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# Validation of the Regional Authority Index

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**ABSTRACT** This article validates the Regional Authority Index (RAI) with seven widely used decentralization indices in the literature. A principal axis analysis reveals a common structure. The major source of disagreement between the RAI and the other indices stems from the fact that the RAI does not include local governance, whereas most other indices do. Two other sources of disagreement concern the treatment of federal versus non-federal countries, and countries which have recently regionalized and/or have asymmetrical regions, whereby the more fine-grained RAI captures greater variation. The second part of the article discusses content validity of fiscal indicators.

**KEY WORDS:** Convergent validity, content validity, decentralization indicators, fiscal indicators, fiscal federalism, regionalization, decentralization

## Introduction

The purpose of this article is to validate the Regional Authority Index (RAI). One can distinguish between two reasons for assessing (internal) validity of measurements. First, by validating measurements, ‘commonalities’ come to the fore. In how far do the measures measure the same? This is how one usually understands assessing (internal) validity. Another reason, however, may lie in exploring ‘differences’ between measurements. When do measures of the same concept disagree? The answer to this question reveals information that might be helpful in deciding when or how to use one or the other measurement. In this article the validity of the RAI is assessed by looking at the commonalities as well as the differences between the RAI and other, widely used, regionalization and decentralization indices.

Three types of indices exist: indices measuring institutional decentralization/regionalization, indices of fiscal decentralization/regionalization or indices that combine institutional and fiscal components. Institutional indices have been developed by Lane and Ersson (1999), Lijphart (1999), Hooghe and Marks (2001), Treisman (2002), Arzaghi and Henderson (2005) and Brancati (2006). Fiscal indices were introduced by Oates (1972), Castles (1999), Braun (2000), Ebel and Yilmaz (2002),

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Meloche *et al.* (2004), Stegarescu (2005a) and Enikolopov and Zhuravskaya (2007). Some authors combine the two types into one index (Woldendorp *et al.*, 2000).

Despite the abundance of indices, there is little systematic comparison of their validity (an important exception is Rodden (2004)). This article focuses on two types of validity (Ray, 2007; Bollen, 1989).<sup>1</sup>

- *Convergent* validity assesses whether a given indicator is associated empirically with other indicators that conform to theoretical expectations: it involves comparing alternative measures of the same concept or comparing measures of different concepts (Ray, 2007: 12). Measurements of the same concept—in this case, decentralization—should converge, that is, they should correlate across a given set of cases.
- *Content* validity assesses the degree to which an indicator captures the content of the measured concept (Adcock and Collier, 2001: 537). This is a “qualitative type of validity where the domain of the concept is made clear and the analyst judges whether the measures fully represent the domain” (Bollen, 1989: 185). Testing for content validity “does not involve the comparison of a measure with any other quantitative data, and can be employed even before any data is collected” (Ray, 2007: 12). Content validity means that scholars agree on the definition of decentralization, or agree on how decentralization can be broken down into different types of decentralization. The measurements may differ in their ‘content’ because different theoretical assumptions underlie them.

Convergent validity for the RAI is assessed by comparing the index with seven institutional-type regionalization and decentralization indices commonly used in the literature. Fiscal indices are not used to examine convergent validity of the RAI because there are major caveats with respect to content validity. I point out two caveats with conceptualizing and operationalizing fiscal decentralization.

The next section introduces and compares seven institutional measures. Can decentralization be conceived as a single, continuous dimension? What is the common structure underlying these measures? Several hypotheses for explaining variation among the different measures are then tested, and the strongest cases of disagreement are analysed in greater detail. The last section examines the content validity of fiscal indicators of decentralization.

### Decentralization Indices

Decentralization is conceived of as a single, continuous dimension ranging from centralization in which the central government monopolizes decision-making authority to decentralization in which subnational governments have extensive decision-making authority that falls short of a monopoly over authority. It is important to note that this is a simplification. Some authors differentiate among vertical vs. horizontal decentralization, or decentralization with respect to decision making, appointment, electoral, fiscal or personnel (Treisman, 2002), or between fiscal, political and administrative decentralization (Schneider, 2003).

The RAI is consistent with these understandings in that it too is composed of different components: institutional depth, policy scope, fiscal autonomy, representation, and law making, executive control, fiscal control and constitutional reform. However, the

RAI differs from some (but not all) indices in that it focuses on regional tiers, i.e. the intermediate tiers with a minimum average jurisdictional population size of 150 000. Several decentralization indices discussed here consider the dispersion of power across all subnational tiers, thus including the local tier, and sometimes they also include dispersion of power to interests groups (i.e. corporatism).

The RAI is compared with seven indices:

*Arzaghi and Henderson (2005)*<sup>2</sup>

These authors present a “nuanced index of ‘institutional’ decentralization, or effective federalism” (Arzaghi and Henderson, 2005: 1176) which they construct by assessing fiscal, political and administrative responsibilities of subnational government. This index is an average of six indicators, each of which ranges from 0 to 4:

- unitary (0) or federal (4) government structure;
- election of a regional executive: no (0) or yes (4);
- election of a local executive: no (0) or yes (4);
- ability of the centre to suspend lower levels of government or to override their decisions: no (4) or yes (0);
- revenue-raising authority of lower-level governments: no (0), limited (2) or full (4);
- revenue sharing: no (0), limited (2) or full (4).

The dataset consists of scores for five-year intervals between 1960 and 1995 for 16 European and Organization for Economic Cooperation and Development (OECD) countries that overlap with the RAI dataset.<sup>3</sup>

*Brancati (2006)*

This index measures ‘political decentralization’, which is understood as the vertical division of authority among subnational levels of government that have independent decision-making power over at least one issue area. It consists of three components, which together construct a scale ranging from 0 to 5:

- subnational elections: 1 point when there are subnational elections;
- subnational legislative control over policies: 1 point each for: tax authority, education and public order/police;
- subnational veto over constitutional amendments: 1.

The dataset consists of 40 European, Balkan and OECD countries,<sup>4</sup> for the years 1985–2000.<sup>5</sup>

*Hooghe and Marks (2001)*

The Hooghe and Marks index is the only one of seven which focuses on regional autonomy—rather than decentralization—within a country. This is an additive index of four components, ranging between 0 and 12.

- Constitutional federalism (0–4), which taps constitutional or legal provisions relating to regional government in the state. One point is assigned for each of the following characteristics (Hooghe and Marks, 2001: 194):
  - existence of a functioning regional tier of government;
  - extensive authoritative competencies, including control over two or more of the following: taxation; police; education policy (including tertiary education); cultural policy; transport and communications policy; economic development; local government; and determination of regional political institutions (e.g. administrative hiring, budget process, timing of regional elections);
  - specific regional competencies that are constitutionally guaranteed;
  - a federal state in which constitutional change is co-decided by the central state and regions.
- Special territorial autonomy (0–2), which refers to constitutional or legal provisions for home rule in special territories. The score is derived by multiplying the score for the extent of authoritative competencies in a special territory with a score that varies by the relative population size of the special territory, so that larger special territories weigh more heavily on the country score (Hooghe and Marks, 2001: 200):
  - scope of competencies (0.5 = weak competencies; 1 = extensive competencies (see the list above);
  - population coverage (1 = less than 10% of the population; 2 = more than 10% of the population).
- Role of regions in central government (0–4), whereby the authors distinguish between legislative and executive power sharing:
  - legislative power sharing, if there is a chamber in the national legislature composed of representatives of regional governments or parliaments (0 = no chamber in the national legislature composed of representatives of regional governments or parliaments; 1 = chamber without wide-ranging veto power; 2 = chamber with wide-ranging veto power);
  - executive power sharing (0 = no regular intergovernmental meetings between central state and regional executives; 1 = regular meetings without authority to reach binding decisions; 2 = regular meetings with authority to reach binding decisions).
- Regional elections (0–2):
  - 1 = the regional assembly is indirectly elected;
  - 2 = the regional assembly is directly elected.

