Economic Integration and Political Disintegration

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In a world of trade restrictions, large countries enjoy economic benefits, because political boundaries determine the size of the market. Under free trade and global markets even relatively small cultural, linguistic or ethnic groups can benefit from forming small, homogeneous political jurisdictions. This paper provides a formal model of the relationship between openness and the equilibrium number and size of countries, and successfully tests two implications of the model. Firstly, the economic benefits of country size are mediated by the degree of openness to trade. Secondly, the history of nation-state creations and secessions is influenced by the trade regime. (*JEL* F02, O57)

> In a regime of Free Trade and free economic intercourse it would be of little consequence that iron lay on one side of a political frontier, and labor, coal, and blast furnaces on the other. But as it is, men have devised ways to impoverish themselves and one another; and prefer collective animosities to individual happiness. John Maynard Keynes, *The Economic Consequences of the Peace,* 1920 p. 99.

The number of countries in the world increased from 74 in 1946 to 192 in 1995. In 1995, 87 countries had less than 5 million inhabitants, 58 less than 2.5 million, and 35 less than 500,000. More than half of the world's countries are smaller (in population) than the State of Massachusetts.[1] In the same half century, the volume of imports plus exports as a share of world GDP, in a sample of 61 countries, has increased by roughly 40 percent.

Figure 1 displays a strong positive correlation, from 1870 to today, between the number of countries in the world and a measure of trade openness, the average ratio of imports plus exports to GDP in a group of nine countries.[2] Similarly, Figure 2 shows an inverse relationship between average tariff rates on manufactured products and the number of countries, in a selected group of countries for which tariff data were available. Tariff rates were slowly increasing between 1870 and the 1920's, while the number of countries was stable or slowly decreasing. After the Second World War tariff rates fell dramatically and the number of countries increased rapidly.[3] Figures 3 and 4 present scatterplots of the detrended number of countries against the detrended trade to GDP ratio,

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[1] In 1990 Massachusetts had a population of 6,016,425. Ninety-eight countries have smaller populations.

[2] These countries are France, Britain, Denmark, Italy, Norway, Portugal, Australia, Brazil, and Sweden—the only countries for which reliable trade data were available continuously since 1870. These countries are representative of trends that affected world trade volumes, however, as the correlation between their average trade to GDP ratio since 1950 and that of a much wider sample of 61 countries since 1950 is 0.93.

[3] These relationships are statistically significant, even when controlling for a time trend. Time-series regression results are available upon request.

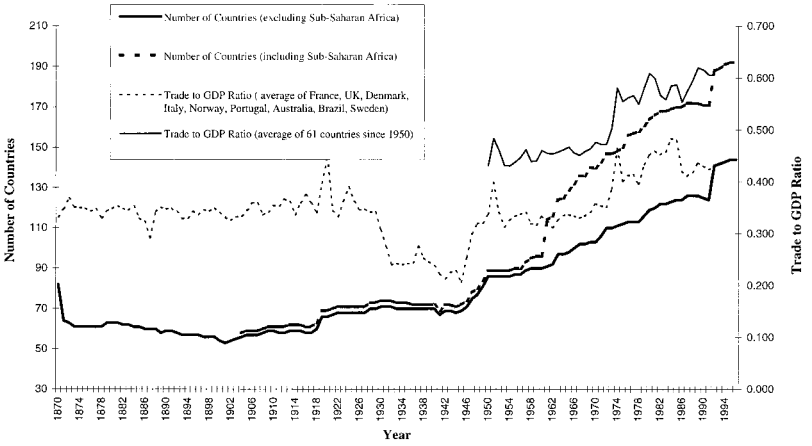

FIGURE 1. TRADE OPENNESS AND THE NUMBER OF COUNTRIES

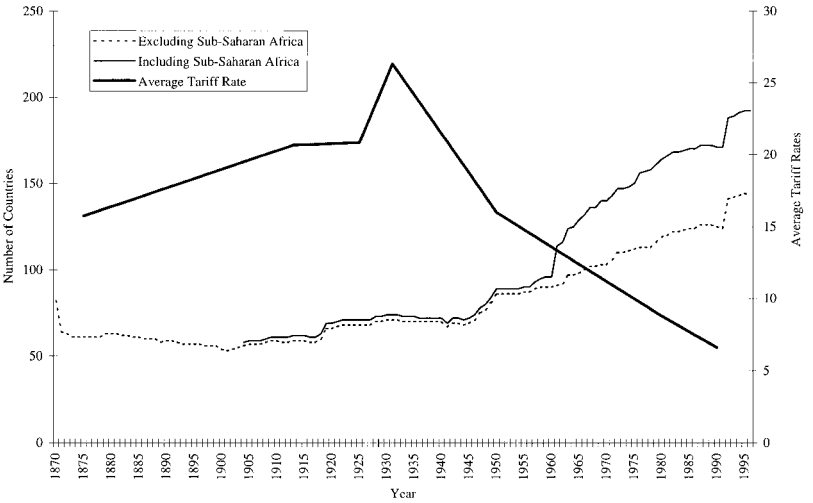

FIGURE 2. AVERAGE TARIFF RATE AND THE NUMBER OF COUNTRIES
(UNWEIGHTED COUNTRY AVERAGE OF AVERAGE TARIFF RATE FOR AUSTRIA, BELGIUM, FRANCE, GERMANY, SWEDEN, UNITED STATES)

showing again a strong positive correlation between the degree of openness of the world trade regime and the number of countries.

This paper argues that trade openness and political separatism go hand in hand: economic integration leads to political "disintegration."

We build upon a simple idea. Consider a model where the size of the market influences productivity. In a world of trade restrictions, the political boundaries of a country influence the size of the country's market, and therefore its productivity level. On the contrary, with free trade the size of countries is irrelevant for the size of markets, so the *size* of a country is unrelated to its productivity.[4] It follows that the equilibrium number of countries and the extent of economic integration are interdependent.

[4] These ideas are discussed informally by historians of nation-building, such as Eric Hobsbawm (1990), are tested by Alberto Ades and Edward Glaeser (1999), and are modeled in a stylized fashion by Spolaore (1995), Kashif S. Mansori (1996), and Alesina and Spolaore (1997). Donald Wittman (1991) also mentions this point.

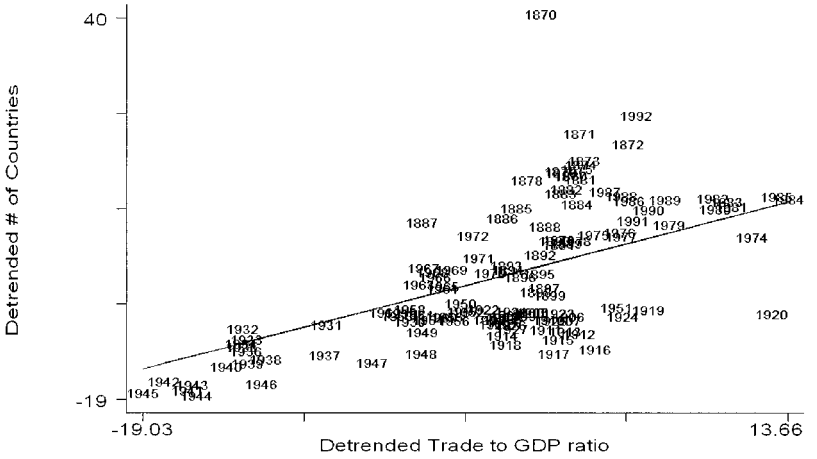

FIGURE 3. SCATTERPLOT OF DETRENDED NUMBER OF COUNTRIES PLOTTED AGAINST DETRENDED TRADE TO GDP RATIO (WITHOUT SUB-SAHARAN AFRICA—1870–1992)

