

BEYOND FEDERALISM:  
ESTIMATING AND EXPLAINING  
THE TERRITORIAL STRUCTURE OF GOVERNMENT\*

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ABSTRACT

This paper argues that the basic distinction between federal and unitary government has limited as well as served our understanding of government. The notion that variation in the structure of government is a difference of kind rather than degree has straight-jacketed attempts to estimate the authority of intermediate government. One result has been the claim that a country's footprint, not its population, is decisive for government. Analyzing data for 39 countries since 1950, and comparing our own findings with those of alternative measurements, we find evidence for the opposite conclusion. We theorize government structure as a trade-off between responsiveness to soft information and per capita economies in public good provision.

Keywords: federalism, regions, multilevel governance, authority, measurement

DRAFT – COMMENTS WELCOME

The structure of government—the allocation of authority across general purpose jurisdictions—is a deep and puzzling phenomenon. Philosophers from Hobbes to Madison to Ostrom, and political scientists from Riker and Elazar to Lijphart have sought to explain why some countries are, or should be, decentralized while others are centralized.

Since the creation of the United States, government structure has been conceived as a basic choice between a unitary and federal system. A unitary system is one in which authority is centralized. Regional governments, if they exist, implement central policy. Decision making may be deconcentrated, but it is not decentralized. A federal system, by contrast, disperses authority between “regional governments and a central government in such a way that each kind of government has some activities on which it makes final decisions.”<sup>1</sup> Most importantly, regions or their representatives can veto constitutional reform.

Each conception is rooted in a coherent, but opposing, philosophy: “The contrast between Hobbes’ formulation of the institutions of government and that formulated in the American experiments in constitutional choice suggests that fundamentally different approaches exist for the organization of governance in human societies. In the one, a single center of authority, the sovereign, is designed to dominate the whole. Each unit, as a sovereign state, is fully independent of other units as sovereign states. In the other, no single center of authority dominates the rest: all assignments of authority are subject to limits.”<sup>2</sup>

The unitary/federal distinction lies at the heart of our understanding of constitutional choice, and has produced a rich literature on political institutions, but it has biased as well as structured our understanding of government. It conceives variation among governments as difference of kind, rather than degree.<sup>3</sup> It divides the democratic world into distinct camps: unitary

and federal democracies, and thereby tends to compress variation within each category. And while it is highly attuned to constitutional choice, it is uninformative about more subtle and gradual processes of change.

One result is a disconnect between sophisticated case studies of federal and unitary regimes and relatively crude attempts to estimate variation in government structure. Measures of government structure have struggled to impose continuous variation on a categorical distinction. One response has been to fall back on fiscal data. However, the money a government raises or spends is a poor indicator of its authority.

We estimate the authority of regional governments in 39 democracies along eight dimensions and revisit the causes of government structure. Our conclusion, and an impetus for this paper, is that one of the key findings in the literature on government structure is erroneous. Study after study has confirmed the hypothesis that government structure depends on the territorial size of a country. The claim is that the larger the footprint of a country, the more decentralized its government. This finding is consistent with the fact that federal countries, which include the United States, Australia, and Canada, are on average much larger than unitary countries. However, the association between area and government structure disappears when we estimate variation in decentralization among non-federal countries. Finland, France, Japan, Spain and Sweden, for example, are similarly sized, but have contrasting levels of decentralization. Because it diminishes variation within each category, the unitary/federalism distinction is overly sensitive to the creation of federal regimes in the large spaces that were once British colonies and insensitive to variation at the other end of the scale.

Our counter-claim is that the population of a country is more consequential for government structure than its area. We explain this by theorizing a tension between centralization, which reduces the per capita cost of a public good, and decentralization, which facilitates dialogue between government and citizens.<sup>4</sup> This theory yields expectations over government structure that differ from spatial theory, but which are confirmed with new, more accurate, data. We next set out these expectations before examining how alternative measures generate contrasting estimates.

## THEORIZING GOVERNMENT STRUCTURE

### Spatial theory

Three lines of argument have been used to connect the size of a country with its level of decentralization. The first goes under the heading “spatial decay” which describes the increasing costs of communication imposed by distance. These costs could include “inefficiency in the provision and delivery of local public goods as well as transportation costs.”<sup>5</sup> If policy provision is subject to spatial decay, centralized provision of public goods becomes more wasteful the more distant the region, and correspondingly, decentralized provision becomes relatively more efficient.

The second argument applies the same spatial logic to policy externalities. The larger the footprint of a jurisdiction, the less its policy making will affect neighboring jurisdictions, and the smaller the efficiency loss arising from policy spillover. The argument informs public goods theory which sets up a trade-off between the benefit of adapting policy to particular regions and the loss arising from failure to internalize the effects of local decisions for neighboring regions.<sup>6</sup> “Perfect

mapping” of government structure requires that different government tiers provide efficient levels of outputs of public goods whose benefits are “encompassed by the geographical scope of their jurisdictions.”<sup>7</sup> The implication is that the larger a country, the smaller the costs arising from policy spillover among regional governments.<sup>8</sup>

A third line of argument assumes that larger countries are more heterogeneous, and that as a consequence, larger countries decentralize in order to fit policy to the preferences of those living in particular regions.<sup>9</sup>

Empirical research has confirmed the idea that larger countries are more decentralized. Arzaghi and Henderson conclude that “[L]and effects are enormous and significant, where greater land area and hence spatial dispersion increase the likelihood of being federal. From the base probability of 0.18 . . . a one-standard deviation in land raises the probability of being federal to 0.60.”<sup>10</sup> Panizza finds that “When more than one measure of size is included in the regression, only *Area* shows a robust correlation with fiscal centralization.”<sup>11</sup> Garrett and Rodden find that “As expected, countries with larger *area* are significantly more decentralized. . . . *Population* and *urbanization* have no effect on decentralization in any of the estimations, so we drop them from subsequent analysis.”<sup>12</sup>

However, as we shall see, the evidence for the effect of country size is sensitively dependent on measurement and loses significance under controls. And while the arguments linking area to government structure are plausible, their causal power is debatable. The first, spatial decay, explains decentralization as a cost of communication.<sup>13</sup> The ancients were acutely aware that, in a world of horse and oar, distance compromised central control. But does the erosion of distance produce centralization? In a paper written in the 1950s, Herbert Simon and his

co-authors hypothesizes that long-distance telephony makes it “unnecessary” for governments “to allow representatives much discretion” and that “improved methods of communication have made a much greater degree of centralization possible.”<sup>14</sup> Modern technology has continued to cut the cost of long-distance communication, but this has not been accompanied by centralization.<sup>15</sup>

The argument that externalities decay with distance is plausible, but perhaps not as plausible as the notion that externalities depend on the extent of political, social, and economic interaction across jurisdictions. What constrains human interaction among jurisdictions? Distance, certainly, but also, and more directly, differences in language and culture. So while one may expect the sheer size of a country to reduce externalities among its subnational jurisdictions, we suspect the diversity of norms across sub-populations of a country to be more important.

This brings us to the third line of argument: larger countries tend to be more heterogeneous, and hence more decentralized. The most cited analyses, Panizza, and Alesina and Spolaore, build models in which distance from the center (or capital) of a country is a proxy for preference heterogeneity.<sup>16</sup> However, the evidence for this intuition is unconvincing. The association between country size and the Fearon/Laitin measure of ethnic diversity across 39 democracies and quasi-democracies is just 0.078 (sig = 0.62).<sup>17</sup> It is true that vast former colonies became home to diverse groups of immigrants, but these countries have high rates of geographical mobility, and as a result, they have few territorial minorities. By contrast, many European countries, despite their small area, contain territorial minorities with distinctive languages and cultures.

## Soft information versus scale economies

The theory we set out as an alternative to spatial theory conceives jurisdictional design as a trade-off between responding appropriately to soft information, which favors decentralization, and exploiting scale economies in providing the public good, which favors centralization. Both sides of the trade-off are influenced by the number of people in the jurisdiction.