The dataset covers 14 West European countries,<sup>6</sup> with four time-points of evaluation for each country: 1950, 1970, 1990 and 2000.

#### *Lane and Ersson (1999)*

This is an index of decentralization which is understood as “the territorial location of public decision and implementation functions at various levels of government” (Lane and Ersson, 1999: 207). The index consists of four discrete components for a total of 10 points:

- extent of federalism (0–3);
- special territorial autonomy (0–2);
- functional autonomy (0–2);
- local government discretion (0–3).

The dataset contains scores for 18 West European countries<sup>7</sup> and has one data point capturing decentralization in the post-Second World War period.<sup>8</sup>

*Lijphart (1999)*

Lijphart measures federalism and decentralization which he conceives as one dimension. The index consists of five ordinal categories which construe a scale that ranges from 1 to 5:

- 1 = unitary and centralized;
- 2 = unitary and decentralized;
- 3 = semi-federal;
- 4 = federal and centralized;
- 5 = federal and decentralized.

This dataset consists of 36 countries, of which 24 West European and OECD countries overlap with the RAI.<sup>9</sup> There is one score which is an average evaluation of the post-Second World War period.<sup>10</sup>

*Treisman (2002)*

Treisman focuses on decentralization and measures different types: vertical, decision making, appointment, electoral, fiscal and personnel decentralization.<sup>11</sup> Decision-making decentralization comes closest to the definition of decentralization used in this article and therefore, I use it to validate the RAI.

An index of decision-making decentralization can be made by summing three components of decentralization identified by Treisman, which creates a scale ranging from 0 to 3:<sup>12</sup>

- weak autonomy = 1: the constitution reserves to subnational legislatures the exclusive right to legislate on at least one specific policy area or if subnational legislatures have residual authority;
- residual autonomy = 1: the constitution gives subnational legislatures the exclusive right to legislate on policy areas not specifically assigned in the constitution;
- subnational veto = 1: there is a regionally elected upper chamber that has the constitutional right to block legislation.

The dataset covers 41 European, Balkan and OECD countries,<sup>13</sup> and the scores reflect the situation in the mid-1990s.

Woldendorp *et al.* (2000)

Their autonomy index measures “how independent the non-central units of government are as regards policy making” (Woldendorp *et al.*, 2000: 35). It consists of four components, which combine in a scale from 0 to 8.

- Central fiscalization (0–2):<sup>14</sup>
  - 2: if a country has a degree of fiscal centralization lower than 75%;
  - 1: if a country has a degree of fiscal centralization between 75% and 90%;
  - 0: if a country has a degree of fiscal centralization equal to or more than 90%.
- Regional autonomy (0–2):
  - 2: if regional autonomy is formally laid down (as is the case in federalist states);
  - 1: if the country is a semi-federalist system;
  - 0: neither.
- Centralization (0–2):
  - 2: if the state is not considered to be centralized;
  - 1: if the state is considered to be medium centralized;
  - 0: if the state is considered to be highly centralized.
- Local government autonomy (0–2):
  - 2: if three conditions are met: local government is mentioned in the constitution, its autonomy is recognized and it is guaranteed own representation;
  - 1: if one of these conditions is met;
  - 0: all other cases.

The dataset contains 37 European, Balkan and OECD countries,<sup>15</sup> and there is one time-point of evaluation which reflects the post-Second World War period.<sup>16</sup>

### *Factor Analysis*

To see whether these diverse measures of a single concept—decentralization—have a common structure, a principal axis analysis is employed (Marks *et al.*, 2007).<sup>17</sup> Since the number of countries for which there are scores differs per decentralization index, four separate factor analyses are performed to maximize the number of cases.

The factor analyses in Table 1 reveal that the indices do, indeed, have a common structure. In each analysis, the principal axis has an eigenvalue well above one, and the explained variance is 75% or more. The RAI measure loads strongly on the principal axis in all four analyses. Lijphart’s and Hooghe and Marks’ and, to a lesser extent, Brancati’s and Treisman’s measure also load heavily on the principal axis.

### **Sources and Cases of Disagreement**

This section explores the sources of disagreement between the decentralization indexes and close attention is paid to the most important cases of disagreement.

The decentralization indices can be considered as expert judgments. As can be seen from the description of the indices, each expert uses her/his own criteria. Although

**Table 1.** Factor analyses of seven decentralization indices and the Regional Authority Index

Decentralization index	Factor analysis I	Factor analysis II	Factor analysis III	Factor analysis IV
Regional Authority Index (RAI)	0.996	0.934	0.920	0.910
Arzaghi and Henderson (2005)	0.748	–	–	–
Brancati (2006)	0.771	0.840	0.917	0.906
Hooghe and Marks (2001)	0.945	0.924	–	–
Lane and Ersson (1999)	0.809	0.740	–	–
Lijphart (1999)	0.894	0.923	0.931	–
Treisman (2002)	0.824	0.884	0.869	0.906
Woldendorp <i>et al.</i> (2000)	0.920	0.789	0.874	0.866
<i>n</i>	7	14	23	36
Eigenvalue	6.017	5.232	4.072	3.209
Explained variance (%)	75	75	81	80

*Note:* All indices are standardized. The factor loadings resulting from a principal axis analysis are shown. The following time periods are compared with each other: RAI (average for 1950–2006); Arzaghi and Henderson (2005) (average score of eight, five-year intervals between 1960 and 1995); Brancati (2006) (one score for 1985–2000); Hooghe and Marks (2001) (average of four time-points: 1950, 1970, 1990, 2000); Lane and Ersson (1999) (one score for 1945–1995); Lijphart (1999) (one score for 1945–1996); Treisman (2002) (one score for the mid-1990s); Woldendorp *et al.* (2000) (one score for 1945–1998).

there are commonalities in these criteria, there are also many differences. Furthermore, experts differ in their level of knowledge for different countries. One may hypothesize that this all leads to different evaluations of subnational autonomy in countries.

### Sources of Disagreement

To explore the structure of disagreement between the RAI and the other measures, the RAI is regressed on each decentralization index.<sup>18</sup> By exploring the residuals from regressing the RAI on one of the other decentralization indices one can see when the measures disagree. What are of interest here are ‘systematic’ sources of bias or error—not random error. Where can one expect to observe larger residuals, that is to say, where can one expect the scores of the RAI to differ systematically from those of one of the other indices?

### No Regional Tier

One major difference between the RAI and all but one of the alternative seven indices is that the RAI captures only intermediate regional tiers, not local government. The RAI also excludes regional tiers with an average population size below 150 000 people. Six of the seven other indices consider local as well as regional government in assessing decentralization. So the RAI is designed to measure regional government and this, one would expect, is somewhat conceptually distinct from decentralization, which the other indices measure.

It seems reasonable, then, to expect negative residuals for countries which have only one subnational government tier, which are countries with local government only. That



is to say, the RAI should under-estimate decentralization in countries that have only a local tier.

