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Asymmetric Decentralization: Nature and Determinants[1]

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ABSTRACT

Decentralization have been central features of governance reforms. However, their implementation rarely follows a symmetrical pattern across subnational units. Instead, asymmetric decentralization has become prevalent in both federal and unitary states. Nevertheless, the empirical determinants of asymmetric decentralization remain insufficiently explored. This paper tries to fill this gap offering a systematic analysis of the nature and determinants of asymmetric decentralization across a large cross-section of countries and regions using data from the Regional Authority Index (RAI). The empirical analysis combines cross-country and cross-regional models estimated using Ordinary Least Squares (OLS) and Robust Least Squares (RLS). At the country level, ethnic fragmentation, population size, and territorial characteristics are associated with higher levels of asymmetry. At the regional level, a greater distance from the national capital and the presence of distinct linguistic identities are linked to above-average regional authority. The analysis of changes over time indicates that transitions to democracy act as a catalyst, activating structural conditions and fostering increases in interregional asymmetry.

JEL classification: H77, H11, R58, C23

Keywords: asymmetric decentralization, multilevel governance, regional authority, ethnic fragmentation, robust regression, territorial diversity

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1. Introduction

Decentralization and devolution have been central components of governance reforms worldwide over recent decades. Across a wide range of political systems, countries have transferred administrative, political, and fiscal powers to subnational governments in response to political and economic pressures. Early contributions to the fiscal federalism literature established a normative principle for the design of multilevel governance, largely assuming that decentralization would proceed symmetrically across subnational units (Musgrave, 1965; Oates, 1972; Tarlton, 1965). In practice, however, decentralization rarely unfolds in a uniform manner. Central governments frequently grant different levels of authority to regions within the same country, generating asymmetric patterns of decentralization. Importantly, such asymmetries are no confined to federal systems but are also increasingly observed in unitary states.

Recent empirical evidence confirms the growing prevalence of asymmetric decentralization. Allain-Dupré et al. (2020) document a steady expansion of asymmetric arrangements over the last seven decades, initially concentrated at the regional level and later extending to local governments.[2] Using data from the Regional Authority Index (RAI), Lago and Blais (2026) show that the number of countries employing asymmetric allocations of authority among subnational governments more than doubled between 1950 and 2016, reaching 57 of the 79 countries analyzed.

Despite its prevalence, asymmetric federalism has received relatively limited attention in the empirical fiscal federalism literature. Existing studies suggest that ethnic, cultural, and economic heterogeneity may influence whether decentralization takes symmetric or asymmetric forms (Bird, 2003; Martinez-Vazquez, 2007; Blöchliger and Montes-Nebreda, 2024; Neudorfer et al., 2025), but these relationships have rarely been tested across broad cross-national and cross-regional samples. This paper addresses this gap by providing a comprehensive empirical analysis of the determinants of asymmetric decentralization at the regional level. The focus on regions, rather than local governments, is deliberate. Local level asymmetries are typically driven by well-understood economic factors such as economies of scale, spillovers, or metropolitan governance needs, and they rarely pose significant challenges to national cohesion. By contrast, regional asymmetries often reflect deeper territorial cleavages and may have far-reaching political implications.

Building on the theoretical literature, the paper identifies a set of country -and region- level characteristics that may shape asymmetric decentralization. The

[2] The increasing creation and prevalence of metropolitan areas and metropolitan authorities around the world should probably not be considered a form of asymmetric decentralization but rather the emergence of an additional level of government with distinctive functional expenditure responsibilities between the traditional local and regional levels.

empirical analysis relies on the RAI values and their population-weighted standard deviation. Using Ordinary Least Squares (OLS) regression and Robust Least Squares and robust regression techniques, we find that geographic, demographic and social factors explain asymmetric arrangements more consistently than economic or political variables. Moreover, the results suggest that these structural characteristics may remain institutionally latent until activated by critical junctures, especially political transitions to democracy.

The remainder of the paper is structured as follows. Section 2 reviews the most relevant literature on asymmetric federalism and develops a simple theoretical framework on its determinants. Section 3 discusses the measurement of asymmetric decentralization and territorial diversity. Section 4 presents the data, empirical strategy and results, and Section 5 concludes.

2. The nature of asymmetric federalism

2.1 Concept and typologies

Decentralization, in both federal and unitary systems, refers to a mode of state vertical organization in which authority is divided or shared between central governments and subnational units such as regions, states, provinces, or municipalities. This distribution of power operates along three main dimensions -fiscal, administrative and political- which combine in different ways depending on each country's historical trajectory and institutional design.

The normative foundations of the first generation of fiscal federalism literature generally assumed that decentralization occurred symmetrically, with all subnational units at the same level exercising identical powers (Tarlton, 1965). Subsequent contributions have questioned this assumption, stressing that heterogeneous preferences, identities, and territorial characteristics may often require differentiated institutional arrangements (Alesina et al., 1995). In practice, decentralization frequently serves as a mechanism to accommodate territorial diversity within a single political system (Romero-Caro and Valdesalici, 2024a).

Such diversity may stem from geographic conditions, linguistic, cultural, religious or ethnic cleavages, political identities or economic disparities (Blöchliger and Montes-Nebreda, 2024, Neudorfer et al. 2025). When these differences are salient, uniform allocations of competences may be inefficient or politically unsustainable, leading to asymmetric institutional solutions. Congleton (2015) conceptualizes this logic as *menu federalism*; whereby different regions are granted differentiated bundles of competences.

Within this framework, asymmetric decentralization refers to institutional arrangements in which subnational units at the same level possess unequal degrees of autonomy and power, even while operating within a common national institutional and political framework (Bird, 2003). These differences shape how each territory interacts with the overall system (Tarlton, 1965; Watts, 2000).

Such asymmetries can arise through fiscal, administrative or political dimensions. Fiscal asymmetry occurs when certain regions enjoy exclusive taxing powers or special revenue arrangements (such as the *foral* regimes of the Basque Country and Navarre in Spain). Administrative asymmetry refers to differentiated executive authority over specific policies or public services (Quebec's special status in linguistic policy in Canada, Bavaria's internal security powers in Germany, the autonomous police forces of Catalonia in Spain). Political asymmetry, in turn, refers to variations in institutional self-rule or representation, such as regional parliaments or executives while the rest of the country remains under a centralized framework. This is the case of Scotland, Wales and Northern Ireland vis-à-vis England within the United Kingdom (Martínez-Vázquez, 2007; Sorens, 2016; Cahyaningsih et al. 2019).

The literature distinguishes several typologies of asymmetric decentralization. One common distinction is between qualitative asymmetry, whereby specific regions exercise exclusive competences (for example, Quebec administers social security at the provincial level, whereas in the rest of Canada it is managed nationally), and quantitative asymmetry, whereby all regions share the same policy domains but with varying degrees of authority (for instance, different shares of tax collections as in the Basque Country and Navarre in Spain).

A second distinction concerns *de jure* asymmetry (Watts, 2000; Martínez-Vázquez, 2007), which is explicitly recognized in constitutional or legal frameworks (such as the grating of differentiated competences to a region as in the chartered or *foral* system of the Basque Country and Navarre in Spain, the special status of the Aceh and West Papua provinces in Indonesia, or the former constitutional status of Jammu and Kashmir in India until 2023). D*e facto* asymmetry, by contrast, arises when certain regions wield greater practical influence without formal recognition in the constitution or special laws, due to their population size, economic resources, or electoral weight, or simply when some regions make much more use of a common potential framework of available subnational powers than the other subnational governments at the same level, as is the case of Quebec in Canada (Vaillancourt 2026) .

A third distinction contrast *ex ante* asymmetry, incorporated into the constitutional design from the outset, reflecting pre-existing heterogeneous demographic or geographic factors -as in the cases of Greenland and the Faroe Islands, whose special status is recognized under Danish law- with e*x post* asymmetry, which develops over time through political negotiation and territorial bargaining (Watts, 2000; Martínez-Vázquez, 2007). A recent example can be found in Spain, where political agreements between the central government and the Catalan regional government envisage the transfer of fiscal competences like those already enjoyed by the Basque Country and Navarre.

Finally, asymmetric arrangements may be temporary, designed to address transitional differences in administrative capacity like in Colombia, Macedonia or Peru, or permanent, forming an enduring component of a country's decentralization system.

2.2 Determinants of Asymmetry in Federal and Decentralized Systems: a simple theoretical framework

As noted above, the purpose of this study is to identify the regular explanatory factors underlying the adoption of asymmetric decentralization arrangements across countries. The literature reviewed in the previous section suggests two complementary analytical perspectives that jointly help structure our theoretical framework.

The first perspective focuses on explaining why some countries exhibit higher levels of asymmetry at a given point in time. From this viewpoint, asymmetric decentralization is more likely in countries characterized by structural features that generate territorial diversity and heterogeneous demands for self-rule (these include social, cultural, demographic, economic, geographical and institutional features). These characteristics operate as background conditions that increase the likelihood of asymmetric claims emerging and being institutionalized. This logic is closely related to the broader decentralization literature, which has long sought to explain why some countries decentralize more extensively than others (Canavire-Bacarreza et al. 2017). When such decentralization-prone conditions are particularly acute and diverse within already decentralized systems, they may translate into asymmetric rather than uniform allocations of authority.

The second perspective is dynamic and focuses on explaining when asymmetric arrangements are adopted or expanded. Even where structural conditions are present, asymmetry often remains latent until specific events such as political transitions or armed conflicts act as catalysts.

