

# Democracy, Federalism, and the Size of States

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## Abstract

We demonstrate that territorial size is intimately linked to the structure of political authority within states. We take an evolutionary approach, arguing that there are certain stable, long-term equilibrium combinations of size and political institutions. Building on a general theory of public goods provision and rent-seeking, we predict that, *ceteris paribus*, democracies will tend to be smaller than autocracies, since governments in the latter have greater incentives to expand the territory under their control in order to maximize rents; looked at from the other direction, small states are more likely to have democratic institutions than large states, since governments in the latter suffer greater losses in rents from expanding the size of the ruling coalition. Federalism offers an alternative type of equilibrium. We predict that democracies are more likely to adopt federal institutions than are autocracies, since governments in the latter are less inclined to relinquish authority to produce public goods (and hence the capacity to generate rents) to others. In addition, by allowing different public goods to be provided at more optimal scales, federalism increases incentives for democratic governments to expand the size of the state. Overall, we expect that unitary (i.e. non-federal) democracies will tend to be smaller than both autocracies and federal democracies. We find strong support for the hypotheses in a series of cross-sectional empirical investigations.. Theory and evidence indicate that democracy, federalism, and size are closely related to one another.

# Democracy, Federalism, and the Size of States

Michael J. Hiscox and David A. Lake

We live in a world of approximately 185 states, averaging in size about 850,000 square kilometers. The smallest, Singapore, barely registers on a map. The largest, Russia, is nearly 17 million square kilometers, down from over 22 million prior to the breakup of the Soviet Union. It is discomfiting to acknowledge that we understand only poorly how and why states—the basic building blocks of political life—take their number and form.

Contemporary events have drawn new attention to the number and size of states within the global system. The recent disintegrations of Yugoslavia and the Soviet Union have created a large number of new states, producing one of the more active periods of state formation in modern history. Yet scholarly work on state formation and state size has been rare. Several authors have addressed the historical origins of states, helping us understand why these units long ago became the dominant institution of modern politics (e.g., Tilly 1990, Spruyt 1994). Work on imperialism (e.g., Doyle 1986) and political integration (e.g., Deutsch 1957, Haas 1958) has addressed particular motivations for enlarging existing political units. Others have addressed the ethnic conflicts and secessionist crises that underlie many recent cases of state disintegration and formation (e.g., Bartkus 1999). But to date few have attempted to explain the size and distribution of contemporary states.

The issue touches at the heart of international relations theory from a number of angles. Just why is the globe divided into 185 units, rather than 18, or 1,850 or 185,000? What explains which units become the largest members of the system? When do states strive to expand in size, and when do they collapse and divide? Since the processes by which states expand and contract are often violent and wrenching, this latter question has a particular substantive importance.

We demonstrate below that territorial size is intimately linked to the structure of political authority within states. We take an evolutionary approach, arguing that there are certain stable, long-term equilibrium combinations of size and political institutions. Building on a general theory of public goods provision and rent-seeking, we predict that, *ceteris paribus*, democracies will tend to be smaller than autocracies, since governments in the latter have greater incentives to expand the territory under their control in order to maximize rents. Looked at from the other direction, small states are more likely to have democratic institutions than are large states, since governments in the latter suffer greater losses in rents from expanding the size of the ruling coalition. Federalism offers an alternative type of equilibrium. We predict that democracies are more likely to adopt federal institutions than are autocracies, since governments in the latter are less inclined to relinquish authority to produce public goods (and hence the capacity to generate rents) to others. In addition, by allowing different public goods to be provided at more optimal scales, federalism increases incentives for democratic governments to

expand the size of the state. Overall, we expect that unitary (i.e. non-federal) democracies will tend to be smaller than both autocracies and federal democracies.

We assess the available evidence and find strong support for the hypotheses. Democracy, federalism, and size do appear to exert strong interactive constraints on one another that produce, at any particular moment in time, predictable equilibrium patterns. We do not argue that internal political institutions exclusively determine territorial size, or vice versa. Territorial and political changes are rare and complex events that exhibit many particularities. Much work remains to be done developing and testing alternative and complementary hypotheses. Nonetheless, the theory and evidence below indicates that democracy, federalism, and size are closely related to one another.

The paper proceeds in four principal sections. We begin with a survey of the evolving population of states. Section two reviews the existing literature. We develop our evolutionary approach in section three. Section four reports results from a series of quantitative tests.

## **1. The States System**

We begin with a brief census of the modern states system, starting in 1815 at the end of the Napoleonic Wars and ending in 1995 after the breakup of the Soviet Union. The origins of the system go back much further, of course, but we are constrained here by data availability. The data set we have constructed identifies all sovereign states during this period, applying an expansive

definition of sovereignty so as to include the largest number of possible cases.<sup>1</sup> Territory is defined as home or national land mass, generally a contiguous area governed as a single political unit. Colonial holdings are not included in the analysis.<sup>2</sup> Our system begins in 1815 with 35 states, and grows to 46 states in 1890, 63 in 1920, and 154 in 1993.<sup>3</sup> As Figure 1 shows, the period with the largest average size of states is between 1875 and World War I. Although colonial possessions are not included, it is interesting to note that this is also the period of most active overseas expansion. From a peak in 1876-1885, there is a steady decline in the average size of states.

The birth of new states leads this general pattern, as would be expected (see Table 1). In the 19<sup>th</sup> century, the size of new states oscillated widely. Since World War I, however, new states have been consistently smaller than the average state. There is no strong pattern in the number of states born in the 19<sup>th</sup> century, but the 20<sup>th</sup> century is characterized by three waves—one in Eastern Europe after WWI, a second in the former European empires after WWII, and a third with the breakup of the Soviet Union after 1991. The majority of states are created from peripheral or colonial territories, not from the disintegration of

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<sup>1</sup> We compiled the list of sovereign states from Arthur S. Bank's Cross National Times Series data set, the Correlates of War project, and the Polity III database. Disagreements between "birth" and "death" dates for states were settled by reference to the *Statesman's Yearbook*, which provides concise explanations for the historical events in question. As to whether mergers of states created new entities (e.g., Germany and Italy in the 19<sup>th</sup> century) or simply larger but continuing entities (e.g., the Federal Republic of Germany after re-unification), we followed the coding decisions used in the above sources.

<sup>2</sup> Territorial data are from the *Statesman's Yearbook* and Goertz and Diehl's Territorial Change Dataset (see Goertz and Diehl 1992). See Appendix II below.

existing states. The trend toward smaller states is thus not simply an artifact of increasing numbers and a fixed landmass—although that itself would require some explanation. Rather, for most of the period covered here, we can reasonably treat the periphery as a near infinite source of potential states and potential additions to existing states.

There are 29 state “deaths” in the data set (roughly 16 percent of the total number of states identified), challenging the common wisdom that states “never die” and that only weak selection mechanisms exist within the international system.<sup>4</sup> State death is also episodic, with nearly half occurring in the context of German and Italian unification. Not surprisingly, expired states are always smaller than the average state in the system or the average new state, indicating that the selection mechanism, such as it is, works against the smaller members of the system.

There is no strong regional pattern in the size of states (see Figure 2). African states are, on average, the smallest; as Africa also possesses the youngest states, this is part of the downward trend in state size over time. Oceania has the largest states, but this is mostly the product of one large state, Australia, with

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<sup>3</sup> There is a substantial amount of missing data. There are currently 185 members of the United Nations, for instance, but (as of 1993) only 154 states with territorial data.

<sup>4</sup> There is some ambiguity in how to count cases here as some countries, such as Estonia, die and are then resurrected later. Nonetheless, 16 percent is a remarkably large number given the prevailing view of international selection mechanisms. On state death, see Fazal (2000) who reports a nearly 30 percent rate of state elimination. Her figure is higher than ours because she identifies a set of states missing from the standard COW and Polity III datasets and she codes as deaths cases in which states were conquered during WWI and WWII (even though they were reborn immediately after hostilities in essentially the same form). Because we do not have any

few other states in the region. The mean size of states in each region is larger for “all years” than in 1993, reflecting a tendency for larger states to form first within each region.

## 2. The Size of States and Political Institutions

The optimal size of states, and the relationship between democracy and size, has long been a subject of philosophical inquiry. In what might be called the classical view, originating in Plato and Aristotle, it was believed that democracy could survive only in a small state—indeed, Plato set the maximum number of citizens (heads of households) at 5,040, and Aristotle defined the limit as the number of individuals who could gather for debate in one place. In turn, there was some expectation that small polities would tend to be democratic, although this was far less certain.

With the development of representative democracy in the 18<sup>th</sup> century, this classical view was turned on its head. As James Madison wrote in *Federalist* 10, expansive territories and populations were not an impediment to democracy but actually an advantage, as the greater variety of parties and interests would inhibit majorities from possessing a common motive and imposing their will on minorities. Robert Dahl and Edward Tufte (1973) contrast these classical and

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political, demographic, or economic data on the missing states she has identified, we do not include them in our analysis here.

representative views, and conclude that an appeal to philosophical principles cannot itself resolve the question of state size.

Recent work on the optimal size of states by economists has raised a separate set of issues.<sup>5</sup> Collectively, they identify three key factors that should influence choices about the size of political units.<sup>6</sup> First, technological change can affect the economies of scale in producing public goods (Bolton, Roland, and Spolaore 1996). Improvements in the fortification of castles in the middle ages, for instance, reduced economies of scale in the provision of security and played an important role in the feudalization of Europe; subsequent improvements in artillery, on the other hand, increased scale economies and contributed to the formation of larger absolutist states (Bean 1973; Quester 1977; Downing 1992). Various technological improvements in monitoring agents and citizens have also reduced the costs of collecting taxes in large jurisdictions over time (Dudley 1992; McNeill 1982). The argument is straightforward, but the precise effects of particular changes are hard to estimate since the costs of producing different public goods and extracting revenue are very difficult to measure.