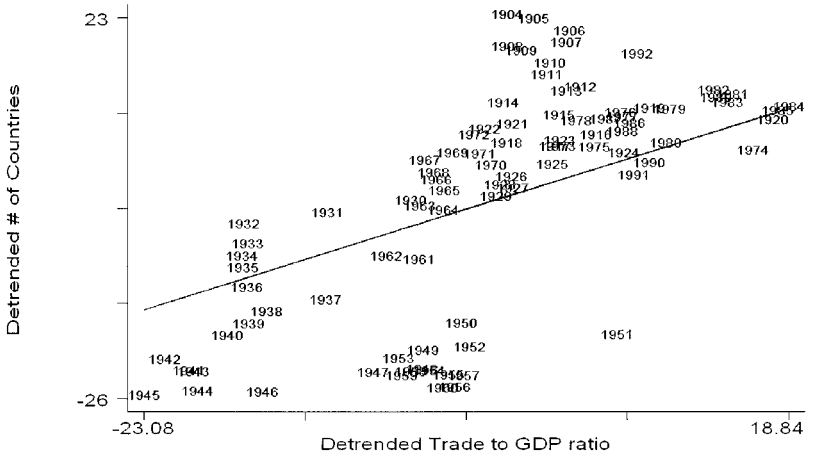

FIGURE 4. SCATTERPLOT OF DETRENDED NUMBER OF COUNTRIES PLOTTED AGAINST DETRENDED TRADE TO GDP RATIO (WITH SUB-SAHARAN AFRICA—1903–1992)

More specifically, this paper pursues two goals: Firstly, we develop an explicit model of geography and trade which endogenously derives the equilibrium number and size of countries as a function of the trade regime. Secondly, we provide empirical evidence for two critical implications of the model: (i) the effect of country size on economic growth is mediated by the degree of openness; (ii) the long-term history of country formation and separation has been influenced by the pattern of trade openness and economic integration and vice versa. In particular, we emphasize a trade-off between the economic benefits of size, which are a function of the trade regime, and the costs of heterogeneity resulting from large and diverse populations.

On the theory side, this paper links the literature on geography and trade with a recent formal literature on country formation and, in particular, a paper by Alesina and Spolaore (1997).[5] It also relates to the analysis of economic integration and preferential trade agreements, but unlike the traditional analysis of trade blocs, we focus on the endogenous forma-

[5] For a recent survey of this literature, see Patrick Bolton et al. (1996).

tion of sovereign jurisdictions.[6] Empirically, our paper is related to the recent literature on the effects of openness on economic growth, such as Jeffrey Sachs and Andrew Warner (1995), Wacziarg (1998), and Ades and Glaeser (1999), and the effects of openness on public policy, such as Alesina and Wacziarg (1998) and Dani Rodrik (1998).

The organization of this paper is as follows: Section I presents the model linking country size to productivity and derives endogenously the equilibrium number of countries as a function, among other things, of the trade regime. Section II provides cross-country evidence on how the interaction between country size and the degree of trade liberalization influences economic growth. The last section concludes by discussing the relationship between country formation and trade regimes in history and in modern times.

I. The Model

A. *Production, Trade, and Growth*

The world is composed of W "economic units" (in short "units"), which are the basic entities carrying out economic activities. These units are not geographically mobile. They can be interpreted as homogeneous regions, themselves composed of one or more identical and geographically immobile individuals. A "country" k is made of S_k units, where $1 \leq S_k \leq W$.

A unique final good, Y, is produced at time t in each unit i, using the following production function:

$$(1) \qquad Y_{it} = A_i \left(\sum_{j=1}^{n} X_{ijt}^{\alpha} \right) L_{it}^{1-\alpha}$$

with $0 < \alpha < 1$. X_{ijt} denotes the amount of intermediate input j used in region i at time t, and L_{it} is unit i's labor at time t, which is supplied inelastically. There is no labor mobility across regions. The markets for the final good and for labor are perfectly competitive.

Each region produces one and only one intermediate input (X_{it} for region i) using an immobile, region-specific stock of capital K_{it}.[7] Each unit of region i's specific capital yields one unit of the intermediate input i.

We assume that $n = W$, which implies that every region can use the intermediate inputs produced by all other regions in order to produce the final good. Intermediate goods are sold in a competitive market within the region. They can also be sold to other regions, in which case costs associated with trade are incurred. We model these costs with the following standard "iceberg" assumption.

Barriers to trade: When Z units of an intermediate good are shipped from region i' to region $i'' \neq i'$, only $q(i', i'')$ arrive, with $0 \leq q(i', i'') \leq 1$.

$q(\cdot)$ is a function of all the obstacles which make interregional trade costly. These obstacles can be geographical, technological, and political. In particular, costs associated with exchange across political borders arise because trade takes place between different political and legal systems.[8] A simple and useful specification of $q(i', i'')$ is the following:

$$(2) \qquad q(i', i'') = (1 - \beta_{i'i''})(1 - \delta_{i'i''})$$

where $0 \leq \beta_{i'i''} \leq 1$ and $0 \leq \delta_{i'i''} \leq 1$. The parameter $\beta_{i'i''}$ measures political trade barriers between i' and i'', while $\delta_{i'i''}$ measures physical barriers.[9]

In order to obtain a closed-form solution for the model, we make the following simplifying assumptions.

ASSUMPTION 1: $A_i = A$; $L_{it} = 1$ *for* $i = 1, 2, \ldots, W$ *at every* t.

ASSUMPTION 2: $\delta_{i'i''} = 0$ *for every* i', i''.

[6] The classical reference is Jacob Viner (1950). More recent contributions to this large literature include Paul Krugman (1991a, b) and the papers in the volumes edited by Jaime de Melo and Arvind Panagariya (1993) and Jacob Frenkel (1997).

[7] As usual, region-specific capital can be interpreted as a broad aggregate which includes human capital.

[8] John McCallum (1995) and John Helliwell (1998) document that, in fact, national borders create barriers to trade that go beyond the existence of explicit, policy-induced trade restrictions.

[9] Some political barriers to trade, such as tariffs, may generate fiscal revenues. We are assuming that these revenues do not influence the levels of consumption and/or production. This would not be the case, for instance, in a model where productive public goods were used in production.

ASSUMPTION 3: *Political barriers are zero for regions belonging to the same country and constant for international trade. More formally:*

$$\beta_{i'i''} = 0$$

if i' and i'' belong to the same country

$$\beta_{i'i''} = \beta \text{ otherwise.}$$

The first two assumptions impose symmetry in the model. Although they considerably simplify the algebra, they should not affect the qualitative nature of our results.[10] Assumption 3 is, in a sense, the definition of a country in our model: unlike exchange within countries, trade across borders entails some costs.[11]

We can now proceed to derive the equilibrium input prices and the levels of international trade at each time t:

Suppose that D_{it} units of input i are used domestically (i.e., either within region i or within another region which belongs to the same country as region i). By contrast, when F_{it} units of input i are shipped to a *foreign* region (i.e., a region that does *not* belong to the same country as region i), only $(1 - \beta)F_{it}$ units will be used for production. In equilibrium, as markets are perfectly competitive, each unit of input i will be sold at a price equal to its marginal product both domestically and internationally. Therefore:

$$P_{it} = A\alpha D_{it}^{\alpha - 1} = A\alpha(1 - \beta)^{\alpha} F_{it}^{\alpha - 1} \quad (3)$$

where P_{it} is the market price of input i at time t.

At each time t, the resource constraint for each input i is:

$$S_i D_{it} + (W - S_i)F_{it} = K_{it} \quad (4)$$

where S_i is the size (i.e., the number of regions) of the country to which region i belongs.[12]

Define:

$$\theta \equiv (1 - \beta)^{\alpha/(1-\alpha)} \quad (5)$$

The parameter θ can be interpreted as a measure of "international openness": the lower are the barriers to international trade, the higher is θ.

Equations (3)–(4) and definition (5) imply that, at each time t:

(i) The amount of intermediate input i that region i ships to any other region belonging to the same country is:

$$D_{it} = \frac{K_{it}}{(1 - \theta)S_i + \theta W}. \quad (6)$$

(ii) The amount of intermediate input i that region i ships to any other region *not* belonging to the same country is:

$$F_{it} = \frac{\theta K_{it}}{(1 - \theta)S_i + \theta W}. \quad (7)$$

A Simple One-Period Example.—Consider the simple case in which, at time 0, each region is endowed with a given amount of capital K_0 (equal across regions for simplicity). Suppose that individuals in each region i only care about their own consumption in period 0 (denoted by C_{i0}), and that countries have all equal size S. In this highly simplified setting, it is easy to show that both income Y and consumption C, in equilibrium, are equal across regions and are given by:

$$Y = C = AK_0^{\alpha}[(1 - \theta)S + \theta W]^{1 - \alpha}. \quad (8)$$

Note that in equation (8) output and consumption are:

(a) increasing in openness θ (for a given country size S);
(b) increasing in country size S (for a given level of openness θ), and
(c) decreasing in size of countries multiplied by openness $S\theta$.