Accordingly, we separately further analyze the two types of potential explanatory factors, which we can call “conditions” and “triggers” of asymmetric arrangements.

Structural conditions

The literature identifies several characteristics that predispose political systems toward asymmetric arrangements. A range of social, cultural, demographic, economic, geographic and institutional factors have been identified by the literature as potential explanatory variables of cross-country variation in asymmetries in the vertical distribution of powers.

First, capacity-driven asymmetries. In some cases, subnational authorities may lack the administrative capacity to provide public services efficiently due to small size, geographic conditions, low population density, or limited resources. In such cases, central governments may retain competences in weaker regions while decentralizing more extensively elsewhere, often affecting peripheral or associated territories. These asymmetries often apply to peripheral or remote units that maintain weaker connections with the national core, such as associated states or special federations (Watts, 2000; Martínez-Vázquez, 2007; De Mello and Jalles, 2026).[3]

Second, territorial diversity. Asymmetric federalism may also stem from distinct cultural, linguistic, ethnic, or religious characteristics concentrated in one or more territories. When distinct identities are geographically concentrated, uniform institutional arrangements may be perceived as inadequate. Strong regional identities, particularly when combined with political mobilization and perceived historical grievances, tend to foster demands for differentiated autonomy (Bird, 2003; Chassé et al., 2024).

Third, economic differences. Regional disparities in income, development, or access to natural resources may also generate asymmetric outcomes. Horizontal inequalities and poorly calibrated equalization systems can intensify territorial conflict, and fuel demands for special treatment (Sharma, 2025).

Fourth, historical legacies related to state formation, colonial administration, or previous sovereignty can shape contemporary decentralization patterns. Regions with distinct historical trajectories often retain differentiated institutional arrangements over time (Romero-Caro and Valdesalici, 2024a; Bhattacharyya, 2024; Blöchliger and Montes-Nebreda, 2024).

Fifth, geographic complexity, including country size, insularity, border location, and remoteness, affects governance cost and territorial cohesion. Distance from the national capital and spatial fragmentation increase the likelihood of asymmetric arrangements (Alesina and Spolaore, 1997; Martínez-Vázquez, 2007: Blöchliger and Montes-Nebreda, 2024).

Finally, institutional and political frameworks, such as the vertical and horizontal distribution of powers within states, regime type, political culture, party system structure and electoral rules, condition the feasibility of asymmetric outcomes. Non-integrated party systems and strong regional parties tend to facilitate asymmetric decentralization (Watts, 2000; Brancati, 2006; Hankla et al., 2019; Chassé et al., 2024).

Exogenous triggers

Structural conditions alone can be insufficient to explain the timing of asymmetric reforms. The literature highlights several exogenous events that can act as a trigger.

First, democratization and other significant institutional changes. Transitions from authoritarian to democratic regimes often represent critical junctures in which

[3] Rather than a permanent arrangement, alternatively, this type of asymmetry can be seen as a temporary arrangement emerging as part of a gradual decentralization process, where certain regions assume competencies more rapidly depending on their administrative absorption capacity. Thus, this case would fit into the temporary type of asymmetric decentralization discussed above.

territorial arrangements are renegotiated. Asymmetry often functions as a compromise strategy to accommodate regional demands while preserving territorial integrity (Sorens, 2016).

Second, extreme events, such as armed conflicts, geopolitical realignments, peace settlements or natural disasters, may also catalyze asymmetric decentralization arrangements. Post-conflict institutional redesigns have frequently relied on asymmetric arrangements to manage diversity and stabilize political systems (Blöchliger and Montes-Nebreda, 2024; Sahadžić, 2023; Cadaval-Sampedro et al. 2023).

Third, economic integration processes and globalization can intensify centrifugal pressures by unevenly affecting regions. Wealthier or more open regions may demand greater autonomy in contexts of high interregional redistribution and factor mobility (Bird, 2003; Alesina et al., 1995; Alesina and Spolaore, 1997; Rode et al., 2018).

Finally, multilateral treaties and international norms, particularly regarding minority rights, may encourage differentiated autonomy arrangements by legitimizing asymmetric governance models.

In what follow, we focus on the role of transitions from dictatorship to democracy or vice versa when explaining changes in the temporal dimension of the panel.

3. The challenge of measuring diversity and asymmetry in previous literature

This paper develops an empirical framework to examine the determinants of asymmetric decentralization by jointly operationalizing asymmetry in decentralization alongside its key drivers. Measuring asymmetry is inherently complex due to its dynamic and multidimensional nature. It reflects the diverse allocation of authority across territorial units and evolves over time through constitutional reforms, policy transfers, and political bargaining. Moreover, asymmetry can manifest across several dimensions -including political, fiscal and administrative - which complicates cross-country and cross-regional comparison.

Early attempts to measure decentralization tended to rely on aggregate indicators of fiscal or administrative autonomy, implicitly assuming uniform allocations of power across subnational units. More recent contributions explicitly address asymmetry by complementing conventional decentralization indices with measures that capture differentiated authority. For instance, Sorens (2011) incorporates regional autonomy in economic policy, taxation, and institutionalization, while adding a dummy variable to identify asymmetric regions. In a complementary approach, Mathieu and Guénette (2018) propose a six-dimension index that evaluates the extent to which national institutional frameworks recognize subnational autonomy. Their measure emphasizes the protection of distinct cultural communities and includes linguistic rights, migration competences, fiscal autonomy, and both internal and external dimensions of self-determination. These contributions highlight that asymmetric decentralization often reflects not only functional considerations but also the formal recognition of territorial identities.

Other authors have focused on typological classifications rather than continuous indices. De Mello and Jalles (2026) distinguish among asymmetric regions, which are constitutionally regular but endowed with differentiated powers; autonomous regions, operating outside the general constitutional framework under special legislation; and dependent regions, administered directly by the central government. This typology provides a systematic means of capturing the heterogeneity of decentralization schemes and their alignment with territorial diversity.

In parallel, the literature has devoted increasing attention to the measurement of territorial diversity as a key driver of asymmetry. Romero-Caro and Valdesalici (2024b) and Martínez-Vázquez (2007) emphasize the relevance of cultural, linguistic, ethnic, and religious heterogeneity. Building on this insight, Blöchliger & Montes-Nebreda (2024) develop the Federal Diversity Index, which integrates social, political and economic dimensions of diversity. By capturing both the fragmentation and depth of territorial differences, this index illustrates how diversity interacts with institutional design and contributes to differentiated intergovernmental architectures.

4. Empirical Strategy and Data

Our empirical analysis aims to identify the key determinants of asymmetric decentralization across countries. The dependent variable is constructed using the most recent available data on decentralization from the RAI (2018). From this index, we derive two complementary measures of regional-level asymmetry. Estimation techniques are selected to address potential econometric issues, including heteroskedasticity, multicollinearity, and the presence of influential observations. The accompanying tables provide detailed definitions of all variables and their data sources.

4.1. Cross-country analysis. Cross-sectional data

We begin by examining the data on asymmetry and assessing whether the overall level of decentralization can account for the extent of asymmetry observed. Figures 1 and 2 provide a visual approximation of the distribution of asymmetric arrangements in decentralization across countries. Using regional RAI values, we compute two complementary measures: the range of the indicator across regions (maximum minus minimum value) and the population-weighted standard deviation, where weights correspond to each region's share of the national population.

The first measure, the range, captures the existence of specific asymmetries but does not consider their effective scope in terms of the population affected. In contrast, the population-weighted standard deviation incorporates the demographic relevance of the asymmetries, accounting for the proportion of the population exposed to these arrangements. As a result, countries can exhibit high asymmetry according to the range measure while the actual impact on the population remains limited, leading to a low weighted standard deviation. Nevertheless, the simple linear correlation coefficient of both indicators is 0.80, indicating a strong correlation.

[Insert Figures 1 and 2 near here]

Figures 3 and 4 relate national-level RAI values in 2018 to internal regional diversity, proxied by the range and population-weighted standard deviation described above. In Figure 3, a weakly positive but statistically non-significant linear relationship is observed (p-value = 0.24). For the population-weighted standard deviation, the regression line is essentially flat. This lack of a linear relationship is further confirmed by the non-linear non-parametric nearest-neighbor fit. Overall, these results suggest that the general level of decentralization alone does not explain the extent of asymmetric arrangements, regardless of whether asymmetry is measured by range or population-weighted standard deviation.

[Insert Figures 3 and 4 near here]

4.1.1. Specification and econometric methodology

What is the role of the theoretically identified potential determinants in the actual observed level of asymmetry? To assess this relationship, we estimate three alternative models using the different groupings of determinants listed above.

The first model focuses on social, political, and economic factors. It includes six explanatory variables: *Language*, *Religion, Ethnic, Party System Nationalization Score (psns_sw), GDP_pc,* and *GINI*. Preliminary estimations also included total GDP and the Human Capital Index. However, the inclusion of these variables substantially increased multicollinearity, with Variance Inflation Factors (VIF) values for both variables close to 10, while the overall fit of the regression rose only marginally.

The second model focuses on geographic and demographic determinants. It includes the number of regions (*Regions*), the proportion of islands or territorially separated regions relative to the total (*Islands_Share*), the proportion of border regions (*Borders_Share*), total land area (*Area*), a Geographical Fragmentation Index (*GFI*), total population (*Population*), the population of the largest city (*Largest_City*), and population density (*Density*). VIF values are below 3, except in the case of GFI, slightly over 3. Hence, multicollinearity is not a serious concern.[4] Definitions and data sources are reported in Table 1, while Table 2 summarizes the main descriptive statistics.