The second important claim in this recent work is that trade openness reduces the optimal size of states. In a series of related models, Casella and Feinstein (1990), Alesina and Spolaore (1997; also Alesina, Spolaore, Wacziarg 2000), and Bolton and Roland (1997) posit a tradeoff between the economic

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<sup>5</sup> Curiously, with the exception of Quester 1977, who examines the effects of the offense-defense balance on state size, we have not found any recent works by political scientists examining this question.

benefits of expanding state size, due to reduced transactions costs within a larger national market, and the “political costs” of expansion, due to increased dissatisfaction with policies that become more distant from the ideal points of more voters as size increases and the preferences of citizens become more diverse. When barriers to international trade are lowered, the economic benefits of larger size decline relative to the political costs. In this way, it is argued, recent globalization may explain the apparent increase in demands for regional autonomy in the advanced industrialized states and the small size of most new states formed in the 1990s.<sup>7</sup> Again, this is a straightforward claim, although the direction of causality is questionable. Small states will naturally be more open to international trade, as the costs of forgoing specialization and exchange are greater for them than for larger states. This creates a proverbial “chicken-and-egg” problem when it comes to relating openness with state size.

Finally, and of most interest to us here, this recent work by economists has also attempted to link the optimal size of states to the character of political institutions. The key assumption is that citizens in larger states have more heterogeneous preferences over the types of public goods they would like the government to produce. Democratic institutions are thus expected to lead to a world of inefficiently small states because citizens secede from large units

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<sup>6</sup> Friedman 1977 also addresses tax regimes and size.

<sup>7</sup> Alesina, Spolaore, and Wacziarg (2000) offer a discursive account of the relationship between openness to trade and state formation, noting that as trade barriers rose in the late 19<sup>th</sup> century, few new countries were created (see above) and country size expanded through empires; as trade

whenever their preferences diverge so much from the policy preferred by the median voters in such units as to outweigh the economic advantages of integration. Alesina and Spolaore (1997) model these choices and demonstrate that, because individuals do not internalize the negative economic externalities that secession imposes on others (the lost economic benefits from larger markets), democracy will tend to produce “too many” states when compared with those chosen by a benevolent social planner to maximize world welfare.<sup>8</sup> By way of contrast, they demonstrate that if a small number of rent-maximizing autocrats collaborated to divide the world into separate units these states would be “too few” and much larger in size.

While the basic intuition here seems plausible, these models are limited in several important ways. They do not permit analysis of a world in which levels of democracy vary across states, but instead assume that all states are equally democratic or autocratic. They hinge upon the assumption that preferences over policy are more heterogeneous in larger states, though there seems to be little clear evidence to support this claim. Measures of ethnic and religious heterogeneity among citizens, which appear to be the best available indicators of variance in policy preferences, are actually weakly and negatively associated

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barriers have fallen since 1945, on the other hand, the number of new countries has grown rapidly.

<sup>8</sup> Bolton and Roland (1997) also demonstrate how secession results from the optimizing choices of median voters in separate regions within a larger political unit.

with state size.<sup>9</sup> And finally, these models do not allow for federal solutions that might reconcile the demand for local autonomy over some policy decisions with the economic benefits that come from national control over other aspects of policy. We address each of these limitations in the analysis below, allowing for variation in institutions across states, divorcing the issue of policy preferences from state size, and permitting federalism. Our conclusions about the relationship between democracy and state size are thus quite different from the prevailing wisdom: we argue that non-federal democracies will tend to be much smaller than autocracies in any state system, even if preference heterogeneity is unrelated to size, while federal democracies may grow to be among the largest states.

### 3. Democracy, Federalism, and Size

All governments produce public goods in exchange for revenue. Their monopoly of the legitimate use of force gives them a comparative advantage in

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<sup>9</sup> As a simple test, we examined the index of “ethnic and linguistic fractionalization” (Philip G. Roeder. 2001. “Ethnolinguistic Fractionalization (ELF) Indices, 1961 and 1985.” February 16. <<http://weber.ucsd.edu/~proeder/elf.htm>>.. In 1985, the pair-wise correlations between the index and territorial size and population are only 0.04 (n=138) and -0.02 (n=136), respectively. While there is a stronger positive correlation between fractionalization and size among just the African states, there is also a strong negative relationship between the index and size elsewhere (e.g. Oceania). On a theoretical level, blanket assumptions about preferences and size seem highly problematic. Simply imagine adding a third person to a “state” in which two people with different preferences over a single policy dimension currently reside. Whether or not this will increase aggregate unhappiness with the chosen policy will depend upon whether the new person’s ideal policy lies between or outside the ideals of the existing residents. The same conditionality applies at higher levels of aggregation. There is no reason to assume, a priori, that new citizens must be “extremists” rather than “moderates” in terms of their preferences over policy (and in fact, integration may be biased towards the latter).

producing goods where collective action problems, informational asymmetries, contractual impediments, and other barriers to voluntary exchange would otherwise create “market failures.” Due to their unique ability to employ violence legitimately, moreover, governments possess a monopoly within their core areas of production. For those goods where some measure of coercion is necessary to overcome market failures, governments have a clear advantage over other possible providers. This condition of monopoly allows governments to extract rents from citizens in the form of tax revenues that exceed the costs of producing public goods.<sup>10</sup>

Even as natural monopolists, however, governments produce within a “contestable market” (Baumol et al., 1982). That is, even though only one government exists within a given territory, it must garner support from some more or less sizeable proportion of citizens or lose power to an alternative government. In autocracies and oligarchies, the size of this “ruling coalition” may be extremely small, since the mass of citizens has no way to influence government decisions. In democracies, on the other hand, leaders are selected through and dependent upon the “electoral connection,” and the government must be supported by at least a majority of citizens.<sup>11</sup>

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<sup>10</sup> On rents and rent-seeking, see Buchanan, et al, 1980. On predatory theories of the state, see North 1981 and Levi 1988.

<sup>11</sup> Bueno de Mesquita et al. 1999, develop a related model that includes a selectorate and, within that group, a minimum winning coalition and derive a variety of predictions on the dyadic behavior of democracies. They do not address the question of state size.

Political institutions thus influence how and to what extent governments exercise their monopoly powers to extract and redistribute rents. The less democratic the regime, the smaller the ruling coalition, and the more scope the government will have to extract rents for its supporters and skimp on the provision of public goods.<sup>12</sup> Different aspects of this issue have been examined before. McGuire and Olson (1996) have studied the effects of regime type on rent-seeking and the provision of public goods with an eye to explaining cross-national differences in economic growth. Grossman (1991) models the behavior of rulers in non-democratic regimes and shows that they extract larger rents when military technology favors repression over insurrection.<sup>13</sup> Persson and Tabellini (2000) show that, in advanced democracies, competition between candidates for votes tends to eliminate their ability to earn rents when in office (though not completely if politicians are unable to make binding commitments to electoral platforms).<sup>14</sup> No previous treatments, however, have clearly linked rent-seeking to the issue of state size. As we demonstrate below, the ability to extract rents produces incentives for governments to create and administer larger territories.

### 3.1. The Provision of Public Goods and the Extraction of Rents

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<sup>12</sup> For an empirical test of this argument, see Lake and Baum 2001.

<sup>13</sup> See also Grossman 1994 and 1999, and Grossman and Kim 1996.

<sup>14</sup> See also Persson, Roland, and Tabellini 1997.

We begin with a state in which  $s$  citizens (indexed by  $i$ ) each have quasi-linear preferences over private consumption ( $c$ ) and a public good ( $g$ ) that is provided in identical amounts to all citizens:

$$u_i = c_i + f_i(g) \quad (1)$$

where  $f_i(\cdot)$  is a concave and increasing function of the per-person quantity of the public good provided. Assume that taxes cannot be targeted, and that government spending is financed by taxing each citizen's income,  $y_i$ , at common rate,  $t$ .<sup>15</sup> Also, in keeping with existing models (e.g., Alesina and Spolaore 1997), citizens cannot move into or out of the state. Private consumption,  $c_i$ , is equal to disposable income, so we can write:

$$u_i = (1-t)y_i + f_i(g) \quad (2)$$

Breaking with other models, we simplify by assuming that individuals have identical tastes in the consumption of the public good, and the common function  $f(\cdot)$  takes the following specific form:

$$f(g) = -k(g_0 - g)^2 \quad (3)$$

where  $g_0$  is the ideal amount of the public good everyone would like to consume, and  $k$  measures satisfaction from consumption of  $g$  relative to other consumption ( $k > 0$ ). This establishes that there is diminishing utility in the consumption of the

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<sup>15</sup> The assumptions that public goods and taxes cannot be targeted to different citizens are standard in existing models (e.g. Bolton and Roland 1997) and are not crucial for the results below; relaxing them would make the analysis much less tractable.

good and allows us to define equilibrium policy.<sup>16</sup> And to keep things simple we stipulate that territory is distributed uniformly among citizens and all citizens earn the same income ( $y$ ). Thus, like Alesina and Spolaore, we set aside issues of redistribution that do not relate directly to regime type and rent extraction.<sup>17</sup> Specifying a uniform distribution of territory means that  $s$  represents territorial size as well as population.<sup>18</sup>

Following Olson (1993) and McGuire and Olson (1996), we posit that government decisions are made by a ruling coalition comprising some non-zero proportion,  $\alpha$ , of citizens in the nation ( $0 < \alpha \leq 1$ ). In a “pure” autocracy, the ruling coalition would be one leader, and  $\alpha$  would approximate zero; in a “pure” democracy,  $\alpha$  would equal unity. We can usefully interpret  $\alpha=0.5$  as a defining line, since democracies should at a minimum include a majority of citizens in the ruling coalition. The ruling coalition chooses the amount of the public good it will provide and the amount of rent it will extract and redistribute to itself.