As we will see next, these results generalize to a dynamic model, in which different regions can start with different levels of initial capital, and capital is accumulated over time.

[10] A relaxation of Assumption 2 is examined in a previous version of this paper (Alesina et al., 1997) with no interesting changes in the results.

[11] We are not pursuing here a distinction between a country and a customs union. For results on this point, see Spolaore (1998).

[12] For the moment, we are taking country sizes as given. We will endogenize the number and size of countries in the following subsection.

The Dynamic Case.—We now consider the case in which, while at each time t the level of capital in each region i is given, households can increase the stock of capital by saving. We assume that, in continuous time, the intertemporal utility function in each region i is given by:

$$U_i = \int_0^{\infty} \ln C_{it} e^{-\rho t}\, dt \tag{9}$$

where C_{it} denotes consumption at time t by the representative household living in region i, and $\rho > 0$. We select log-utility for notational simplicity. All of the results generalize to any standard constant relative risk aversion (CRRA) utility function $(C_{it}^{1-\sigma} - 1)/(1 - \sigma)$ with $\sigma > 0$. Household net assets in region i are identical to the stock of region-specific capital K_{it}. Each household will maximize its intertemporal utility given its initial level of capital K_{i0} and the following dynamic constraint:

$$\frac{dK_{it}}{dt} = r_{it}K_{it} + w_{it} - C_{it}. \tag{10}$$

From standard intertemporal optimization:

$$\frac{dC_{it}}{dt}\frac{1}{C_{it}} = (r_{it} - \rho). \tag{11}$$

As each unit of capital yields one unit of intermediate input i, the net return to capital r_{it} is equal to the market price of intermediate input P_{it} (for simplicity, we assume no depreciation). Using equations (3) and (6), we have that:

$$\begin{aligned} r_{it} = P_{it} &= \alpha A D_{it}^{\alpha-1} \\ &= \alpha A[(1-\theta)S_i + \theta W]^{1-\alpha} K_i^{\alpha-1}. \end{aligned} \tag{12}$$

The steady-state level of capital is the same in each region of a country of size S_i,[13] and is given by:

$$K_i^{ss} = \left[\frac{\alpha A}{\rho}\right]^{\alpha/(1-\alpha)} [(1-\theta)S_i + \theta W]. \tag{13}$$

[13] In other words, within each country, all regions will converge to the same level of steady-state capital, independently of their initial level of unit-specific capital.

The steady-state level of output in each unit of a country of size S_i is given by:

$$Y_i^{ss} = A^{1/(1-\alpha)}\left[\frac{\alpha}{\rho}\right]^{\alpha/(1-\alpha)}\left(S_i + \theta \sum_{j \neq i} S_j\right). \tag{14}$$

Therefore, the difference between the steady-state levels of income of two units i and j, belonging to different countries of size S_i and S_j respectively, can be written as:

$$\begin{aligned} Y_i^{ss} - Y_j^{ss} = A^{1/(1-\alpha)}&\left[\frac{\alpha}{\rho}\right]^{\alpha/(1-\alpha)} \\ &\times (1-\theta)(S_i - S_j). \end{aligned} \tag{15}$$

Equation (15) implies that:

(a) When $\theta = 1$ (i.e., $\beta = 0$: complete openness), each region in the world reaches the same steady-state level of output independently of the size of its country: $Y_i^{ss} = Y_j^{ss}$. In this case, country size imposes no constraint on the steady-state level of output within each country.

(b) When $\theta < 1$ (i.e., $\beta > 0$: there exist barriers to international trade, larger countries have greater incomes in steady state. Note that the difference $|Y_i^{ss} - Y_j^{ss}|$ associated with a given difference $|S_i - S_j|$, is decreasing in θ. This means that, at higher levels of openness, country size imposes less of a constraint on income. Equivalently, larger countries experience lower gains from increased openness than smaller countries.

In order to illustrate these results more clearly, we now examine the case of countries of equal size. When all countries have equal size S, the steady-state level of output can be written as:

$$Y^{ss} = A^{1/(1-\alpha)}\left[\frac{\alpha}{\rho}\right]^{\alpha/(1-\alpha)} [(1-\theta)S + \theta W]. \tag{16}$$

As we have assumed away depreciation, output and consumption are equal in steady state: $C^{ss} = Y^{ss}$. In equation (16) the steady-state level of

output is increasing in openness θ (for a given country size S), increasing in country size (for a given level of openness), and decreasing in size of countries multiplied by openness $S\theta$.

Around the steady-state the growth rate of output can be approximated by:

$$\frac{dY}{dt}\frac{1}{Y} = \xi e^{-\xi}(\ln Y^{ss} - \ln Y(0)) \tag{17}$$

where $\xi \equiv \frac{\rho}{2}\left[\left(1 + \frac{4(1-\alpha)}{\alpha}\right)^{1/2} - 1\right]$ and $Y(0)$ is initial income.

Equations (11)–(12) and (16)–(17) immediately imply the following important results.

PROPOSITION 1: *The growth rate of income* (*in the neighborhood of the steady state*) *and the growth rate of consumption are increasing in size S, increasing in trade openness* θ, *and decreasing in size S multiplied by openness* θ.

Furthermore, as we showed above, from equation (15) we derive the following.

PROPOSITION 1′: *The steady-state level of income and the steady-state level of consumption are increasing in size S, increasing in trade openness* θ, *and decreasing in size S multiplied by openness* θ.

These results are explored empirically in Section II.

B. *The Number and Size of Countries*

We now turn to the relationship between trade openness and the equilibrium number and size of countries. Consider the simple one-period example [equation (8)]. In this case, everyone's income and consumption would be maximized if the entire world belonged to the same country, so that $S = W$. Analogously, in the dynamic model, growth and steady-state income would be maximized when $S = W$.[14]

This is an extreme and implausible case, since it ignores the costs associated with the excessive size of countries and the heterogeneity of their populations. Indeed, substantial costs may be involved if the British and Irish, Israeli and Arabs, Turks and Greeks, Tutsi and Hutu were to belong to the same country, with the same governments, laws, and public goods. We model this feature by assuming that each individual bears some *heterogeneity costs* $h(S)$ which are a function of the size of the country:

$$h(S) \geq 0 \tag{18}$$

$$h'(S) > 0 \quad ; \quad h''(S) \geq 0. \tag{19}$$

While it is a priori reasonable to assume that heterogeneity is not decreasing in the size of a country, there are obvious exceptions. Relatively small countries can be very heterogeneous (for example, Rwanda) while larger countries, in terms of population, can be more homogeneous (for example, Japan). Equations (18)–(19) are a rough reduced form for a model capturing the costs of heterogeneity. For instance, Alesina and Spolaore (1997) provide a model where, as in equation (18)–(19), *average heterogeneity* in each country is increasing in size. In that model, a group of heterogeneous individuals forming a country have to agree on a common set of public policies. Individuals are uniformly distributed on an ideological segment, so that the larger the country, the larger the average distance between the common policy adopted and each individual's preferred policy. Equation (19) also assumes that the cost function is weakly convex.

The One-Period Example.—Again, we start with the simple case in which individuals only care about one period, and each region is endowed with K_0 units of capital.