The third model combines the two previous ones to provide a comprehensive perspective on the determinants of asymmetry decentralization. To increase the degrees of freedom and limit the number of regressors, those with very low t-statistic values obtained from the previous estimations are discarded. We establish the threshold at a low value of 1 as a compromise between simplicity and inclusiveness.[5] This procedure results in 6-7 regressors and approximately 9 to 10 observations per estimated coefficient, which provides an adequate number of degrees of freedom. This approach may be useful when employing more advanced estimation methods, as further described below.

Summarizing, we estimate three specifications:

$$Asymmetry = f(economic, social, and\ political\ variables) \quad [1]$$

$$Asymmetry = g(geography, demographic\ variables) \quad [2]$$

$$Asymmetry = f(\cdot) + g(\cdot) \quad [3]$$

The analysis at this first stage relies on cross-sectional data for all countries with available RAI values, employing the most recent information for 2018. This is the same time reference for the regressors. We start with 76 observations, which are progressively reduced depending on the availability of information for the variables included in each regression. In particular, the most problematic variables are GINI, Party System Nationalization Score (*psns_sw*), and language, for which data availability is more limited. The inclusion of GINI involves losing 16 observations, *psns_sw* losing 9, and language losing 4. Because there are overlaps among these missing data, the effective reduction in the sample used in each case is smaller.

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4 In preliminary estimations, we also included the standard deviation of regional population to capture spatial asymmetries in the distribution of population across countries. However, this approach led to multicollinearity issues, with VIF values above 5. The primary cause is the high correlation between the population standard deviation and the total population of countries. The simple linear correlation coefficient is 0.81, and the R^2 from regressing the former on the latter (0.661) is much greater than the R-squared for the main regressions in columns 3 and 4 of Table 3. Consequently, when interpreting the impact of population size, it is important to consider that the effect of a larger population inherently incorporates the associated impact of a more unequal distribution.

5 To avoid discarding potentially relevant variables, we applied the LASSO (Least Absolute Shrinkage and Selection Operator) methodology, keeping as regressors those with t-statistics above 1 and testing the inclusion of the remaining variables appearing in models 1 and 2. The results confirmed that none of the excluded variables were selected using the LASSO procedure.

The estimates reported in columns 1 to 6 of Table 3 are performed using OLS. The presence of heteroskedasticity in the residuals leads us to replace the standard errors with robust estimators based on the Huber-White-Hinkley correction. Multicollinearity is assessed using the Variance Inflation Factors (VIF), with a threshold of 3.

Several potentially influential observations were identified using different diagnostic procedures, including *RStudent*, *DFFITS*, and *COVRATIO*. Since OLS estimates are known to be sensitive to such observations, we re-estimated the merged models employing a Robust Least Squares (RLS) estimator. It substitutes the squaring of residuals in OLS with a loss function that assigns less weight to outliers. Specifically, we applied Huber's MM-estimation method and Huber Type I robust z-statistics.[6]

4.1.2. Results

The vector of economic, social, and political variables accounts for less variation than the set of geographic and demographic variables. However, results show that any approach or analysis disregarding one of these vectors would yield lower explanatory power and biases due to omission of relevant variables.

Second, when both vectors of determinants are included in the models, one variable consistently emerges as especially salient in explaining the two measures of asymmetry considered in this study: ethnic fragmentation. Econometrics confirms that higher levels of ethnic fragmentation are associated with greater observed asymmetry in both the range and the weighted standard deviation indices.

Third, larger populations (which, as noted above, are highly correlated with greater inequality in the distribution of regional population) and a higher proportion of insular regions within a country are both associated with a wider range of regional RAI values. In contrast, when the weighted standard deviation of asymmetry is analyzed, population density also shows a significant and positive relationship. That is, higher population density is linked to greater observed asymmetry under this alternative measure.

Controlling the influence of outliers using a RLS estimator produces a shift in the pattern of significant predictors. Surface area becomes a more relevant determinant of the weighted standard deviation, while the effect of insularity becomes statistically insignificant. The former result can be attributed to the substantial dispersion in land area across countries, with some exhibiting extreme values: the maximum value is 1,850 times the minimum value. Moreover, islands typically host only a small proportion of the national population and then have a limited impact on overall levels of asymmetry. The strong increase in the adjusted

[6] MM-estimation uses a two-step process: it first applies S-estimation to detect outliers among regressors, then uses those estimates as starting points in M-estimation, which reduces the effect of outliers in the dependent variable. By combining both, MM-estimation achieves robust results against outliers in both independent and dependent variables.

R-squared for Robust Least Squares (RLS) estimation is consistent with the rise in the z-statistics in the equation explaining the range of RAI.[7] Once the impact of outliers is controlled for, ethnic fragmentation, insularity, and population size emerge as strong predictors of cross-country differences in the RAI range.

4.2. Cross-Regional Analysis

This analysis complements the previous one by adopting the region as the unit of observation. Whereas the above tried to explain the existence of disparities between countries, this one focuses on identifying the factors that account for the deviation of each region's RAI from the national average. A positive value of the variable indicates that the region exhibits a degree of decentralization above the national average, and vice versa.

4.2.1 Specification and econometric methodology

While the set of explanatory variables remains largely comparable, their precise definitions differ. For instance, whereas the earlier specification included the country's total area to capture size effects, the current approach considers the region's relative share of national territory. Similarly, instead of employing the proportion of insular regions within a country, this analysis uses a dichotomous variable indicating whether the specific region is insular or not. These modifications yield results that are both complementary and, in some cases, particularly revealing.

In preliminary OLS estimates, we found evidence of heteroskedasticity but not of multicollinearity. Even when combining both sets of variables , all the corresponding VIF values were below the threshold of 3 (max VIF=2.90). Moreover, the same formal tests on influential observations used in cross-country estimates revealed a significant number of outliers potentially compromising the robustness of OLS estimates, a problem even more severe now when observing individual regions and not statistics synthesizing regional data. Hence, we finally discarded OLS to choose a robust regression approach instead.

Initially, we tried to implement the standard MM-estimator used before. However, the presence of several dummy variables among the regressors created challenges related to computation and convergence. Robust estimators like MM minimize continuous scale functions that poorly handle binary variables, especially when these dummies have low variability or represent infrequent categories. Hence, we switched to a robust estimator available in Stata via the *MS regress* command.[8] However, this estimator does not support robust standard errors to deal with

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[7] Rw^2 is calculated using robust regression residuals. This results in a measure of model fit that is less influenced by outliers and more reflective of the model's explanatory power for the "typical" data, especially in the presence of heteroskedasticity or non-normal error distributions.

[8] This command, developed by Verardi and Croux (2009), implements both M- and S-estimators for robust linear regression estimation. It allows to distinguish between dummy variables and continuous predictors when computing robust scale estimates, ensuring appropriate treatment of categorical regressors.

heteroskedasticity. To resolve this, we applied a bootstrap method with 1,000 replications to obtain a robust variance–covariance matrix.

Table 4 summarizes the definitions and data sources of variables, and Table 5 reports the main descriptive statistics.

4.2.2. Regional results

Table 6 summarizes the main findings. The variable *Island* is not significant at the regional level, in clear contrast to the cross-country estimations on the share of island regions. This difference can be explained by the distribution of the variable's values: insular regions tend to display extreme decentralization scores, but in both positive and negative directions. For example, while values below -10 account for only 0.8% of all regions, they represent 8% among islands; similarly, values above +10 constitute just 0.5% of all regions, but 10% among insular ones. In other words, insularity is associated with greater asymmetry, but this asymmetry manifests in both directions. As a result, being an island does not significantly predict a higher-than-average degree of decentralization.

The effect of travel time to the national capital has a positive and highly significant effect on asymmetric decentralization. Controlling for insularity, greater distance from the capital tends to foster higher asymmetric levels of decentralization within countries.

Regional-level data on ethnicity are unavailable. However, the variable *Language* shows a positive and significant effect. Regions with a distinct cultural or linguistic identity (20% of the sample) tend to exhibit higher degrees of decentralization. This is also true in the case of *Indigenous regions*, but less than 2% of regions belong to this category.

The result for the variable *Religion* is noteworthy. Its negative and highly significant coefficient reflects the underlying distribution of this variable. Although it is 1 in 6% of regions, they represent 25% of the regions with *RAI_diff* values below -5 and only 5% of those exceeding +5. While this variable is positively correlated with *Language* (+0.34) and *Indigenous region* (+0.38), the intensity is not enough to produce multicollinearity.

Regions hosting the national capital tend to have higher levels of decentralization. On the contrary, population density, which was positively associated with decentralization in the country-level analysis, does not have a significant effect at the regional level.

While country size (in both population and area) was a robust driver of asymmetry at the national level, the relative weight of each region in these dimensions is not significant. That is, larger and more populous countries are prone to greater asymmetries, but the largest or most populous regions within each country do not necessarily display higher decentralization.

4.3. On the changes over time

Tables 7 and 8 complement the previous analysis by showing the evolution of the two variables (*RAI_range* and *RAI_sd*) over time. The tables display initial, intermediate (by decade), and final values. Red shades indicate reductions, while green shades represent increases. The intensity of each tone reflects the magnitude of the change.

