, the choice by a majority between autonomy and independence trades off the constraints imposed by fiscal competition under autonomy against the efficiency losses from separation.[8] Concretely, a region that would like to raise taxes and redistribution relative to the levels in the Union would have to choose between incurring a capital flight cost to the other region under autonomy or incurring an efficiency production loss

8. Note that if independence cannot prevent capital mobility across borders, an assumption we investigate in Section VI, then autonomy always dominates independence since fiscal competition will take place under both regimes.

under independence. Thus, if the inefficiency cost under independence is high or the overall stock of capital is low (so that the effects of capital flight are limited enough) or both, then the relevant choice is between autonomy or unification. Vice versa, the relevant options are unification or independence. Finally, if the income distributions of the two regions or per capita income are sufficiently different or both, then unification is always dominated by either independence or autonomy. Which of those two will then prevail depends on the extent of fiscal competition and the costs of separation.

We now investigate with the help of our model under what parameter conditions unification, autonomy, or independence will prevail. To simplify the analysis, we assume that a move from centralization to autonomy involves no efficiency losses at all ($\alpha = 1$), while a move to independence involves the usual efficiency losses. But, under independence each country can set up barriers to the mobility of capital, while in the unified nation capital is always perfectly mobile.

To introduce the option of regional autonomy, we modify the game considered in the previous section. In the first stage there is a national vote on redistribution policy in the union, as before. In a second stage a referendum on autonomy takes place in each region. To make comparisons possible with the results of Section III, we assume that autonomy is adopted if it is favored by a majority of voters in at least one region. Whatever the outcome of this referendum, regions can in a third stage decide whether they want to be fully independent. When autonomy is chosen, each region sets its own tax rate; and when tax rates are fixed, each agent can decide how to allocate his capital across both regions. We shall assume that under autonomy all income from capital is taxed at source only. This tends to be the case in practice even when regional tax systems are based on a residence principle. Hence our assumption.

Consider now equilibrium redistribution policies under a regime of regional autonomy, and let t_{FA} and t_{FB} be the regional tax rates under autonomy. Fiscal competition between regions takes place as a result of our assumption that if an individual in region B exports capital to region A the income from that capital gets taxed in region A.

With perfect capital mobility, no arbitrage in equilibrium requires that the after-tax returns on capital in each region are equal, so that

$$r_A(1 - t_{FA}) = r_B(1 - t_{FB}). \tag{16}$$

Replacing r_A and r_B by the respective marginal products of capital, we have

$$(1 - t_{FA})/k_A^{1-\beta} = (1 - t_{FB})/k_B^{1-\beta}. \tag{17}$$

One immediately sees from equation (17) that a lower tax rate in one region ($t_{FA} < t_{FB}$) implies a higher capital-labor ratio in that region, $k_A > k_B$.

A Nash equilibrium in regional fiscal policies is a pair of tax rates (t_{FA},t_{FB}) such that t_{Fi} is each median voter's best response given the other region's choice of income tax t_{Fj}. Thus, for any given t_{Fj}, region i's choice t_{Fi} is the solution to the following program:

$$\max_{t_i} \left[(1 - t_i)w_{mi} + \left(t_i - t_i^2/2\right)y_i\right] \tag{18}$$

subject to

$$(1 - t_i)/k_i^{1-\beta} = (1 - t_j)/k_j^{1-\beta}.$$

The best response function of region i to t_j is then the solution to the first-order condition:

$$w_{mi} - (1 - t_i)y_i = (1 - t_i)\frac{dw_{mi}}{dt_i} + \left(t_i - \frac{t_i^2}{2}\right)\frac{dy_i}{dt_i}. \tag{19}$$

With no fiscal competition (the case in Section III), the right-hand side of equation (19) is zero. However, in the presence of fiscal competition, any increase in domestic income taxes induces some capital flight, which in turn reduces domestic income. Thus, one should expect the right-hand side of equation (19) to be negative under fiscal competition. Now, we have

$$\frac{dw_{mi}}{dt_i} = \beta(1 - \beta)k_i^{\beta-1}\frac{1}{L_i}[L_{mi} - k_i^{-1}K_{mi}]\frac{dK_i}{dt_i} \tag{20}$$

$$\frac{dy_i}{dt_i} = \beta k_i^{\beta-1}\frac{1}{L_i}\frac{dK_i}{dt_i}, \tag{21}$$

where dK_i/dt_i is strictly negative.[9] Thus, an increase in domestic taxes does indeed have a negative impact on domestic per capita