The most general formulation for the utility function, defined over consumption and heterogeneity costs, is $U(C, h)$. Without loss of generality, we assume that the utility function is separable in C and h. In particular, we

[14] Only in the case $\theta = 1$, namely complete openness, would the size of each country be uninfluential. Needless to say, if $S = W$, the trade regime, i.e., the value of θ, is irrelevant.

assume that the utility of an individual living in country i is given by:[15]

$$U(C_i, h(S_i)) = \ln C_i - h(S_i). \tag{20}$$

We focus on the case of equal country sizes. Given the symmetry of the model, and given the results in Alesina and Spolaore (1997), the case of equal sizes is clearly the natural one to focus upon. However, we do not explore the possibility that other equilibria may exist, with countries of different sizes. We begin by considering the optimal number of countries (thus, the size S^*), which maximizes the sum of individual utility, as if S^* were chosen by a worldwide benevolent social planner. This optimal number of countries chosen by the social planner is also the number of countries that would be selected unanimously by referendum, if the world population were asked to vote on the number of equally sized countries in the world.[16]

The equilibrium country size S^*, defined as the size S that maximizes $U(C, h) = \ln C - h(S)$ given (8), is implicitly identified by the first-order condition, as the unique solution to:[17]

$$(1 - \alpha)(1 - \theta)[(1 - \theta)S^* + \theta W]^{-1} = h'(S^*) \tag{21}$$

which implies:

$$\frac{dS^*}{d\theta} = -\frac{(W - S)h'(S) + (1 - \alpha)}{(1 - \theta)h'(S) + (1 - \theta)Sh''(S)} < 0. \tag{22}$$

As the equilibrium number of countries is given by $N^* = W/S^*$, we can state the following.[18]

PROPOSITION 2: *For any (weakly) convex $h(S)$, the equilibrium number of countries is increasing in the degree of openness θ.*

A closed-form solution can be easily obtained in the case of linear heterogeneity costs, namely:

$$h(S) = hS \tag{23}$$

where the parameter h captures the magnitude of heterogeneity costs.

Using equation (23) we obtain:

$$S^* = \frac{1 - \alpha}{h} - \frac{\theta}{1 - \theta} W \tag{24}$$

which clearly illustrate Proposition 2: *for given heterogeneity costs, the number of countries should increase with trade liberalization,* an implication which we explore empirically in Section III.

The Dynamic Case.—A complete study of the equilibrium number and size of countries in a dynamic framework could quickly become intractable, especially as it should involve an explicit modeling of adjustment costs and potentially complex transitional dynamics. However, the analysis remains relatively simple if we focus on the "steady-state" number and size of countries.

Define the equilibrium country size S^{ss} as the size that maximizes everyone's utility in steady state. From the previous subsection, we know that, when all countries have equal size and the economy is in steady state, C^{ss} and Y^{ss} are equal and given by equation (16). Hence, the

[15] Note that in this paper, for simplicity, we assume that heterogeneity costs are identical for everyone regardless of their location within countries.

[16] One can show that under mild, sufficient conditions, the social planner maximizing the sum of individual utilities would *choose* to create countries of equal size. The treatment of voting, however, with the assumption of equal country sizes, raises difficult technical problems, as discussed in Alesina and Spolaore (1997).

[17] Clearly, equilibrium size and equilibrium number of nations are positive integers. For simplicity, we will abstract from those integer constraints.

[18] Note that this proposition holds for any $U = u(C) - h(S)$, where $u'(C) > 0$, $u''(C) < 0$, $h'(S) > 0$, $h'' \geq 0$. By using $Y(S, \theta) = AK^{\alpha}[(1 - \theta)S + W]^{\alpha}$ it is easy to verify that

$$\frac{dS^*}{d\theta} = -\frac{u''\left(\frac{\partial Y}{\partial S}\right)^2 + u'\frac{\partial^2 Y}{\partial S^2} - h''}{u''\frac{\partial Y}{\partial S}\frac{\partial Y}{\partial \theta} + u'\frac{\partial Y}{\partial S \partial \theta}} < 0.$$

equilibrium size S^{ss} is implicitly defined by the following first-order condition:

$$(25) \quad (1-\theta)[(1-\theta)S^{ss}+\theta W]^{-1} = h'(S^{ss})$$

which implies that higher openness is associated with smaller countries in steady state.[19] That is, Proposition 2 extends to this dynamic setting.

C. *Unilateral Secessions*

The equilibrium size S^* derived above may or may not be robust to unilateral secessions. The latter can take two forms:

1. A subset of "units" or individuals from one given country forms a new country, keeping the size of all of the other countries and the degree of openness of the world economy as given.
2. A subset of "units" or individuals from two or more different countries separate from their original countries and form a new entity, keeping the size of all of the other countries and the degree of openness constant.

An important point is that the degree of openness is assumed to be given when regions are contemplating secessions. To the extent that "openness" captures the features of the world trade regime as a whole, this assumption is appropriate. The same assumption implies that any new country would adopt the *same* trade regime as the rest of the world, including the trade regime of the country or countries from which it seceded.

Straightforward, although tedious calculations permit to check the conditions under which S^* is secession free.[20] In general, one needs to impose restrictions on the parameters of the model (W, h and θ) in order to guarantee this property of the unanimous equilibrium derived above. These restrictions ensure that S^* is not too large, otherwise unilateral secessions become profitable. In order to ensure the existence of a stable equilibrium, we assume that these restrictions on parameter values hold.[21]

The incentives for unilateral secessions will also depend on whether regions more prone to breaking away are receiving transfers from the remaining regions. The issue of interregional transfers is, however, not our focus here.[22]

D. *Endogeneity of Trade Barriers*

Thus far, we have assumed that the degree of openness θ is exogenous, and taken as given by countries contemplating secessions or mergers. While this is appropriate from the point of view of an individual country, in the aggregate the number and size of countries would influence the choice of a world trade regime. Ceteris paribus, small countries have an incentive to maintain low trade barriers and to advocate an open world trading system. Consider, for instance, an exogenous increase in heterogeneity costs h. This would lead to a reduction in the equilibrium size of countries. In turn, smaller countries would benefit more from trade openness, providing support for a more open trade regime.[23]

However, barriers to trade across countries are not only induced by trade policy. Differences in languages, culture, business practices, legal systems, etc., make trade within a country easier than trade across borders. Therefore, even in a world of no tariffs and no other formal trade restrictions, national borders would still matter. Convincing evidence which is consistent with this point is provided by McCallum (1995) who studies trade flows between Canadian regions, and across the border with the United States. In other words, even leaving aside other reasons

[19] Since: $\frac{dS^{ss}}{d\theta} = -\frac{(W-S)h'(S)+1}{(1-\theta)h'(S)+(1-\theta)Sh''(S)} < 0.$

[20] See the working paper version (Alesina et al., 1997) of this article for precise details on the derivation.

[21] Similarly, Alesina and Spolaore (1997), in a different but related model, show that the optimal number of countries may or may not be self-enforcing and secession free. In the present paper, the set of parameter values for which S^* is secession free is large, and in no way "knife-edged." More details are available upon request.

[22] In order to address this point, one would need a model with heterogeneity amongst regions and individuals. See Alesina and Spolaore (1997) and Bolton and Gerard Roland (1997).

[23] For an analytical treatment of this point, see the working paper version (Alesina et al., 1997) of this article and, also, Spolaore (1995, 1997).

for why excessively small countries would be unfeasible, a "zero tariff" regime does not imply that the optimal size of countries is infinitesimal. In fact, being part of a political unit may facilitate trade, even in a world without tariffs. Hence, while an exogenous reduction in the size of countries may lead to the adoption of a more open trade regime which, in turn, would bring about a further reduction in equilibrium country size, the existence of cross-country trade barriers which are beyond the reach of policy implies that the resulting equilibrium cannot be characterized by infinitesimally small countries.

It is worth noting that we have always, until now, maintained the assumption that, while heterogeneity costs influence the choice of country size, they do not influence the benefits of trade. Suppose, instead, that heterogeneity costs across units also affect the propensity or benefits of trade. For instance, people may have a preference for trading with people who are similar to them. In this case, a reduction in the costs of heterogeneity would bring about, simultaneously, larger countries and easier trade. Thus, a direct effect of increased "tolerance" would run against, and partly counterbalance, the relationship between country size and trade emphasized in this paper. Furthermore, to the extent that formal or informal barriers to trade emerge endogenously from the heterogeneity of individuals, even domestic trade is not unrelated to country size. For instance, domestic (or within-country) trade barriers may be higher in larger, more heterogeneous countries, than in smaller, more homogeneous ones.

Finally, in our model, the number and size of countries adjust smoothly to underlying changes in the parameters; in practice, border changes and secessions or unifications are costly and lengthy processes. This implies that we may observe border changes only when the underlying parameters have suffered a sufficiently large change. Also, to the extent that border changes are less costly when many borders are changing, the process of country formation and destruction may be lumpy rather than continuous. The end of major wars provides a good example of this fact. In Section III, we show that, in fact, the process of country formation and secession was "lumpy" and occurred in geographical clusters.