The government’s budget constraint can now be written in per-person terms as:

$$ty = q(g) + r \quad (4)$$

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<sup>16</sup> By holding tastes constant across individuals we sidestep the issue of whether size is related to preference heterogeneity. If heterogeneity does increase reliably with size (as per Alesina and Spolaore 1997) the results we derive below are accentuated.

<sup>17</sup> Again, relaxing this assumption would only accentuate the results derived below (if we allow that members of any ruling coalition are likely to be wealthier than the rest of society).

<sup>18</sup> We focus here on territorial size, rather than population, though the two dimensions are closely connected. States are defined fundamentally as territorial entities and, unlike the division of territory, which is always a politically-engineered outcome, demographic patterns can be affected by an wide array of nonpolitical forces and events.

where the costs of producing the public good are described by  $q(\cdot)$ , an increasing function of  $g$ , and  $r$  is the amount of rents or surplus tax revenues extracted from each citizen. Marginal cost, denoted by  $q_g$ , is strictly positive.<sup>19</sup> The standard assumption about the costs of producing most public goods, for which there is empirical support, is that they reflect increasing returns to scale and, hence, the long-run average cost curve is negatively sloped over a large range of production levels.<sup>20</sup> In general, of course, the per capita cost of a public good will decline with the number of taxpayers who finance it, although at some point problems of overcrowding and coordination will cause costs to rise. Moreover, there are cost advantages when producing public goods over a larger area: in particular, providing security from foreign invasion tends to grow less costly with size because area expands more rapidly than the borders that surround it. These various economies of scale are critical in the analysis of state size below.

Using (2), (3), and (4) we can now write the decision problem for the ruling coalition in terms of maximizing the utility of each (identical) coalition member:

$$\begin{aligned} \max \quad & y - q(g) - r - k(g_0 - g)^2 + r/\alpha & (5) \\ \text{subject to} \quad & q(g) + r \leq y \\ & g \geq 0, r \geq 0 \end{aligned}$$

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<sup>19</sup> We assume that, if  $g=0$ , there are still some costs to governing (and collecting taxes); that is,  $q(\cdot) > 0$ .

<sup>20</sup> See Bolton, Roland, and Spolaore 1996; Alesina and Spolaore 1997. For empirical evidence, see Easterly and Rebelo 1993.

The final term in (5) is the amount of rent distributed to each coalition member (equal to  $rs/\alpha s$ ). It is very easy to show that with increasing degrees of democracy the equilibrium amount of the public good provided rises and the equilibrium level of rents falls. (See Appendix I for solutions). At the autocratic extreme, the ruling coalition provides no public goods and extracts all income as rents; at the democratic extreme, the public good is provided at the “optimal” level and rents are driven to zero.

### 3.2. The Evolving Size of States and Democracy

This simple framework allows us to examine how changes in the size of states (and in political institutions) can result from the self-interested decisions of ruling coalitions. The approach we take here focuses on sequences of such decisions over time, and thus differs greatly from the existing literature on state size where the emphasis is on defining an equilibrium distribution of states for the system as a whole. The latter approach requires extremely restrictive assumptions about the institutional mechanism by which states are formed. For instance, Alesina and Spolaore (1997) assume that in a fully democratic international system individual citizens can make the decision about whether to secede from a state; voluntary citizen choice is thus the process by which nations are formed. They contrast this with an equally extreme non-democratic world in which states are created by a cooperative consortium of dictators. In both versions, all states formed are equal in size. Neither version seems particularly

helpful for dealing with an international system composed of states of different sizes and regimes of various types, and in which political units are defined and altered by a range of processes that include both autocratic coercion and democratic consent.

We take a different tack, focusing on the competing incentives of different ruling coalitions to expand the size of their jurisdictions (or alter political institutions), then examining the consequences of the cumulative effects of such changes over time for the structure of the international system. The formation of the state system is thus seen as the outcome of an evolutionary process: at any moment in time, the array of states in the system reflects the results of the historical sequence of decisions made in smaller political units about expansion or contraction. The political units that were the building blocks for this process were presumably small proto states or polities (the type described by Olson (1993) as creations of “stationary bandits”). Even in the current system, as decisions are made about the formation of new states, we assume that these polities represent the primordial building blocks of possibly larger units called states.

We suggest that the historical process can be likened to a very simple form of an evolutionary game between ruling coalitions.<sup>21</sup> In the first “round” of this game, there exists a set of small, equal-sized polities across which regime type

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<sup>21</sup> We use “evolutionary” here simply to connote that states are engaged in a form of competition that, over time, transforms the characteristics of the population. Unlike standard evolutionary

varies randomly. Ruling coalitions in these units can make competing “bids” to expand their states by incorporating land and populations in surrounding locations into their jurisdiction. These bids can be thought of as expenditures for winning and securing control of the territory and its resident population, and may be related to the use of military force or the distribution of “bribes” or side-payments to deter or defeat opposition. In succeeding rounds, ruling coalitions can bid for more territory in the same way, or give up territory acquired in earlier rounds. We also allow that ruling coalitions can make decisions in each round that alter the character of the regime (by democratizing or the reverse).<sup>22</sup> At any point in time, the outcomes from the sequence of preceding rounds will be reflected in a system-wide distribution of states varying in size and regime type.

In this model, no coalition ever bids more for new territory than it is worth to them in succeeding rounds (in terms of per-person utility), time horizons are identical, there are an indefinite number of rounds, and all income is consumed in each round.<sup>23</sup> There are several ways in which the bidding contests for new territory may be structured, but the simplest assumption—consistent with our earlier observation that the periphery of the states system has provided, until recently, an endless supply of new states or additions to states—

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game-theoretic approaches, we do not model a “reproductive” mechanism in which states that are more successful in one “generation” are replicated at a higher rate in the next.

<sup>22</sup> That is, regime change in this model is always in the form of a “revolution from above.”

is that some amount of new territory is “up for grabs” in each successive round and the highest bid wins.<sup>24</sup> It is not necessary to limit this auction to a specific type: it could take a form in which every state bears the cost of its bid (say in military spending), for instance, or it could take a form in which only the winner bears any actual cost (paying local residents, for instance, to acquiesce). All that is necessary for our purposes here is that control of the new territory goes to the state that is willing to pay the most for it.<sup>25</sup> Consumer demand for the public good is taken to be identical among citizens everywhere, as are ownership of territory, incomes, and the costs of supplying the public good to citizens.

Changes in size are independent of changes in regime type; this implies that “new” citizens incorporated in a state are treated just the same as “old” citizens (the same proportion of them,  $\alpha$ , become part of the ruling coalition).<sup>26</sup> Finally,

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<sup>23</sup> We thus set aside the possibility of “investing” in order to win future bidding contests. Examining differences in time horizons and capacities for investing across different types of regimes is a logical area for extensions of the analysis, but we do not pursue them here.

<sup>24</sup> We have experimented with alternative game structures in which the location of the new territory varies randomly, for instance, and only states designated as contiguous with it can bid for it, and in which a number of new states (with randomly assigned regime characteristics) can also form in each round, bidding against each other for control of some amount of new territory. One can also allow that some new territory may not be “winnable” in that the cost of taking control may exceed the maximum that any state is willing to pay for it. The key substantive results are the same as in the simplest version of the game described here.

<sup>25</sup> By emphasizing the size of the bid each party is willing to offer, we sidestep a lot of thorny strategic issues that might arise in bargaining or fighting over territory. To specify the bargaining process more fully would add considerable complexity to the model without altering its basic result.

<sup>26</sup> This assumption can be relaxed in a fairly straightforward way to examine some specific issues raised in previous studies of federalism and imperialism. In particular, we might allow that the government could treat citizens in new territories in less democratic fashion than citizens at home—and hence differentiate between them in the provision of public goods and the imposition of taxes (i.e., act as a discriminating monopolist). Allowing for this possibility serves to magnify the relationship between autocracy and expansion that we elaborate below, and also helps to account for instances of “democratic imperialism” (e.g., the British and French overseas empires in the nineteenth century).

for simplicity, we assume that per-person income is unaffected by the size of the jurisdiction.<sup>27</sup>

It is easy to see how this evolutionary process should play out (see Appendix I for a fuller treatment of the model). The amount each ruling coalition is willing to bid for new territory in each round depends upon the extent to which expansion increases utility for coalition members (as defined in (5) above for optimal levels of  $g$  and  $r$ ). The derivative of (5) with respect to state size,  $s$ , is:

$$-\alpha^1 q_s \quad (6)$$

where  $q_s$  denotes  $\partial q / \partial s$ , and the assumption of a downward-sloping average cost curve for the production of the public good (i.e., economies of scale) implies  $q_s < 0$ . It is immediately clear that the less democratic the form of government (the lower is  $\alpha$ ), the greater the marginal gain in utility for the members of ruling coalition from an additional unit of territory, all else equal, and thus the more they will be willing to bid to expand the jurisdiction. In the first round then, the ruling coalition in the most autocratic state will outbid others to win the new territory. In subsequent rounds, since the average cost curve flattens out as problems of overcrowding and coordination in the provision of public goods rise

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<sup>27</sup> In extensions of this model we have allowed, in line with Alesina, Spolaore, and Wacziarg (2000), that per-person income is an increasing function of the size of the jurisdiction, since there are likely efficiency gains from incorporating more productive assets (territory and people) into one integrated market. As Alesina, Spolaore, and Wacziarg posit, however, the relationship between size and income depends upon the extent of barriers to trade with the rest of the world: that is, the greater are barriers to trade, the more important is the size of the domestic market as a determinant of per capita income. We can thus write  $y = y(s, \lambda)$ , where  $\lambda$  denotes barriers to trade,  $\partial y / \partial T > 0$ ,  $\partial y / \partial \lambda < 0$ , and the cross-derivative  $\partial^2 y / \partial s \partial \lambda$  is positive. The results are predictable: incentives to expand the size of the territorial unit are decreasing in the size of barriers to trade.

in the expanding state ( $q_s$  approaches zero), the same coalition will continue to win new territory only until it is outbid by the ruling coalition in the second most autocratic state. The pattern is the same as the game continues over successive rounds: only when more autocratic states have expanded to sizes at which economies of scale are exhausted will less autocratic states begin to expand at all. The most democratic states will always be smaller since the incentives to expand (to generate rents) for their ruling coalitions will always be smaller.