#### *Federal Versus Non-federal Countries*

The fine-grained character of the RAI allows for capturing graduations in the extent of regional autonomy—even in countries with highly autonomous regions, such as federal countries. This is different from most indices, which usually employ a sharply discontinuous measure, sometimes simply dichotomous, that distinguishes federal from non-federal countries. Lijphart, for example, assigned all federal countries a score of 5, whereas only Austria scores a 4.5. All federal countries, except Austria, thus receive the highest score while non-federal countries are allowed to have more differentiated scores (between 1, 2 and 3).

The RAI is more sensitive to variation within the federal category: the range among federal countries is 14, from about 17 (Austria and the Russian Federation) to almost 30 (Germany) up to about 31 (Bosnia and Herzegovina). This range is about the same as it is for non-federal countries which vary between 0 (multiple countries) to about 14 (the Netherlands and Sweden).

Other indices, however, work exactly the opposite way: they tend to treat the non-federal countries more as a homogeneous group and allow more variation among the federal countries. Treisman's measure, for example, gives only six out of 33 non-federal countries a score higher than zero, whereas all eight federal countries score between 1 and 3.

Differential sensitivity in measurement should produce systematic differences in scoring. That is to say, for some indices, such as Lijphart's, one would expect the residuals with the RAI to be larger for federal countries than for non-federal countries. Conversely, for other indices, such as Treisman's, the residuals should be smaller for federal countries and larger for non-federal ones.

These different biases in scoring become apparent when one compares, for each index, means, standard deviations and ranges for federal with those for non-federal countries (Table 2).

All decentralization indices are able to differentiate between federal and non-federal countries, i.e. the mean score for non-federal countries is significantly different from the mean for federal countries.<sup>19</sup> This means that all decentralization indices pick up 'between-group' differences. But not all measures are equally suited to capture 'within-group' differences.

The ratio measure in Table 2 gives a sense of this. The ratio is calculated by dividing the standard deviation of federal countries by that of non-federal countries. A ratio larger than one indicates that the decentralization index is biased to capturing variation among federal countries, a ratio smaller than one indicates the opposite. One can see that the RAI, Arzaghi and Henderson and Woldendorp *et al.* differentiate equally between countries 'within each group'. Hooghe and Marks and Lijphart tend to treat the federal countries as a homogeneous group, whereas Brancati, Lane and Ersson and Treisman tend to treat non-federal countries as a homogeneous group.

One may expect differences in scoring to lead to negative residuals (under-estimation by the RAI) for federal countries for the Hooghe and Marks and Lijphart

**Table 2.** Comparison of means, standard deviations and ranges between federal and non-federal countries for eight decentralization indices (standardized)

Decentralization index	Federal countries				Non-federal countries				Ratio
	Mean	St. dev.	<i>n</i>	Min-Max	Mean	St. dev.	<i>n</i>	Min-Max	
Arzaghi and Henderson (2005)	0.873	0.776	5	-0.892-1.400	-0.397	0.825	11	-1.351-0.942	<b>0.941</b>
Brancati (2006)	1.203	0.863	9	-0.318-2.616	-0.349	0.736	31	-2.274-1.638	<b>1.173</b>
Hooghe and Marks (2001)	1.829	0.323	8	1.527-2.131	-0.305	0.700	48	-0.890-1.829	<b>0.423</b>
Lane and Ersson (1999)	1.259	1.033	3	0.663-2.452	-0.252	0.809	15	-1.127-1.259	<b>1.277</b>
Lijphart (1999)	1.539	0.128	6	1.278-1.592	-0.513	0.483	18	-0.917-0.400	<b>0.265</b>
Treisman (2002)	1.396	0.821	8	0.525-2.848	-0.319	0.727	33	-0.636-1.687	<b>1.129</b>
Woldendorp <i>et al.</i> (2000)	1.468	0.690	7	0.616-2.243	-0.342	0.709	30	-1.554-0.616	<b>0.973</b>
Regional Authority Index	1.477	0.547	9	0.896-2.340	-0.409	0.652	33	-1.030-1.452	<b>0.839</b>

*Note:* The ratio score is obtained by dividing the standard deviation for federal countries by the standard deviation of non-federal countries. A ratio of more than 1 indicates that federal countries vary more in their scores than non-federal countries. A ratio score of less than 1 indicates that non-federal countries vary more than in their scores than federal countries. The following countries were considered federal for most of the time during their democratic existence in the post-Second World War period: Australia, Austria, Bosnia and Herzegovina, Canada, Germany, Russian Federation, Serbia and Montenegro, Switzerland and the USA.

measures, whereas it should lead to positive residuals (over-estimation by the RAI) for federal countries for the Brancati, Lane and Ersson and Treisman measures.

#### *Asymmetry and Regionalizing*

A last source of disagreement might be expected for countries that, for some reason or another, are complicated to evaluate. This may be so when a country has asymmetrical regions that depart from the general country pattern, or when decentralization in a country has been in flux recently.

The vertical state structure is not necessarily uniform within a single country at a certain point in time *and* over time. A country might have a special autonomous region which has more autonomy than other subnational units, for example *Grønland* and the *Færøerne* in Denmark and *Åland* in Finland. There might also be differences between units of the same subnational tier. Examples are the historic communities versus the other *autonomas comunidades* in Spain and the special statute regions versus the ordinary regions in Italy.

Decentralization is a moving target. Subnational tiers may be created or abolished, autonomy may be deepened or revoked. In France, for example, the *régions* were institutionalized in 1964 and, over time, were granted more autonomy. How scholars

evaluate these differences at a certain point in time may differ, and this, one would expect, should lead to variation in scoring.

### Explaining Disagreement

Testing these expectations requires that disagreement is operationalized. I use as a measure the residuals from regressing the RAI on the other decentralization indices.

The first two sources of disagreement—presence or absence of a regional tier and federal or non-federal—are operationalized as dummy variables.<sup>20</sup> To measure asymmetry and dynamic regionalization, an additive index (0–2) is constructed, whereby a value of 1 is allocated to a country that has (had) asymmetric regions,<sup>21</sup> and a value of 1 to a country that has experienced radical regionalization<sup>22</sup> in the post-Second World War period. The RAI is regressed on the decentralization indices and the residuals are subsequently regressed on the sources of disagreement variables.<sup>23</sup> The absolute residuals are considered first, before the raw residuals (taking the sign into account).

The absolute residual analysis in Table 3 shows that the sources of disagreement differ across decentralization indices. The strongest predictor of disagreement for Brancati and Treisman is the ‘no regional tier’ variable. The federal–non-federal variable is effective in explaining disagreement with the Treisman index and the asymmetry/regionalized variable explains disagreement with the Lijphart variable. None of the factors appeared significantly associated with the residuals for Arzaghi and Henderson, Hooghe and Marks, Lane and Ersson, and Woldendorp *et al.*

**Table 3.** Analysis of the absolute residuals of the regression of RAI on the different decentralization indices (all indices are standardized)

Source of disagreement	Arzaghi and Henderson (2005)	Brancati (2006)	Hooghe and Marks (2001)	Lane and Ersson (1999)	Lijphart (1999)	Treisman (2002)	Woldendorp <i>et al.</i> (2000)
No regional tier	–	0.673*** (0.196)	–	0.321 (0.341)	0.199 (0.154)	0.361*** (0.131)	0.071 (0.160)
Federal–non-federal	–0.032 (0.128) <sup>a</sup>	0.276 (0.172)	–0.087 (0.245) <sup>a</sup>	0.547* (0.296)	0.044 (0.112)	0.314** (0.126)	0.012 (0.153)
Asymmetry/regionalized	–0.046 (0.081) <sup>a</sup>	0.047 (0.109)	–0.051 (0.090) <sup>a</sup>	0.197 (0.139)	0.193*** (0.066)	0.037 (0.077)	0.028 (0.090)
<i>n</i>	98	40	51	18	24	41	37
R <sup>2</sup>	0.02	0.26	0.02	0.22	0.30	0.23	0.01
Adj. R <sup>2</sup>	–	0.20	–	0.05	0.20	0.17	–0.08

Note: \* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

The residuals are regressed on the different sources of disagreement. The beta-coefficients and their standard errors are shown.