9. A straightforward calculation using the no arbitrage equation (17) reveals that

$$\frac{dK_i}{dt_i} = \frac{-(K - K_A/L_B)^{1-\beta}}{\left[(1 - t_B)(1 - \beta)(K_A/L_A)^{-\beta}\,1/L_A + (1 - t_A)(1 - \beta)(K - K_A/L_B)^{-\beta}1/L_B\right]} < 0.$$

income. However, the effect on the median voter's pretax income is ambiguous. The reason is that, while the labor income component of the median voter is negatively affected by the capital flight, the capital income component is positively affected because capital flight increases the marginal product of capital and reduces the marginal product of labor. However, if the median income relative capital endowment, K_{mi}/L_{mi}, is smaller than k_i, then both terms on the right-hand side of equation (19) are negative. In reality, the ownership of capital is concentrated primarily in the upper deciles of the income distribution so that typically K_{mi}/L_{mi} is smaller than k_i. We shall henceforth make that assumption.[10]

It is useful to begin the analysis with the special case where the two regions are identical, so that $w_{mA} = w_{mB}$. In that case the equilibrium tax rate under unification t^* is the most preferred tax rate of the median voter in each region. However, under autonomy the unique Nash equilibrium is such that the median voter in each region sets a strictly lower rate than t^*, as the next lemma indicates.

LEMMA 1. Assume that $w_{mA} = w_{mB}$. Then, there exists a unique Nash equilibrium under fiscal competition with $t_{FA} = t_{FB} = t_F < t^*$. Furthermore, $dt_F/dK < 0$, when holding fixed w_{mi}/y_i.

Proof. See the Appendix.

To understand this result, it is easiest to consider Figure IIa.

The best response functions of each region are increasing in the tax rate of the other region, and for any tax rate of the other region the best response is always lower than t^*. The effect of fiscal competition is, thus, to induce each region to set a tax rate below t^* in order to attract capital from the other region. Note also that an increase in total capital K (keeping w_m/y and, thus, t^* fixed) has the effect of increasing fiscal competition and lowering t_F.

If there are no efficiency losses from separation, the two median voters would be indifferent between living in a unified nation or living in an independent country, and since in both cases fiscal competition is avoided, we have

10. If the opposite were true, then it is possible that the median voter could benefit from capital flight, and this would reduce the effects of fiscal competition. We do not analyze this rather unrealistic scenario.

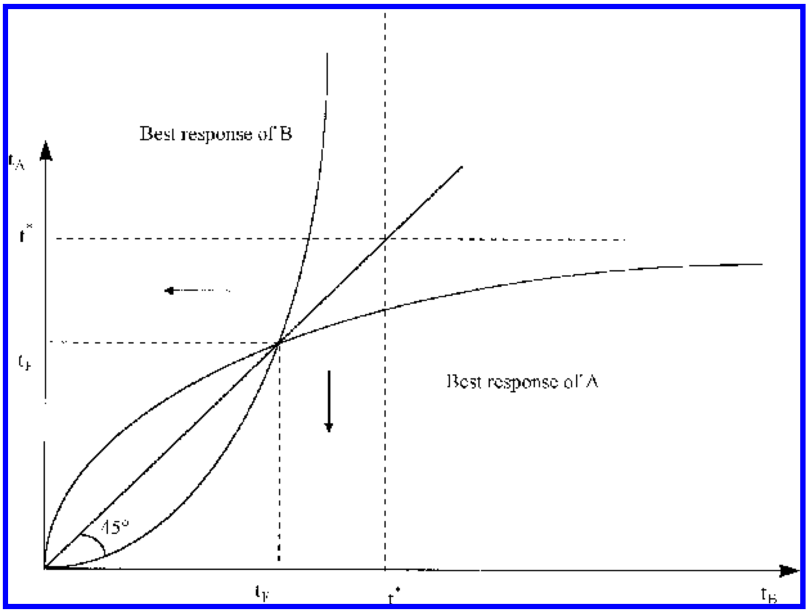

FIGURE IIa

PROPOSITION 4. When $w_{mA} = w_{mB}$ and $\alpha = 1$, unification and separation are strictly preferred to autonomy by both median voters. Moreover, unification is preferred to separation as soon as $\alpha < 1$.

Proof. See the above discussion.

The simple case where the two regions are identical and where there are no efficiency losses under separation provides an immediate illustration of the fact that autonomy may be dominated by unification (and independence) because of the constraining effect of fiscal competition. One drawback of this special case, however, is that it does not establish that independence may be strictly preferred by at least one region over both autonomy or unification.