The argument that soft information requires decentralization was put on the table by organizational economists and political scientists who conceive “decision-making for an organization as a process of repeated messages or dialogue.”<sup>18</sup> “We may regard it as close to an impossibility for individuals in close contact with the productive processes to transmit their information in all its details to another office. This proposition, long recognized in practice, is the basis of the management literature on the questions of centralization and decentralization.”<sup>19</sup>

Arrow is taking issue with the Fordist notion that the job of front-line personnel is to convey information to their superiors who then make investment decisions. Decision making in firms engages persons as well as things, and such information may be *soft* – difficult to standardize, resistant to batching, and correspondingly expensive to pass up an organizational hierarchy. A local bank manager, for example, is better positioned to decide on a small-business loan by talking directly with the borrowers to assess their honesty and acumen than is a central banker who has access to a report written by the bank manager.<sup>20</sup>

Government itself can be conceived as a process of repeated dialogue with citizens, and the information that is required for the provision of public goods is no less soft than that for small business loans. This motivates Elinor Ostrom’s summary of her decades-long contribution to the

study of metropolitan government: “Advocates of the metropolitan reform approach assumed that size of governmental units would always be positive for all types of goods and services. Scholars using a political economy approach [by contrast] assumed that size of governmental units would be positive *or* negative depending on the type of public good or service. Those involving face-to-face delivery, such as education, policing, and social welfare, would show a negative effect of governmental unit size; those involving economies of scale, such as highways and utility systems, would show a positive effect”.<sup>21</sup>

In this conception, the scale of government for public goods involving “face-to-face delivery” is population sensitive. This is the case even if there is no heterogeneity of preferences across localities. The contexts of human interaction may vary even if preferences do not. “Street-level” case studies of policy implementation, beginning with the classic example of the Tennessee Valley Authority, generated a vocabulary to describe this—“task environment,” “local interaction,” “local stimuli.”<sup>22</sup>

To the extent that information is soft, informational costs can be expected to increase with population. The larger a group, the more difficult it is to sustain meaningful dialogue: “[T]he need for a minimum message length to achieve any use leads to the view that the number of participants in the decision making dialogue must be strongly limited . . . The argument becomes even clearer if we take the cost of communication to be basically a delay in making the decision.”<sup>23</sup>

One scenario is where there are no economies of scale at all—i.e. a world of soft information where each message has to be individually handled. Minimizing the time delay in communication between a government and its population requires intermediaries who send and return messages to other agents and so on down to each person in the jurisdiction. The delay-

minimizing set-up is a hierarchical network—a system of multi-level governance—where each agent communicates with the same number of agents.<sup>24</sup> Larger populations require more agents at more intermediate levels.

The number of intermediate government levels under perfectly hard information is, by contrast, zero. If there are infinite economies of scale in sending, receiving, and processing messages, then there is no need for intervening agents. The ruler communicates directly with the entire population, sending the same message to each person, and processing all messages received in a single batch. Such standardization is more akin to dictatorship than democracy. However, if preferences can be summarized along a single-peaked dimension, the ruler can be a computer algorithm producing pareto optimal policy.<sup>25</sup> Under perfectly hard information, government structure is impervious to population size.

The extent to which soft information requires authoritative decentralization, and not merely deconcentration, is debated.<sup>26</sup> In principle, the central state could adjust policy to local contexts without empowering subnational actors. There are several possibilities. A central legislature could be composed of locally elected representatives who make local policy; the central government could appoint or control local agents; or the central government might use local agents to collect and report the relevant information.<sup>27</sup> To make headway here one needs to estimate not just who is responsible for policy provision, but who makes authoritative decisions.

The benefits of decentralization exist in tension with its costs. These arise because the population of a decentralized jurisdiction may be too small to reap economies of scale. Decentralization becomes inefficient when the per capita cost of centralized provision of the public good is lower than the per capita cost of the good provided by each subnational jurisdiction.

The fixed per-capita cost of a public good is inversely related to the population of the jurisdiction that provides it.

Both the benefits and costs of decentralization can be expected to vary across a government's policy portfolio. The information necessary for efficient provision of defense or utilities, for example, is chiefly hard, whereas that for job retraining, kindergartens, or home care, involves soft information and on-the-job appraisal. Similarly, least-cost output in defense, transportation, utilities, and networks will usually require large amounts of capital, while that for school systems, hospitals, refuse disposal, welfare provision, and policing will require smaller amounts of capital.<sup>28</sup>

Figures 1A and 1B represent schematic cost curves for two public goods. National defense is a pure public good with a fixed cost over any population size. The informational cost of providing an army or navy is assumed to be constant across population, so this good will be provided at the national level for any population size. The per capita cost of providing a school system, by contrast, declines until population reaches the threshold where economies of scale are exhausted. As the jurisdiction increases in population, so does the per capita cost of responding to soft information about hiring and training teachers, involving parents, or meeting the special educational needs of students. In Figure 1B, the cost of providing a school system is lowest in jurisdictions with a population of  $S$ . In this scenario, a country with a population of  $X_1$  will have a national school system, while one with a population of  $X_2$  will have a regional school system.

[Figure 1 about here]

The literatures on the provision of public goods produce plausible, but contrasting, implications for government structure. Spatial theory implies that government structure is shaped

by the territorial size of a country on the grounds that larger countries tend to be more heterogeneous, face greater spatial decay in the delivery of public goods, or suffer less from spillovers among subnational governments. An alternative view is that a country's population is decisive. If government structure is determined by a scissors whose blades are soft information and per capita cost, one would expect that, irrespective of their footprint or preference heterogeneity, countries with larger populations will be more decentralized.

Two inferential challenges lie in wait as we evaluate the validity of these claims. First, we need to estimate government structure in a reasonably unbiased way. Second, we must control for contending influences on government structure. We tackle these in turn.

## ESTIMATING GOVERNMENT STRUCTURE

In order to assess the claims set out above, we require a measurement instrument that a) comprehensively evaluates the scope of subnational competencies; b) estimates the depth of subnational authority by coding indirect as well as direct forms of central state control through veto and appointment of subnational decision makers; c) encompasses multiple subnational levels of government where they exist; and d) is fine-grained enough to estimate variation among unitary countries and among federal countries.

The measurement instrument used here seeks to encompass what is meant by subnational authority, while disaggregating the concept into dimensions that can be empirically assessed.<sup>29</sup> The dependent variable is the authority exercised within a country by regional government, that is, general purpose government between local and national government having an average

population of 150,000 or more. Regional government distinguishes federal from unitary countries. Whereas all democratic countries have authoritative local governments, the authority of intermediate government varies widely across the countries examined here.

We conceive regional authority in two domains. A subnational government may exercise authority in its own territorial jurisdiction or it may co-exercise authority over a larger jurisdiction of which it is part. This is the distinction between *self rule* and *shared rule* which has gained wide currency in studies of federalism and regionalization.<sup>30</sup>

The concepts of self rule and shared rule provide us with a frame for disaggregating regional authority in eight operational dimensions listed in Table 1. The first dimension, *institutional depth*, distinguishes political decentralization from administrative deconcentration. A regional administration that has the paraphernalia of self-governance, including buildings, personnel, and a budget may, in fact, be a hierarchically subordinate outpost of the central government.<sup>31</sup>

[Table 1 about here]

*Policy scope* taps regional competencies in economic policy, cultural-educational policy, welfare policy, law and order, local government, residual powers, and immigration and citizenship.<sup>32</sup> *Fiscal autonomy* is evaluated in terms of a regional government's authority to set the base and rate of minor and major taxes in its jurisdiction.<sup>33</sup> *Representation* assesses whether a regional government is subject to a regionally elected legislature; whether that legislature is directly or indirectly elected; and whether the region's executive is appointed by the central government, dual (i.e. co-appointed by the central government), or autonomous.

*Law making*, in the domain of shared rule, assesses a) the role of regions in structuring representation at the national level (i.e. in the second legislative chamber); b) whether regional governments are directly represented in the second chamber; c) whether regions have majority or minority representation there; and d) the legislative scope of the second chamber. *Executive control* taps the possibility that regional executives have routine meetings with the central government and whether these are advisory or have veto power.<sup>34</sup> *Fiscal control* refers to the role of regions in negotiating or, at the extreme, exerting a veto, over the territorial distribution of national tax revenues. *Constitutional reform* assesses authority over the rules of the game. Can the central government unilaterally reform the constitution or must reform gain the assent of regional governments or a regionally-dominated second chamber?<sup>35</sup> It is often said that the most basic feature of a federal system is the inability of both the central government and the constituent units to unilaterally modify the structure of the state, but interestingly, regional control over constitutional change is weak in some federations (e.g. Australia; Switzerland) and strong in some unitary polities (e.g. the Netherlands; Sweden before 1970).

[Table 2 about here]

These dimensions hold together. The Cronbach's alpha across the dimensions described above for 39 countries in 2006 is 0.93 which suggests that they can be interpreted as indicators of a single latent construct.<sup>36</sup> Principal components analysis reveals that the eight dimensions are closely associated with the domains of self rule and shared rule, but that 68 per cent of the variance across the dimensions is shared (Table 2).

[Table 3 and Table 4 about here]

Table 3 summarizes alternative measurement instruments, and Table 4 lists the countries that each instrument has in common with the Regional Authority Index. The most cited measure is Lijphart's "Federal/Unitary dimension" which he uses to test hypotheses about consensual *versus* Westminster democracy. The measure has three intermediate categories that contain ten of the 36 country-year observations.<sup>37</sup> Figure 2 matches observations in the Lijphart and Regional Authority Index for 1995 and Table 5 lists cases where Regional Authority Index scores diverge more than two standard deviations from those of alternative measures.