In each round we can allow that a state can “sell off” territory it has acquired in a previous round, transferring control to the highest bidder.<sup>28</sup> Obviously, a state will only give up territory it has previously acquired if there is some change in political institutions: specifically, only if it becomes less autocratic (and hence values the territory, and the rents it represents, less than before and less than some other state is willing to pay for it) or other states become more autocratic (and hence willing to bid more for the territory than it is worth to the state that controls it). Allowing for this possibility, it should be noted, ensures that the equilibrium distribution of territory across states in the system in any given round is “stable” in the sense that all results from auctions in previous rounds are compatible with current incentives (i.e. no ruling coalition

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Given our qualms about the degree to which trade barriers can be considered exogenous to state size, we have set aside these considerations in the present model.

<sup>28</sup> We suppose that states give up units of territory acquired previously in reverse order (i.e. the latest units acquired are relinquished first). To keep things simple, we also stipulate that new units of territory acquired are always smaller than the states that acquire them. Together these conditions just ensure that the ruling coalition that decides to acquire new territory in one round

is currently willing to bid more for territory than it is worth to the state that controls it).

So when are states likely to become more or less democratic? The simple model developed here offers some clues. The change in utility for members of any ruling coalition that results from democratization is the key issue. By first taking the derivative of (5) with respect to  $\alpha$ , it is easy to show that:

$$\begin{aligned}\partial U/\partial \alpha &< 0 \\ \partial^2 U/\partial \alpha^2 &> 0 \\ \partial U/\partial \alpha \partial s &< 0\end{aligned}\tag{7}$$

Democratization is always costly to members of the ruling coalition in our simple model (the first derivative is negative) since all it does is dissipate rents, but notice that those costs are higher for coalitions in less democratic states (the second derivative is positive) and in larger states (the cross derivative is negative) where coalition members stand to lose even more in terms of rents. Flipped around, transitioning towards greater autocracy is more attractive for coalitions in states that are already more autocratic and larger. We do not attempt to characterize institutional change in more detail here, but simply treat coalitions as randomly presented with exogenous incentives and opportunities to transition towards either greater democracy or greater autocracy in each round.<sup>29</sup>

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is always a majority in the new expanded ruling coalition in future rounds, and can thus always reverse its decision and relinquish the territory.

<sup>29</sup> Since democratic transitions are always costly to the current ruling coalition, it will only be chosen when some exogenous benefit outweighs these costs; autocratic transitions are always attractive for those who remain in the ruling coalition when it is reduced in size, but some

As the derivatives above indicate, how the coalitions in different states are likely to respond to such “shocks” is shaped by the prevailing nature of the regime and size of the state.

The bottom line so far is that we can expect more autocratic states to expand the most in size and more rapidly, and as they expand they become even less likely to democratize (and more likely to transition further toward autocracy) than smaller states. The basic evolutionary process thus favors two types of outcomes: small democracies and large autocracies.

### 3.3. Federation

Another type of outcome emerges if we permit expansion to be achieved through federation. To allow for this option, we must complicate the model a little and let governments supply more than one type of public good. A federal agreement assigns responsibility for producing different public goods to different levels of government. In the analysis above, we imagined that the government produced only one type of good (or a basket of goods treated as an average). We now allow that there are two types public goods (goods 1 and 2) that are distinguished only by differences in their cost functions: specifically, there are economies of scale in production of good 1, and diseconomies of scale in production of good 2, given the starting size of all states in round one and the

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exogenous change must occur which provides them with the opportunity to disenfranchise other members of the coalition.

associated levels of production of each good.<sup>30</sup> The guiding intuition here is that the optimal scale of production for different types of public goods is likely very different. Economies of scale are likely to persist over a greater range for some goods (e.g. national defense) than for others (e.g. garbage collection or fire protection), due to differences in the costs of gathering information and coordinating delivery of goods in a large market.

First note how this complication affects the basic incentives to expand state size derived above. If the two goods only differ in this one aspect, we can rewrite a coalition's optimization problem (5) from above as:

$$\begin{aligned} \max \quad & y - q_1(g_1) - q_2(g_2) - r - k(g_0 - g_1)^2 - k(g_0 - g_2)^2 + r/\alpha & (5') \\ \text{subject to} \quad & q_1(g_1) + q_2(g_2) + r \leq y \\ & g_1, g_2 \geq 0, r \geq 0 \end{aligned}$$

It is a simple matter to solve for optimal levels of production of public goods and rents, and take the derivative of (5') with respect to size at those optimal levels:

$$- \alpha^1(q_{1s} + q_{2s}) \quad (6')$$

where  $q_{1s} < 0$  (since there are economies of scale in production of good 1) and  $q_{2s} > 0$  (since there are diseconomies of scale in production of good 2). A simple expansion of the size of the state now carries an added cost,  $\alpha^1 q_{2s}$ , associated with the efficiency losses in production of the second good, which must be

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<sup>30</sup> From first principles, we would assume that good 2 is produced with some scale economies at first but that these are quickly exhausted, thereby incurring diseconomies for further production.

weighed against the efficiency gains in production of the first good and the added rents it allows.

Now imagine instead that a ruling coalition in one state can enter a federal agreement with a ruling coalition in another state, ceding responsibility for producing good 1 (and power to tax citizens to pay for it) to a new federal government that would administer the expanded jurisdiction. The existing governments in both states would continue to supply public good 2 at the “local” level. Consistent with the model above, we suppose that good 1 is supplied to all citizens in identical amounts by the federal government which levies a common tax. The federal agreement ensures that each government can provide its preferred level of good 2 at the local level, then the new federal ruling coalition (the sum of the two local coalitions) will choose a level of good 1 to provide at the national level along with the associated amount of rents that can be redistributed.

To make for easier comparisons with the incentives for a simple expansion of the size of one state, just suppose that the second state involved in the federal deal is a very small territorial unit. This allows us to focus again on the derivative of (5') in order to examine the incentives for making a federal agreement. The key differences now are that the increase in size does not imply diseconomies of scale in production of good 2, which is provided at the local

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This would, however, only complicate the math. Thus, we assume that states are already of a size that exhausts the initial increasing returns in the second good.

level, but it does imply an alteration in proportion of the population included in the (now federal) ruling coalition:

$$- \alpha^1 q_{1s} - \alpha^2 \{y - q(g_1^*) - q(g_2^*)\} \alpha_s \quad (6'')$$

where  $g_1^*$  and  $g_2^*$  are optimal amounts of goods 1 and 2 provided by the federal and local governments, respectively,  $\alpha_s$  denotes  $\partial \alpha / \partial s$  and reflects the degree to which the new federal state is more or less democratic than the original state.

Assuming that no two states have identical institutions ( $\alpha_s \neq 0$ ), it is easy to see by comparing (6'') with (6') that the incentives to form a federation (compared with competitive expansion) are decreasing in the degree to which the state is less democratic than its potential partner. For the less democratic partner, the second term in the equation represents the losses from distributing rents among a larger proportion of taxed citizens ( $\alpha_s > 0$ ). These costs must be weighed against the benefits from avoiding efficiency losses in production of good 2 at the larger scale. It is easy to show that these disadvantages of federation versus expansion are decreasing in the level of democracy (since rents are valued less overall).<sup>31</sup>

The above analysis implies that for governments in similar, highly democratic states, federation will be a very attractive method for expanding the effective size of the jurisdiction when there are both economies and diseconomies

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<sup>31</sup> Of course, a federal agreement might provide some kind of bargain between the local ruling coalitions in which the more democratic state compensates the less democratic state for lost rents. But we assume that such agreements are very difficult to negotiate and the credibility of a commitment to furnish such transfers in perpetuity seems highly suspect. Transactions costs and

of scale in the provision of various public goods. In these democratic cases it is likely that (6'') greatly exceeds (6'). Democracies that would make very low bids for control of new territory, due to concerns about diseconomies of scale in the provision of some public goods, might instead be drawn to federal agreements with other democracies. Such agreements would effectively align political units with the optimal scales of production of different public goods, siting authority for social services and education at the local level, for instance, and national defense and the environment at the federal level.<sup>32</sup> Within the context of the European Union, this has become known as the principle of "subsidiarity:" locating the production of public goods at the level of government able to provide them most efficiently.

We can amend our simple evolutionary model then, to allow that any two states in our system can, in any round, decide to form a federation. A federal bargain will carry some costs, since the bargain must be negotiated and federal institutions created. A federation is formed when it would increase utility for members of the ruling coalitions in two states, allowing for these costs, and when neither member would prefer to have won new territory alone during that round at the prevailing "price." If more than one such agreement is feasible for a ruling coalition in any state, it will choose only the agreement that provides the greatest gain in utility. Once formed, federations no longer bid for new territory but may

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credibility problems rise in line with the value placed upon rents (that is, they increase with autocracy).

extend the federal agreement to include new members (one at a time). The basic results are predictable: for any given set of parameters (specifying the distribution of types of states in the system, the cost functions for the two goods, and the costs of bargaining federal agreements), more democratic states are always more likely to enter federal agreements. This much is already clear from (6'').