To establish the latter possibility, we need to consider situations where the income distributions are different across regions. Thus, assume without loss of generality that $w_{mA} > w_{mB}$; in other words, income is less evenly distributed in region B. In that case, fiscal competition between the two regions leads to the following outcome under autonomy.

LEMMA 2. If $w_{mA} > w_{mB}$, then under autonomy the unique Nash equilibrium in taxes is such that $t_{FA} < t_{FB} < t_B^*$, and the per capita capital stock is higher in region A than in region B. In addition, when the capital stock in the nation is increased, holding w_{mi}/y constant, the equilibrium tax rates are reduced: $dt_{Fi}/dK < 0$.

Proof. See the Appendix.

Note that fiscal competition always hurts the higher tax region (region B here), since it induces a capital flight and a reduction in its tax base. As a result, region B is most likely to choose separation over autonomy to prevent such a capital flight. Notice also that the fiscal competition constraint is tighter the greater the capital stock K in the nation. One may thus conjecture that for a sufficiently high capital stock K and a sufficiently low efficiency loss from separation (α close to 1), situations may arise where full independence is preferred to unification and also to autonomy by at least one median voter. The next proposition confirms this intuition and gives the preferred regime of region B (the region with more inequality)[11] for any combination of K and α.

PROPOSITION 5. For any $|w_{mA} - w_{mB}| > 0$, there exists $\tilde{\alpha} < 1$, such that
(i) $\forall \alpha \geq \tilde{\alpha}$, unification is always dominated (despite accommodating taxes), and independence is preferred to autonomy in at least one region, when the capital stock in the nation is large: $K \geq K(\alpha)$ (where $K(\alpha)$ denotes the capital level at which region B is indifferent between autonomy and independence).
(ii) $\forall \alpha < \tilde{\alpha}$, independence is always dominated, and unification is preferred to autonomy in both regions for all $K > \overline{K}$ (where $\overline{K}$ denotes the capital level at which region B is indifferent between unification and autonomy).

Proof. See the Appendix.

Thus, independence is likely to occur (whenever there are differences in income distribution between regions) when the

11. Since the region with more inequality is the one suffering most from fiscal competition, it is that region which has the greatest incentives to choose full separation over autonomy or full integration. Thus, it is that region's choice which will determine the final outcome.

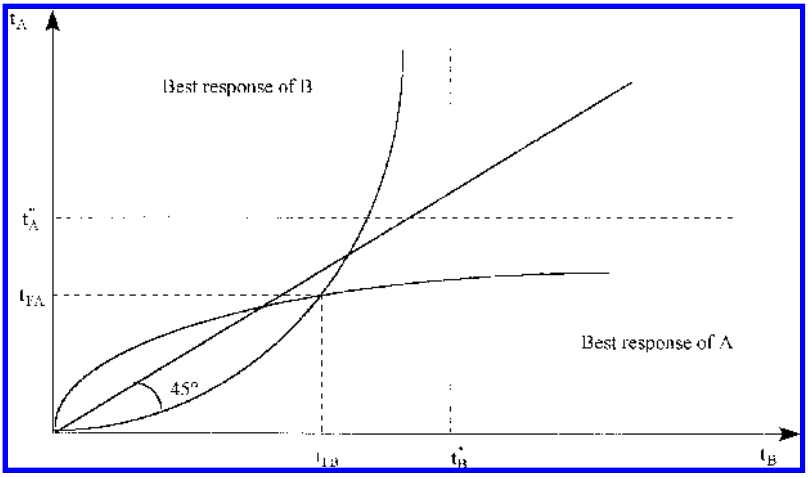

FIGURE IIb

level of capital is high and when the efficiency losses from separation are low. Indeed, when the efficiency loss is small, the relative benefits of autonomy over independence are small, and when the capital stock is high, the damaging effects of fiscal competition under autonomy are high. The results of Proposition 5 can be conveniently summarized in Figure III.

This figure illustrates that for low efficiency losses there are only two possible equilibrium regimes: independence and autonomy. The latter dominates the former if the effects of fiscal competition are mild. This case corresponds to the (A) triangle in the southeast region of Figure III. When the negative effects of fiscal competition (with high K) become larger, independence (I) dominates. Similarly, when the efficiency losses are high, independence is always avoided. Unification (U) will then be preferred to autonomy if fiscal competition is too important.