[Figure 2 and Table 5 about here]

The greatest differences with Lijphart are for Italy and France, which shift markedly in the Regional Authority Index between 1965 and 1995, but little in the Lijphart dataset. Italy created a new regional tier, *regioni*, in 1972 with directly elected councils and competencies in urban planning, health, and education. In France, Napoleonic *départements* gained authority in 1982 when the powers of centrally appointed prefects were transferred to the presidents of directly elected *département* councils.

There is also some divergence at the top end of the scale. All but one of the seven federal regimes identified by Lijphart in 1995 score the maximum, while estimates range between 18 (Austria) and 29.3 (Germany) on the Regional Authority Index. Austria and Germany are both federal polities, but there are some sharp contrasts. In contrast to German *Länder*, Austrian *Länder* have little authority over national legislation or over the base or rate of regional taxes.

Arzaghi-Henderson estimate considerably more decentralization in Poland for 1990 and 1995 than does the Regional Authority Index. At issue is the difference between decentralization and deconcentration. Regional governments in Poland were downgraded in 1990 to central

outposts and direct elections were reinstated only in 1999.<sup>38</sup> Brancati registers no change in Belgium from 1985 to 2000, whereas the Regional Authority Index spikes up in 1989 when Belgian regions and communities obtained broader policy competencies, taxation powers, and shared rule.

Panizza and Stegarescu use measures of fiscal decentralization based on IMF and OECD statistics.<sup>39</sup> These data estimate subnational receipts as a share of total government receipts. Panizza has estimates for 1975, 1980 and 1985, while Stegarescu's slightly different fiscal measure provides an annual time series from 1965 to 2001. Our scores differ more than two standard deviations from those of Panizza for Belgium, and in the case of Stegarescu, also for Germany. In both countries, regional governments exert considerable authority, but this is not indicated by their fiscal take. Belgian regions and communities came to exercise broad-ranging legal and constitutional powers after 1989, but fiscal decentralization was blocked until 1995. German *Länder* exchanged tax autonomy for shared rule in 1966, and are among the most authoritative subnational governments in any democracy.

Figure 3 maps the Stegarescu estimates against those of the Regional Authority Index for 1999, the latest year with estimates for the maximum number of countries shared between the indices. The further north a country in Figure 3, the greater is its share of government revenue. Sweden and Japan are placed above the United States; Denmark and Finland above Belgium and Australia; and every one of these countries above Germany. None of these comparisons accord with the literature on subnational government in these countries. Fiscal measures have been used to good effect in studies of fiscal federalism,<sup>40</sup> but they are inappropriate as measures of political decentralization.<sup>41</sup>

[Figure 3 about here]

## EXPLAINING GOVERNMENT STRUCTURE

We measure area and population of a country on a logarithmic scale because the expected effect of an additional person or  $\text{km}^2$  declines as absolute population or territory increases. In order to estimate their causal effects we exert the following controls (see the Appendix for details).

***Ethnicity.*** Subnational communities – bounded groups of densely interacting humans sharing distinctive norms – are considered a magnet for regional authority. Ethnic communities often have distinct policy preferences. Rokkan suggests that culturally peripheral communities are predisposed to resist centralization and demand self-rule.<sup>42</sup> Additionally, government is hypothesized to work best when it encompasses communities that “can draw on a reservoir of common cultural materials – language, experience, understandings about modes of interactions – that makes it easier for community members to communicate and work together.”<sup>43</sup>

***Inequality.*** One expectation is that relatively rich regions will demand greater fiscal autonomy and poor regions will demand centralized redistribution.<sup>44</sup> Alternatively, poor regions may prefer decentralization if their optimal fiscal policy differs substantially from that of the country as a whole.<sup>45</sup> Poor regions with distinctive labor markets may want decentralization to implement appropriate labor market policies.<sup>46</sup> The available data does not allow us to model the interaction of regional inequality with regional fiscal or labor market variables over time, but we are able to observe the standard deviation of mean per capita income across regions in 39 countries.

**Affluence.** Laitin argues that citizens in richer countries may be willing to pay the costs of regional government to preserve cultural and linguistic diversity.<sup>47</sup> Also, the policy portfolios of governments in richer countries may include a larger share of public goods that are efficiently delivered at the regional level.<sup>48</sup>

**Democracy.** Democracies are considered to be more responsive than autocracies to demands for regionalization on account of their openness to societal pressures for self rule.<sup>49</sup>

**Regional political parties.** Regional political parties press for greater regional authority.<sup>50</sup> While regional political parties rarely form governments, a regional party may precipitate regional reform as a pivot or by inducing a party in government to steal its thunder.<sup>51</sup>

## RESULTS

The first column of Table 6 models *Population* and *Area* under controls. Whereas *Area* does not reach significance, *Population* has a large and significant effect on *Regional Authority*. Subsequent columns impose robustness tests. The second column reports a measure of multicollinearity, the variance inflation factor (VIF). Multicollinearity inflates the standard errors, making it harder to assess the independent effect of a variable.<sup>52</sup> A VIF > 3 is regarded as low, but it is still the case that because *Area* is associated with *Population* (R=0.69) and *Inequality* (R=0.24), its standard error is larger than it would be if it were uncorrelated with these variables. The inflation of the standard error for *Area* is  $\sqrt{1.98} = 1.41$  which produces a VIF-adjusted standard error of  $1.22/1.41 = 0.87$ . If *Area* were to share none of its variance with the other independent

variables, the estimate for its effect on *Regional Authority* still fails to reach significance ( $t$ -value = 1.43). The VIF-adjusted  $t$ -value for *Population* is 4.18.

[Table 6 about here]

The final columns of Table 6 estimate a lagged endogenous variable model and a jackknife test. Both tests indicate that *Population* is significant in explaining *Regional Authority* and that *Area* fails to reach significance. Controlling for past levels of *Regional Authority* minimizes concern that the association between *Population* and *Regional Authority* is spurious. The estimates for *Population* and *Area* are robust when we delete individual countries from the analysis.<sup>53</sup>

Figure 4 estimates the effect of population on regional authority using *Clarify*. Uncertainty associated with the expected values of *Regional Authority* is greatest at the extremes. A country with a population of five million has an expected Regional Authority Index between 7.1 and 9.7 within a 95 percent confidence band, with an average 8.4 as our best guess. This would, for example, be a country in which regional governments have indirectly elected assemblies that appoint regional executives with the power to set the rate of minor taxes and exercise competences, subject to central veto, in economic and welfare policy. A country with a population of 50 million has a mean expected Regional Authority Index of 14.1 (within a 95 percent confidence band of 9.8 to 18.2). Regional governments in this country might then have elected assemblies, broader policy competencies not subject to central veto, power to set the base as well as the rate of minor taxes, and some role in national decision making, for example, by designating representatives to a second legislative chamber or by meeting routinely with the central government.

[Figure 4 about here]

Lijphart, quoting Dahl and Tufte, anticipates that a country's location on the unitary/federal dimension is related to population size, but this is difficult to detect when countries are categorized as unitary or federal.<sup>54</sup> Countries that Lijphart codes as unitary (Figure 5: lower ellipse) and as federal (Figure 5: higher ellipse) vary quite a lot in the Regional Authority Index. The variation is particularly sharp among the unitary countries. Iceland, for example, has a level of intermediate government (*landsvæðun*) that exists only as a statistical category. Greece, by contrast, has a regional tier consisting of 54 prefectures (*nomoi*) which, from 1994, were run by directly elected councils and a council-selected prefect. Councils have competence over primary education, hospitals, roads, and transport. Central oversight remains extensive, and prefects continue to double as central state agents in urban planning and sanitation. New Zealand, which also has the minimum score in the left-hand Figure, has 16 regions run by directly elected councils that can set the base and rate of property taxes and which are responsible for public transport, environmental policy, including air, land and marine pollution, river and coastal management.

[Figure 5 about here]

Measurement can be decisive in assessing causality. This is revealed in Table 7 which compares results for common samples using different estimates of the dependent variable. The first column runs the model for all observations in Lijphart's dataset. The second column replaces Lijphart's measure with the Regional Authority Index for the same set of cases. As one would suspect from Figure 5, *Population* is insignificant as a predictor using Lijphart's measure and significant when using the Regional Authority Index.

[Table 7 about here]

Subsequent columns pair alternative instruments with the Regional Authority Index. Estimates for *Population* are insignificant while those for *Area* are significant for both the Arzaghi-Henderson measure and for the Regional Authority Index. The result appears to be driven by the sample which is limited to 16 countries with a population greater than 10 million. These include Australia, Canada, and the United States which are vast and decentralized. The regression line connects these countries and the remaining ones. There is no association between *Area* and *Regional Authority* for the three English-speaking countries, and the association for the remaining 13 countries is weakly negative.

Brancati selects countries to maximize variation on ethnic groups. This works well for her purpose, which is to evaluate the effect of decentralization on ethnic conflict,<sup>55</sup> but produces estimates that are sensitive to outlying cases in the sample shared with the Regional Authority Index. A panel jackknife dropping individual countries produces insignificant estimates for all independent variables.