II. Size, Openness, and Growth

In this section, we test Propositions 1 and 1′ of Section I, which suggests that both the steady-state level of per capita income and its growth rate in the neighborhood of the steady state are:

1. Positively related to trade openness.
2. Positively related to country size.
3. Negatively related to country size multiplied by openness.

In other words, smaller countries benefit more from being open to trade than large countries, or, to put this in another way, more open countries benefit less from size than countries that are more closed to trade.[24] Throughout, we measure openness to trade using the ratio of imports plus exports to GDP. This variable has the advantage of capturing a broad definition of openness, such as we have adopted in the theory. Namely, trade ratios incorporate both a policy component and a gravity component, as well as determinants of the degree of trade openness that do not enter the traditional definition of policy openness (differences between legal and political systems, language barriers, etc.). Furthermore, measures of trade volume are available for more countries than policy measures.[25] Lastly, trade volume measures are more widely used than policy measures in cross-country studies of trade and growth, allowing comparability of our results with previous findings.[26] We measure country size using

[24] Previous research has provided some support for this hypothesis: Ades and Glaeser (1999), with a sample restricted to the poorest countries, show that the interaction between openness and country size bears a significant negative estimated coefficient. However, they use per capita income as a measure of market size, whereas we use total income or population. Wacziarg (1998) extended the Ades and Glaeser result to a wider sample of countries. Finally, Athanasios Vamvakidis (1997) presents similar regressions, but uses policy measures for openness, rather than trade volumes, and also obtains a significantly negative estimate on the interaction between openness and market size.

[25] For a discussion of the measurement issues involved in assessing the effects of trade openness on growth, see Wacziarg (1998).

[26] See for instance Sebastian Edwards (1993), Vamvakidis (1997), Wacziarg (1998), Ades and Glaeser (1999), and Jeffrey A. Frankel and David Romer (1999).

two different variables. Firstly, the log of total GDP reflects the overall purchasing power of the economy, i.e., its *economic size.* Secondly, we also employ the log of total population, which reflects perhaps more closely the *political size* of a country. The former is closer to the spirit of our theory, since it approximates more closely the size of the market.

A. *Summary Statistics and Conditional Correlations*

Tables 1 and 2 present summary statistics for the main variables used in this section, averaged over the 1960–1989 time period. Table 1 provides orders of magnitudes, while Table 2 provides simple correlations between openness, country size, and growth. Openness is positively correlated with growth, but negatively correlated with both of our measures of country size, which is consistent with our discussion of the relationship between a country's size and its own degree of openness to trade (Section I, subsection D).

Table 3 presents a set of *conditional correlations.* Firstly, the correlation between openness and the growth of per capita income is equal to 0.641 for small countries (where "small" is defined by restricting the sample to countries with the log of population below the full sample median), while it is only 0.150 for large countries (large countries are the complement of the group of "small" countries). The same pattern holds when conditioning on different levels of total GDP. Secondly, the correlation between the log of population and growth is 0.454 conditional on openness being below the full sample median, while it is slightly negative (−0.116) for open countries. Again, the same holds when considering the correlation of the log of GDP with growth. These simple conditional correlations provide strong suggestive evidence consistent with our first hypothesis: namely, country size correlates much less with growth for countries that are more open to trade. Similarly, openness and growth are more tightly linked for small countries than for larger ones.

B. *Least-Squares Results*

In Table 4, we present simple least-squares regressions for averaged variables over the period 1960 to 1989. For each measure of country size, we show three sets of results. Firstly, we present regressions of growth on a constant, openness, country size, and their interaction. These regressions are meant to capture the specification derived from Proposition 1′, namely the independent variables are viewed as determinants of growth in the neighborhood of the steady state. Secondly, we added the log of per capita income, measured in 1960, to the regression. According to the modified neoclassical model of growth presented is Section I, the interpretation of the other conditioning variables in this regression is now that they represent the determinants of the *steady-state level* of per capita income.[27] In other words, this specification is meant to test Proposition 1. Lastly, in order to investigate whether our results are due to the omission of other determinants of growth, not accounted for by our theory, we included other common determinants of growth in our regression. These included the ratio of government consumption to GDP, the fertility rate, male and female human capital, and the investment rate. To select these variables, we followed closely the specification in Robert Barro (1991), a benchmark in cross-country growth studies. Throughout, the size of the sample was determined solely by the availability of data. That is, the sample size decreases as more variables are included in the regressions, as some newly included variables are available for fewer countries.

The results from these simple regressions are encouraging for our theory. The signs of the estimated coefficients are as predicted by the Propositions 1 and 1′: the interaction term bears a negative coefficient, while both country size and openness bear positive coefficients. While

[27] See N. Gregory Mankiw et al. (1992) for the formal derivation of the standard cross-country growth specification from "augmented" versions of the Solow model. The relationship between "levels" and "growth" is well known: If y_{it} is GDP per capita at time t in country i, we can write:

$$\log y_{it} - \log y_{it-1} = \alpha + \beta \log y_{it-1} + \text{other controls.}$$

This is the standard growth regression which allows for conditional convergence. One can rewrite this regression in levels:

$$\log y_{it} = \alpha + (\beta + 1)\log y_{it-1} + \text{other controls.}$$

TABLE 1—SUMMARY STATISTICS FOR THE MAIN VARIABLES OF INTEREST

	Mean	Median	Maximum	Minimum	Standard deviation	Number of observations
Average annual growth	2.156	2.161	6.730	−1.817	1.739	120
Openness ratio	62.214	52.559	306.901	12.589	39.287	120
Log per capita GDP 1960	7.325	7.138	9.200	5.549	0.888	119
Log total GDP	16.361	16.049	21.737	11.545	1.993	119
Log population	8.653	8.629	13.649	3.992	1.702	127
Fertility rate	5.076	5.724	7.988	1.855	1.817	126
Female human capital	0.815	0.507	4.695	0.003	0.883	106
Male human capital	1.150	0.897	4.844	0.037	0.963	106
Investment rate (percent GDP)	16.028	15.913	34.843	1.370	8.178	120
Government consumption (percent GDP)	18.473	16.772	39.445	6.097	7.036	120

Note: All variables except log income per capita 1960 are averaged over the 1960–1989 period.

TABLE 2—SIMPLE CORRELATIONS FOR GROWTH, PER CAPITA INCOME, OPENNESS AND COUNTRY SIZE

	Growth	Log GDP	Log per capita GDP 1960	Log population	Openness
Average annual growth	1.000				
Log total GDP	0.228	1.000			
Log per capita GDP 1960	0.197	0.521	1.000		
Log population	0.042	0.872	0.053	1.000	
Openness ratio	0.368	−0.418	0.111	−0.602	1.000

Notes: All variables except log income per capita 1960 are averaged over the 1960–1989 period.
Number of observations: 119.

TABLE 3—CONDITIONAL CORRELATIONS

Variable	Conditioning statement[a]	Correlation with growth[b]	Number of observations
Openness	Log population > median = 8.629	0.150	58
Openness	Log population ≤ median = 8.629	0.641	61
Openness	Log GDP > median = 16.049	0.353	59
Openness	Log GDP ≤ median = 16.049	0.637	60
Log population	Openness > median = 52.559	−0.116	59
Log population	Openness ≤ median = 52.559	0.454	60
Log GDP	Openness > median = 52.559	0.089	59
Log GDP	Openness ≤ median = 52.559	0.547	60

[a] Medians are computed from individual samples, while correlations are common sample correlations.
[b] Average annual growth rate of per capita GDP, 1960–1989.

the estimated coefficients on the latter are also consistently significant, the coefficient on interaction term is, at worst, only significant at the 13-percent level. In three of the six regressions, however, it is statistically significant at the 5-percent level. Numerically, the results suggest that a hypothetically infinitesimal country (that is, with a log of total GDP equal to zero), the effect of a 10-percentage-point increase in openness on annual growth is contained between 0.60 and 0.95 percentage points, depending on the specification. This effect falls in the range 0.12 to 0.30 when the log of total GDP falls to the sample median (equal to 16.049). Similarly, the effect of a standard-deviation increase in the log of total GDP (equal to 1.99) on annual growth rates, for a hypothetical closed country (zero openness), varies between 0.61