<sup>a</sup>Cluster-corrected standard errors (Arzaghi and Henderson, 2005: 16 countries  $\times$  8 time-points; Hooghe and Marks, 2001: 14 countries  $\times$  4 time-points).

The same analysis is repeated for raw residuals and the results reported in Table 4. The most striking result is that all beta-coefficients are negative for the 'no regional tier' variable which means that the RAI systematically *under-estimates* subnational autonomy of countries which have no regional tier.

### Cases of Disagreement

It is not only interesting to see what the sources of disagreement are but also whether disagreement is caused by certain countries. What are the outliers? I define a 'case of disagreement' as having a residual score of two standard deviations or more. Table 5 shows thirteen cases of disagreement involving nine countries.

The differences in scoring for Cyprus, Finland, Luxembourg and Macedonia can be explained by the fact that the RAI does not measure local government while the other decentralization indices do. But the precise scoring of these cases still raises some questions.

Cyprus and Luxembourg scored 1 (out of 3) on the Treisman measure since the constitution of these countries reserves to subnational legislatures the exclusive right to legislate in at least one specific policy area. For Luxembourg this is birth, marriage and death certificates<sup>24</sup> and for Cyprus it is town planning.<sup>25</sup> This kind of scoring leads to some curious bedfellows: Australia and Russia also scored 1 on Treisman's index, and yet it would be difficult to sustain that the states of Australia and the

**Table 4.** Analysis of the raw residuals of the regression of RAI on the different decentralization indices (all indices are standardized)

Source of disagreement	Arzaghi and Henderson (2005)	Brancati (2006)	Hooghe and Marks (2001)	Lane and Ersson (1999)	Lijphart (1999)	Treisman (2002)	Woldendorp <i>et al.</i> (2000)
No regional tier	–	–1.093*** (0.256)	–	–0.221 (0.514)	–0.304 (0.259)	–0.766*** (0.209)	–0.493** (0.238)
Federal–non-federal	0.413* (0.233) <sup>a</sup>	0.457** (0.225)	–0.232 (0.356) <sup>a</sup>	0.910* (0.446)	–0.144 (0.187)	0.180 (0.201)	0.318 (0.228)
Asymmetry/ regionalized	–0.169 (0.152) <sup>a</sup>	0.133 (0.143)	0.057 (0.156) <sup>a</sup>	0.387* (0.210)	0.289** (0.111)	0.157 (0.123)	0.120 (0.134)
<i>n</i>	98	40	51	18	24	41	37
R <sup>2</sup>	0.20	0.48	0.05	0.35	0.38	0.38	0.24
Adj. R <sup>2</sup>	–	0.44	–	0.21	0.29	0.33	0.17

Note: \* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

The residuals are regressed on the different sources of disagreement. The beta-coefficients and their standard errors are shown. A negative sign means under-estimation and a positive sign means over-estimation of the RAI.

<sup>a</sup>Cluster-corrected standard errors (Arzaghi and Henderson, 2005: 16 countries  $\times$  8 time-points; Hooghe and Marks, 2001: 14 countries  $\times$  4 time-points).

**Table 5.** Cases of disagreement between the Regional Authority Index and seven decentralization indices from the literature

Country	Sign	Decentralization index
Belgium	+	Brancati (2006)
Belgium	+	Hooghe and Marks (2001)
Cyprus	–	Brancati (2006)
Cyprus	–	Treisman (2002)
Finland	–	Woldendorp <i>et al.</i> (2000)
Germany	+	Brancati (2006)
Germany	+	Lane and Ersson (1999)
Luxembourg	–	Treisman (2002)
Macedonia	–	Brancati (2006)
Macedonia	–	Woldendorp <i>et al.</i> (2000)
Poland	–	Arzaghi and Henderson (2005)
Serbia and Montenegro	+	Brancati (2006)
Sweden	+	Hooghe and Marks (2001)

*Note:* A case of disagreement is defined as having a residual of above two standard deviations. The sign of the residual is also given. A positive sign signifies over-estimation and a negative sign signifies under-estimation of the RAI. There are no cases of disagreement between the RAI and Lijphart's (1999) measure.

*federacii subwekty* in the Russian Federation have the same autonomy as the municipalities in Cyprus and Luxembourg. Treisman's index, then, may not be discriminatory enough to tap the full range of variation in decentralization.

A similar observation could be made for the Macedonian score on Brancati's index. Macedonia scored 3 out of 5, because local governments have authority over taxation (+1) and education (+1) and they have an elected assembly (+1). However, the 1995 law on self-government strongly curtailed these powers, as Brancati noted herself.<sup>26</sup> Macedonia's score of 3 ranks on a par with the *regioni* in Italy, the *autonomas comunidades* in Spain, the Australian states, the Russian federal subjects and the Belgian *Gemeenschappen/Regios*.

Woldendorp *et al.* gave Macedonia a score of 4 (out of 7). The score reflects that local government is mentioned in the constitution in combination with independent rights and its own representative body (+2 points) and that fiscal centralization is lower than 75% (+2 points). The latter part of the scoring is contested by several more recent studies, which highlight the limited tax autonomy of Macedonian local governments. Woldendorp *et al.* (2000: 32–38) measured fiscal centralization as “Central Government Revenues as a % of General Government”, which is 44% for Macedonia (meaning that the local governments collect 66% of general government revenue). Financial governmental data for Macedonia are hard to find, but the new Law on Local Government Finance (2002) assigns the levy of various taxes on property to local government units together with 3% of the personal income tax and access to an equalization fund equal to 3% of value added taxes (Davey, 2004). Local government's share in government expenditures as a percentage of general government expenditures was 7% in 2003 (Davey, 2004). In light of these data, the scoring of Macedonia by Woldendorp *et al.* is questionable for the post-2000 period but appears plausible for the 1991–1998 period (but see Todorovski, 2001 for the late 1990s).

The higher score for Finland for Woldendorp *et al.* has to do with the fact that the RAI does not measure local government. Finland scores high on subnational autonomy, a component of the Woldendorp *et al.* measure, which brings it on a par with the Scandinavian as well as with the federal countries. Unlike its Scandinavian neighbours, Finland had no significant regional (or county) level of government before 1993, which is why the RAI under-estimates decentralization in Finland but not in the other Scandinavian countries.