Fiscal federalism measures, including those used by Panizza and Stegarescu, confirm *Area* and disconfirm *Population* (final columns of Table 7).<sup>56</sup> When we use the Regional Authority Index for the same set of cases, we find precisely the reverse. A possible explanation is that the allocation of taxation across levels of government is peculiarly sensitive to territorial spillover on the ground that a local tax will be suboptimal if non-residents living in a neighboring town use city services for which they are not taxed.<sup>57</sup>

## CONCLUSION

In recent years there has been renewed concern with the effect of measurement error on valid inference about political attitudes,<sup>58</sup> ethnic conflict,<sup>59</sup> democracy,<sup>60</sup> political parties<sup>61</sup>—to list but a few topics raised in recently published articles. Forty years ago, Blalock identified one of the chief problems: “A very common practice whenever measurement is clearly recognized as being crude is to resort to a relatively small number of ordered categories. In the extreme case the analyst may use dichotomies in order to simplify his analysis. It may not be recognized that such very simple procedures produce both random and nonrandom measurement errors that become increasingly serious as the number of categories is reduced.”<sup>62</sup>

This article has argued that this is precisely the case in the study of government. The contrast between unitary and federal government is fundamental, yet it appears to have straight jacketed efforts to estimate variation across time and space. Researchers who wish to measure government structure have added intermediate categories or they have used fiscal data. We show that neither strategy is particularly successful in producing unbiased estimates.

The unitary/federal distinction is valid, but it does not say much about how federal or unitary countries vary cross-sectionally or over time. It directs our attention to the rare event of constitutional choice, but away from reforms that don't shift a country from one category to the other. By conceiving government structure in dichotomous terms, the unitary/federal distinction is insensitive to change and overly sensitive to the creation of federal regimes in former British colonies.

One response is to use available data on the share of subnational tax receipts or spending as an indicator of subnational authority, but this is error-prone because a government's fiscal envelope can be a poor guide to its capacity to decide how it spends.

The measurement instrument used here is grounded on the distinction between self rule and shared rule made by federalism scholars themselves. We estimate self rule and shared rule along eight dimensions designed to tap the institutional depth of regional governments, the scope of their policy competencies, their role in law making, their executive capacity, representation, fiscal control, and constitutional powers. The instrument is sensitive to variation among federal regimes and among unitary regimes as well as between them, and we find that countries with larger populations tend to have more authoritative regional governments. The well-established claim that the area of a country is influential appears to be wrong.

Why should one care that the population of a country rather than its area is consequential for its government? A country's footprint is an inert object fixed for decades or even centuries, but its population is alive and changeable. The causal mechanism by which area affects government structure, spillover, depends on distance. The causal mechanism by which population affects government structure, soft information, depends on the benefit of dialogue in providing public policy. While we know less about soft information than we know about distance, the line of theorizing pursued in this article may draw on—and perhaps contribute to—theories of democracy and participation.

The finding concerning the effect of population raises fundamental questions about how we should explain the structure of government. The size of a country's population is a structural factor that lies far back, and perhaps at the very beginning, in the causal chain leading to political

decisions about the creation of a new level of government or the allocation of authority across existing levels. There is much to learn about the mechanisms. How does the functional pressure of population and the demand for soft information get translated into the political pressures that shape decision making? Attempts to answer this question will need to connect theories of party competition and public policy with accurate estimation of government structure. By carefully bringing more information to bear on the dependent variable, our purpose is to produce more valid estimates of causal effects, and ultimately better theory.

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**Table 1: Regional Authority Index (RAI)**

<b>Self Rule: The authority exercised by a regional government over those who live in the region</b>		
Institutional depth	The extent to which a regional government is autonomous rather than deconcentrated.	0–3
Policy scope	The range of policies for which a regional government is responsible.	0–4
Fiscal autonomy	The extent to which a regional government can independently tax its population.	0–4
Representation	The extent to which a region is endowed with an independent legislature and executive.	0–4
<b>Shared Rule: The authority exercised by a regional government or its representatives in the country as a whole</b>		
Law making	The extent to which regional representatives co–determine national legislation.	0–2
Executive control	The extent to which a regional government co–determines national policy in intergovernmental meetings.	0–2
Fiscal control	The extent to which regional representatives co–determine the distribution of national tax revenues.	0–2
Constitutional reform	The extent to which regional representatives co–determine constitutional change.	0–3

**Table 2: Factor Analysis of Regional Authority**

Components	Single-factor solution	Two-factor solution:	
		Self-rule	Shared rule
Institutional depth	0.86	<b>0.96</b>	0.55
Policy scope	0.90	<b>0.96</b>	0.63
Fiscal autonomy	0.83	<b>0.83</b>	0.64
Representation	0.82	<b>0.95</b>	0.47
Law making	0.81	0.54	<b>0.94</b>
Executive control	0.83	0.68	<b>0.81</b>
Fiscal control	0.82	0.55	<b>0.93</b>
Constitutional reform	0.74	0.55	<b>0.86</b>
Eigenvalue	5.46	5.46	1.21
Explained variance (%)	68.27		82.80
Factor correlation			0.59

*Note:* Principal components factor analysis, oblimin non-orthogonal rotation, listwise deletion; n = 39 (country scores for 2006). For the two-factor solution, the highest score for each dimension is in **bold**. Results for any other year in the data set (1950–2006) are similar.

**Table 3: Measurement Instruments**

<p><b>Lijphart (1999)</b></p>	<ul style="list-style-type: none"> <li>• 36 pre-1996 democracies</li> <li>• 2 time points (1965, 1995)</li> </ul>	<p><i>Federalism</i> (1–5). Classification in five categories:</p> <ul style="list-style-type: none"> <li>• 1= unitary and centralized;</li> <li>• 2= unitary and decentralized;</li> <li>• 3= semi-federal;</li> <li>• 4= federal and centralized;</li> <li>• 5= federal and decentralized</li> </ul> <p>Criteria: a) do states “have formally federal constitutions” or not; b) are federal or nonfederal states centralized or decentralized (i.e. is the range of powers assigned to the regional level large or small); c) do some states fall into an intermediate category? (Lijphart 1999: 188-191.)</p>
<p><b>Arzaghi–Henderson (2005)</b></p>	<ul style="list-style-type: none"> <li>• 48 countries with population over 10 million</li> <li>• five-year intervals for 1960–1995</li> </ul>	<p><i>Federalism</i> (0–4). The fiscal, political, and administrative responsibilities of subnational governments averaged across six dimensions:</p> <ul style="list-style-type: none"> <li>• official federal versus unitary government structure (0 or 4)</li> <li>• election of a regional executive (0 or 4)</li> <li>• election of a local executive (0 or 4)</li> <li>• ability of the center to suspend lower levels of government or to override their decisions (0 or 4)</li> <li>• no, limited, full revenue raising authority of lower levels of governments (0, 2 or 4)</li> <li>• revenue sharing (0, 2 or 4)</li> </ul>
<p><b>Brancati (2006)</b></p>	<ul style="list-style-type: none"> <li>• 30 countries with regional ethnic groups</li> <li>• annual data for 1980–2000</li> </ul>	<p><i>Political decentralization</i> (0–5). Vertical division of power among multiple levels of government that have independent decision-making power over at least one issue area:</p> <ul style="list-style-type: none"> <li>• democratically elected regional legislatures (0 or 1)</li> <li>• regional legislatures can raise or levy their own taxes (0 or 1)</li> <li>• regional legislatures have joint or exclusive control over education (0 or 1)</li> <li>• regional legislatures have joint or exclusive control over public order or police (0 or 1)</li> <li>• regions approve whether constitutional amendments become law (0 or 1)</li> </ul>
<p><b>Panizza (1999)</b></p>	<ul style="list-style-type: none"> <li>• 76 countries</li> <li>• 3 time points (1975, 1980, 1985)</li> </ul>	<p><i>Decentralization ratio</i> (0–100). Calculated as 100 minus fiscal centralization ratio which is central government revenues as percentage of total public sector revenues (IMF data).</p>
<p><b>Stegarescu (2005)</b></p>	<ul style="list-style-type: none"> <li>• 23 OECD democracies</li> <li>• annual data for 1965-2001</li> </ul>	<p><i>Fiscal autonomy</i> (0–100). Autonomous sub-central tax revenues as percentage of total government tax revenues, excluding social security revenues and taxes paid to the EU (OECD data).</p>

**Table 4: Country Overlap**

Country	Lijphart	Arzaghi-Henderson	Brancati	Panizza	Stegar-escu	Country	Lijphart	Arzaghi-Henderson	Brancati	Panizza	Stegar-escu
Australia	X	X		X	X	Lithuania			X		
Austria	X			X	X	Luxembourg	X			X	X
Belgium	X		X	X	X	Macedonia					
Bulgaria						Malta	X			X	
Canada	X	X	X	X	X	Netherlands	X	X		X	X
Croatia						New Zealand	X			X	X
Cyprus				X		Norway	X		X	X	X
Czech Republic						Poland		X	X		
Denmark	X			X	X	Portugal	X			X	X
Estonia			X			Romania		X	X		
Finland	X		X	X	X	Russia		X			
France	X	X		X	X	Slovakia					
Germany	X	X		X	X	Slovenia			X		
Greece	X	X	X	X	X	Spain	X	X	X	X	X
Hungary		X				Sweden	X		X	X	X
Iceland	X			X	X	Switzerland	X		X	X	X
Ireland	X			X	X	Turkey		X	X		
Italy	X	X		X	X	United Kingdom	X	X	X	X	X
Japan	X	X			X	United States	X	X	X	X	X
Latvia	X										

Note: Countries listed are those for which we have Regional Authority scores and data for all independent variables in the Appendix.