To summarize, the trade-off between independence and unification remains the same as analyzed previously. However, both can be dominated by autonomy within a federal state provided that the inefficiencies of fiscal competition are not too large compared with the preferred alternative.

To conclude this section, we ask what would be the outcome if the initial situation was independence and a vote in both regions took place on integration into a federal state (autonomy). This question may shed some light on the process of European

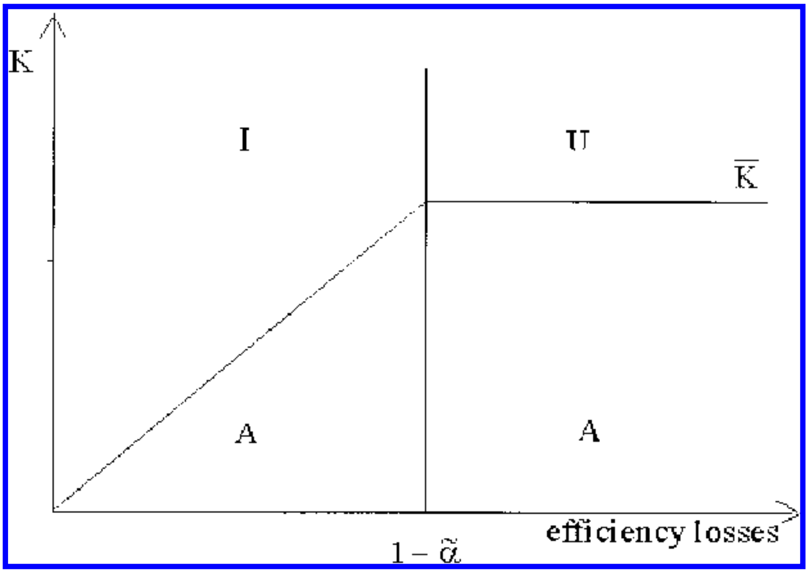

FIGURE III

political integration. The answer is relatively straightforward. As above, it suffices to consider region B's choice between separation and autonomy. We know from Proposition 5 that autonomy will be rejected for all $K > K(\alpha)$ and accepted otherwise (for $\alpha \geq \tilde{\alpha}$). Now, if full integration is not an option, then the set U in Figure III is partitioned into two subsets, I and A, with the subset I including all K above $K(\alpha)$ and the subset A including all K below $K(\alpha)$. From this modified figure we infer that a gradual move toward full unification, with a first phase where countries are asked to choose between autonomy and separation, and a later stage where further moves toward unification might be contemplated is not necessarily more likely to succeed than a rapid movement toward full unification, where countries are asked to choose immediately between independence and full unification. Indeed, when fiscal competition is severe, the inefficiencies of independence are not necessarily worse for the median voter than the constraints on fiscal policy under autonomy. In those situations a move toward fiscal unification may actually be politically easier to implement than a move to a federal state. Alternatively, a vote on full political integration with opt-out clauses to autonomy may be preferable to a vote on a move to a federal state only.

VI. Perfect Factor Mobility and the Incentives to Separate

Our analysis in the previous section has allowed for capital mobility but not labor mobility. In reality, capital mobility is generally much greater than labor mobility. Therefore, assuming no labor mobility seems a good working hypothesis. Nevertheless, the reader may wonder what happens when both capital and labor are mobile.

In this section we show that under perfect mobility of capital and labor any attempt at separation (or autonomy) in order to impose another fiscal policy is self-defeating. Any difference in fiscal policy between regions induces movements in capital and labor which eventually lead to a harmonization of fiscal policies.

So suppose that both capital and labor are perfectly mobile. If an individual moves with his labor endowments from region A to B, he will pay the tax rate of region B and receive the government transfers of the residents in region B. And, as before, an individual moving his capital to another region has the income on that capital taxed in this region.

Because of perfect mobility of both factors, there is now an additional equilibrium condition that an individual with labor and capital endowments L_v and K_v in region A must have the same after-tax income as an individual with the same factor endowments in region B. Otherwise, there is a strictly positive gain from moving from one of the regions to the other:

$$(22)\quad \left[(1 - t_B)\left[(1-\beta)y_B L_v + \beta \frac{y_B}{k_B} K_v\right] + \left(t_B - \frac{t_B^2}{2}\right) y_B\right] = \left[(1 - t_A)\left[(1-\beta)y_A L_v + \beta \frac{y_A}{k_A} K_v\right] + \left(t_A - \frac{t_B^2}{2}\right) y_A\right].$$

As before, because of perfect capital mobility, equation (17) must also hold. Combining both equations, we then obtain the following equilibrium condition:

$$(23)\quad (1-\beta)L_v[(1-t_B)y_B - (1-t_A)y_A] = t_A\left(1 - \frac{t_A}{2}\right)y_A - t_B\left(1 - \frac{t_B}{2}\right)y_B .$$

As a consequence of the mobility of both factors, we modify the final stage of our sequential game of the previous section as follows: after the unification, separation, or autonomy decisions have been taken and after the tax rates have been chosen, each individual can choose to locate his factor endowments wherever he wants.