In the sample, stability and slow changes predominate. In half of the countries (49.3%), no changes were identified in the regional *RAI_range*, and only in 15% of them did the change exceed 10 points in absolute value.

The countries that display substantial increases in *RAI_range* are Malaysia, Nicaragua, Pakistan, Papua New Guinea, and Portugal. Conversely, the largest declines are observed in Albania, Argentina, Brazil, Greece, Mexico, and the United States. In most cases, changes occur consistently in a single direction, except for three countries (Argentina, Pakistan, and the United States) where more complex patterns emerge, showing both symmetric and asymmetric impulses over time.

Regarding *RAI_sd*, the countries with the strongest increases in asymmetry are Belgium, Brazil, Spain, Mexico, Nicaragua, and Pakistan. The sharpest reductions occur in Argentina, Australia, and Peru. Once again, the most erratic patterns are found in Argentina and Pakistan.

[Insert Tables 7 and 8 near here]

We are especially interested in the hypothesis that regime shifts from dictatorship to democracy or vice versa could lead to larger or smaller levels of asymmetry in regional decentralization. Therefore, the sample is now restricted to countries that have experienced at least one regime change during the period of analysis. Table 9 and Figure 8 report average annual changes in asymmetry under democracy and dictatorship.

There is evidence that periods of dictatorship exhibit greater inertia in the degree of asymmetry than democratic periods. Moreover, increases in both *RAI_range* and *RAI_sd* occur more frequently during democratic regimes. Let us focus on two particularly striking cases (Argentina and Pakistan), considering the alternation between major asymmetry changes of opposite signs. Between 1950 and 2018, the average annual change in *RAI_range* in Argentina was -1.18 during the dictatorship years and +0.10 under democracy. When using *RAI_sd*, values are -0.36 and 0.0 respectively. The corresponding four figures for Pakistan are 0.11, 0.32, -0.14, and 0.36. Those results again suggest a pushing effect of the transition to democracy on the extent of interregional asymmetry in decentralization.

[Insert Table 9 near here]

5. Conclusions

This paper examines the growing importance of asymmetric decentralization in multilevel governance systems. While early fiscal federalism theory largely assumed uniform symmetric decentralization processes, in practice many countries have devolved powers unevenly across regions. Comparative evidence shows that asymmetric arrangements have expanded significantly since the mid-twentieth century in both federal and unitary states. Despite this trend, asymmetric decentralization has received relatively limited empirical attention, and its determinants remain insufficiently understood. Existing studies point to the potential role of ethnic, cultural, and economic heterogeneity, but these relationships have not been systematically tested in a comprehensive and comparative framework. This paper addresses this gap through an empirical analysis of regional-level asymmetries.

The analysis is performed both at the national and the regional level. Furthermore, we separately analyze the structural elements and the triggers that can explain asymmetric decentralization. From a cross-country perspective, asymmetric arrangements are most strongly associated with ethnic fragmentation, population size, and territorial characteristics such as insularity and land area. In contrast, economic or political variables display weaker and less consistent effects once spatial and demographic dimensions are controlled for.

At the regional level, asymmetry tends to increase with distance from the national capital and in regions with distinct linguistic identities, confirming that geographic remoteness and cultural differentiation foster demands for greater autonomy. However, insularity does not systematically predict higher decentralization - reflecting the potential dual nature of islands as both highly autonomous and highly dependent territories. The phenomenon of 'downward asymmetry' remains insufficiently explored, highlighting the need for further analysis in future research.

From a dynamic perspective, which analyzes countries' characteristics that may trigger asymmetric arrangements, the paper shows that transition from dictatorship to democracy works as a catalyst in shaping multilevel governance and boosting asymmetries in the distribution of regional authority arrangements.

Three main extensions of this paper are particularly promising. First, to use dependent variables particular components of the RAI, such as Self-rule and Fiscal autonomy. Second, to explore alternative database to measure the extent of asymmetric arrangements, although, so far, we have not been able to identify any source that matches the RAI in terms of coverage and detail. Finally, to shed light on the empirical relevance of other factors affecting changes in asymmetry over time, beyond transitions in the political regime.

Table 1: Variables: Definitions and data sources

VARIABLE	DESCRIPTION	YEAR	SOURCE
RAI_range	Difference between the max and min value of the regional (tier 1) RAI	2018	Hooghe et al. 2016 & Shair-Rosenfield et al. 2021
RAI_sd	RAI Population-weighted standard deviation	2018	Hooghe et al. 2016 & Shair-Rosenfield et al. 2021
Language	Language fractionalization measure (0-1)	2001	Alesina et al. 2003
Religion	Religious fractionalization measure (0-1)	2001	Alesina et al. 2003
Ethnic	Ethic fractionalization measure (0-1)	Several years	Alesina et al. 2003
PSNS_sw	Standardized and Weighted Party System Nationalization Score	Latest election year available	Kollman et al. 2019
GDP_pc	GDP per capita (constant 2015 thousands US$) [NY.GDP.PCAP.KD]	2018	World Bank
GINI	Gini index [SI.POV.GINI]	2018	World Bank
Regions	number of first-level administrative regions	2018	Own elaboration
Islands_Share	number of islands or separate regions	2018	Own elaboration
Borders_Share	share of islands or separate regions over the total	2018	Own elaboration
Area	Surface area (millions of sq. km) [AG.SRF.TOTL.K2]	2018	World Bank
GFI	Geographical Fragmentation Index	2012	Rodríguez-Pose and Crescenzi, 2020
Population	Population in millions, total [SP.POP.TOTL]	2018	World Bank
Largest_City	Population in the largest city (% of urban population) [EN.URB.LCTY.UR.ZS]	2018	World Bank
Density	Population density (people per sq. km of land area) [EN.POP.DNST]	2018	World Bank

Source: Own elaboration.

Table 2: Descriptive statistics

VARIABLE	N	MEAN	MEDIAN	SD	MAX	MIN
RAI_range	76	4.03	1.00	6.13	22.00	0.00
RAI_sd	76	0.86	0.22	1.60	8.96	0.00
Language	72	0.28	0.22	0.23	0.81	0.00
Religion	75	0.40	0.38	0.20	0.82	0.00
Ethnic	76	0.34	0.31	0.21	0.74	0.00
PSNS_sw	67	0.73	0.78	0.14	0.90	0.28
GDP_pc	74	20.22	12.41	20.46	86.76	1.02
GINI	60	35.84	34.85	6.90	53.90	24.60
Regions	76	21.08	17.00	15.94	85.00	2.00
Islands_Share	76	0.05	0.00	0.09	0.43	0.00
Borders_Share	76	0.46	0.44	0.23	1.00	0.00
Area	75	1.29	0.24	3.21	17.10	0.01
GFI	75	35.80	36.71	6.79	47.20	15.29
Population	75	77.22	11.51	225.99	1402.76	1.27
Largest_City	73	26.99	25.28	14.16	81.40	3.08
Density	75	145.92	93.64	179.80	1256.23	3.25

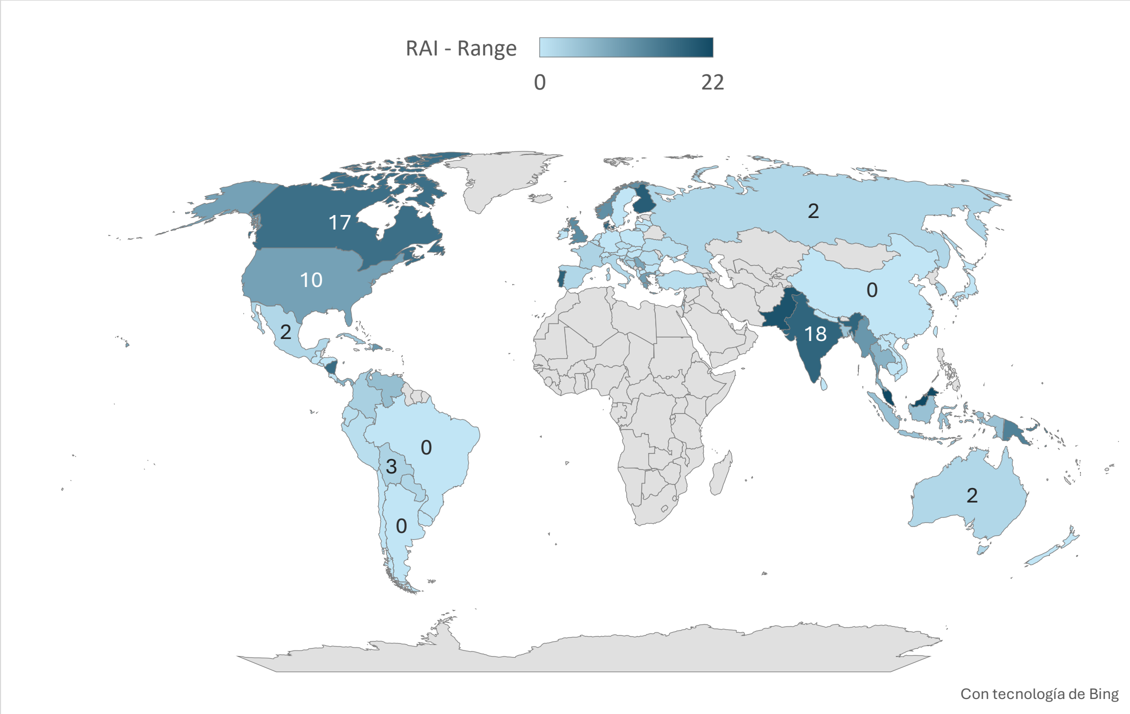
Source: Own elaboration.