**Table 5: Regressing the Regional Authority Index on Alternative Instruments**

Measure	Residuals larger than 2 St.Dev.	Cases	Disagreement
Lijphart	-2.41	France 1995	Extent of authority for new and directly elected tier
	-2.57	Italy 1995	Extent of authority for new and directly elected tier
Arzaghi-Henderson	+2.10	Poland 1990, 1995	Extent of central control over regional tier
Brancati	-2.37 to -3.08	Belgium 1989-2000	Reform of policy, tax and constitutional veto powers for regions & communities
Panizza	-2.40 to -2.48	Belgium 1980, 1985	Fiscal revenues vs. political authority
Stegarescu	-2.36 to -2.44	Belgium 1989-1994	Autonomous taxes vs. political authority
	-2.29 to -2.31	Germany 1973-2001	Autonomous taxes vs. political authority

Note: Cases listed are those for which the residuals of regressing the Regional Authority Index on an alternative measure are equal or greater than two standard deviations. A negative sign indicates that the estimate of the alternative measure is smaller than the estimate of the Regional Authority Index.

**Table 6: Population, Area and Regional Authority**

	Regional Authority Index <sup>1</sup>	Variance Inflation Factor	LDV model	Jack-knife- 39 countries
N (clusters)	1603 (39)		1603 (39)	
Population	5.68*** (2.07)	2.30	0.10** (0.05)	5.68** (2.41)
Area	1.24 (1.22)	1.98	0.01 (0.02)	1.24 (1.51)
Ethnicity	11.48** (4.61)	1.26	0.10 (0.11)	11.48* (6.11)
Inequality	-3.92 (5.79)	1.75	-0.02 (0.16)	-3.92 (7.11)
Affluence	1.79** (0.86)	1.11	0.06** (0.03)	1.79* (0.97)
Democracy	1.46*** (0.37)	1.23	0.00 (0.02)	1.46*** (0.45)
Regional parties	15.26*** (4.23)	1.33	0.16* (0.09)	15.26** (5.84)
<i>Regional authority<sub>t-1</sub></i>	—	—	0.99*** (0.00)	—
<i>Constant</i>	-57.79 (12.43)	—	-0.78 (0.38)	—
<i>R<sup>2</sup></i>	0.62		0.995	—
<i>F test</i>	31.12***		—	—
<i>Mean</i>		1.57		

Note: Non-standardized beta coefficients; robust standard errors clustered on country are listed in parentheses. \*\*\* p < .01, \*\* p < .05, \* p < .10.

<sup>1</sup> Annual scores for 1950 to 2006 across 39 democracies. Scores are calculated for each dimension at each regional tier and next aggregated to the country level weighted by population.

**Table 7: Sensitive Dependence on Alternative Measurement Instruments**

Data set	Lijphart		Arzaghi-Henderson		Brancati		Panizza		Stegarescu	
N (clusters)	46 (24)		100 (16)		209 (16)		61 (24)		742 (23)	
Time period	1965, 1995		1960-95, 5-year intervals		1985-2000, annual		1975, 1980, 1985		1965-2001, annual	
Dependent variable	Lijphart	RAI	Arzaghi-Henderson	RAI	Brancati	RAI	Panizza	RAI	Stegar-escu	RAI
Population	0.50 (0.94)	6.39** (2.43)	5.01* (2.36)	-0.02 (2.74)	0.77 (0.53)	4.13 (3.28)	-6.79 (5.33)	5.78* (3.04)	-2.99 (5.45)	5.21** (2.24)
Area	0.36 (0.34)	0.56 (1.22)	4.60*** (0.88)	4.61*** (1.32)	0.20 (0.36)	1.98 (2.34)	7.69** (2.73)	0.30 (1.57)	8.56** (3.73)	1.19 (1.27)
Ethnicity	2.08 (1.67)	10.51* (5.15)	0.39 (2.87)	-1.78 (4.32)	2.02** (0.74)	13.44*** (3.77)	22.02 (14.31)	7.38 (5.28)	35.79* (18.49)	11.50*** (3.94)
Inequality	0.59 (2.43)	-0.61 (8.39)	-15.39 (11.57)	12.49 (12.98)	3.36 (1.95)	9.41 (9.61)	29.18 (29.39)	9.95 (14.04)	-24.11 (29.79)	11.12 (9.26)
Affluence	-0.07 (0.22)	1.27 (1.18)	1.76 (1.35)	2.53** (1.17)	0.81 (0.61)	9.16** (3.98)	13.89** (5.60)	4.85 (3.76)	4.25 (3.09)	4.49*** (1.51)
Democracy	0.81*** (0.26)	3.67** (1.03)	1.47** (0.53)	2.03** (0.74)	0.28*** (0.09)	1.26** (0.47)	1.17 (1.36)	1.20 (1.12)	4.80 (2.86)	2.84*** (1.00)
Regional parties	1.35 (1.20)	12.29** (3.48)	54.25* (29.29)	90.37* (44.42)	-1.24 (0.91)	11.75** (5.09)	-32.63** (14.61)	9.36 (7.04)	-11.29 (20.39)	10.71** (4.05)
<i>Constant</i>	-12.21 (4.70)	-87.10 (19.80)	-57.18 (14.82)	-37.20 (15.50)	-11.24 (5.34)	-82.21 (30.09)	-26.10 (34.65)	-66.29 (22.36)	-56.31 (49.01)	-85.86 (17.40)
<i>R</i> <sup>2</sup>	0.45	0.67	0.76	0.64	0.71	0.82	0.46	0.65	0.39	0.66
<i>F</i> test	32.92***	29.74***	122.50***	35.89***	9.53***	119.64***	8.33***	19.50***	5.83***	55.38***

Note: Non-standardized beta coefficients; robust standard errors clustered on country are listed in parentheses. \*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .10$ .