To see how total factor mobility affects final outcomes in this game, consider the situation where the two regions do not set the same tax rate, and assume without loss of generality that $t_A < t_B$. Then, the highest income earners in region B, who are primarily concerned with reducing their tax burden, move to region A. This, in turn, implies that the government's tax revenues in region B are reduced. The resulting reduction in redistribution in that region then induces individuals with lower incomes also to switch, and so on. It is easy to guess now that any equilibrium must have equal tax rates. The next proposition establishes that in any equilibrium of our game not only are tax rates the same, but also income distributions must be such that the (per capita) supply of publicly provided private goods is the same in both regions.

PROPOSITION 6. Under perfect factor mobility any equilibrium under autonomy or independence is such that both regions set the same tax rate and both regions have income distributions such that per capita tax revenues in both regions are the same.

Proof. By contradiction, suppose that an equilibrium exists where, without loss of generality, $t_B > t_A$. In equilibrium all agents locating in region B must weakly prefer to live in region B rather than in region A. Thus, all agents in region B have incomes w_B, such that

$$w_B(t_B - t_A) \leq (t_B - t_B^2/2)y_B - (t_A - t_A^2/2)y_A .$$

Similarly, in region A,

$$w_A(t_B - t_A) \geq (t_B - t_B^2/2)y_B - (t_A - t_A^2/2)y_A .$$

But this, in turn implies that in equilibrium all agents in region A have higher incomes than the richest agent in region B. Now, the poorest agent in region A, with say income w_ρ receives more in public good consumption than what he is taxed:

$$t_A w_\rho < (t_A - t_A^2/2)y_A .$$

Similarly, the richest agent in region B, with say income w_r receives less in public good consumption than what he is taxed:

$$t_B w_r < (t_B - t_B^2/2) y_B .$$

Thus, the richest agent in region B must strictly prefer to switch to region A, where he becomes the poorest agent and receives a positive instead of a negative net transfer. But this contradicts the fact that all agents weakly prefer to be in their region in equilibrium. Thus, there cannot exist an equilibrium with different tax rates.

Now, when both regions set the same taxes, there cannot be an equilibrium where their income distributions differ sufficiently that per capita tax revenues differ in the two regions. Indeed, with different (per capita) tax revenues, one region necessarily supplies more publicly provided private goods per capita. In that case, all agents in the region with a lower supply of public goods would have an incentive to switch to the region with a higher supply of public goods.

QED

COROLLARY. The outcome where both regions are identical in all respects and where both regions set a tax of $t_F < t^*$ is an equilibrium under autonomy or independence.

Proof. We know from Proposition 4 that when both regions are identical there is a unique Nash equilibrium in taxes given by $t_{FA} = t_{FB} = t_F$. Given these tax rates, and given that both regions are identical, they have the same per capita tax revenues. No individual, therefore, has a strict incentive to move his factor endowments.

QED

There may exist other equilibria, under autonomy or independence, where the two regions are not identical in all respects. For example, the regions may have identical populations and identical per capita and median incomes, but their income distributions may still differ. However, note that in all equilibria the two regions must have identical per capita and median incomes; otherwise, either total per capita tax revenues are not the same, or the two median voters are not the same (which is incompatible with the condition that the two tax rates must be identical).

Given that in all equilibria under autonomy or independence the median voters are the same, they necessarily have the same income and preferences over fiscal policy as the median voter in the nation as a whole. Perfect mobility thus leads to an equalization of fiscal policies across regions and removes this primary motive for separation or autonomy. Moreover, under the latter regimes, the equilibrium tax rate will be strictly lower than t^* because of fiscal competition.