TABLE 4—DETERMINANTS OF GROWTH RATES: OLS ESTIMATES

Dependent variable: Growth of per capita GDP 1960–1989	Size = log of GDP			Size = log of population		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−9.956	−9.247	6.299	−4.900	−6.330	7.884
	(2.231)	(2.260)	(2.828)	(1.375)	(1.773)	(2.495)
Size*openness	−0.004	−0.004	−0.003	−0.004	−0.004	−0.004
	(0.002)	(0.002)	(0.002)	(0.0025)	(0.0026)	(0.002)
Country size	0.646	0.742	0.306	0.624	0.606	0.278
	(0.133)	(0.139)	(0.102)	(0.143)	(0.142)	(0.1187)
Openness	0.094	0.095	0.060	0.057	0.057	0.044
	(0.035)	(0.035)	(0.030)	(0.020)	(0.021)	(0.017)
Log of per capita income 1960	—	−0.339	−1.277	—	0.229	−1.144
		(0.189)	(0.216)		(0.137)	(0.198)
Fertility rate	—	—	−0.322	—	—	−0.306
			(0.126)			(0.127)
Male human capital	—	—	1.684	—	—	1.817
			(0.440)			(0.454)
Female human capital	—	—	−1.465	—	—	−1.587
			(0.441)			(0.448)
Government consumption (percent GDP)	—	—	−0.043	—	—	−0.044
			(0.020)			(0.020)
Investment rate (percent GDP)	—	—	0.076	—	—	0.084
			(0.024)			(0.024)
Adjusted R^2	0.321	0.333	0.652	0.244	0.249	0.647
Regression standard error	1.437	1.4238	1.0129	1.5123	1.5112	1.0196
Number of observations	119	119	97	120	119	97

Notes: All variables are averaged over the 1960–1989 period, except initial income in 1960. Heteroskedastic-consistent (White-robust) standard errors are in parentheses.

and 1.48. At the median of openness (equal to 52.56), the effect falls between 0.30 and 1.06. The same pattern holds when size is measured by the log of population. These orders of magnitude suggest that the estimated effects are large economically, and their signs are consistent with our theory.

C. *Endogeneity Issues*

Several authors have suggested that the estimated effect of trade openness on economic growth is biased due to the endogeneity of openness. To address this issue, Frankel and Romer (1999) construct an instrument for openness using exogenous gravity variables, and show that the estimated coefficient on the trade to GDP ratio in a cross-country income-level regression is actually *increased* when endogeneity issues are properly accounted for. The endogeneity of openness is a concern in the present paper as well, as discussed in Section I, subsection D. Furthermore, this problem potentially extends to the endogeneity of the interaction term between openness and country size. We follow Frankel and Romer (1999) in selecting gravity variables as potential instruments for openness and for the interaction term between openness and country size. These variables are likely to be strongly associated with the degree of openness, and unlikely a priori to be affected by reverse causation. We provide instrumental variables evidence largely to evaluate the robustness of our basic results. In any case, previous results by Frankel and Romer (1999) show that the endogeneity of openness is unlikely to be a major problem.

We focus upon the following set of purely geographic variables: dummy variables for whether a country is an island, a small island, a small country, and a landlocked country.[28] These are mostly "gravity" variables that are widely used as instruments in the cross-country

[28] All of these variables are more precisely defined in the Appendix. We thank an anonymous referee for suggesting this set of variables.

openness and growth literature. In addition, we added the interaction between each of these variables and the log of population to the list of instruments, in order to explicitly account for the potential endogeneity of the interaction term between openness and country size. Since they are pure geography variables, these instruments are unlikely to be affected by reverse causation with respect to post-1960 economic growth. To check this fact, we can perform Hausman tests for overidentification, since we have eight instruments and two endogenous variables.

Tables 5A and 5B presents Hausman χ^2 statistics pertaining to the null hypothesis that the set of instruments other than the small country dummy and its interaction with country size are valid instruments. The results are not sensitive to which instruments are tested for. Specifically, the choice of other pairs of instruments as "benchmark" instruments in the Hausman procedure does not change the result: in all cases we cannot reject the null hypothesis that the coefficients obtained from an (inefficient) IV model using only the small country dummy and its interaction with size as instruments are the same as those obtained using the full set of instruments. Indeed, the *p*-values for this hypothesis are always greater than 68 percent.

Next, we checked whether the instruments are closely related to openness and the interaction term between openness and country size, another requirement for valid instruments: these are likely to provide little identifying information unless they are strongly jointly correlated with the corresponding endogenous variables. To investigate this, we regressed the three endogenous variables on the instruments plus the included exogenous variables in each specification of Table 5A. We then performed *F*-tests for the joint significance of the instruments in these regressions. As shown in Table 5B, for all specifications our instruments are indeed significantly associated with openness, the interaction between openness and the log of population, and the interaction between openness and the log of total GDP. This again suggests that the instruments do indeed provide identifying information.

The results from the instrumental variables procedure, in Tables 5A and B, are in line with the previous OLS results, which come out reinforced in terms of statistical significance. The pattern of signs, as predicted by the theory, is maintained. The magnitude of the coefficients on openness is raised somewhat, in line with results in Frankel and Romer (1999). This suggests that the endogeneity issue applied to openness and the interaction term is unlikely to be an important source of fragility for our results. Furthermore, the use of instruments has increased the significance of some of the coefficients, particularly on the interaction term between openness and country size.

D. *Levels Approach*

To further establish the robustness of our results, we ran regressions using the level of per capita income in 1989 as a dependent variable (without including lagged per capita income on the right-hand side).[29] Although our theory delivers predictions for the growth rate of income [or, in neoclassical growth theoretic terms, for the steady-state level of income, see equation (15) and Barro and Xavier Sala-i-Martin (1995)], levels regressions constitute useful complements to empirical tests of Proposition 1, and may lead to reducing measurement error inherent in the dependent variable of growth regressions. As stressed in Robert Hall and Charles I. Jones (1999), levels regressions require a broader set of controls than growth regressions, since the source of variation previously captured by initial income now has to be accounted for otherwise. We address this issue by controlling for a wide set of covariates. Another important issue that arises with level regressions is endogeneity with respect to trade and the interaction term between trade and country size. We address this issue by using end-of-period income as a dependent variable and by instrumenting for the trade and the interaction between trade and size using the aforementioned instruments.

In spite of the difficulties associated with levels regressions, Table 6 further establishes the robustness of our main findings. Namely, the signs of the relevant coefficients are in line with the theory, although their significance has fallen relative to growth regressions. In the regressions without any controls, the coefficient on the interaction term between size and

[29] In doing so we follow the recommendations of an anonymous referee.

TABLE 5A—DETERMINANTS OF GROWTH RATES: INSTRUMENTAL VARIABLES ESTIMATES

Dependent variable: Growth of per capita GDP 1960–1989	Size = log of GDP			Size = log of population		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−13.793	−14.299	−1.271	−9.955	−10.365	3.083
	(3.869)	(3.825)	(3.713)	(3.233)	(3.293)	(3.032)
Size*openness	−0.006	−0.0075	−0.007	−0.007	−0.007	−0.007
	(0.004)	(0.0037)	(0.002)	(0.005)	(0.005)	(0.003)
Country size	0.833	1.133	0.701	1.066	1.035	0.603
	(0.226)	(0.255)	(0.201)	(0.307)	(0.315)	(0.204)
Openness	0.131	0.163	0.136	0.102	0.101	0.077
	(0.061)	(0.058)	(0.038)	(0.039)	(0.039)	(0.023)
Log of per capita income 1960	—	−0.662	−1.229	—	0.118	−0.980
		(0.329)	(0.228)		(0.179)	(0.200)
Fertility rate	—	—	−0.253	—	—	−0.243
			(0.132)			(0.133)
Male human capital	—	—	1.501	—	—	1.561
			(0.459)			(0.471)
Female human capital	—	—	−1.319	—	—	−1.346
			(0.477)			(0.472)
Government consumption (percent GDP)	—	—	−0.043	—	—	−0.043
			(0.023)			(0.022)
Investment rate (percent GDP)	—	—	0.055	—	—	0.072
			(0.029)			(0.027)
R^2	0.271	0.246	0.617	0.116	0.149	0.629
Regression standard error	1.508	1.541	1.115	1.656	1.636	1.099
Number of observations	119	119	97	120	119	97
Hausman χ^2	0.87	0.68	0.39	1.48	1.19	0.00
p-value	0.832	0.953	≈1.00	0.686	0.880	≈1.00

Notes: Instruments used—small country dummy, island dummy, small island dummy, landlocked country dummy, and the interaction of each of these variables with the log of population. Heteroskedastic-consistent (White-robust) standard errors are in parentheses.