Figure 1A: National Defense

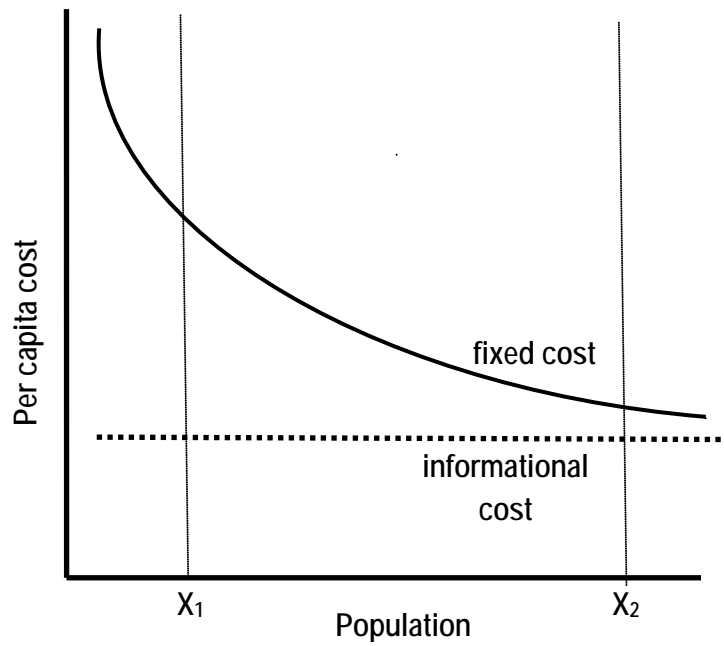
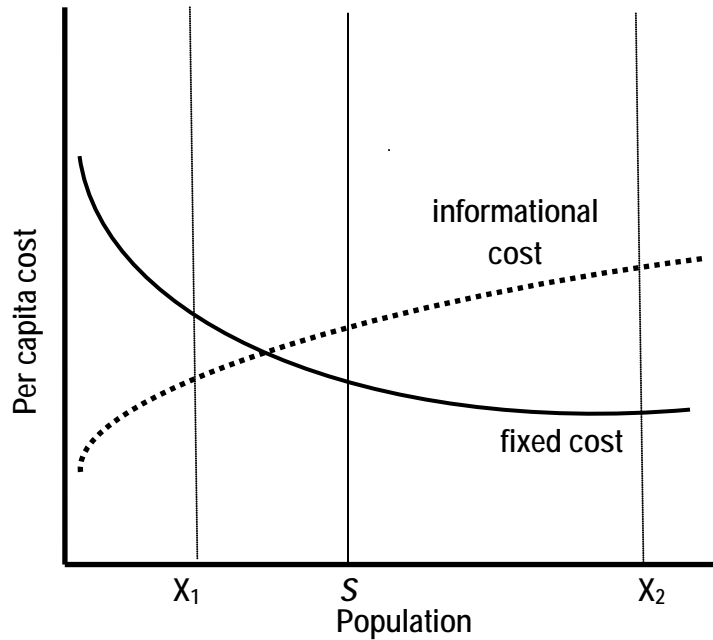
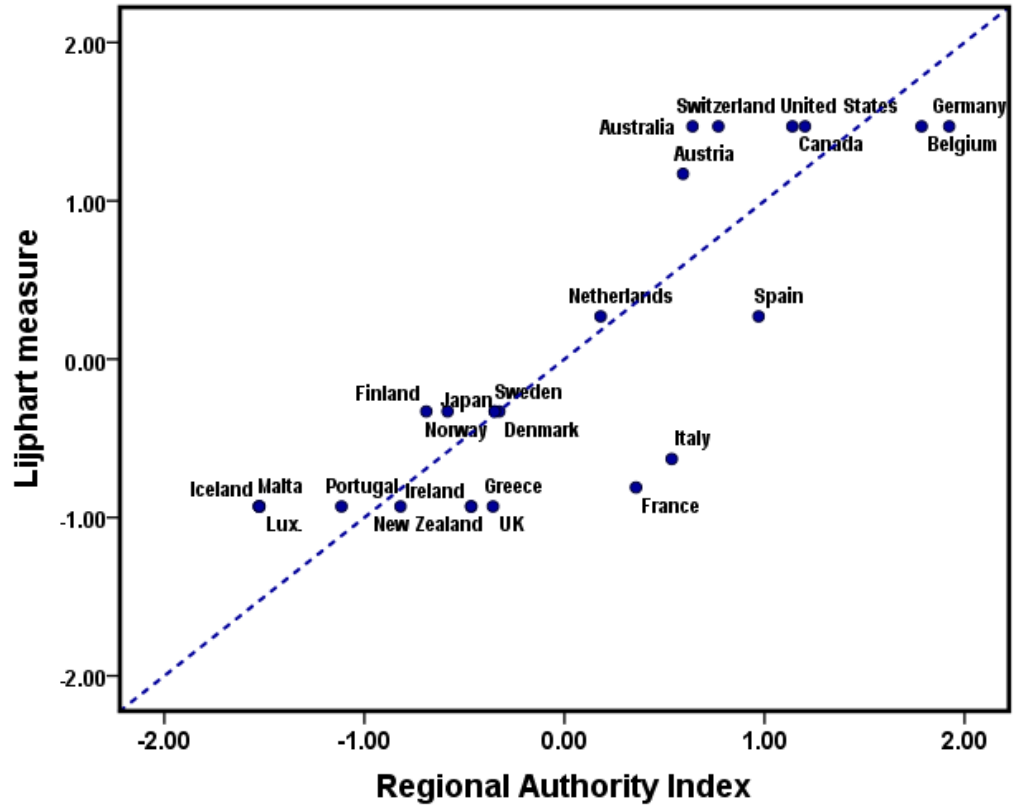


Figure 1B: School System



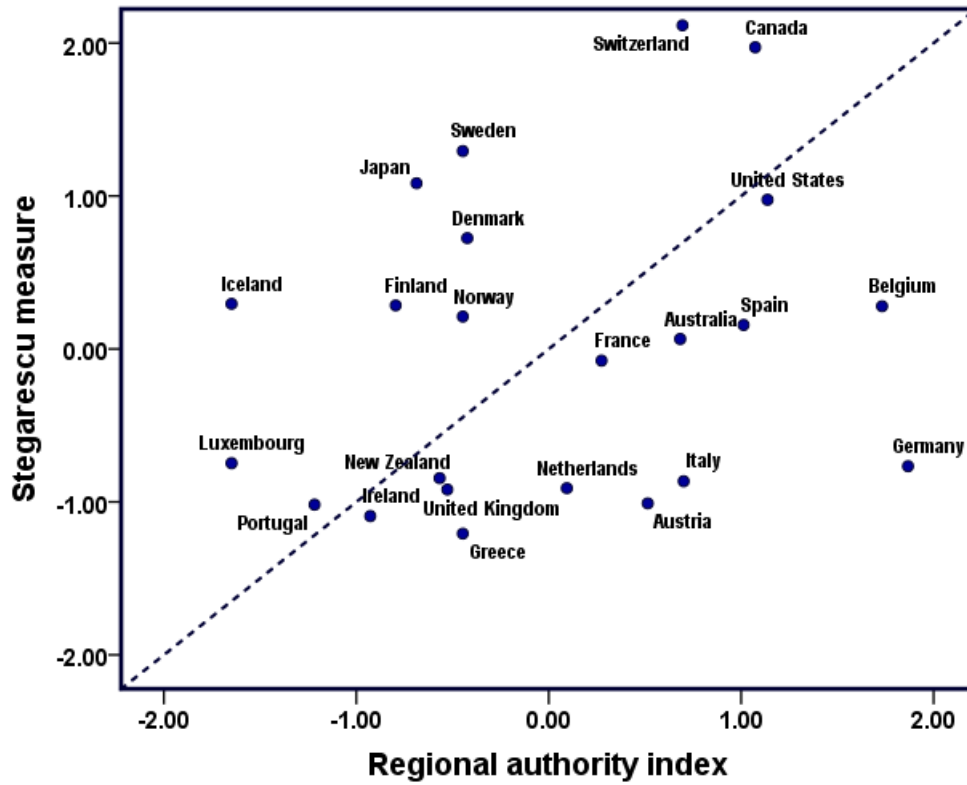
Note: Least-cost provision of national defense is at maximum population. Least-cost provision of a school system is at  $S$ . A country with a population of  $X_1$  will have a national school system, whereas a country with a population of  $X_2$  will have regional school systems.

Figure 2: Lijphart and Regional Authority Estimates



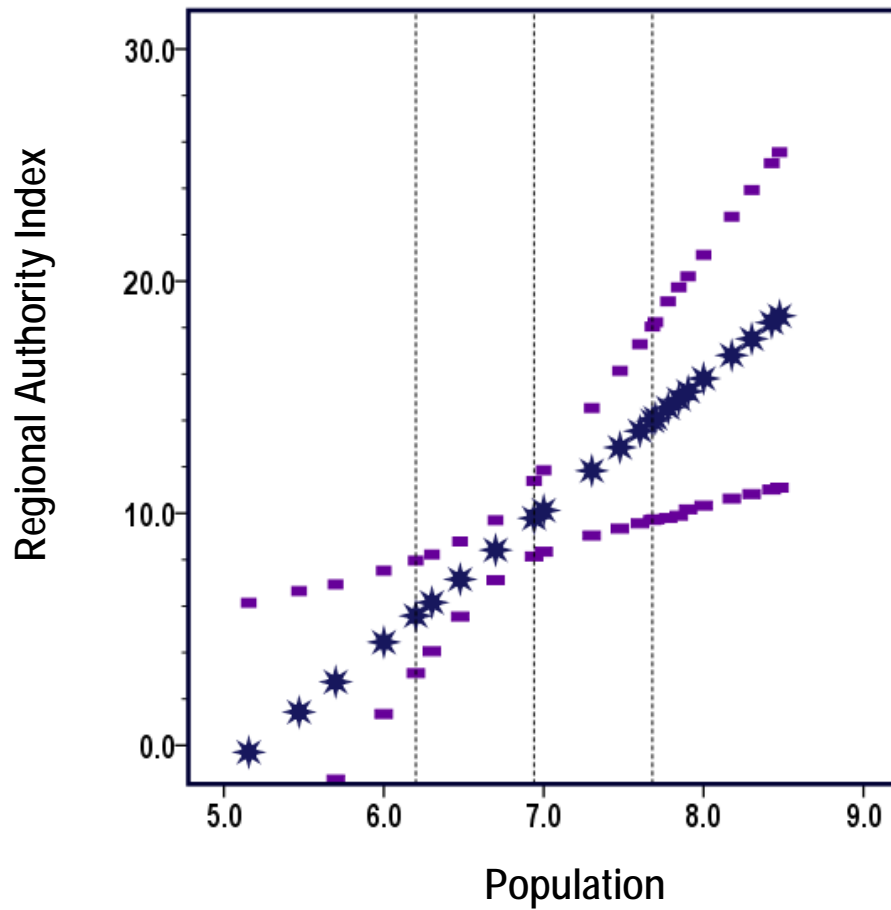
Note: Estimates (z-scores) for 24 countries common to the Lijphart dataset and Regional Authority Index in 1995.