Another result is more surprising. There are incentives for these more democratic states to expand the scope of the federal agreement up to the optimal size of the public good with the largest scale economies of production. Referring back to (6''), and assuming for simplicity that  $\alpha_s$  is very small, we can see there are incentives to expand the federal agreement as long as the average cost of producing good 1 is declining so that  $-\alpha^{-1}q_{1s}$  exceeds the costs of the bargain. When the economies of scale in the production of the good are exhausted, so that  $q_{1s} = 0$ , there will be no more incentives to expand state size any further. Thus, these federal democracies have a limiting size that is set by the optimal scale of the public good with the greatest economies of scale, along with the distribution of other states in the system (the ability to find partners) and bargaining costs. Given large economies of scale, then, these federations will grow much larger than non-federal democracies and even many less democratic non-federal states, which must balance economies of scale in production of some goods against

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<sup>32</sup> For a recent summary of this literature, and extension to include problems of credible commitment, see Bednar, Eskridge, and Ferejohn 1999.

diseconomies of scale in production of others when expanding and bid competitively to win new territory.

### 3.4. Testable Implications of the Model

The evolutionary process in the state system thus seems to favor three outcomes: small democracies, large autocracies, and large democratic federations. This pattern should be revealed if we examine the distribution of states in the system at any moment in time. We can distil these results into several testable hypotheses for the empirical analysis that follows:

*H<sub>1</sub>: Federal states are more likely to be democratic.*

*H<sub>2</sub>: Unitary (non-federal) democracies will be the smallest states in the system.*

*H<sub>3</sub>: Unitary autocracies will be larger than unitary democracies, but may or may not be larger than federal democracies.*

*H<sub>4</sub>: Federal democracies will be larger than unitary democracies, but may or may not be larger than unitary autocracies.*

## 4. Empirical Results

Borders are “sticky” and may be the most rigid institutions of modern political life. In the data used for this study, summarized above and discussed in more detail below, there are 12,646 “country-years” but only 340 cases of territorial change (and we have complete political data on only 296 of these cases). In turn, levels of democracy and federalism are also relatively stable.

Despite the large number of potential observations, it is difficult to test inferences on the relationship between democracy, federalism and size because of the lack of variation in the data and, more important, in the real world.

Despite this limitation, it is possible to test our evolutionary model and the hypotheses that follow from it in at least a preliminary and tentative fashion. In this section, we report a series of cross-sectional investigations of the relationship between democracy, federalism and size. Cross-sectional tests of evolutionary theories implicitly assume that the system is in equilibrium at the time of the analysis, an unlikely event. All that is necessary for our tests, however, is that the system be tending toward equilibrium. Any “out of equilibrium” cases will simply be reflected in larger standard errors, thereby making it less likely that our results will attain statistical significance. Even though we present cross-sections on only two years, we tested the same model repeatedly on different years and note below the periods over which the results are robust.

In addition, if borders are inherently sticky, then the nature of the political regime at the moment the state is “born” may be particularly important. Since both borders and the type of regime are more malleable at moments of creation, it is more likely that the state’s political institutions and size will begin in alignment. We conduct a second cross-sectional investigation restricted to the first year each state enters the system.

For an evolutionary theory such as ours, which variable is treated in cross-sectional analyses as the “dependent” variable and which as the “independent” variables is somewhat arbitrary. To be consistent with the form of our hypotheses above—and because state size is central to many questions in international relations and democracy has received much attention in the recent literature—we treat territorial size as the dependent variable in the tests reported below. This is not to imply that democracy or federalism cause size any more than size causes democracy. To reiterate, we expect only to find these variables correlating in certain predictable patterns. The results below simply estimate the strength and magnitude of the relationships between democracy, federalism and size.

Six variables are of central importance for the theory (for all variables and sources, see the Appendix II below). Territorial size (as described in section one) is measured in thousands of square kilometers. We use the natural log of territory in all regressions to correct for heteroskedasticity.

The concept of democracy is now commonly operationalized using the democracy and autocracy variables in the Polity data set. Following standard practice, we subtract the autocracy index (0-10) from the democracy index (0-10), thereby creating a single, 21-point scale of democracy that runs from -10 (least democratic) to +10 (most democratic). Federalism is measured by the centralization of political authority variable in the Polity III data set. This variable is explicitly designed to distinguish between states in which “no more than

moderate decision-making authority is vested in local or regional governments,” intermediate cases, and states in which “local and/or regional governments have substantial decision-making authority.” Centralized or unitary states are coded as zero, intermediate or mixed cases as one, and decentralized or federal states as two.<sup>33</sup>

We have included a range of control variables in the analysis. Since our evolutionary model assumes that states are equally old, we include an index—named “independence”—which measures the age of each country as the number of years since 1815 or whenever the country first enters the system, whichever is later. We also include an income or development variable to control for the effects of cross-national differences in wealth (which were excluded from the model). Three proxies are available: GDP per capita, iron and steel production per capita, and energy consumption (measured in coal-ton equivalents) per capita. In the models below, energy consumption per capita is a more statistically robust indicator and is reported for all regressions. Since the model above assumes a uniform distribution of territory among citizens in all locations, we also control for cross-national differences in population density.<sup>34</sup> States with

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<sup>33</sup> An alternative measure of federalism might be revenues or expenditures by the central government relative to all government revenues or expenditures. There is only a modest correlation (approximately 0.35) between the Polity III centralization variable and the revenue or expenditure figures. Unfortunately, revenues and expenditures are available for only OECD countries between 1970 and 1994.

<sup>34</sup> Our territorial size data reflect all known changes in territory, adjusting the number of square kilometers annually to correspond to changes in boundaries. We do not have population figures for the pieces of territory transferred from one unit to another. As a result, we use the population figures reported in standard sources described in the Appendix. We know that these sources missed many changes in territory and, we assume, many corresponding changes in population.

higher population densities are likely to be producing public goods in greater quantity, *ceteris paribus*, and thus should have less incentive to expand to exploit scale economies. In addition, while the model assumes that cost functions are identical everywhere, it seems likely that the costs of providing public goods are lower where populations are more concentrated. To allow for this, we include the ratio of the urban population to total population in each state, anticipating that states may have greater incentives to expand when populations are more urbanized.

In auxiliary models, we also control for 1) coastline as a proportion of total borders, to examine whether oceanic boundaries limit the ability of states to expand; 2) a measure of the degree to which the terrain is mountainous (a dummy variable coded as little, somewhat, and extremely mountainous); 3) trade openness, measured by the sum of exports and imports as a proportion of GDP; and 4) regional location, to pick up on any further generational effects, common histories of decolonization, or scale economies unique to a particular area (Europe, where we perhaps understand the process of state formation most fully, is the excluded category).

#### 4.1. Democracy, Federalism and Size

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Given the strong results for both population density and urban population in our models, however, we do not believe the inevitable measurement errors seriously distort the results.

Table 2 presents cross-sectional results for 1925 and Table 3 presents similar results for 1985. Each year was picked as representative of the interwar and post colonial periods, respectively. Given the sticky nature of the relationships of concern here, any one year is nearly the same as any other within each period. This suggests that the system is more or less in equilibrium at each time.

The results strongly support hypotheses 2-4. In a “log-lin” model, such as that employed here, the coefficient approximates the percent change in territorial size caused by an absolute change in the relevant independent variable. For ease of interpretation, the expected values of territory in extreme cases, holding all other variables at their mean values, are presented in the second panel of each table for unitary democracies, unitary autocracies, and federal democracies (calculated using King et al., 1999).

In 1925, using Model 1 (Table 2a), a one unit increase in democracy (on a 21 point scale) is associated with approximately a 10 percent decrease in territory. Similarly, a one unit increase in federalism (on a three point scale) produces a 62 percent increase in territorial size. The joint effects of democracy and federalism are presented in the second panel. During the interwar period, unitary autocracies were over five times larger than unitary democracies. Federal democracies, in turn, are almost four times larger than unitary democracies. (The joint effects of autocracy and federalism produce enormous expected values, but for reasons predicted by the model and discussed below this is almost an empty

set that is seldom observed over the long run.) In substantive terms, democracy appears to exert a slightly larger effect than federalism. This is partially misleading, however, as hypothesis 1 and the results in Table 5 below indicate that democracy also has indirect effects on size by increasing the likelihood of federalism. This same general pattern exists throughout the interwar period. The effect of democracy is significant at standard levels for all years after 1919 until 1938, while federalism is significant only during the 1920s.

In 1985, using Model 1 (Table 3a), a one unit increase in democracy produces a seven percent decline in territorial size while a one unit increase in federalism is associated with an 83 percent increase. The joint effects are again illustrated in the second panel. In the post-colonial period, unitary democracies were nearly four times smaller than unitary autocracies and more than five times smaller than federal democracies. In contrast to the interwar period, federalism now appears to exert a substantively larger effect on territorial size than democracy. This may indicate that changing technologies of public goods provision have increased the benefits from subsidiarity relative to the rents that can be extracted from citizens. The coefficient on federalism is always highly significant from 1946 to 1985. The coefficient on democracy becomes significant only after 1960 and even then occasionally fails to attain standard significance levels. Given the destabilizing effects of decolonization on much of the world, it is plausible that the system as a whole was “out of equilibrium” in the years immediately after World War II but slowly moved back into equilibrium by the

late 1960s. Although the results within each period are generally stable, there is clearly some unexplained variance within and across the two periods.