Table 3. Cross-country results. OLS and RLS estimates.

	RAI_range	RAI_sd	RAI_range	RAI_sd	RAI_range	RAI_sd	RAI_range	RAI_sd
Language	3.02 (0.65)	0.18 (0.16)						
Religion	-2.22 (0.49)	-0.050 (0.04)						
Ethnic	5.62 (1.34)	0.88 (1.01)			8.99** (2.61)	2.37*** (2.97)	3.58*** (2.66)	0.57** (2.06)
PSNS_sw	10.32* (1.89)	1.87 (1.54)			6.76 (1.46)	1.69 (1.28)	1.16 (0.65)	-0.092 (0.25)
GDP_pc	0.052 (1.03)	0.009 (0.64)			0.0205 (0.73)		-0.002 (0.11)	
GINI	-0.094 (0.70)	-0.013 (0.45)						
Regions			-0.017 (0.46)	-0.009 (1.14)		-0.0079 (1.10)		-0.0020 (0.56)
Islands_Share			30.78*** (3.28)	8.18** (2.16)	35.62*** (3.51)	10.24** (2.27)	42.76*** (14.68)	0.77 (1.24)
Borders_Share			2.34 (0.66)	0.14 (0.19)				
Area			0.20 (0.82)	0.040 (1.20)		0.024 (0.60)		0.037** (2.04)
GFI			0.018 (0.19)	-0.005 (0.20)				
Population			0.0052 (1.09)	0.0002 (0.51)	0.012*** (6.88)		0.011*** (7.44)	
Largest_City			0.061 (1.54)	0.012 (1.37)	0.075* (1.96)	0.016 (1.67)	0.028 (1.39)	0.0037 (0.88)
Density			0.0007 (0.22)	0.0007 (1.12)		0.0018*** (3.25)		0.0012*** (3.71)
Number of observations	52	52	72	72	63	63	63	63
R^2	0.115	0.043	0.227	0.241	0.350	0.322		
Rw^2							0.877	0.342
Max VIF Value	2.18	2.37	3.05	3.29	1.72	2.90		
Estimator	OLS	OLS	OLS	OLS	OLS	OLS	RLS	RLS

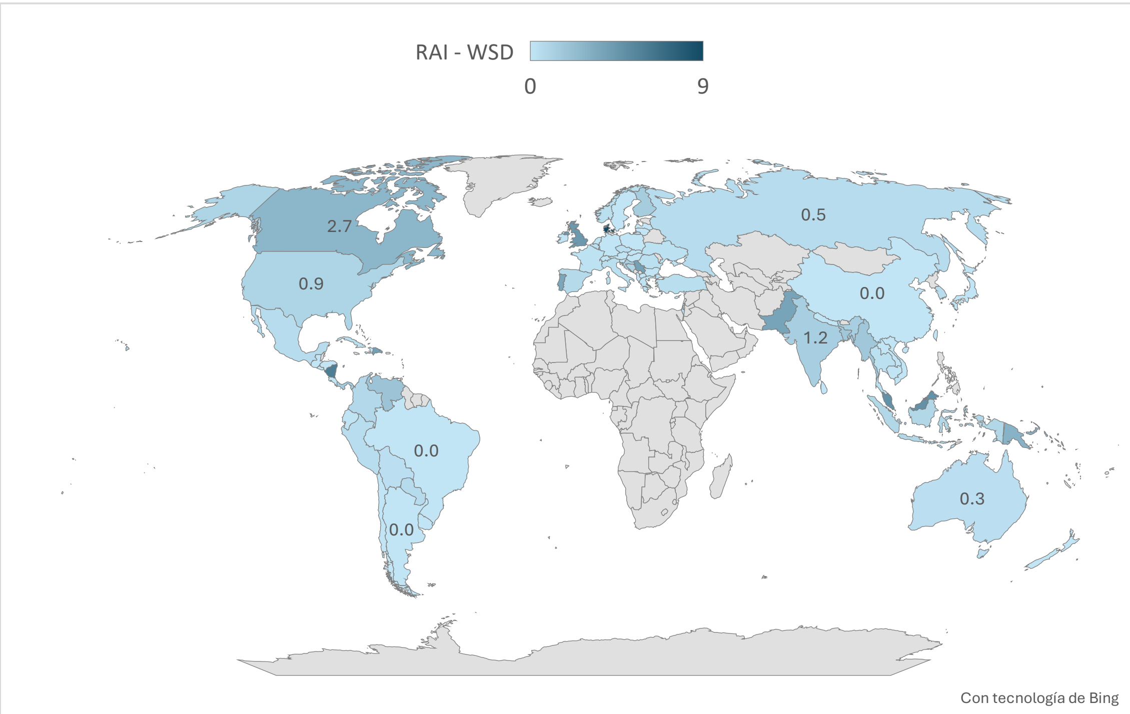
Notes: Huber-White-Hinkley robust t-statistics in parentheses in OLS estimates. Huber Type I robust z-statistics in Robust Least Squares (RLS) estimates. ***, **, * indicates statistical significance at 10%, 5% and 1%, respectively. The Rw^2 is the Robust weighted R^2.

Figure 1: Cross-regional range of RAI in the world



Note: Regional RAI values from 2018 or the latest available. Range is the difference between the maximum and minimum regional RAI value.
Source: Own elaboration from Hooghe et al. 2016 & Shair-Rosenfield et al (2021)

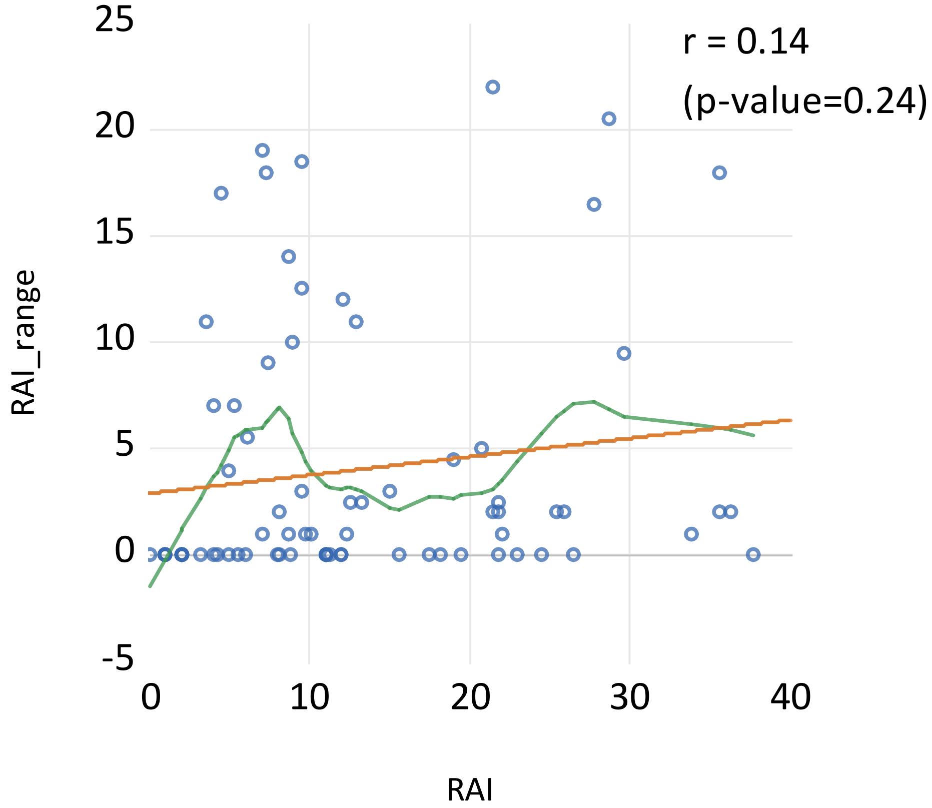
Figure 2: Regional standard deviation of RAI in the world



Note: Regional RAI values from 2018 or the latest available. WSD stands for Population Weighted Standard Deviation of RAI.

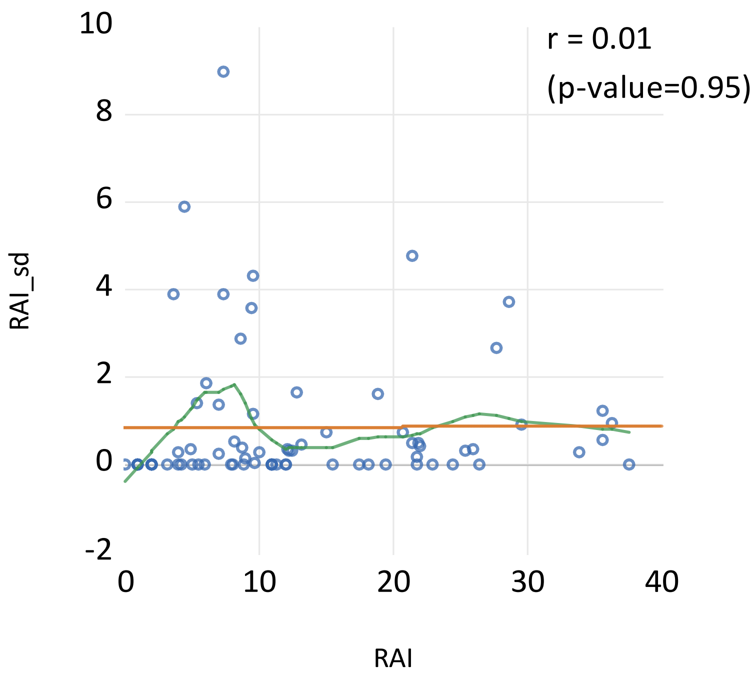
Source: Own elaboration from Hooghe et al. 2016 & Shair-Rosenfield et al (2021)

Figure 3: Relationship between the RAI regional range and the RAI country average



Source: Own elaboration.