Figure 3: Fiscal Decentralization



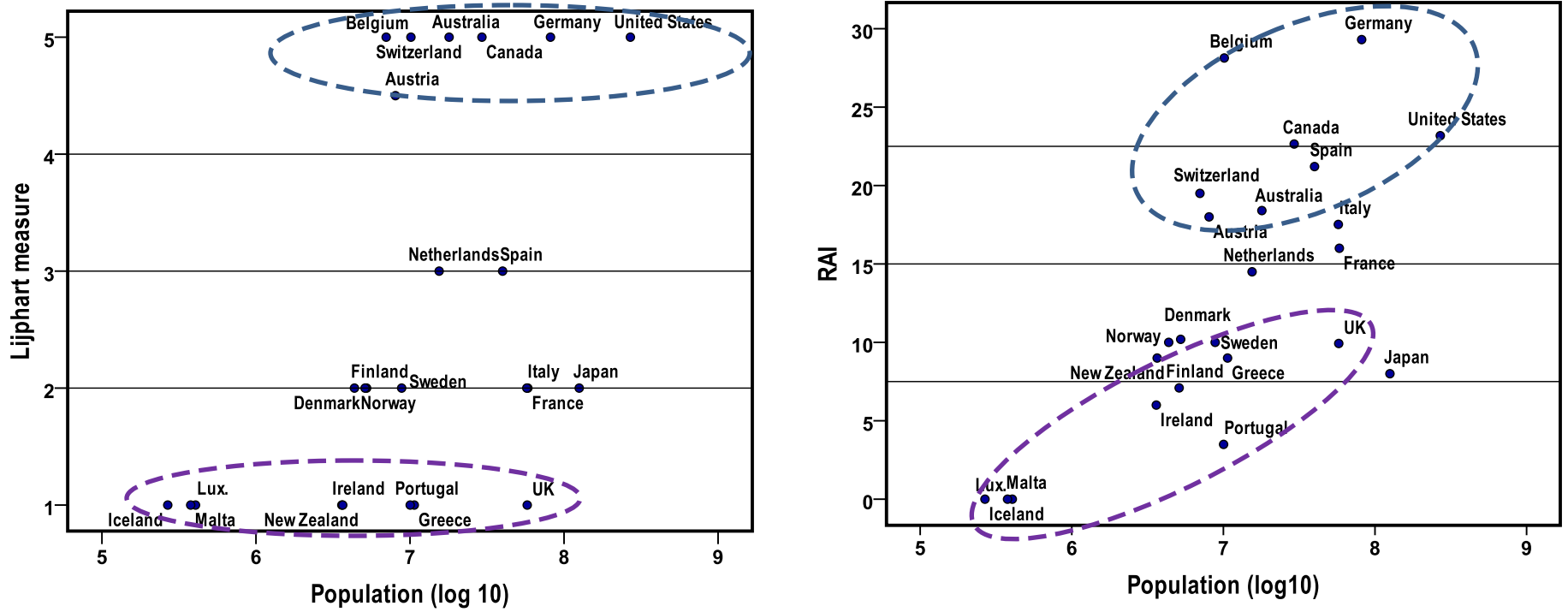
Note: Estimates (z-scores) for 23 countries common to the Stegarescu dataset and Regional Authority Index for 1999.

**Figure 4: Marginal Effect of Population on Regional Authority**



Note: Marginal effect of *Population* on *Regional Authority* within 5–95% confidence bands. The vertical lines indicate, from left to right, populations one standard deviation below the mean (1.35 million, e.g. Estonia), the mean population (8.6 million, e.g. Sweden), and one standard deviation above the mean (48 million, e.g. Italy or France in the 1960s), respectively.

Figure 5: The Federal/Unitary Straitjacket



Note: Estimates for the 24 countries common to the Lijphart dataset and Regional Authority Index (RAI) for 1995.

## APPENDIX

### Operationalization of Independent Variables (Tables 6 & 7)

<b>Population</b>	Annual figures in '000s, log <sub>10</sub> . <u>Source</u> : <i>Penn World Table</i> 6.3 (Heston et al. 2009).
<b>Area</b>	Annual figures in '000 km <sup>2</sup> , log <sub>10</sub> . <u>Source</u> : <i>Penn World Table</i> 6.3 (Heston et al. 2009).
<b>Ethnicity</b>	<p>The probability that two individuals selected at random from the country's population will be from different ethnic groups. Denoting population shares of ethnic groups in a country as <math>p_1, p_2, p_3, \dots, p_n</math>, the ethnic fractionalization index is</p> $F = 1 - \sum_{i=1}^n p_i^2$ <p>Fearon's estimate provides one time point for the postwar period. Only countries where ethnic difference is mostly or wholly territorially concentrated according to the <i>Minorities at Risk</i> dataset (2009) receive a value different from zero. <u>Source</u>: Fearon (2003); available on <a href="http://www.stanford.edu/~ifearon/">http://www.stanford.edu/~ifearon/</a>, accessed March 2011.</p>
<b>Inequality</b>	<p>Coefficient of variation (CV) of regional GDP per capita. The measure is standardized and calculated as follows:</p> $CV_U = \frac{\sqrt{\frac{\sum_i (y_i - \bar{y}_U)^2}{N}}}{\bar{y}_U}$ <p>where <math>y_i</math> is the income per capita of region <math>i</math>, <math>N</math> is the number of regions and <math>\bar{y}_U</math> is the mean per capita GRDP (unweighted by population) in a country:</p> $\bar{y}_U = \frac{1}{N} \sum_i y_i$ <p>There is no single year for which data are publically available for all countries. We use 2000 or nearest year to score 39 countries.</p> <p><u>Source</u>: Regional GDP per capita data from <i>Eurostat</i> website for EU-27, Croatia and Macedonia (accessed in March 2011); OECD data for non-EU democracies (accessed in March 2011); Russia from Benini &amp; Czyzewski (2007). For a discussion of the coefficient of variation and other measures of regional inequality, see Shankar &amp; Shah (2001).</p>
<b>Affluence</b>	Annual real gross domestic product per capita, current price. Log <sub>10</sub> . <u>Source</u> : <i>Penn World Table</i> 6.3 (Heston et al. 2009).
<b>Democracy</b>	<i>Freedom House</i> index for each country-year since 1972. Values estimated by the authors prior to 1972. The index sums scores for political rights and civil liberties on 7-point scales from 1=most democratic to 7=least democratic. Recoded so that high values indicate more democracy. <u>Source</u> : <a href="http://www.freedomhouse.org">http://www.freedomhouse.org</a> , accessed in March 2011.
<b>Regional parties</b>	Proportion of seats in the national parliament for regional parties on an annual basis. Non-election years take on the value of the most recent election year prior. A party is regional when it has an exclusively regional electoral base. <u>Source</u> : Party list provided by Arjan H. Schakel and updated by the authors.

## Summary Statistics

Measure/Variable	Mean	St.Dev.	Min	Max
<i>Measures of Regional Authority</i>				
Institutional Depth	2.08	1.48	0	5.76
Policy Scope	1.68	1.58	0	5.00
Fiscal Autonomy	1.41	1.55	0	4.94
Representation	2.77	2.29	0	7.97
Law Making	0.43	0.68	0	2.00
Executive Control	0.31	0.60	0	2.00
Fiscal Control	0.40	0.71	0	3.00
Constitutional Reform	0.80	1.34	0	5.98
<i>Independent Variables</i>				
Population	6.96	0.75	5.16	8.48
Area	2.21	0.93	-0.50	4.23
Ethnicity	0.12	0.20	0.02	0.60
Inequality	0.24	0.13	0.00	0.62
Affluence	3.82	0.47	2.42	4.82
Democracy	12.1	1.60	3.00	13.00
Regional Parties	0.03	0.12	0.00	1.00

**Correlation Table for the Measures of Regional Authority**

	ID	PS	FA	R	LM	EC	FC	CR
Institutional Depth	1							
Policy Scope	.88	1						
Fiscal Autonomy	.74	.85	1					
Representation	.93	.87	.73	1				
Law Making	.60	.61	.62	.54	1			
Executive Control	.63	.75	.60	.58	.67	1		
Fiscal Control	.50	.52	.44	.43	.73	.52	1	
Constitutional Reform	.58	.60	.59	.52	.71	.50	.80	1

*Note: N=1603. ID=Institutional Depth; PS=Policy Scope; FA=Fiscal Autonomy; R=Representation; LM=Law Making; EC=Executive Control; FC=Fiscal Control; CR=Constitutional Reform*