In both time periods, population density is strongly and negatively associated with state size; more densely populated states tend to be smaller, as we suspected. Also in line with expectations, the percent of the population living in urban areas is strongly and positively associated with territorial size. The more concentrated the settlement pattern, the larger the country tends to be, all else held constant. The number of years of independence exerts a small but typically significant effect on size. Older countries tend to be larger, supporting some of the inferences drawn from our initial census in section one of this paper. Wealth, measured by per capita energy consumption, tends to reduce the size of states in recent years, but this effect is not significant for all models and is not apparent at all in the interwar years.<sup>35</sup>

In Tables 2 and 3, we test, where data permit, alternative specifications of our basic model. To our initial surprise geographic features intuitively associated with state size do not appear to exert a significant effect (Table 3a, Equation 2). As explained above, we measure the proportion of a country's borders that is comprised of oceanic coasts, expecting that those with a high ratio of coastline to total borders will be more constrained and more likely to be below their optimal size. We also created a variable for terrain, again expecting that mountainous

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<sup>35</sup> We had no firm expectations about the effects of this control variable. On the one hand, there may be greater demand for public goods in wealthier societies, or superior production

territory makes it harder to deliver public goods and govern and, therefore, more likely that the country will be smaller. Neither variable appears to have any significant effect on size. We suspect that these geographic features may produce countervailing effects. Mountain ranges most likely serve as natural barriers to expansion for some states (e.g., Switzerland). Once mountain ranges are surmounted, however, states may be able to expand into the surrounding plains until the next geographic barrier is reached. The Appalachia Mountains slowed the movement of European settlers across the United States in the early nineteenth century but, once past this barrier, homesteaders quickly filled the Great Plains. The Ural Mountains posed a similar barrier to Russia's Eastward expansion that, once surmounted, allowed the Czars to extend their control all the way to the Pacific. Similarly, for some countries, oceans may exert a constraint on size. Having filled the available area, the state simply cannot expand further. For these states, the surrounding ocean does prevent them from reaching their optimal size. Conversely, large oceanic borders may facilitate expansion for other states. With few competitor states in each region, itself a product of their oceanic moats, Australia, Russia, and the United States were able to absorb whole continents. With these countervailing effects and upon reflection, perhaps we should not have expected these variables to be systematically related to state size.

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technology, which would suggest lower incentives to expand size; on the other hand, wealthier societies will have larger budgets with which to bid for new territory.

As demonstrated in Equation 3 of Table 3a, trade openness is importantly and significantly related to the size of states. Countries that trade more are smaller: for each additional percent of GDP accounted for by international trade in 1985, for instance, countries are predicted to be approximately 177 percent smaller. At the same time, trade openness is a policy choice that varies more over time than does the size of states. Rather than suggesting that trade openness causes states to be smaller, it is more likely that small countries choose to be more open. Unfortunately, there is insufficient variation in the size of states over time to establish the direction of causality, but the latter interpretation seems more sensible, at least in a cross-sectional test. For our purposes, the important point to note is that, controlling for trade openness, democracy and federalism continue to exert nearly identical effects on state size. The coefficients do decline in magnitude, but the more significant finding is that the results stay remarkably consistent across this alternative specification. Even controlling for openness, unitary democracies are smaller and federal states larger. Although the “economic openness” explanation summarized in section two is supported by these results, democracy and federalism possess strong and independent effects on size.

Confirming the inference drawn above from Figure 2 on regional size disparities, there are no significant differences in size relative to Europe (the excluded category) in either period. Asia in 1985, which is significantly larger than Europe, is the only exception.

In sum, this cross sectional investigation supports the set of predictions embodied in hypotheses 2-4. Unitary democracies are smaller than both unitary autocracies and federal democracies. Curiously, there is a “flip-flop” in the relative sizes of unitary autocracies and federal democracies relative to one another between the interwar and post-colonial periods. Given the contingent nature of the hypotheses this does not contradict the theory. It does suggest, however, that the benefits of subsidiarity may have grown larger relative to the rents that can be extracted by autocratic governments.

#### 4.2. Democracy, Federalism and Size: New States

Table 4 presents similar tests as above conducted on “new states,” with the unit of observation being the year in which the state entered the international system.<sup>36</sup> For reasons of data availability (specifically, on the income proxies), the set of cases is limited to states formed after 1860. Although we have not allowed for state births in the simplest form of the evolutionary model described in the previous section, the extension is straightforward: assume, for instance, that a random number of new states (with randomly assigned regime characteristics) can form in each round of the game, bidding only against each other for control of some amount of new territory. The same results then follow. The primary intuition behind this test is that, given the joint determination of borders and

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<sup>36</sup> In several instances, the political variables were not coded by Polity III for the first several years of a regime’s history. In these instances, we use the first year in which data on democracy and federalism are available as the unit of observation.

regime type at the time of creation, a state's initial regime and size are especially likely to be in equilibrium.

The results of this test are quite similar in their substantive effects to the cross-sectional results reported in the previous sub-section. Democracies are significantly smaller than other states, with the coefficient on the new states nearly identical to that for all states in 1985. Federalism exerts a somewhat smaller effect than in either 1925 or 1985. These results point in similar directions as those in Tables 2 and 3, replicate the magnitude of the effects of democracy on size, and therefore lend greater confidence to the previous tests. Interestingly, there appears to be no significant temporal effect on the size of newly born states.

#### 4.3. Democracy and Federalism

Hypothesis 1 predicts that federal states are more likely to be democracies. To put this another way, democracies may be federal, but autocracies will be unitary. We should observe few federal autocracies in the real world.

Tests of the relationship between democracy and federalism are plagued by the lack of change in these basic regime characteristics as well as the absence of good measures of the scale economies in producing public goods. Although this is not a complete test of the relationship, democracy does appear to be strongly related to federalism.

As federalism is an ordinal variable that takes on a small number of unevenly spaced values, we conduct a multinomial logit analysis. The results are

presented in Table 5. Centralized states are the comparison category. As might be expected, the “mixed” category between unitary and federal states is not significantly related to democracy. Democracy, however, is significantly and positively related to the federal category.

Since the coefficients in such models are difficult to interpret, the predicted probabilities for a highly autocratic state (-10 on the democracy scale) and a highly democratic state (+10 on this same scale) are presented in the second panel of Table 6 (using King et al., 1999). As these predicted probabilities make clear, all states are more likely to be centralized. Unitary states are far more common than federal states. More important, however, only 2 percent of all autocratic states but 22 percent of all democratic states are likely to be federal. Among the set of countries that are organized federally, democracies clearly and strongly predominate.

Federal autocracies are theoretically and empirically anomalous. Perhaps as a consequence, the handful of real cases suggest they are also highly unstable. Since 1960, there have been only nine such states: Brazil (1965-1973), Cameroon (1961), Czechoslovakia (1961-1973 [end of data]), Libya (1961-1963), Mexico (1961-1977), Pakistan (1961), Sierra Leone (1967), United Arab Emirates (1971-), and Yugoslavia (1961-1979). Brazil, Mexico, and Yugoslavia maintain their federal systems but move into and, more importantly, out of autocracy. Once they become autocratic, on the other hand, Cameroon, Libya, Pakistan, and Sierra Leone quickly eliminate federalism. Only Czechoslovakia (during the

years for which we have data) and the United Arab Emirates are both autocratic and federal over the long term. If a state is highly federal, it appears to be difficult to maintain autocracy, and highly autocratic states quickly centralize power (and rents). As implied by the theory, federal autocracies appear to be “out-of-equilibrium.” Overall, the results strongly support hypothesis 1.

### **Conclusion**

The statistical tests produce a robust and compelling story. Unitary democracies are, indeed, smaller than other states. Federal states, on the other hand, are larger than unitary states. There is no clear difference in size between autocracies, which tend to be unitary, and federal democracies. The rent-seeking bias of autocratic states and the benefits of subsidiarity pursued by federal democracies push both types of states toward larger territorial sizes. There are some hints in the data that today the gains from subsidiarity may actually outweigh the rents for autocrats, but any conclusions along these lines must remain tentative.

These strong empirical results fit well with the theoretical framework we have developed. Autocracies with small ruling coalitions appear to earn greater rents from producing public goods and, in turn, to possess an expansionary bias. All things considered, they have greater incentives to bid for control of larger territories. Democracies with large ruling coalitions extract fewer rents and either

fail to grow in size relative to autocracies or do so by creating larger federal states.

The results above, along with the widely acknowledged “third wave” of democracy (Huntington 1991), suggest that we may be living in an age of transition. On the one hand, the rise of separatist movements in many states around the globe, and the breakup of formerly communist regimes, may be the product of the current trend toward greater democracy. Stuck within the territorial vestiges of autocracy, groups may perceive that they can provide public goods for themselves more effectively than their current, inefficiently large states. Alternatively, groups within large states may stop short of seeking full independence, but demand new federal arrangements that allow for better resource use. Interestingly, the theory we have developed here implies that democratic politicians will also recognize the new reality and the social gains from smaller states or greater federalism, and will yield to if not lead this possible trend toward a reorganization of territory and political authority.<sup>37</sup> If this transition is, in fact, underway, we may find ourselves living not in a world of 185 states, but in one of many more separate entities.

On the other hand, the spread of democracy also opens up new possibilities for confederation across existing borders to take advantage of what appear to be the increasing gains from subsidiarity. By permitting states to amalgamate without fear that they will be exploited by some autocratic neighbor

or successor government, greater democracy also encourages the formation of larger, supranational federal units. Once secure in democratic “neighborhoods,” states can join together to capture the benefits from larger scale economies in producing public goods. In this case, the European Union may be the opening wedge in a consolidation of political authority in new, larger, federal, and most importantly, democratic superstates. To the extent that democracies choose this road, the size of states may expand dramatically in the years ahead.