TABLE 5B—FIRST-STAGE F-TESTS FOR THE INSTRUMENTS

Endogenous variable:	Openness	Openness*log population	Openness*log total GDP
Specification 1—F-statistic	6.12	—	5.31
(p-value)	0.000		0.000
Specification 2—F-statistic	5.93	—	4.52
(p-value)	0.000		0.0001
Specification 3—F-statistic	4.20	—	3.69
(p-value)	0.0003		0.001
Specification 4—F-statistic	4.48	4.27	—
(p-value)	0.0001	0.0002	
Specification 5—F-statistic	4.56	4.04	—
(p-value)	0.0001	0.0003	
Specification 6—F-statistic	3.81	3.17	—
(p-value)	0.001	0.0035	

Note: F-tests on the instruments from a regression of the three endogenous variables on the list of instruments plus the exogenous regressors in each specification (8 degrees of freedom in the numerator).

openness is insignificant, although of the right sign. Focusing on the regressions which include the greatest set of controls [columns (3) and (6)], both the interaction term between openness and size and the openness term appear with significant coefficients, while the coefficient on size is now insignificant, although again of the desired sign. Therefore, we take these results as providing additional evidence in favor of Proposition 1.

TABLE 6—DETERMINANTS OF INCOME LEVELS: INSTRUMENTAL VARIABLES ESTIMATES

Dependent variable: Log of per capita income 1989	Size = log of GDP			Size = log of population		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−4.736	0.906	8.010	1.725	6.444	8.820
	(2.233)	(5.253)	(2.148)	(1.929)	(1.873)	(1.002)
Size∗openness	−0.001	−0.008	−0.004	−0.0002	−0.010	−0.006
	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)	(0.002)
Country size	0.636	0.442	0.068	0.494	0.243	0.004
	(0.131)	(0.314)	(0.143)	(0.184)	(0.206)	(0.121)
Openness	0.049	0.141	0.063	0.032	0.079	0.040
	(0.038)	(0.064)	(0.029)	(0.020)	(0.027)	(0.016)
Number of observations	114	80	71	115	81	72
Adjusted R^2	0.12	0.80	0.93	0.13	0.86	0.92
Regression standard error	1.052	0.566	0.361	1.1769	0.469	0.368

Notes: Included controls (output suppressed):

Columns (1) and (4): No controls.

Columns (2) and (5): Ethnolinguistic fractionalization, urbanization rate in 1970, distance from major trading partners, average number of revolutions and coups per year, and a set of dummies for whether there was a war between 1960 and 1985, whether the country was ever a colony (since 1776), postwar independence, oil exporting countries, Muslim majority, Catholic majority, Protestant majority, Confucian majority, Hindu majority, socialist country, Latin America, South East Asia, OECD, Sub-Saharan Africa.

Columns (3) and (6): Same as columns (3) and (6) plus fertility rate, male human capital, female human capital, government consumption as a share of GDP, investment rate.

Instruments used: Log of population, dummies for small country, small island, island, landlocked country, and each of the interactions of these dummies with the log of population.

Heteroskedastic-consistent (White-robust) standard errors are in parentheses.

III. Discussion

A. *Historical Overview*

In the working paper version (Alesina et al., 1997) of this paper, we analyzed, in a brief historical overview, the evolution of trade regimes and country formation since the early nineteenth century.[30] We made a few points which we will only mention here. Firstly, we argued that the process of nation-building in the first half of the nineteenth century can be interpreted as resulting from the trade-off between the benefits of market size and the costs of population heterogeneity.[31]

Secondly, at the end of the nineteenth century the emergence of colonial empires can be viewed, at least in part, as a response to stagnant trade amongst European powers and to the need to expand markets in a period when protectionism was on the rise.[32] As a referee correctly pointed out, a colonial empire allowed the European powers to have large markets without having to bear too much of the cost of heterogeneity, since the colonies did not share the same institutions as the colonizers (and in particular were not generally granted the right to participate in the colonizers' political processes).

Thirdly, the pattern of trade regimes and country formation in the interwar and post-Second World War periods is consistent with the predictions of our model. In the interwar period, borders remained "frozen," namely virtually no new country obtained independence and, concurrently, international trade collapsed as a result of protectionist policies and the Great Depression. At the same time, colonial empires remained largely intact.

Figure 5 shows the number of countries

[30] The working paper version (Alesina et al., 1997) is available from the National Bureau of Economic Research as Working Paper No. 6163 and, for a more recent version, directly from the authors.

[31] In our reading of the historical records, we found a number of references pointing to precisely this trade-off in debates amongst the framers of the new nation-states in Europe.

[32] According to Eric Hobsbawm (1987 p. 67, the British prime minister in 1897 told the French ambassador that "if you were not such persistent protectionists, you would not find us so keen to annex territories."

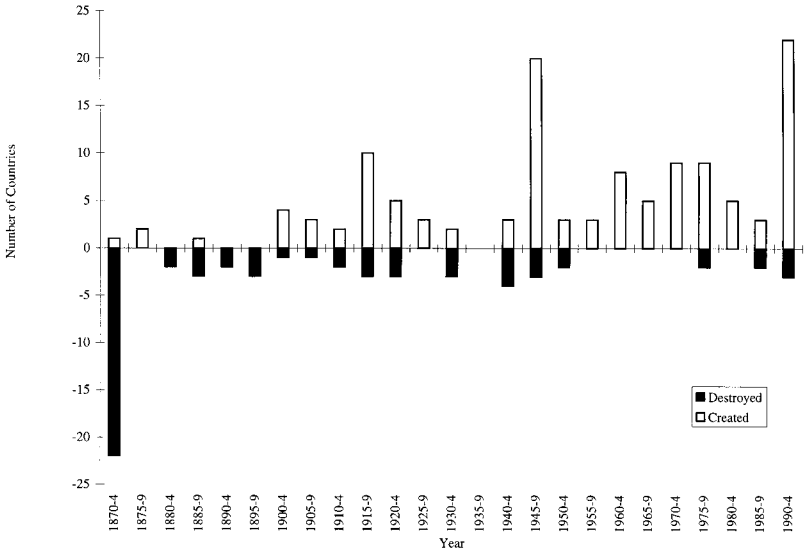

FIGURE 5. COUNTRIES CREATED AND DESTROYED
(FIVE-YEAR PERIODS, EXCLUDES SUB-SAHARAN AFRICA)

created and destroyed in five-year periods from 1870 until today. It excludes Sub-Saharan Africa, for which the identification of "countries" in the nineteenth century is somewhat problematic. The German unification, in which 18 previously independent entities disappeared, explains the dip at the beginning of Figure 5. This figure also shows that very few new countries were created from 1875 to the Treaty of Versailles, while some countries disappeared. As was argued above, this was also a period of growing trade restrictions.

The same figure identifies a peak, i.e., a large number of countries created with the Treaty of Versailles in 1919. International borders hardly changed at all in the interwar period, until the late thirties, with the unfolding of the Second World War. In fact, Figure 5 shows that in the interwar period very few new countries appeared in the world.[33]

On the contrary, after the Second World War, trade restrictions were gradually reduced and the number of countries rapidly increased (see, again, Figure 3). In the 50 years that followed the Second World War, the number of independent countries exploded. As shown in Figure 1, there were 64 independent countries in the world (outside Sub-Saharan Africa) in 1871, after the first German unification. This number declined slightly, to 59, until the First World War. In 1920, the world (including Sub-Saharan Africa) consisted of 69 countries. There were 89 in 1950 and 192 in 1995. As a consequence of this increase in the number of independent nations, the world now comprises a large number of relatively small countries: in 1995, 87 of the countries in the world had a population of less than 5 million, 58 had a population of less than 2.5 million, and 35 less than 500 thousand. At the same time, the share of international trade in world GDP increased dramatically.