**Countries, Start of Measurement (through 2006), Minimum, Mean, Maximum Value on Regional Authority Index**

Country	Start	Min	Mean	Max	Country	Start	Min	Mean	Max
Australia	1950	18.02	18.32	19.40	Lithuania	1992	.00	3.20	4.00
Austria	1955	17.00	17.44	18.00	Luxembourg	1950	.00	.00	.00
Belgium	1950	14.00	22.33	32.07	Macedonia	1991	.00	.00	.00
Bulgaria	1991	1.00	1.00	1.00	Malta	1964	.00	.00	.00
Canada	1950	22.60	22.63	22.65	Netherlands	1950	13.50	13.73	14.50
Croatia	1991	.00	7.75	10.00	New Zealand	1950	.00	6.00	9.00
Cyprus	1960	.00	.00	.00	Norway	1950	4.00	7.37	10.00
Czech Republic	1993	.00	3.50	7.00	Poland	1990	2.00	4.82	8.00
Denmark	1950	4.14	7.90	10.19	Portugal	1976	2.54	3.43	3.59
Estonia	1992	.00	.00	.00	Romania	1991	6.00	8.81	11.00
Finland	1950	1.09	2.57	7.11	Russia	1993	15.66	17.50	19.00
France	1950	6.00	10.77	16.00	Slovakia	1993	.00	2.57	6.00
Germany	1950	28.42	29.15	29.47	Slovenia	1990	.00	.00	.00
Greece	1950	1.00	3.14	10.00	Spain	1978	10.04	20.25	22.14
Hungary	1990	8.00	9.24	10.00	Sweden	1950	10.00	11.29	13.50
Iceland	1950	0.00	.00	.00	Switzerland	1950	19.50	19.50	19.50
Ireland	1950	.00	1.49	6.00	Turkey	1950	1.00	4.23	5.00
Italy	1950	8.35	13.63	22.74	United Kingdom	1950	4.69	9.06	9.93
Japan	1950	8.00	8.25	10.00	United States	1950	23.08	23.14	23.20
Latvia	1990	.00	.00	.00					

## Notes

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<sup>1</sup> Riker 1987, 101.

<sup>2</sup> Ostrom 1987, 22.

<sup>3</sup> Wibbels observes that the “attempt to define the crucial characteristics of federalism has amounted to generating columns of federal prerequisites, checking off some number of those prerequisites, and then producing lists of federal systems. The problem with this tactic is that it tends to create dichotomous distinctions: systems are either federal or they are not. Such an antipodean approach [...] violates the tremendous variation across federal systems” (Wibbels 2005, 67). See Ziblatt 2004 for a historically informed effort to rethink the federal-unitary divide.

<sup>4</sup> Arrow 1961; Kochen & Deutsch 1969; 1966; Treisman 2007, 55-69.

<sup>5</sup> Arzaghi & Henderson 2005, 1165.

<sup>6</sup> Alesina & Spolaore 2003; Oates 1972.

<sup>7</sup> Oates 2005, 351; Olson 1969.

<sup>8</sup> Oates 2005, 357.

<sup>9</sup> Alesina et al. 1995, 754; Breuss 2004, 40; Färber 2001, 112.

<sup>10</sup> Arzaghi & Henderson 2005, 1179.

<sup>11</sup> Panizza 1999, 113.

<sup>12</sup> Garrett & Rodden 2003, 97.

<sup>13</sup> Thomas Hobbes, who believed in central authority, recognized that distance compromised the capacity of the monarch to rule in all matters. He therefore contrasted division of authority with

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division of administration, and advocated division of administration for far-flung territories or colonies (Hobbes 1960 [1651]).

<sup>14</sup> Simon et al. 1956, 275 and 279.

<sup>15</sup> Of the 39 countries dealt with here only Sweden and Germany have become more centralized since 1950, while 29 have become more regionalized.

<sup>16</sup> Panizza 1999; Alesina & Spolaore 2003.

<sup>17</sup> Fearon & Laitin 2003.

<sup>18</sup> Arrow 1991, 5; Kochen & Deutsch 1969, 735.

<sup>19</sup> Arrow 1961, 11.

<sup>20</sup> Stein 2002, 1892-93.

<sup>21</sup> Ostrom 2010, 8. Brackets added.

<sup>22</sup> Scholz et al. 1991; Hodge 1938; Pritchett 1943. The notion that policy making under soft information demands dialogue between local and central decision makers underpins social, environmental, research and educational policy making in the European Union. Sabel & Zeitlin theorize this as “experimentalist” governance: “At the core of these new forms is a recursive process of provisional goal-setting and revision through feedback from experience of pursuing them in different contexts. Sub-units within and beyond the organization are given substantial responsibility for defining the best ways to achieve these goals, separately and in conjunction with one another. They are also responsible for monitoring their own operations to find and fix gaps in the ensuing plans as they occur. Their results are then compared against one another, to identify and diffuse opportunities for performance improvement. Finally the goals themselves are

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periodically revised in response to the problems and possibilities revealed by such reviews” (Zeitlin 2010, 2; Sabel & Zeitlin 2010).

<sup>23</sup> Arrow 1991, 6.

<sup>24</sup> The number of levels in the hierarchy is the natural logarithm of the population. See Treisman 2007, 63-69.

<sup>25</sup> This is the notion of the social planner (Alesina & Spolaore 2003).

<sup>26</sup> Hooghe & Marks 2009; Oates 2006; Treisman 2007.

<sup>27</sup> Besley & Coate 2003; Lockwood 2002; Treisman 2007.

<sup>28</sup> Ostrom & Ostrom 1971; Ostrom & Parks 1999.

<sup>29</sup> Adcock & Collier 2001; Eckstein 1973.

<sup>30</sup> Amoretti & Bermeo 2004; Elazar 1987; Keating 1998; Lane & Ersson 1999; Watts 1998; Ziblatt 2006. See also Eaton 2008.

<sup>31</sup> Falleti 2010; Inman 2008.

<sup>32</sup> Brancati 2006; Keating 2001; Peterson 1995; Sorens 2010.

<sup>33</sup> OECD 1999; Rodden 2004; Schakel 2008.

<sup>34</sup> Wright 1988.

<sup>35</sup> Amoretti 2004, 9; Bednar 2009, 4; Watts 1998.

<sup>36</sup> The scales are designed to have equivalent intervals. The regression models we use have been shown to be quite robust to distortions that could arise from smooth monotone transformations, including summation of ordinal scores across rating scales (Shevlin et al. 1997).

<sup>37</sup> Lijphart 1999, 186-95.

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<sup>38</sup> Schakel 2008, 156; Council of Europe 2000a, 47–8.

<sup>39</sup> Panizza 1999; Stegarescu 2005.

<sup>40</sup> Boadway & Shah 2009; Rodden 2006.

<sup>41</sup> Rodden 2004; Schakel 2008; Sorens 2010.

<sup>42</sup> Rokkan 1983; Gellner 1983.

<sup>43</sup> Habyarimana et al 2007, 711; see also Deutsch 1966.

<sup>44</sup> Bolton & Roland 1997; Dahl Fitjar 2008; Van Houten 2003.

<sup>45</sup> Alesina & Spolaore 2003: 63-67.

<sup>46</sup> Beramendi 2010.

<sup>47</sup> Laitin 1998.

<sup>48</sup> Osterkamp & Eller 2003; Peterson 1995.

<sup>49</sup> Hooghe et al. 2010; Meguid 2009.

<sup>50</sup> Granger tests indicate that the causality runs from regionalist political party representation to regional authority. However, this cannot be generalized to party systems, for as Chhibber and Kollman observe, “party systems become more national as governments centralize authority” (2004, 79).

<sup>51</sup> Hopkin & Van Houten 2009; Sorens 2009; Swenden & Maddens 2009.

<sup>52</sup> The VIF for independent variable  $j$  is  $1/(1 - R_j^2)$ , where  $R_j^2$  is the squared multiple correlation from a regression of variable  $j$  on all other independent variables in the model. The  $VIF_j$  is proportional to the variance of variable  $j$  explained by the other independent variables in the model.

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<sup>53</sup> The strong and significant effect of population is robust when we control for urbanization. To the extent that it is easier to coordinate public goods provision in densely populated areas, urbanization should reduce the effect of population on regional decentralization (Arzaghi & Henderson 2005). We test both the independent effect of urbanization and its interaction with population, but detect no significant effects (results obtainable from the authors).

<sup>54</sup> Lijphart 1999, 252; Dahl & Tufte 1973.

<sup>55</sup> Brancati 2006.

<sup>56</sup> Panizza 1999; Stegarescu 2005.

<sup>57</sup> Blöchliger & King 2006.

<sup>58</sup> Ansolabehere, Rodden, Snyder 2008.

<sup>59</sup> Baldwin & Huber 2010.

<sup>60</sup> Coppedge et al. 2008.

<sup>61</sup> Marks et al. 2007.

<sup>62</sup> Blalock 1970, 1105.