Therefore, if a new vote on unification was held following the move to independence or autonomy, both regions would have a majority in favor of unification. One may, thus, conclude that under perfect factor mobility, independence or autonomy of the regions is not a stable outcome. Eventually, migration and capital movements are such that a majority emerges in both regions in favor of unification. In other words, any move to autonomy or independence in order to implement a different redistribution policy is self-defeating. This result stands in contrast with the local public goods literature since Tiebout [1956] and the more recent political economy literature on local jurisdictions where mobility leads to stratification into rich and poor communities (see, e.g., Bewley [1981], Wooders [1989], Epple and Romer [1991], Fernandez and Rogerson [1994], and Bénabou [1996a]). Our model with politics of redistribution sheds light on the homogenizing effects of factor mobility on policy choices and its positive effect on political integration. In Bolton and Roland [1996] we introduce differences in tastes over public good consumption as well as differences in income across agents and show how the homogenization of communities under perfect factor mobility depends on the nature of the public good supplied.

VIII. Conclusion

This paper provides a positive analysis of the breakup of nations. The analysis is confined to a simple framework in which the main conflict of interest between regions is over fiscal and redistribution policies. When the preferences of political majorities across regions differ substantially over the content of these policies, breakup may be inevitable, even if it leads to efficiency losses because of the political benefits of breakup to local majorities. This framework is relevant in cases where conflicts over fiscal and redistributive policies play an important role such as Belgium, Czechoslovakia, Italy, Scotland, and to a certain extent Québec. It is relevant to understand difficulties in the process of European political integration and to understand the breakup of Yugoslavia or the Soviet Union, though here, clearly, other factors have played an important role. Interestingly, in the latter two cases, the prospect of one day joining the European Union after breaking up represented a potential economic benefit, whereas the collapse of central planning in the Soviet Union significantly reduced any economic benefits from staying in the old Soviet Union.

The analysis can be extended in further directions. First, the question of what constitutes a region should be explored further. In this paper the analysis was carried out with two well-defined regions. One can consider more complex situations where a "regional entity" is determined endogenously. Second, the effect of differences in language and culture on incentives to separate should also be explored further. A first attempt in this direction can be found in Bolton and Roland [1994]. Third, one could explore the effect of alternative channels from income distribution to economic policy formation than the one analyzed in this paper (see, e.g., Bénabou [1996b]). Fourth, the modeling of the economic benefits of integration could be done more explicitly with structural models of trade, optimal currency zones, economies of scale of public goods provision, etc.

To conclude, while our analysis helps to explain why fragmentation of existing nations may arise in a world where many of the benefits of economic integration can be obtained without political integration, it also raises the question of how supranational institutions guarantee the provision of public goods such as peace, free trade, monetary stability, and enforcement of private contracts.

APPENDIX

Proof of Lemma 1

A Nash equilibrium in fiscal competition must be a solution of (18) with $t_{FA} = t_{FB}$, since both regions are identical. We omit indexes of regions in what follows. The first-order condition becomes

$$\text{(A1)} \qquad w_m - (1 - t)y = (1 - t)\frac{dw_m}{dt} + \left(t - \frac{t^2}{2}\right)\frac{dy}{dt}.$$

After making the adequate replacements and rearrangements, equation (A1) becomes

$$\text{(A2)} \qquad (1 - t)\left[L_m - \frac{\beta}{2}(L_m - k^{-1}K_m)\right] = (1 - t)^2 - \frac{\beta}{2}\frac{(t - t^2/2)}{1 - \beta}.$$

The left-hand side is a negatively sloped linear function of t, and the right-hand side is a quadratic function of t having two positive roots, one smaller and one larger than one. There is thus a unique root $0 \leq t_F < 1$. As the right-hand side of (A1) is always negative, we must have $t_F < t^*$.

We now show, that, holding w_m/y constant, $dt_F/dk < 0$.

We know from the definition of individual pretax income and from factor prices that $w_m/y = L_m - \beta(L_m - K_m/k)$. Assuming $dK_m = 0$, for w_m/y to remain constant, we must have

$$dL_m = \frac{\beta}{1-\beta} K_m \frac{dk}{k^2}. \tag{A3}$$

Under that condition, an increase in k will increase the intercept of the left-hand side of (A2). The expression for the shift in the intercept, for a varying k and L_m is

$$\left(1 - \frac{\beta}{2}\right) dL_m - \frac{\beta}{2}\frac{dk}{k^2} K_m . \tag{A4}$$

Replacing dL_m by (A3), one sees that (A4) is always strictly positive $\forall \beta$ for $dk > 0$. This shift in the left-hand side of (A2) will decrease t_F. It is then immediate to see that for L constant $dt_F/dk < 0$ implies that $dt_F/dK < 0$.