We should stress that the increase in international trade in the last half-century, as documented by Figure 1, is not the simple result of an accounting illusion. In fact, if two countries

[33] Note that, among the very few new country creations, at least one, Egypt (independent in 1922) results from a classification problem: Egypt in 1922 was already largely independent from Britain, but its status switched from a protectorate to a semi-independent country. Leaving aside Vatican City, the only other countries created between 1920 and the Second World War were Ireland (1921), Mongolia (1921), Iraq (1932), and Saudi Arabia (1932) (although, again, Saudi Arabia was de facto independent since the mid-1920's).

were to split, their resulting trade to GDP ratios would automatically increase, as former domestic trade is now counted as international trade. But Figure 1 only features the average trade to GDP ratio for a set of countries *whose borders did not change since 1870.*[34] Furthermore, Figure 2 employs average tariffs on foreign trade for a selection of countries with available data, a more direct reflection of trade policy, to display a similar historical pattern. Obviously, such policy measures are not subject to the accounting illusion either.

Finally, it is useful to discuss two recent or current cases of border changes. One is Québec's separatism, in the context of NAFTA. An important issue in the discussion of Québec's independence is how this region benefits, in terms of trade flows, from being part of Canada relative to being an independent country in NAFTA.[35] In studying precisely this point both McCallum (1995) and Helliwell (1998) conclude that, at least for Canada, national borders still matter, so that trade among Canadian provinces is ceteris paribus much easier than between Canadian provinces and U.S. states. This implies that there might be a cost for Québec in terms of trade flows if it were to become independent. Such arguments were made by the proponents of the "no" in the self-determination referendum of 1996.

The second case is that of the European Union. At first glance, the process leading toward European integration and monetary union could be seen as contrary to our argument, since several major countries are increasing their politico-economic ties in a period of worldwide trade liberalization. According to many observers, however, Europe will never be a federal state, in the usual sense. Instead, several countries in Europe will form a loose confederation of independent states, joined in a common currency area, coordinated macroeconomic policies to support this common currency, in addition to a free-trade area supplemented by a harmonization of regulations and standards.

In fact, while economic integration is progressing at the European level, regional separatism is more and more vocal in several member countries of the Union, such as Spain, Belgium, Italy, and even France.[36] So much so, that many an observer has argued that Europe will (and, perhaps should) become a collection of regions (Brittany, the Basque Region, Scotland, Catalonia, Wales, etc.) loosely connected within a European federation.[37] The motivation of these developments is consistent with our argument: linguistic, ethnic, and cultural minorities feel that they are economically "viable" in the context of a truly European common market, thus they can "safely" separate from the home country.[38] In other words, the nation-state in Europe is threatened from above because of the necessity of developing supranational juridical institutions, and from below because of rampant regional movements. These movements feel they do not really need Madrid, Rome, or Paris, when they can be loosely associated to the "Europe of Regions" politically, and be fully integrated in the Union economically. Newhouse (1997) puts it rather starkly: "[In Europe], the nation-state is too big to run everyday life and too small to manage international affairs."

An exhaustive discussion of the relationship between economic an political integration in Europe is beyond the scope of this paper.[39] However, to the extent that we can interpret Europe as an area of "deep economic integration" rather than as an area of political integration, recent developments in Western Europe do not contradict the main argument of this paper.

B. *Concluding Comments*

We have argued that trade liberalization and average country size are inversely related. Thus,

[34] Trade with formerly colonized countries is counted as international trade, so that decolonization had no "artificial" effect on trade volumes.

[35] For an in-depth discussion of Québec's separatism and its economic consequences, see McCallum (1992).

[36] For a recent discussion of "rising regionalism" in Europe, see Joseph Newhouse (1997).

[37] See Jean Drèze (1993) on this point.

[38] Interestingly this argument is often mentioned in the press. For an example pertaining to Scotland, see the *Financial Times,* September 16, 1998: "(...) the existence of the European Union lowers the cost of independence for small countries by providing them with a free trade area (...) and by creating a common currency which will relieve the Scots of the need to create one for themselves (...)."

[39] See Alesina and Wacziarg (1999) for a more complete discussion.

the "globalization" of markets goes hand in hand with political separatism.

While this paper has emphasized the link from trade regime to country size, one may argue that the opposite channel may also be operative; namely a world of small countries has to adopt a relatively free-trade regime, because this is in the interest of small countries. The two channels are not mutually exclusive. Suppose that a certain region (say, Québec, Catalonia, Ukraine, etc.) considers demanding independence. Each of these regions takes the trade regime in the world, at the moment of their declaration of independence, as given. However, if the process of political separatism continues, and average country size declines, more and more "players" in the international arena have an interest in preserving free trade, thus reinforcing the movement toward trade liberalization that may have influenced their decision about secession in the first place.

An implication of this paper is that as the process of economic "globalization" will progress, political separatism will continue to be alive and well. The concept of relatively large and centralized nation-states is and will be more and more threatened by regional separatism from below, and the growth of supranational institutions from above, in a world of "global" markets.

Appendix A: Number of Countries Data

Definitions

In most cases the determination of when a country appeared or disappeared is fairly uncontroversial. For example it is clear that the first German unification happened in 1871, that Algeria was born in 1962, and so on. In a number of cases, however, it may be unclear whether a country was independent or not. For instance, Afghanistan was under British "influence" for some time, but never became a crown colony. For such cases, we had to use decision rules to determine the number of countries in any single year. These rules are the following:

1. For most of the countries, the dates of colonization and independence are specified in Encyclopedia Britannica, so we used those dates. We also double-checked with Centennia, a computerized map program, whenever the data in Centennia was available. If conflicts occurred, we consulted country-specific history books.
2. For a few countries, the process of colonization and gaining independence took a long time. We used the year in which a country lost control over its foreign policies as the starting point of colonization and the year that a country "fully" gained its independence as the year that it became independent. The word "fully" is usual terminology in the Encyclopedia Britannica and implies that the colonizer has left all powers to the local government.
3. If formal colonization did not occur for a given country, e.g., Bhutan, we used the criterion that its foreign policies was controlled by a foreign power as the starting point of colonization.
4. Countries that were under suzerainty of another country, e.g., Serbia and Romania under the Ottoman Empire, were classified as colonies.
5. A few countries, e.g., Afghanistan, were not colonized but were under the influence of foreign countries. They were classified as independent countries.

Appendix B: Data Sources and Description

Variable name: Growth
Source: Summers-Heston v. 5.6. Unit: Percentage points
Definition: Growth rate of PPP adjusted gross domestic product

Variable name: Trade/GDP ratio
Source: Summers-Heston v. 5.6. Unit: Percentage points
Definition: Ratio of imports plus exports to GDP

Variable name: Initial income per capita
Source: Summers-Heston v. 5.6. Unit: Log of per capita GDP in dollars
Definition: Real gross domestic product per capita in a given year (PPP adjusted)

Variable name: Human capital (male and female)
Source: Barro-Lee. Unit: Years

Definition: Average years of secondary and higher education in the total population over age 25

Variable name: Investment rate
Source: Summers-Heston v. 5.6. Unit: Percentage points
Definition: Real investment share of GDP (1985 international prices)

Variable name: Fertility rate
Source: World Bank. Unit: Number of children per woman
Definition: Total fertility rate (children per woman)

Variable name: Public consumption
Source: Summers-Heston v. 5. Units: Percent
Definition: Share of government consumption of goods and services in GDP, excluding transfers and public investment

Variable name: Log population
Source: Barro-Lee. Unit: Logarithm of population
Definition: Country population

Variable name: Log of area
Source: Barro-Lee. Unit: Millions of square kilometers (log)
Definition: Log of country land area

Variable name: Landlocked dummy
Source: Authors. Unit: Dummy variables
Definition: Equals 1 if the country is landlocked

Variable name: Island dummy
Source: Authors. Unit: Dummy variables
Definition: Equals 1 if the country is an island

Variable name: Small country dummy
Source: Authors. Unit: Dummy variables
Definition: Equals 1 if the country's land area is smaller than 50 million square kilometers

Variable name: Small island dummy
Source: Authors. Unit: Dummy variables
Definition: Equals the island dummy multiplied by the small country dummy

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