Figure 4: Relationship between the RAI weighted standard deviation and the RAI country average.



Source: Own elaboration.

Table 4: Cross-regional Dataset Variables: Definitions and data sources

VARIABLE	DESCRIPTION	YEAR	SOURCE
RAI_diff	Difference between Country RAI and Regional RAI	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Language	Dummy variable. 1: A majority speaks a mother-tongue that differs from the majority in the country. 0: Otherwise	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Religion	Dummy variable. 1: A majority of a region's population adheres to one or more religions that differ from the majority religion in the country. 0: Otherwise.	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Indigenous region	Dummy variable. An indigenous region is a general-purpose jurisdiction created with the explicit purpose of providing governance for an indigenous people or peoples. 1: A region is coded as indigenous when it meets the following criteria: a) it exists between the local level of government and the national level; b) the jurisdiction is codified in law. An indigenous region may or may not be contiguous.	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
GDP_pc	GDP per capita (constant 2015 thousand US$) [NY.GDP.PCAP.KD]	2016 - 2018	World Bank and other regional sources
Creation date	Year in which the region as a unit was created (1949 if before 1950)	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Island	Dummy variable. 1: the region is non-contiguous and 30km or more removed from any other region of its state. 0: Otherwise	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Travel hours	The travel time in hours by road or water in 2020 (Google Maps)	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Area share	Share of region size over total country size (Sum of all regions)	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Population share	number of islands or separate regions	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Density	Population density (people per sq. km of land area)	2018	Shair-Rosenfield et al. 2021 & Hooghe et al. 2016
Capital	Dummy variable. 1: The region contains the country's capital. 0: Otherwise	2018	Own elaboration

Table 5: Cross-regional Dataset Descriptive statistics

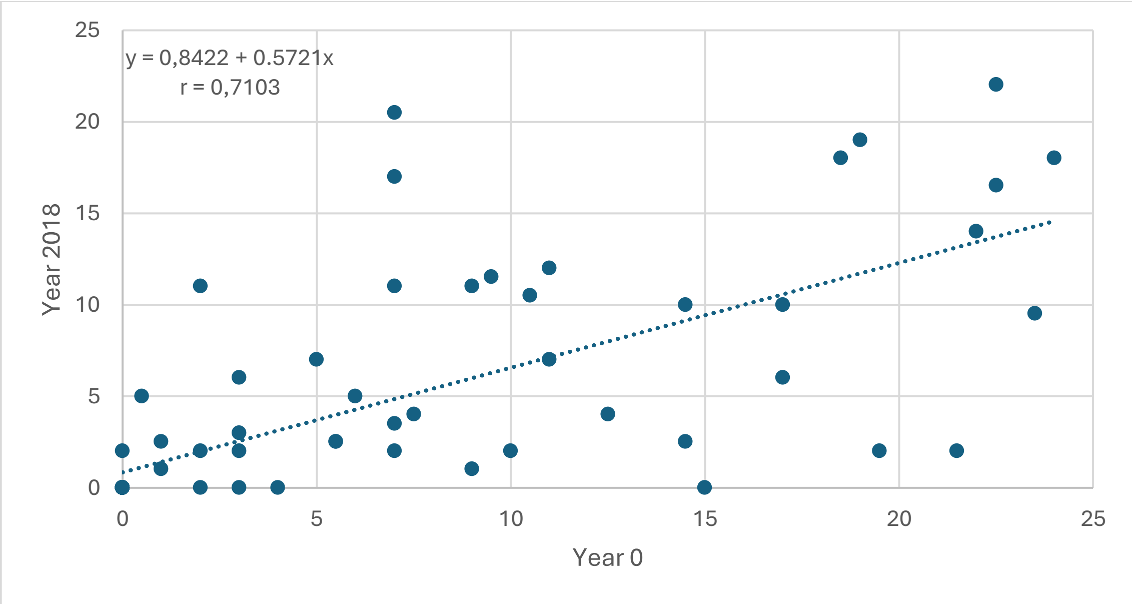
VARIABLE	N	MEAN	MEDIAN	SD	MAX	MIN
RAI_diff	1747	0.00	0.00	1.89	18.00	-15.13
Language	1747	0.20	0	0.40	1	0
Religion	1747	0.06	0	0.23	1	0
Indigenous region	1747	0.02	0	0.13	1	0
GDP_pc	1535	21.31	8.99	74.50	2619.91	0.06
Creation date	1747	1967	1950	23	2018	1931
Island	1747	0.03	0	0.17	1	0
Travel hours	1698	10.21	5.00	17.47	210.00	1.00
Area share	1747	0.04	0.02	0.06	0.98	0.00
Population share	1747	0.04	0.02	0.06	0.65	0.00
Density	1747	534.88	83.83	2837.99	85313.45	0.02
Capital	1747	0.05	0	0.22	1	0

Table 6. Cross-regional results. RLS estimates.

	RAI_diff
Language	0.022 (3.19)***
Religion	-0.016 (3.77)***
Indigenous region	3.86 (4.24)***
GDP_pc	0.000041 (0.69)
Creation date	0.000056 (0.64)
Island	-0.014 (0.09)
Travel hours	0.0017 (4.34)***
Area share	-0.025 (0.93)
Population share	0.014 (0.80)
Density	-0,00000018 (0.22)
Capital	0.0066** (2.05)
Number of observations	1495

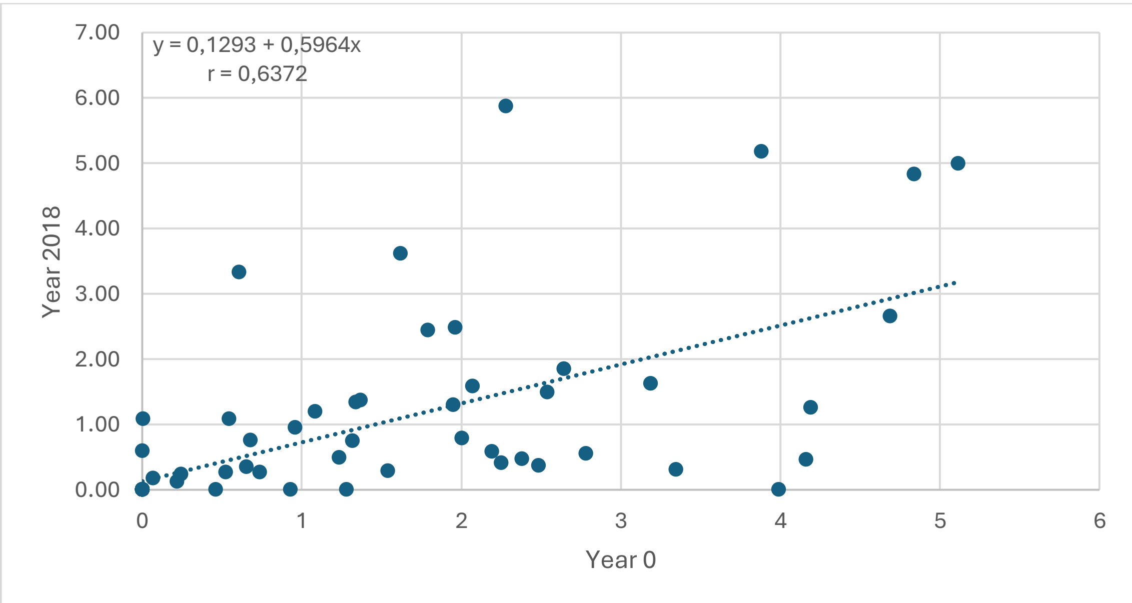
Notes: Bootstrapped z-statistics in parentheses. **, * indicates statistical significance at 5% and 1%, respectively.

Figure 5: Scatter plot with the initial and final value of RAI_range.