QED

Proof of Lemma 2

Start from a situation where $w_{mA} = w_{mB}$ and where both regions set the Nash equilibrium tax level t_F; assume an exogenous increase in w_{mA}; and keep the tax rate in region B fixed at t_F. This induces a best response in region A of $t_{FA} < t_F$. Indeed, looking at (A2), an exogenous increase in w_{mA} above w_m produces an upward shift in the intercept $L_m - \beta/2\ (L_m - K_m/k)$ and thus a reduction in t_{FA} below t_F. This direct effect is not offset by the ensuing increase in income per capita caused by the capital inflow. Indeed, even though this increase in income per capita tends to increase t_{FA}, the nonarbitrage equation tells us that a net capital inflow in region A (producing this indirect effect) necessitates in equilibrium a net reduction in the tax rate of region A. The best response of A to any tax rate in region B will thus, because of the exogenous increase in w_{mA}, result in a lower tax rate in region A (including a lower t_A^*). The shift in A's best response function will thus lower t_{FA} and t_{FB}, but t_{FA} will be lower than t_{FB} as the equilibrium will be below the 45 degree line, as can be seen in Figure IIb. Obviously, t_{FB} remains below t_B^*. From the no arbitrage equation, it then follows that in equilibrium the capital stock per capita in region A is greater than in region B.

The last part of Lemma 2 is easily proved by starting from $w_{mA} = w_{mB}$. We know from Lemma 1 that $dt_F/dK < 0$. An exogenous increase in w_{mA} will then, as we just showed, only further decrease t_{FA} and t_{FB} below t_F.

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Proof of Proposition 5

Before proving (i) and (ii), let us proceed by backward induction, and see when independence is chosen, assuming that autonomy has been accepted.

From Lemma 2 we know that $dt_{Fi}/dK < 0$. Thus, for K and α sufficiently large the losses from tax competition under independence outweigh the efficiency loss of independence. The schedule $K(\alpha)$ is given by the solution to the equation $U_{mB}(t_{FB}(K)) = U_{mB}(t_B^*,\alpha)$, where the former is the utility of region B's median voter under autonomy and the latter her utility under independence. Keeping t_B^* fixed, we have

$$\frac{\partial U_{mB}}{\partial t_{FB}}\frac{\partial t_{FB}}{\partial K}dK = \frac{\partial U_{mB}(t_B^*,\alpha)}{\partial \alpha}d\alpha \Rightarrow \frac{dK}{d\alpha} = \frac{\partial U_{mB}/\partial \alpha}{(\partial U_{mB}/\partial t_{FB})\cdot(\partial t_{FB}/\partial K)}.$$

We know from Propositions 1 and 2 that an increase in α increases U_{mB} under independence. Therefore, $\partial U_{mB}/\partial \alpha > 0$. Moreover, from Lemma 2 we know that an increase in K leaving w_{mi}/y_i constant will decrease t_{FB}, thereby decreasing U_{mB}; $\partial U/\partial t_{FB}$ $\partial t_{FB}/\partial K$ is thus negative. Therefore, $dK/d\alpha < 0$. Defining $K(\alpha)$ as the locus making the median voter in region B indifferent between independence and autonomy, it follows that $\forall K \geq K(\alpha)$, independence is preferred to autonomy.

If $K \geq K(\alpha)$, we are thus back to the choice between unification and independence since acceptance of autonomy will always lead to independence. We are thus back to the case of Proposition 2, and $\tilde{\alpha}$ is such that $t_B^{\min} = t_A^{\max}$.

We now ask what happens when $K < K(\alpha)$ and ask first under what conditions it is possible to find a tax rate in the unified country such that a majority in each region defeats a referendum on autonomy. Call $\tilde{t}_{lB}(\tilde{t}_{lA})$ the accommodating tax rate at which the median voter in region B (region A) is indifferent between autonomy and a unified fiscal policy. Because under autonomy, region B suffers both from fiscal competition and capital flight, $\tilde{t}_{lB}$ will be lower than t_{FB}. Under any tax rate greater than $\tilde{t}_{lB}$, more than 50 percent in region B will reject autonomy.