A case where the source of disagreement lies in a different definition of the boundaries of the country is Serbia and Montenegro, which is scored relatively lower on decentralization by Brancati than the RAI. The main reason, it appears, is that Brancati focused primarily on Serbia during 1985–2000, while the RAI considers Serbia and Montenegro as a unit.<sup>27</sup>

Three cases of disagreement concern differences in whether particular tiers are included or excluded. The first is Belgium, to which Hooghe and Marks gave a lower score than the RAI in 1970 and in 1990. The main reason for this disagreement is that Hooghe and Marks focused on one government tier—the most autonomous tier at a given time-point—rather than on all intermediate tiers. In 1970, the most autonomous tier consisted of the provinces and, by 1990—their next time-point—it was the communities. The RAI, on the other hand, evaluates all intermediate tiers of government present at any time-point. Belgium is also a case of disagreement with the Brancati measure. The main reason is that Brancati also focused on one tier of government, namely the regions/communities but not the provinces. This results in a lower scoring by Brancati.

A third case of divergence, also with the Hooghe and Marks measure, is Sweden, which is scored higher by the RAI in 1950 and 1970. Hooghe and Marks considered the county governments in the Scandinavian countries as local and did not include them because their measure concerns regional autonomy. Hooghe and Marks therefore did not include the *län* in Sweden, whereas the RAI does,<sup>28</sup> resulting in a lower scoring by Hooghe and Marks.

The remaining disagreements cannot be reduced to the local government factor, to country definition or to inclusion/exclusion of particular tiers.

A first and second case of divergence is Germany, which Lane and Ersson and Brancati scored significantly lower on decentralization than the RAI. Lane and Ersson gave Germany 4 (out of 10), which places Germany at the same level as Denmark, Finland and the Netherlands. The main reason for this is Lane and Ersson's unusually expansive operationalization of decentralization: not only does it include local governance (+3 for Denmark and Finland), but also functional, neo-corporatist autonomy (+2 for the Netherlands).

Brancati scored Germany 3 (out of 5) as she estimated that the *Länder* do not have control over public order/police (–1) and constitutional amendments do not require *Länder* approval (–1). Both coding decisions are contestable. Public order/police is actually a concurrent power (Watts, 1999; Swenden, 2006; this issue). On constitutional change, *Länder* approval of constitutional amendments is indispensable due to their dominance in the *Bundesrat* (this issue). Brancati did not measure shared power exercised via an upper chamber but the RAI does.

Another case of disagreement with the Brancati measure concerns Cyprus. Brancati scored Cyprus 3 out of 5, while the RAI scores it 0. The disagreement lies in the operationalization of decentralization. Closer examination shows that Brancati included consociational arrangements laid down in the constitution which decentralize authority to the Greek and Turkish Communities, while the RAI excludes decentralization to non-territorial actors.

A fourth and final case of disagreement is Poland, which Arzaghi and Henderson scored higher than the RAI. The difference in opinion appears to be whether the central government has the ability to suspend or to override subnational decisions. According to Arzaghi and Henderson, the answer is no, and so Poland receives a score of 4 instead of 0 for this sub-indicator. The scoring of Poland seems to be incorrect. The highest regional tier, the *województwa*, have gained directly elected councils and more autonomy since the end of communism, but their decisions are still subject to central sanctioning (see the country profiles in this issue; Council of Europe, 2000: 47–48; Kowalczyk, 2000: 228). Central control is even greater for the lower regional tier, *powiaty*, and for local government, the *gminy*, for which the central government has the right to override decisions and has the authority to suspend the councils (Council of Europe, 2000: 46–51; Kowalczyk, 2000: 222–228; Glowacki, 2002: 113–114; Okraszewska and Kwiatkowski, 2002: 201–202).

### Content Validity of Fiscal Indicators

Fiscal indicators are employed widely as an overall measure of decentralization (see, for example, Oates, 1972; Castles, 1999; Lane and Ersson, 1999; Braun, 2000; Fisman and Gatti, 2002; Stegarescu, 2005b). These indicators are based upon two extensively used sources: the Governance Finance Statistics database by the International Monetary Fund and Historical and/or National Accounts and/or Revenue Statistics of the OECD. Many different operationalizations exist but the most broadly used operationalizations are the following:

- (a) subnational share of total government expenditures;
- (b) intergovernmental grant share (i.e. grants from higher tier governments) as a percentage of total subnational revenue;
- (c) subnational own revenue (i.e. revenues from taxes plus fees and levies) as a percentage of total subnational revenue;
- (d) subnational tax revenue share as a percentage of total subnational revenue;
- (e) subnational tax revenue share as a percentage of total government tax revenue.

One can categorize the different operationalizations in two broad classes: expenditure (a and b) and revenue (c, d and e) aggregate fiscal indicators. Both classes of fiscal indicators raise two main caveats/problems with respect to content validity. First, fiscal indicators do not differentiate very well between decision-making authority and the authority to implement<sup>29</sup> and, therefore, cannot be used to measure subnational decision-making authority. The second caveat is that fiscal indicators do not measure effectively differences in subnational implementation powers.



*Caveat 1*

Expenditure and revenue fiscal indicators fail to capture how much decision-making authority subnational governments have and do not differentiate between decision-making and implementation.

To exemplify this caveat one may differentiate between 'regulatory policies and policies involving the direct expenditure of public funds' (Majone, 1994). This distinction helps to tell apart policies with a direct bearing on the public budget, for example welfare state policies, from policies that are not expensive for government budgets but have considerable impact on society through the rules they impose, for example civil and criminal law. While the cost of expenditure programmes is borne by the public budget, the cost of most regulatory policies is borne by citizens and firms (Majone, 1994).

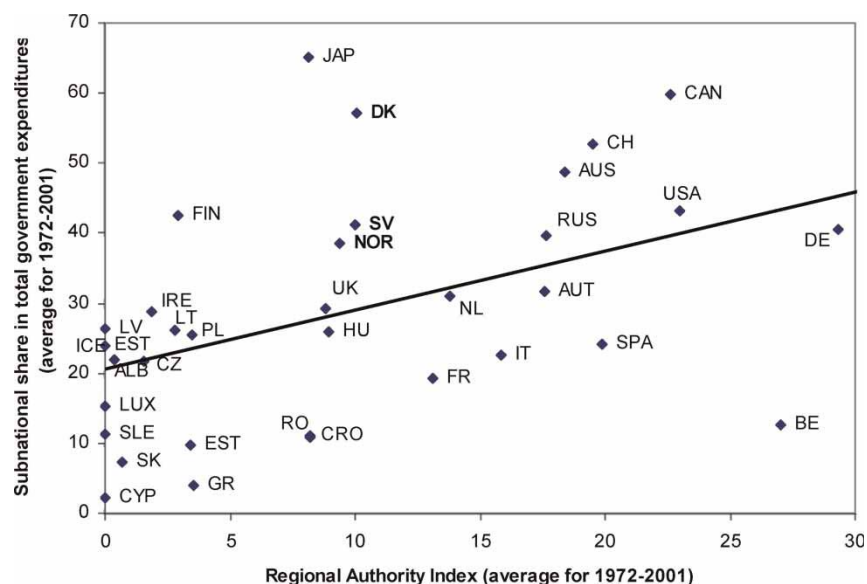
To the extent that regions have control over regulatory policies, expenditure fiscal indicators would reveal nothing about decentralization. Imagine two countries, one in which subnational governments have the authority to implement expenditure policies (country A) and one in which subnational governments have authority regarding regulatory policies (country B). An expenditure fiscal indicator will score country A higher than country B on subnational decentralization. However, it would be wrong to conclude that country A is more decentralized than country B or that subnational governments in country A are more autonomous than those in country B. In fact, subnational governments in country B might have much more autonomy than those in country A since regulatory policies have the capacity to affect society deeply.