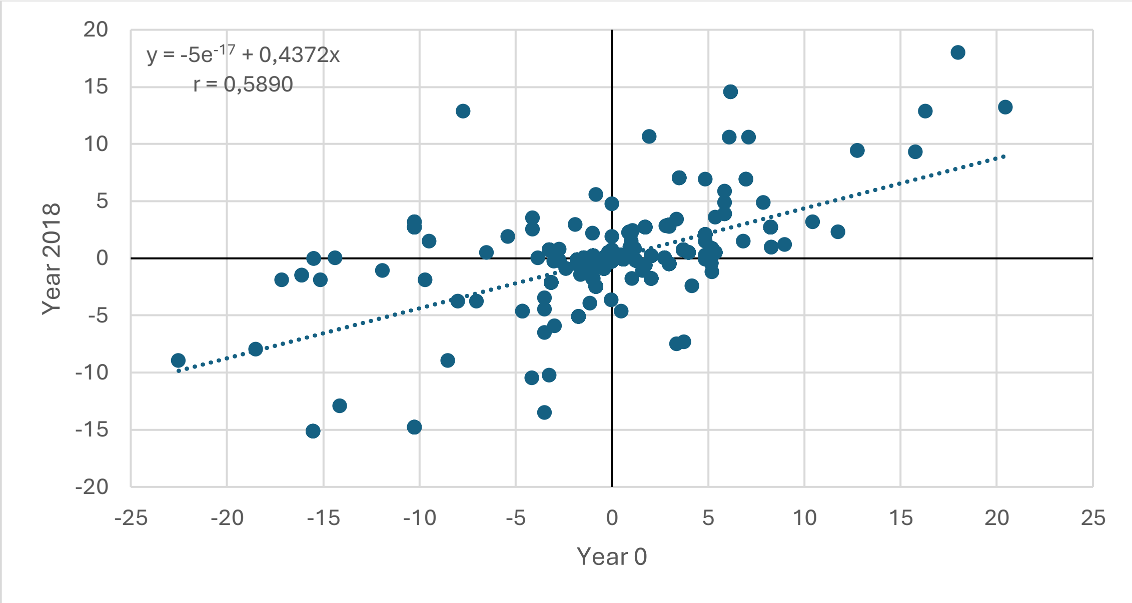
Note: Year 0 refers to the first year available for each country. Source: Own elaboration.

Figure 6: Scatter plot with the initial and final value of RAI_sd.



Note: Year 0 refers to the first year available for each country. Source: Own elaboration.

Figure 7: Scatter plot with the initial and final value of RAI_diff.



Note: Year 0 refers to the first year available for each region. Source: Own elaboration

Table 7: Evolution of RAI_range

RAI_range	Initial YEAR	Initial	2018	1960	1970	1980	1990	2000	2010	2018	TOTAL Variation
Albania	2000	0	0								0
Argentina	1950	22	0	1	-13	-1	15	-22	-2		-22
Australia	1950	22	2			-4	-16				-20
Austria	1955	0	0								0
Belgium	1950	0	6		7	1		1		-3	6
Bangladesh	1972	0	5					5			5
Bulgaria	1991	0	0								0
Bosnia and Herzegovina	1995	2	2								0
Bolivia	1950	0	3				1	1	2	-1	3
Brazil	1950	21	0		-13	3	-9	-2			-21
Canada	1950	23	17		-3		-2	1	-2		-6
Switzerland	1950	0	0								0
Chile	1950	0	0								0
China	1950	2	10	1	-3	3		8	1	-2	8
Colombia	1950	9	3			1	2	-9			-6
Costa Rica	1950	0	0								0
Cuba	1950	0	4			3		1			4
Cyprus	1960	0	0								0
Czech Republic	2000	0	0								0
Germany	1950	0	0								0
Denmark	1950	24	18	-5			-6	6	-1		-6
Dominican Republic	1950	2	11	3		2			4		9
Ecuador	1950	0	0			7		-4	-1	-2	0
Spain	1950	4	2	2		-2	4	-5		-2	-2
Finland	1950	24	24								0
France	1950	0	3				3				3
United Kingdom	1950	9	14					7		-2	5
Greece	1950	17	0					-1		-16	-17
Guatemala	1950	0	0								0
Honduras	1950	0	0								0
Croatia	1993	3	3								0
Haiti	1950	0	0								0
Hungary	1990	5	0					-5			-5
Indonesia	1950	0	5	1	2	-1		-2	5		5
India	1950	19	18	3			-2	2		-3	-1
Ireland	1987	0	0								0
Israel	1950	0	0								0
Italy	1950	7	2			-2	-1		-2		-5
Japan	1950	0	0								0
Cambodia	1953	0	0								0
South Korea	1952	0	3					3	-1		3
Laos	1953	0	0					1	-1		0

Sri Lanka	1950	0	0				9			-9	**0**
Lithuania	1995	0	0								**0**
Latvia	2009	0	0								**0**
Mexico	1950	14	2			-5	-1	-2		-4	**-12**
North-Macedonia	1996	0	0								**0**
Myanmar	1950	10	11		-10				2	9	**1**
Malaysia	1957	0	22		4	18					**22**
Nicaragua	1950	0	17				11		6		**17**
Netherlands	1950	0	0								**0**
Norway	1950	11	12						1		**1**
Nepal	1950	0	0								**0**
New Zealand	1963	0	0			1	-1				**0**
Pakistan	1950	7	21	-7	11	-10	14	-5	11		**14**
Panama	1950	9	7			-1	-3	2			**-2**
Peru	1950	0	1						1		**1**
Philippines	1950	0	0								**0**
Papua New Guinea	1975	0	14				3	1	10		**14**
Poland	1990	0	0								**0**
Portugal	1950	0	19			16		4		-1	**19**
Paraguay	1950	0	2					2			**2**
Romania	1991	2	0								**-2**
Russian Federation	1993	3	0								**-3**
El Salvador	1950	0	0								**0**
Serbia	2006	0	11								**11**
Slovakia	1993	0	0								**0**
Slovenia	1999	0	0								**0**
Sweden	1950	6	0			-5		-1			**-6**
Taiwan	1950	0	0						10	-10	**0**
Thailand	1950	0	7			3		2	-3	5	**7**
Turkey	1950	0	0								**0**
Ukraine	1996	1	1								**0**
Uruguay	1950	0	0								**0**
United States	1950	24	10			-14		11	-11		**-14**
Venezuela	1950	0	6	4	7		2	-6	-1		**6**
Vietnam	1950	0	0								**0**

Notes: Colors indicate changes in asymmetry: gray for missing data, white for no change, green for increases (darker shades reflect stronger positive shifts), and red for decreases (darker shades indicate stronger negative shifts). Source: Own elaboration

Table 8: Evolution of RAI_sd

RAI_sd	Initial YEAR	Initial	2018	1960	1970	1980	1990	2000	2010	2018	TOTAL Variation
Albania	2000	0,0	0,0								0,0
Argentina	1950	7,8	0,0	-3,6	-2,3	0,2	2,3	-4,1	-0,4		-7,8
Australia	1950	3,5	0,3	-0,1	-0,1	-0,9	-2,0	0,0			-3,1
Austria	1955	0,0	0,0								0,0
Belgium	1950	0,0	7,4		3,1	-0,9	-0,3	4,0	0,4	1,2	7,4
Bangladesh	1972	0,5	3,8				2,8	-1,2	1,6	0,1	3,3
Bulgaria	1991	0,0	0,0								0,0
Bosnia and Herzegovina	1995	4,8	5,8						1,0	1,9	1,0
Bolivia	1950	0,0	0,3				0,1	0,1	0,1	0,0	0,3
Brazil	1950	1,7	7,3		-0,8	2,7	3,7	-0,3	0,2	0,1	5,6
Canada	1950	6,4	7,0	-0,2	0,7	-0,2	0,0	0,1	1,8	-1,6	0,6
Switzerland	1950	0,0	0,0								0,0
Chile	1950	0,0	2,0					0,5	0,5	1,0	2,0
China	1950	0,9	1,7	-0,5	-0,4	2,4	-0,1	-1,1	0,0	0,4	0,8
Colombia	1950	2,3	1,2	-0,1	0,0	0,1	-0,3	-0,9	0,1	0,1	-1,0
Costa Rica	1950	0,0	0,0			0,3	0,2	-0,5			0,0
Cuba	1950	0,0	0,3			0,3		0,1			0,3
Cyprus	1960	0,0	0,0								0,0
Czech Republic	2000	3,6	2,0						-1,5		-1,5
Germany	1950	9,7	10,4		0,8	-0,4	0,3	0,0	0,1	-0,1	0,7
Denmark	1950	3,0	2,5	-0,1	-0,7	0,8	-1,3	1,3	-0,6		-0,6
Dominican Republic	1950	0,9	3,3	1,4		0,9			0,1		2,4
Ecuador	1950	0,0	1,8			0,3		0,4	0,3	0,8	1,8
Spain	1950	0,7	6,5	0,0		2,5	2,5	0,5	0,2	0,1	5,8
Finland	1950	1,7	2,7			0,7		0,3	0,0	0,0	1,0
France	1950	0,0	0,5		3,0	-0,5	-2,1	0,0	0,1	0,0	0,5
United Kingdom	1950	2,1	4,3		0,4	0,3	0,5	1,1	0,1	-0,1	2,2
Greece	1950	0,2	3,5				-0,1	3,3		0,0	3,3
Guatemala	1950	0,0	0,0								0,0
Honduras	1950	0,0	0,0								0,0
Croatia	1993	1,2	1,2								0,0
Haiti	1950	0,0	0,0								0,0
Hungary	1990	2,4	1,5					1,8		-2,7	-1,0
Indonesia	1950	0,0	1,6	0,1	0,7	-0,4		0,2	1,0		1,6
India	1950	5,7	6,1	1,4	1,1	0,0	0,0	-1,5	-0,1	-0,4	0,4
Ireland	1987	0,0	3,5							3,5	3,5
Israel	1950	0,0	0,0								0,0
Italy	1950	2,3	5,2		-0,4	0,4	0,7	0,5	1,1	0,6	3,0
Japan	1950	0,0	0,5	0,3	0,0	0,0	0,0	0,1	0,0	0,0	0,5
Cambodia	1953	0,0	0,0								0,0
South Korea	1952	0,0	0,5					1,2	-0,7		0,5
Laos	1953	0,0	0,0					0,1	-0,1		0,0
Sri Lanka	1950	0,0	4,5				4,5		0,0	0,0	4,5