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<sup>37</sup> On democratization and the voluntary territorial breakup of the Soviet Union, see Lake 1997.

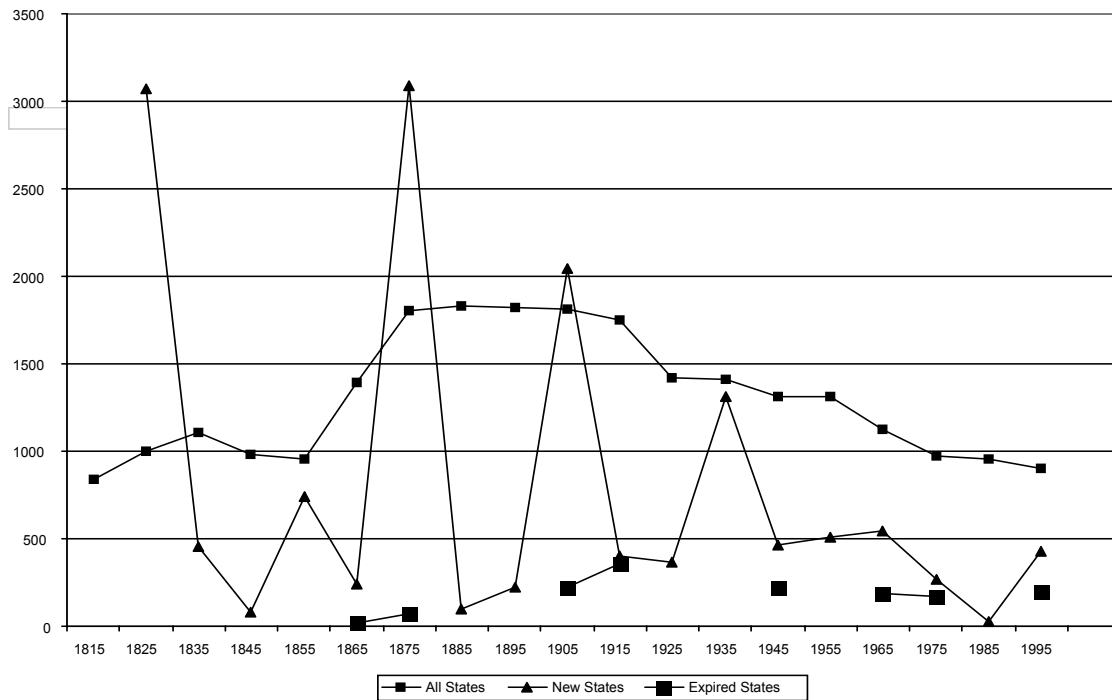
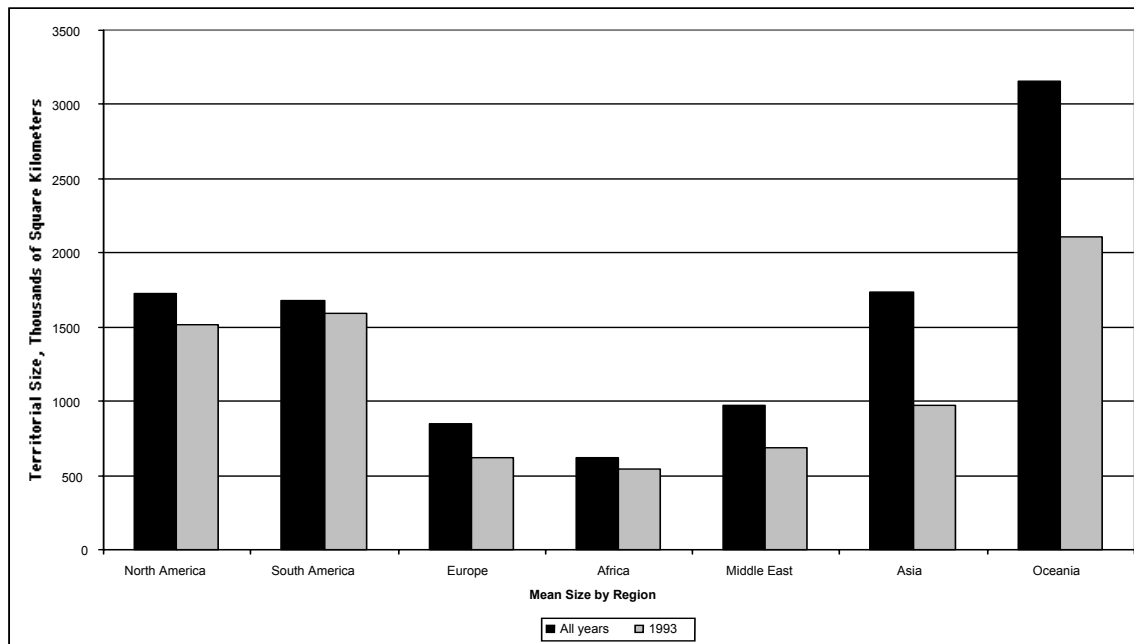


Figure 1. Mean Territorial Size of All, New, and Expired States by Decade



(in thousands of square kilometers)

Figure 2. Mean Size of States by Region, All Years and 1993

**Table 1. Mean Territorial Size of States, 1815-1995, By Decade**  
In Thousands of Square Kilometers

Period	All States	New States		Expired States	
	area	area	number	area	number
1815	838	-	-		0
1816-1825	999	3069	6		0
1826-1835	1107	451	5		0
1836-1845	980	76	7		0
1846-1855	954	744	2		0
1856-1865	1392	239	1	16	6
1866-1875	1802	3091	3	69	9
1876-1885	1828	94	2		0
1886-1895	1821	221	1		0
1896-1905	1810	2043	4	221	1
1906-1915	1746	406	4	357	2
1916-1925	1419	370	15		0
1926-1935	1411	1316	2		0
1936-1945	1313	464	4	225	5
1946-1955	1316	511	16		0
1956-1965	1121	543	39	187	1
1966-1975	973	267	15	168	1
1976-1985	954	23	2		0
1986-1995	903	431	16	192	4

**Table 2. Interwar Years**  
**Panel a. Cross-Sectional Results**

Dependent Variable: Natural Log of Territory (square kilometers)  
 (standard errors in parentheses)

Variable	1	2
Democracy	-0.09* (0.03)	-0.06 (0.04)
Federalism	0.66* (0.29)	0.83** (0.29)
Independence (number of years)	0.00 (0.00)	0.00 (0.00)
Energy consp. per cap (coal-ton equiv.)	0.24 (0.19)	0.27 (0.19)
Population Density ('000 of people per sq. kilometer)	-18.81*** (3.60)	-20.77*** (4.42)
Urban Population/ Total Population	5.80** (2.00)	5.49* (2.29)
N. America		-0.76 (0.54)
S. America		0.38 (0.62)
Africa		0.86 (0.79)
Middle East		0.96 (1.02)
Asia		1.26 (0.80)
Oceania		-0.76 (1.11)
Constant	12.07*** (0.36)	12.10*** (0.41)
N	58	58
Adj. R-squared	0.4699	0.5027

$p \leq .05 = *$ ;  $p \leq .01 = **$ ;  $p \leq .001 = ***$  (two-tailed test)

**Panel b. Expected Values of Territorial Size**  
 (thousands of square kilometers)

Based on Model 1

All Other Variables at their Mean Values

	Autocratic (-10)	Democratic (10)
Unitary (0)	656	120

Federal (2)	-	461
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**Table 3. Cold War/Post-Colonial Years****Panel a. Cross-Sectional Results, 1985**

Dependent Variable: Natural Log of Territory (square kilometers)  
(standard errors in parentheses)

Variable	1	2	3	4
Democracy	-0.07*** (0.02)	-0.07** (0.02)	-0.07*** (0.02)	-0.07** (0.02)
Federalism	0.82*** (0.21)	0.89*** (0.22)	0.90*** (0.22)	0.79*** (0.21)
Independence (number of years)	0.01** (0.00)	0.01** (0.00)	0.00 (0.00)	0.01*** (0.00)
Energy consp. per cap (coal-ton equiv.)	-0.20*** (0.05)	-0.19*** (0.06)	-0.07 (0.06)	-0.16** (0.06)
Population Density (‘000 of people per sq. kilometer)	-2.24*** (0.40)	-2.20*** (0.41)	-1.43** (0.46)	-2.54*** (0.42)
Urban Population/ Total Population	2.82*** (0.85)	2.59** (0.90)	3.60*** (0.94)	3.05*** (0.90)
Coastline/Borders		0.00 (0.47)		
Mountains		-0.10 (0.20)		
Trade Openness (X+ IM/GDP)			-1.77*** (0.45)	
N. America				-0.60 (0.52)
S. America				0.26 (0.56)
Africa				0.57 (0.51)
Middle East				0.21 (0.51)
Asia				1.22* (0.52)
Oceania				1.18 (0.81)
Constant	11.47*** (0.29)	11.56*** (0.36)	12.45*** (0.42)	10.79*** (0.52)
N	124	121	105	124
Adj. R-squared	0.4012	0.3803	0.4880	0.4345

p≤.05=\*; p≤.01=\*\*; p≤.001=\*\*\* (two-tailed test)

**Panel b. Expected Values of Territorial Size**

(thousands of square kilometers)

Based on Model 1

All Other Variables at their Mean Values

	Autocratic (-10)	Democratic (10)
Unitary (0)	354	87
Federal (2)	-	460

**Table 4. Cross-Sectional Results, New States**

Dependent Variable: Natural Log of Territory (square kilometers)  
 (Huber/White robust standard errors in parentheses)