*Fiscal indicators on the expenditure side* are particularly problematic for capturing decision-making decentralization, since they do not reveal whether the expenditure comes from conditional or unconditional grants, whether the central government determines how the money should be spent, whether it sets the framework legislation within which subnational governments implement, or whether—indeed—subnational governments spend the money autonomously (Panizza, 1999; Akai and Sakata, 2002; Ebel and Yilmaz, 2002; Fisman and Gatti, 2002; Breuss and Eller, 2004; Burankaya and Lockwood, 2007; Sharma, 2006).

The argument can be shown empirically in a scatter plot of the RAI against the subnational share of total government expenditure (Figure 1). Subnational governments in Scandinavian countries have the same (or higher) shares of total government expenditures than their peers in federal countries. To conclude from this that Scandinavian countries are as decentralized as federal countries would be wrong. Subnational governments in Scandinavian countries have less decision-making authority over policies, less taxation power and they do not enjoy power sharing.<sup>30</sup> The national government decides policies and local and regional governments implement them (Rodden, 2004).

One could 'correct' the indicator for subnational share by looking at the share of intergovernmental grants (Oates, 1972; Akai and Sakata, 2002; Breuss and Eller, 2004; Stegarescu, 2005a). This indicator measures the amount of central government involvement in subnational provision of policies. Often a distinction is made between conditional (specific) and unconditional (general) grants, whereby it is generally assumed that central government involvement is higher with conditional grants (Shah, 2007). A conditional grant ties expenditure to particular strings (conditions)





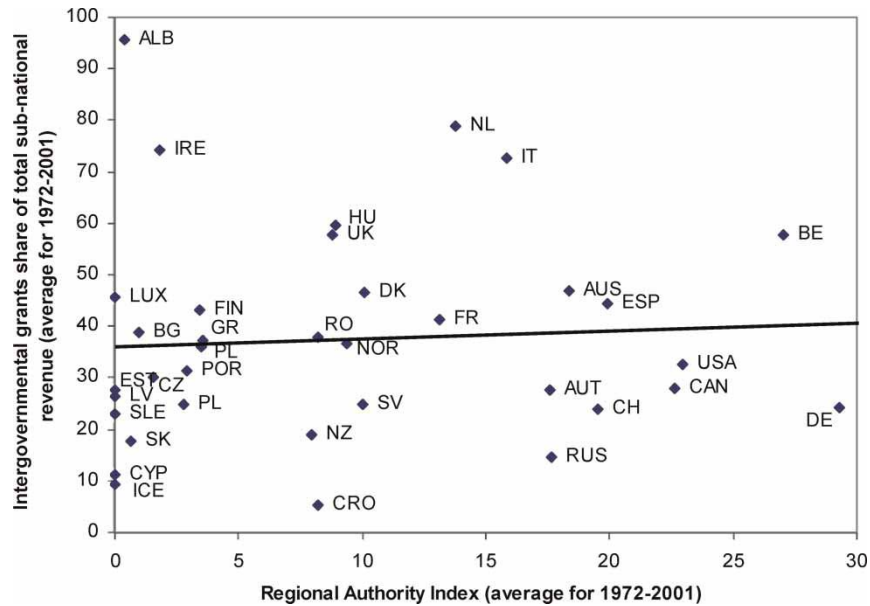
**Figure 1.** Subnational expenditure share as a percentage of total government expenditures plotted against scores on the Regional Authority Index (average for 1972–2001).

*Note:* The Pearson correlation between the two measures is 0.459 ( $p < 0.01$ ;  $n = 35$ ). *Source:* World Bank (2006)

imposed by the central government. But this does not solve the problem. Aside from data availability regarding unconditional and conditional grants (Rodden, 2004), there is the problem that intergovernmental grants do not seem to differentiate between federal and non-federal countries (Figure 2), as borne out by a one-way ANOVA analysis regarding average (1972–2001) subnational intergovernmental grant share as a percentage of total subnational revenue ( $n = 35$ ;  $F: 0.50$ ;  $p = 0.482$ ).<sup>31</sup>

*Fiscal indicators on the revenue side* are not biased against direct expenditure or regulatory policies. But they generate their own problems of concept validity. Revenue fiscal indicators do not help determine whether authorities that can tax autonomously can also decide autonomously what to do with the money (Martinez-Vazquez and McNab, 1997; Panizza, 1999; Ebel and Yilmaz, 2002). While the revenue might be collected freely, it may have to be spent on policies laid down by the central government. There is no direct, theoretical or empirical link between the authority to collect revenues and the authority to decide and implement policies.

This is apparent in Figure 3, which plots the average RAI score for 1972–2001 against the subnational tax revenue as a percentage of total government tax revenue (averages for 1972–2001). The correlation is moderate and significant ( $r = 0.47$ ,  $p < 0.01$ ,  $n = 36$ ). But a closer look at individual countries reveals that Sweden and Denmark are ranked at the same level as the USA and, to a lesser extent, the Russian federation and Switzerland, all three of which are federations. The counties in Denmark and Sweden may set the rate of income tax within central government parameters (this issue), but it would be wrong to conclude that the subnational tiers in



**Figure 2.** Intergovernmental grant share as a percentage of total subnational government revenue plotted against scores on the Regional Authority Index (average for 1972–2001).

*Note:* The Pearson correlation between the two measures is 0.034 (not significant;  $n = 36$ ).

*Source:* World Bank (2006)

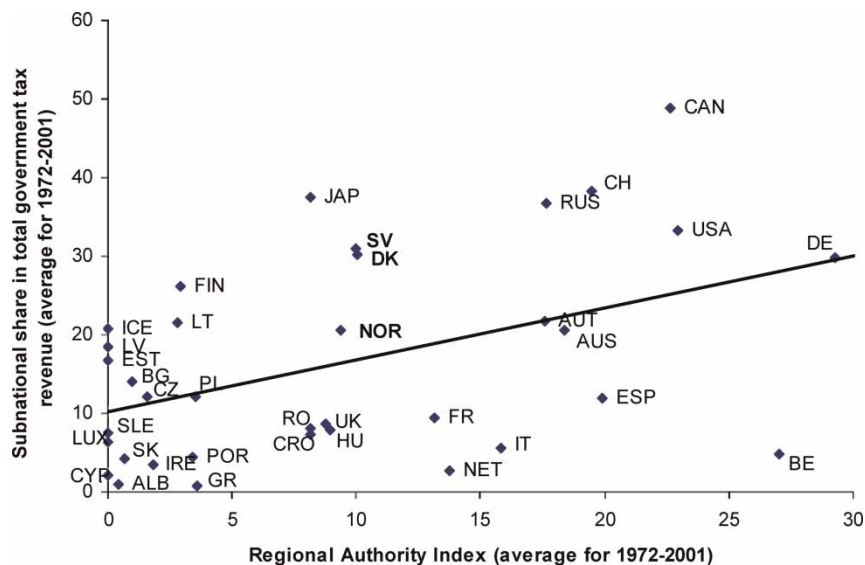
Sweden and Denmark have the same policy and institutional autonomy as their peers in the USA, the Russian federation and Switzerland.