In region A there is a trade-off between the advantages of capital inflows and the inefficiently low tax rate due to fiscal competition. It is easy to see that $\tilde{t}_{lA} > t_{FA}$. For $t \leq t_{FA}$, a referendum on autonomy would yield 100 percent votes since income per capita would increase and the tax rate in the unified country would not be closer to the preferences of a majority. In order to determine $\tilde{t}_{lA}$, it is useful to look at the net gains an individual with income w_v gets from autonomy, when the tax rate in the unified country is t. This is given by the following equation:

$$\text{(A5)} \qquad w_v(t - t_{FA}) - y\left[\left(t - \frac{t^2}{2}\right) - \left(t_{FA} - \frac{t_{FA}^2}{2}\right)\right] + \left(t_{FA} - \frac{t_{FA}^2}{2}\right)Dy_A .$$

The first expression, which is positive for $t > t_{FA}$, gives the economy on tax payments under autonomy. The second expression is negative and gives the loss in transfers from a lower tax rate. The third expression is positive and gives the gain in transfers from the increase in income per capita Dy_A due to capital inflows. It is useful to rearrange this equation in the following way:

$$a(w_v,t_{FA},Dy_A) + (w_v - y)t + y(t^2/2)$$

where

$$\text{(A6)} \qquad a(w_v,t_{FA},Dy_A) = -w_v t_{FA} + y\left(t_{FA} - \frac{t_{FA}^2}{2}\right) + \left(t_{FA} - \frac{t_{FA}^2}{2}\right)Dy_A$$

$$\text{with, for } \frac{\partial a}{\partial w_v} < 0,\ \frac{\partial a}{\partial t_{FA}} > 0 \text{ for } w_y < y(1 - t_{FA})$$

$$\text{and } \frac{2a}{2t_{FA}} < 0 \text{ otherwise, and } \frac{\partial a}{\partial Dy_A} > 0.$$

For $w_v < y$, the income levels we are interested in, the gains from autonomy are a quadratic function of t with intercept $\alpha(w_v, t_{FA}, Dy_A)$, a negative slope for small values of t and a positive slope for higher values of t, and with slope w_v at $t = 1$. There are two positive roots given by

$$\text{(A7)} \qquad t = 1 - \frac{w_v}{y} + \sqrt{\frac{(y - w_v)^2 - 2ya}{y}}.$$

$\tilde{t}_{lA}$ is the biggest of those two roots for $w_v = w_{mA}$. Note that this tax rate is higher than t_A^*, w_{mA}'s preferred tax rate under unification. Below $\tilde{t}_{lA}$, unification is strictly preferred to autonomy by w_{mA}, but when t decreases even more, autonomy is again preferred.

Tax rates below $\tilde{t}_{lA}$ are also thresholds at which agents with income higher than w_{mA} are indifferent between autonomy and unification. At those tax rates, more than 50 percent of voters in region A prefer unification to autonomy.

As long as $\tilde{t}_{lB} < \tilde{t}_{lA}$, there is room for finding a tax rate t making a majority in each region better off than under autonomy. Unification will thus always be preferred to autonomy.

However, when the inefficiencies from fiscal competition are smaller because K is smaller, t_{FA} and t_{FB} increase, and the room to manoeuver becomes smaller. Voters in region B will be less ready to make concessions, and $\tilde{t}_{lB}$ will increase.

Similarly, in region A, t_{FA} will be closer to a majority's preferences and $\tilde{t}_{lA}$ will decrease, as can be seen from looking at (A6), taking into account an increase in $\alpha(w_v,t_{FA},Dy_A)$. $\overline{K}$ is then the level of capital stock at which $\tilde{t}_{lA} = \tilde{t}_{lB}$. That tax rate is the only accommodating tax rate making a majority in each region indifferent between autonomy and unification. Below $\overline{K}$ there is no such accommodation tax rate any more.

To conclude the proof, (i) follows from the fact that below $K(\alpha)$ autonomy is preferred to separation and vice versa above $K(\alpha)$. Above $K(\alpha)$, unification is dominated by separation for $\alpha \geq \tilde{\alpha}$ as seen above. Below $K(\alpha)$, unification cannot be an outcome. Indeed, if a vote over autonomy was rejected, for $\alpha \geq \tilde{\alpha}$, independence would be accepted after such a rejection. We thus have only two possible regimes for $\alpha \geq \tilde{\alpha}$: independence and autonomy. Part (ii) follows from the fact that below $\overline{K}$, autonomy dominates unification and vice versa above K. Independence is always dominated for $\alpha < \tilde{\alpha}$. Indeed, if $\overline{K} < K(\alpha)\ \forall \alpha < \tilde{\alpha}$, then unification is preferred to autonomy whenever independence could dominate autonomy, and unification dominates independence. If $\overline{K} > K(\alpha)$, then above $K(\alpha)$, autonomy would be rejected initially since the latter would lead to independence which is dominated by unification.

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