<b>Variable</b>	
Democracy	-0.6* (0.02)
Federalism	0.51+ (0.26)
Energy consumption per capita (coal-ton equivalents)	-0.33* (0.13)
Population Density (‘000 of people per sq. kilometer)	-3.14** (0.95)
Urban Population/ Total Population	1.40 (2.26)
Year	-0.01 (0.01)
Constant	24.35* (10.82)
N	80
R-squared	0.3988

$p \leq .10 = +$ ;  $p \leq .05 = *$ ;  $p \leq .01 = **$  (two-tailed test)

**Table 5. Democracy and Federalism, 1985****Panel a. Multinomial Logit**

Dependent Variable: Federalism

(Centralized = 0, Mixed = 1, Federal = 2; Centralized is comparison group)

(standard errors in parentheses)

<b>Mixed States</b>	
<i>Democracy</i>	0.07 (0.04)
<i>Energy Consumption per capita</i>	-0.04 (0.15)
<i>Constant</i>	-2.24*** (0.43)
<b>Federal States</b>	
<i>Democracy</i>	0.13** (0.04)
<i>Energy Consumption per capita</i>	0.13 (0.10)
<i>Constant</i>	-2.59*** (0.47)
<b>N</b>	125
<b>Log likelihood</b>	-69.03

p≤.05=\*; p≤.01=\*\*; p≤.001=\*\*\* (two-tailed test)

**Panel b. Predicted Probabilities**

<b>Probability of:</b>	<b>Most Autocratic (-10)</b>	<b>Most Democratic (10)</b>
<b>Centralized</b>	0.92	0.64
<b>Mixed</b>	0.05	0.14
<b>Federal</b>	0.02	0.22

## Appendix I: An Evolutionary Approach to State Size

### A.1. The Provision of Public Goods and the Extraction of Rents

Writing the Lagrangian for (5) and solving for optimal levels of  $g$  ( $g^*$ ) and  $r$  ( $r^*$ ) yields the following results for differing levels of  $\alpha$ :

*for  $0 < \alpha < q_g/2kg_0$*

$$g^* = 0 \quad (\text{a1})$$

$$r^* = y - q(0)$$

*for  $q_g/2kg_0 \leq \alpha < 1$*

$$g^* = g_0 - q_g/2\alpha k \quad (\text{a2})$$

$$r^* = y - q(g_0 - q_g/2\alpha k)$$

*for  $\alpha=1$*

$$g^* = g_0 - q_g/2k \quad (\text{a3})$$

$$r^* = 0$$

That the equilibrium provision of  $g$  rises, and equilibrium levels of  $r$  fall, as  $\alpha$  increases can be seen by comparing  $g^*$  and  $r^*$  in (a1) through (a2) to (a3), and by noting that in (a2)  $g^*$  and  $r^*$  are, respectively, increasing and decreasing in  $\alpha$ .

### A.2. The Size of Nations

The equilibrium for this evolutionary model is characterized by a distribution of territory (and regime types) among states after each round.<sup>38</sup> The “auctioning” of new territory, and exogenous shocks that allow for regime change, mean that the size and institutional characteristics of states in the system shift over time. What we are interested in are patterns in these temporal changes.<sup>39</sup> The simplest way to reveal the dynamics of the evolutionary process is by substituting (a1) through (a3) into (5) and totally differentiating. Winning the new territory will increase per-round utility for each member of the ruling coalition by

$$- \alpha^1 q_s ds \quad (a4)$$

where  $q_s$  denotes  $\partial q/\partial s$  (economies of scale imply  $q_s < 0$ ) and  $ds$  represents the increase in population implied by the expansion. The coalition will be willing to bid for the new territory up to the point at which the per-person cost cancels out the present value of this gain over succeeding rounds: i.e., up to the point at which  $- \alpha^1 q_s ds/(1-w) = B/s$ , where  $w$  is the per-round discount factor and  $B$  is the size of the bid. The coalition’s maximum bid is thus  $- \alpha^2 s q_s ds/(1-w)$ , which is clearly decreasing in  $\alpha$  (or democracy). The maximum bid may be increasing

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<sup>38</sup> It is a set of market outcomes rather than a vector of strategies because ruling coalitions are treated simply as independent utility maximizers. Extending the logic of the model to allow for a strategic dynamic according to which, for instance, states that remain small relative to others risk being eliminated from the system, would be a natural extension, but one that we are not able to pursue in this paper.

<sup>39</sup> Here we describe the formal logic that determines the patterns observed over multiple rounds. Computational simulations can also be used to illustrate the evolutionary patterns for various specific values of the parameters in the model. Results from a series of simulation analyses are available from the authors upon request.

over some range of  $s$  (size), as the per-person tax costs of the bid decline, but must ultimately decline with  $s$  as economies of scale are exhausted (and  $q_s$  approaches zero). If coalitions cannot finance bids by borrowing against future returns, they will face a budget constraint on bidding set by current rents, but the results are unaffected. Since the level of current rents in each state is decreasing in democracy, more autocratic states have greater bidding power. Again, the maximum bid may be increasing over some range of size since the total rents extracted (and hence the budget available for bidding) rises with  $s$ , but this will be outweighed eventually by the shrinking incentives to bid for new territory.

In the first round all states are the same size and so the winning bid will be made by the most autocratic state (the state with the lowest  $\alpha$ ). This bid will match the maximum bid the second most autocratic state was prepared to make. In subsequent rounds the winning bid will either be made by the same state or the next most autocratic state, depending upon whether expansion has eroded the former state's incentives to claim new territory to the point that it can be outbid. States that gain new territory never give it up unless they democratize (so that the costs of the territory henceforth would exceed the gains) or other states become more autocratic (so that they willing to offer more for the territory than it is worth to the original buyer).

To examine the likelihood that any particular state will alter its political institutions, we substitute (a1) and (a2) into (5) – we assume that the extreme solution at  $\alpha = 1$  does not hold – and take the derivative with respect to  $\alpha$ :

$$- \alpha^2(y - q(s, g^*)) \quad (\text{a5})$$

Clearly democratization is less attractive to the ruling coalition in states that are less democratic to begin with and in larger states (since  $q_s < 0$ ).

The pattern that emerges after multiple rounds is thus clear: the most autocratic states expand more and more rapidly than do the most democratic states.

### A.3. Federation

Writing the Lagrangian for (5') and solving for optimal levels of  $g_1$ ,  $g_2$  and  $r$  yields the following results for differing levels of  $\alpha$ :

for  $0 < \alpha < q_g/2kg_0$

$$g_1^* = g_2^* = 0 \quad (\text{a6})$$

$$r^* = y - q_1(0) - q_2(0)$$

for  $q_g/2kg_0 \leq \alpha < 1$

$$g_1^* = g_2^* = g_0 - q_g/2\alpha k \quad (\text{a7})$$

$$r^* = y - q_1(g_0 - q_g/2\alpha k) - q_2(g_0 - q_g/2\alpha k)$$

for  $\alpha = 1$

$$g_1^* = g_2^* = g_0 - q_g/2k \quad (\text{a8})$$

$$r^* = 0$$

For the case of federation, the derivative (6'') can be differentiated with respect to  $\alpha$  to yield:

$$\alpha^2 q_{1s} + 2\alpha^2 \{y - q(g_1^*) - q(g_2^*)\} \alpha_s + \alpha^4 (q_g^2/2k) \alpha_s \quad (\text{a9})$$

where the final term is zero for solution (a6) above, where no public goods are provided at all. The second and third terms represent the disadvantages of federation over expansion for the less democratic state. Both are decreasing in  $\alpha$ , the state's level of democracy. The second term in (a9) represents the losses in rents due to the democratizing effect of federation in spreading rents over a larger ruling coalition. The third term represents the lost rents that result specifically because the increase in democracy at the federal level requires greater provision of good 1.

## Appendix II: Variables and Sources

**Territory:** measured in square kilometers. Data on territory are compiled from the *Statesman's Yearbook* and Goertz and Diehl (1992). The variable was created, first, using data from the *Statesman's Yearbook* for the size of territory and, second, from Goertz and Diehl for the timing and magnitude of territorial change. When information was unavailable from Goertz and Diehl or the *Statesman's Yearbook*, data from the Cross-National Polity Survey were used. The data are for home territory only. Non-contiguous territorial holdings are not included.

**Democracy:** equal to DEMOC – AUTO, creating a 21 point scale with –10 as least democratic and 10 as most democratic. DEMOC and AUTO from Jagers and Gurr (1994).

**Federalism:** CENT variable in Jagers and Gurr (1994). CENT ranges from 1 to 3, with 1 being the most centralized and 3 the most decentralized state. CENT is recoded to range from 0 to 2 to facilitate interpretation of interactive terms (not reported here).

**Independence:** an index that begins in 1815 or whenever the state enters the international system. System entry determined by *Statesman's Yearbook* unless that source is ambiguous or unavailable, in which case *Correlates of War* data are used instead. The index is coded 0 for the year of system entry and increases by 1 for each subsequent year.

**Energy consumption per capita:** measured in coal ton equivalents. Energy consumption is from The National Capabilities Dataset (Singer and Small 1985).

**Population density** (population/territory) and **Urban population** were collected from the World Bank Development Indicators, United Nations Human Development Report and from the Cross National Polity Survey.

**Trade Openness:** Imports of goods and services plus exports of goods and services divided by GDP, as reported by the World Bank World Development Indicators. Unit is current US\$.

**Coastline:** Percentage of a country's border that is coastline. Created from the *CIA World Factbook*.

**Mountain:** Trivariate dummy variable in which 0=no/little mountainous terrain, 1=somewhat mountainous, and 2=extremely mountainous. Created from the physical descriptions in the *CIA World Factbook*.

**Regional Dummies:** Created from COW country codes.

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