The fundamental difference between the subnational tiers in Sweden and Denmark and the constituent units in federal countries is that the central government retains full decision-making rights regarding tax powers in the former—and can unilaterally change the rules if and whenever it so desires—while it is constitutionally bound to respect regional tax powers in the USA, Switzerland and, arguably, even in semi-democratic Russia. Moreover, regional authorities in Sweden and Denmark have primarily administrative powers over a broad range of policies within a national legislative framework. In the USA, Switzerland and the Russian Federation, subnational tiers have principal authority over a swathe of policies.<sup>32</sup>

#### *Caveat 2*

Fiscal indicators do not necessarily measure differences in implementation authority.

There are two reasons. First, one cannot differentiate whether observed differences in fiscal centralization are due to genuine decentralization or whether they reflect differences in political economy. The argumentation is given by Oates (1972: 199–200):



**Figure 3.** Subnational tax revenue share as a percentage of total government tax revenue plotted against scores on the Regional Authority Index (average for 1972–2001).

*Note:* The Scandinavian countries are shown in bold. The Pearson correlation between the two measures is 0.472 ( $p < 0.01$ ;  $n = 36$ ). *Source:* World Bank (2006)

... even if there exists an identical allocation of functions among levels of government across two countries, their centralisation ratios will generally differ if they do not have the same relative expenditure patterns on these functions. A country, for example, with an unusually large portion of its resources devoted to national defense will have, other things being equal, a relatively high degree of fiscal centralisation.... centralisation ratios may differ because certain services provided publicly in one economy are provided in the private sector in another.

Note that this argument applies to the RAI too but that fiscal indicators, and especially direct expenditure policies, are vulnerable to this problem. In the Scandinavian countries, a large proportion of government expenditure is devoted to welfare state policies and these are often provided by subnational governments. In market-liberal Anglo-Saxon countries, welfare state functions tend to be privatized. So a difference in political economy explains higher expenditure (and revenue) in Scandinavian countries than in Anglo-Saxon countries, whereas the allocation of functions among levels of government might be identical. The RAI is not wholly invulnerable to the risk of conflating expenditure with authority, but since it relies on legal documents to gauge the allocation of functions rather than fiscal data, it avoids this problem to some extent.

Secondly, fiscal measures conflate whether an increase in fiscal numbers is the result of a shift in functions or resources between government tiers, or whether it simply

reflects a change in the size of government activities (Stegarescu, 2005a). An increase in fiscal decentralization might be due to a relative increase in either the 'volume' or the 'range' of public goods provided by subnational governments. In the former, authority has not increased; in the latter, it has. Imagine a country in which a subnational government provides unemployment benefits. If, the following year, the subnational government provides sickness pay as well as unemployment benefits, there will have been an increase in authority. This will coincide, presumably, with an increase in subnational expenditure share and/or in an increase in subnational tax share (to finance the increased expenditure). However, subnational expenditure (or revenue) could also have increased without an expansion of authority, for example, if unemployment had increased.

### **Conclusion**

A comparison of the RAI with seven decentralization indices in the literature shows a great amount of agreement. A single underlying factor accounts for about three-quarters of the variance. This is remarkable given the diverse ways of operationalizing a fluid concept such as decentralization.

An analysis of residuals (by regressing the RAI on the seven decentralization indices) shows that the most consistent source of disagreement comes from the fact that the RAI focuses on regional government to the exclusion of local government, while most decentralization indices include local government. A second source of difference relates to the sophistication of the measures. The more fine-grained RAI is able to capture greater variation among both federal and unitary countries than most decentralization indices. Finally, countries-on-the-move, which have undergone major regionalization/federalization in the post-Second World War period, and countries with asymmetrical regions, tend to generate more diverse scores across decentralization indexes than countries with greater architectural stability.

Finally, an analysis of the content validity of fiscal indicators examined the shortcomings of fiscal indicators as a measurement of subnational authority or decentralization. Two caveats were considered. First, fiscal indicators fail to capture whether subnational governments can decide autonomously what to do with the money. Secondly, one cannot tell whether differences in fiscal decentralization are due to genuine political decentralization or to differences in political economy and/or a change in the size of government activities. Therefore, their value as a proxy for decentralization appears limited.

### **Acknowledgement**

I would like to thank Liesbet Hooghe, Lucas Leemann, Gary Marks and Jan Rovny for their helpful discussions and comments. Thanks also go to Dawn Brancati, Christine Kearney, Daniel Treisman, Jaap Woldendorp and Hans Keman for kindly providing their data. A special debt of gratitude is owed to the people of the Center for European Studies and the Political Science Department at the University of North Carolina, where most of the research was done.

## Notes

<sup>1</sup>Bollen (1989) and Ray (2007) distinguished four types of validity. In addition to the two mentioned types of validity, they identified criterion validity and construct validity. Criterion validity “involves the comparison of a measure with some other generally accepted measure of the same concept” (Ray, 2007: 12). A given measure is compared to a ‘golden standard’. Since there is no ‘golden standard’ for decentralization, criterion validity cannot be assessed. Construct validity “assesses whether a measure relates to other observed variables in a way that is consistent with theoretically derived predictions” (Bollen, 1989: 188). Construct validity is not assessed because theoretically derived predictions relating to the effects of regionalization and decentralization are imprecise.

<sup>2</sup>The dataset from which the Arzaghi and Henderson (2005) scores are derived was kindly provided by Christine A. Kearney.

<sup>3</sup>Australia, Canada, France, Germany, Greece, Hungary, Italy, Japan, the Netherlands, Poland, Romania, Russian Federation, Spain, Turkey, UK and the USA.

<sup>4</sup>Australia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Macedonia, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Serbia and Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK and the USA.

<sup>5</sup>Seventeen country scores were provided by Brancati (2006) herself (i.e. Belgium, Bosnia and Herzegovina, Canada, Estonia, Finland, Greece, Lithuania, Norway, Poland, Romania, Slovenia, Spain, Sweden, Switzerland, Turkey, UK and the USA). Twenty-three countries were scored by the author on the basis of information provided by Brancati in personal communication.

<sup>6</sup>Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the UK.

<sup>7</sup>Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK.

<sup>8</sup>The authors do not refer to a precise time point but, since their book concerns the 1945–1995 period, it is reasonable to assume that they consider scores to be an average for this time period.

<sup>9</sup>Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, UK and the USA.

<sup>10</sup>Lijphart (1999) presented average scores for the years 1945–1996.

<sup>11</sup>Vertical decentralization is operationalized as the number of tiers in a country (Treisman, 2002: 5, 14). The Pearson correlation with the Regional Authority Index is 0.546 ( $p < 0.01$ ;  $n = 38$ ). Appointment decentralization is conceptualized as the extent to which executive appointments are made by actors at the same (or lower) tier, rather than from above (“for each appointment that was made by an actor at a higher tier, one point is assigned for each tier that the appointer was above the appointee” Treisman, 2002: 17). Electoral decentralization is operationalized as the extent to which subnational officials are elected (“percentage of subnational tiers at which the executive was chosen by direct election or selected by a directly elected legislature” Treisman, 2002: 18). Appointment and electoral decentralization appear to have affinity with the representation dimension of the Regional Authority Index, i.e. ‘executive’ and ‘assembly’, respectively. The Pearson correlations are low:  $-0.144$  (not significant;  $n = 38$ ) and  $0.215$  (not significant;  $n = 39$ ), respectively. Fiscal decentralization is the share of subnational government in total tax revenues or the share of subnational government in public expenditures. Both are fiscal indicators and, as argued below, they raise important concept validity concerns. Personnel decentralization is the share of subnational governments in total government administration employees (Treisman, 2002: 19). The Pearson correlation between this indicator and the Regional Authority Index is  $0.562$  ( $p < 0.01$ ;  $n = 32$ ).