Lithuania	1995	0,0	0,0								**0,0**
Latvia	2009	0,0	0,0								**0,0**
Mexico	1950	3,8	8,7	-0,6		-0,7	-0,3	-0,5	7,1	0,1	**5,0**
North-Macedonia	1996	0,0	2,8						2,8		**2,8**
Myanmar	1950	2,5	5,5		-2,5				0,4	5,0	**2,9**
Malaysia	1957	6,8	8,6		-0,3	2,2	0,0		0,0		**1,8**
Nicaragua	1950	0,0	5,9				4,1	0,2	1,5		**5,9**
Netherlands	1950	0,0	0,0		2,0	0,2	-2,2		5,2	-5,2	**0,0**
Norway	1950	2,6	0,4			-2,2			0,0		**-2,2**
Nepal	1950	0,0	4,3		0,8	0,9	0,0	1,4	-3,1	4,3	**4,3**
New Zealand	1963	0,0	0,0			0,5	-0,5				**0,0**
Pakistan	1950	3,0	8,4	-2,6	0,1	1,4	4,3	-5,5	8,0	-0,4	**5,4**
Panama	1950	0,9	1,4			-0,1	-0,2	1,1	-0,2		**0,6**
Peru	1950	4,0	0,2		-2,0	1,5	0,2	0,8	-4,3		**-3,8**
Philippines	1950	0,0	1,1				0,7	-0,2		0,5	**1,1**
Papua New Guinea	1975	0,0	2,7				0,7	0,2	1,8		**2,7**
Poland	1990	0,0	0,9					0,9	0,0		**0,9**
Portugal	1950	0,0	4,2			2,2		0,9	0,6	0,4	**4,2**
Paraguay	1950	0,0	0,5					0,5			**0,5**
Romania	1991	0,6	3,1								**2,5**
Russian Federation	1993	1,2	9,9						-1,6	0,9	**8,7**
El Salvador	1950	0,0	1,2					1,2			**1,2**
Serbia	2006	5,1	4,5								**-0,6**
Slovakia	1993	0,0	0,8						-2,1	0,3	**0,8**
Slovenia	1999	0,0	2,3						2,6	-0,3	**2,3**
Sweden	1950	2,3	0,0		-0,7	-1,3		-0,3			**-2,3**
Taiwan	1950	1,0	0,0		0,0	0,0		-1,0	5,0	-5,0	**-1,0**
Thailand	1950	0,0	0,3			1,1		0,7	-1,1	-0,4	**0,3**
Turkey	1950	0,0	3,4				0,5	0,0	2,7	0,2	**3,4**
Ukraine	1996	0,3	0,2							-0,1	**-0,1**
Uruguay	1950	0,0	0,0								**0,0**
United States	1950	5,8	5,6	-0,2		0,2	0,0	-0,1	0,0		**-0,2**
Venezuela	1950	0,0	1,3	0,6	2,0		0,6	-1,5	0,1	-0,3	**1,3**
Vietnam	1950	0,0	0,0					0,0	0,0		**0,0**

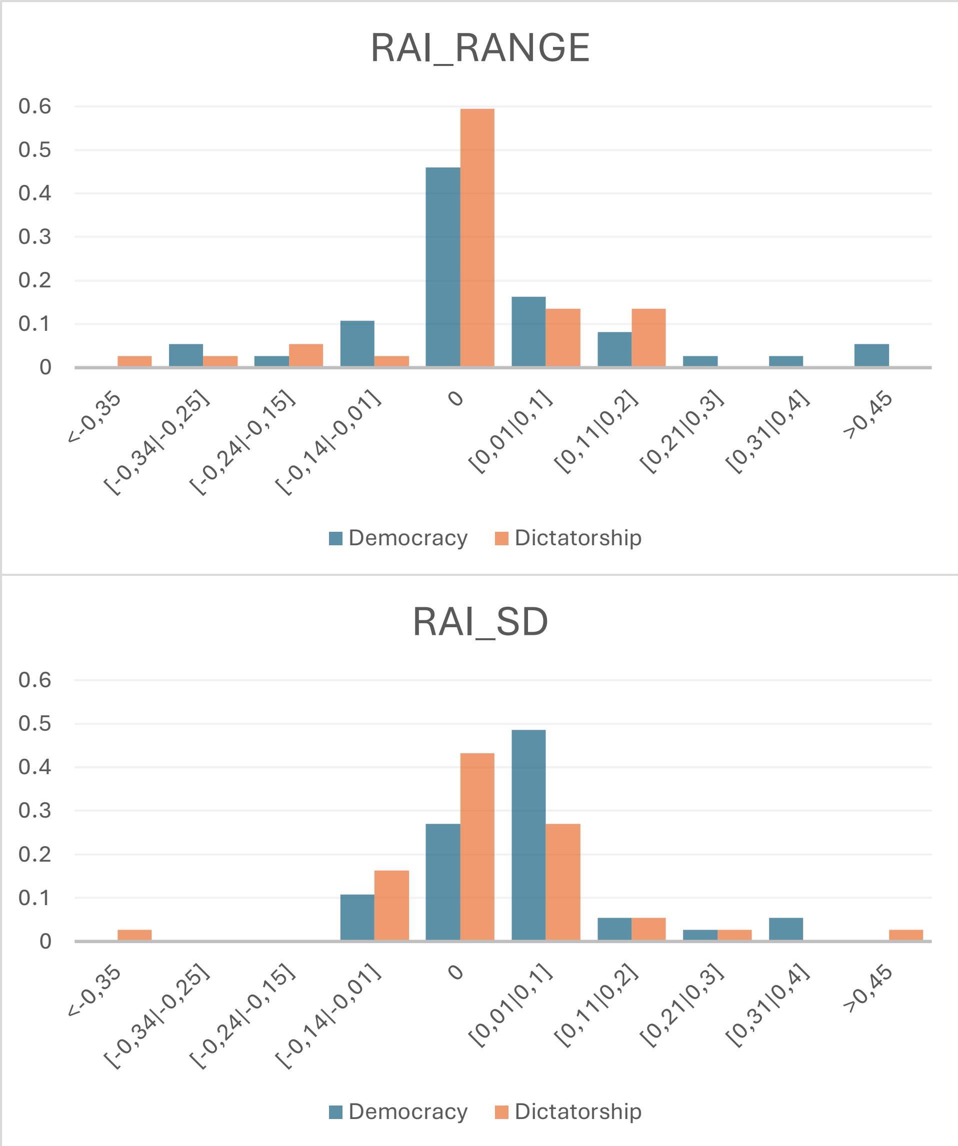
Notes: Colors indicate changes in asymmetry: gray for missing data, white for no change, green for increases (darker shades reflect stronger positive shifts), and red for decreases (darker shades indicate stronger negative shifts). Source: Own elaboration.

Table 9: Average annual change in RAI_range and RAI_sd. Democracy vs Dictatorship periods

	RAI_range		**RAI_sd**	
	Democracy	*Dictatorship*	*Democracy*	*Dictatorship*
Argentina	0,10	-1,18	0,00	-0,36
Bangladesh	0,21	0,00	0,02	0,12
Bolivia	0,07	0,00	0,01	0,00
Brazil	-0,29	-0,33	0,05	0,15
Chile	0,00	0,00	0,04	0,00
Colombia	-0,09	0,00	-0,02	-0,01
Croatia	0,00	0,00	0,00	0,00
Cuba	0,00	0,06	0,00	0,01
Cyprus	0,00	0,00	0,00	0,00
Dominican Republic	0,11	0,20	0,02	0,09
Ecuador	-0,04	0,11	0,03	0,01
El Salvador	0,00	0,00	0,04	0,00
Greece	-0,28	0,00	0,05	0,00
Guatemala	0,00	0,00	0,00	0,00
Honduras	0,00	0,00	0,00	0,00
Indonesia	0,14	0,04	0,06	0,01
Japan	0,00	0,00	0,01	0,00
Laos	0,00	0,00	0,00	0,00
Mexico	-0,21	-0,15	0,38	-0,04
Myanmar	0,00	0,02	0,00	0,05
Nepal	0,00	0,00	0,26	-0,03
Nicaragua	0,53	0,00	0,18	0,00
Pakistan	0,32	0,11	0,36	-0,14
Panama	0,05	-0,14	0,02	-0,01
Paraguay	0,00	0,04	0,00	0,01
Peru	0,03	0,00	-0,05	-0,06
Philippines	0,00	0,00	0,02	0,01
Portugal	0,43	0,00	0,10	0,00
Russian Federation	0,20	-0,20	-0,13	0,47
South Korea	0,08	0,00	0,01	0,00
Spain	-0,10	0,08	0,14	0,00
Sri Lanka	0,00	0,00	0,00	0,20
Taiwan	0,00	0,00	0,00	-0,02
Thailand	-0,04	0,19	-0,01	0,01
Turkey	0,00	0,00	0,07	0,00
Uruguay	0,00	0,00	0,00	0,00
Venezuela	0,07	0,11	0,02	0,02

Note: The table includes only countries experiencing at least one transition between democracy and dictatorship or vice versa during the period 1950–2018. Source: Own elaboration.

Figure 8: Distribution of the average annual change in RAI_range and RAI_sd. Democracy vs Dictatorship periods



Source: Own elaboration.

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