<sup>12</sup>The decision to sum three types of decision-making decentralization is mine. Treisman is reluctant to combine the various measures of decentralization into a single index. For example, he noted (2002: 9–10) that “the right of subnational actors to interfere in central legislative decisions will not necessarily coincide with their autonomy from central interference, so it makes more sense

to use [the] different types of indicators separately than to combine them". This is a defensible position; theoretically or empirically, it is perfectly possible that these different decentralization rights do not coincide. The starting point in this article, and in the issue as a whole, is that decentralization is a multifaceted phenomenon which is best captured by combining measures of diverse components. The Regional Authority Index introduced in this special issue differentiates between self-rule and shared rule, and these concepts resemble Treisman's notions of subnational autonomy from central interference and subnational actors' right to interfere in central legislative decisions respectively. Just as the Regional Authority Index is a summation of self-rule and shared rule, it seems sensible to combine the two indicators of decision-making decentralization into a single measure.

<sup>13</sup>Albania, Australia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Macedonia, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK and the USA.

<sup>14</sup>The operationalization of central fiscalization diverges somewhat from the one published in Woldendorp *et al.* (2000). The adjustments were made after communication with Hans Keman and Jaap Woldendorp.

<sup>15</sup>Australia, Austria, Belgium, Bulgaria, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK and the USA.

<sup>16</sup>The authors do not specify a particular time point but, since their book covers the 1945–1998 time span, it seems reasonable to assume that their scores average the situation for the duration of this time period.

<sup>17</sup>The Pearson correlations between the decentralization indexes are given in Appendix A at the end of this article.

<sup>18</sup>The approach is similar to the one developed by Marks *et al.* (2007) in cross-validating several measures of party positioning.

<sup>19</sup>Analysis of variance (ANOVA) results available upon request from the author.

<sup>20</sup>'No regional tier': whether the country has a regional tier or not (0 = country has a regional tier; 1 = country has no regional tier, i.e. Cyprus, Estonia, Iceland, Latvia, Luxembourg, Macedonia, Malta and Slovenia). 'Federal-non federal': whether the country has been a federal or non-federal country for the largest part of the post-Second World War period (since becoming democratic) (0 = non-federal country; 1 = federal country, i.e. Australia, Austria, Bosnia and Herzegovina, Canada, Germany, Russian Federation, Serbia and Montenegro, Switzerland and the USA).

<sup>21</sup>Countries that scored one point: Australia (Territories versus States), Belgium (*Gemeenschappen* versus *Regios*), Canada (Territories versus Provinces), Denmark (*Færøerne* and *Grønland* versus *Amter*), Finland (*Åland*), Italy (*Regioni a statuto speciale* versus *Regioni a statuto ordinare*), Portugal (*Açores* and *Madeira*), Spain (*Ceuta* and *Mellila*; historic *Autonomas Comunidades* versus the other *Comunidades*), UK (Northern Ireland, London Regional Authority, Scotland and Wales versus Regions) and the USA (Alaska, Hawaii and Washington DC versus States).

<sup>22</sup>The cut-off point of having regionalized is to have had an absolute change of at least 10 in the RAI country score over the post-Second World War period. The following countries meet this criterion: Belgium, France, Italy, Spain and the UK. Since most changes involve more autonomy, I call this variable 'regionalized', though for the UK there are almost as many 'negative' as positive changes (because of the suspension of the parliament of Northern Ireland and the abolishment of the counties in Northern Ireland, Scotland, Wales and parts of England). This does not need to concern us since the variable should indicate whether there is difference cross-sectionally and over time. Differences increase the likelihood of disagreement.

<sup>23</sup>The Pearson correlations between the sources of disagreement and between the residuals of the different decentralization indices are given in Appendix A at the end of this article.

<sup>24</sup>Art. 108 (dataset from Treisman).

<sup>25</sup>Art. 176 (dataset from Treisman).

- <sup>26</sup>Data provided by Brancati (pers. comm.).
- <sup>27</sup>The other decentralization indexes do not include Yugoslavia and/or Serbia and Montenegro for the time period in question.
- <sup>28</sup>The upper chamber with *län* representation was abolished in 1971 and the RAI score decreases for subsequent time periods. Therefore, the time-points 1990 and 2000 do not lead to a case of disagreement.
- <sup>29</sup>The distinction between the authority to decide and the authority to implement is based upon Braun's (2000) 'Right to Decide' and 'Right to Act', respectively. "The Right to Decide refers to who may decide *what* will be done (policy formulation and decision-making). The Right to Act refers to who may decide on *how* it will be done (policy implementation)" (Braun, 2000: 29; original italics).
- <sup>30</sup>Sweden counties (*län*) were represented in an upper chamber before the 1971 parliamentary reform. The data reflect the 1972–2001 period.
- <sup>31</sup>The following countries were considered to be federal: Australia, Austria, Belgium, Canada, Germany, Russia, Spain, Switzerland and the USA. Excluding Belgium and Spain from the federal group does not lead to different conclusions (one way ANOVA analysis:  $n = 35$ ;  $F: 1.85$ ,  $p = 0.182$ ).
- <sup>32</sup>One could extend this argument to the other countries in the dataset.

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## Appendix A: Pearson Correlations

Table A1. Pearson correlations among eight decentralization indices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Regional Authority Index	1							
(2) Arzaghi and Henderson (2005)	0.758**	1						
(3) Brancati (2006)	0.667**	0.607*	1					
(4) Hooghe and Marks (2001)	0.877**	0.799*	0.749**	1				
(5) Lane and Ersson (1999)	0.632**	0.439	0.566*	0.548*	1			
(6) Lijphart (1999)	0.856**	0.719*	0.791**	0.880**	0.839**	1		
(7) Treisman (2002)	0.790**	0.576*	0.790**	0.832**	0.628**	0.726**	1	
(8) Woldendorp <i>et al.</i> (2000)	0.740**	0.826**	0.721**	0.646*	0.808**	0.845**	0.671**	1

Note: \* $p < 0.05$ ; \*\* $p < 0.01$ . Pairwise deletion:  $n = 42$ .

Table A2. Pearson correlations among disagreement estimators

	No regional tier	Federal – non-federal	Asymmetry/ regionalized
No regional tier	1		
Federal – non-federal	-0.253	1	
Asymmetry/ regionalized	-0.267*	-0.019	1

Note: \* $p < 0.10$ ; ( $n = 42$ ).

Table A3. Pearson correlations among residuals for seven decentralization indices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Arzaghi and Henderson (2005)	1						
(2) Brancati (2006)	0.494*	1					
(3) Hooghe and Marks (2001)	0.018	0.675***	1				
(4) Lane and Ersson (1999)	0.372	0.571**	0.304	1			
(5) Lijphart (1999)	0.123	0.601**	0.648**	0.829***	1		
(6) Treisman (2002)	0.147	0.756***	0.641**	0.353	0.456**	1	
(7) Woldendorp <i>et al.</i> (2000)	0.678***	0.656***	0.368	0.831***	0.636***	0.487***	1

Note: \* $p < 0.10$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ . Pairwise deletion:  $n = 41$ .