Codebook:
Subnational Electoral Democracy Scale (SEDS)

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1 Introduction

This codebook describes the Subnational Electoral Democracy Scale (SEDS), a measure of democracies that focuses on secondary subnational units that fall below the national level but above the municipal or country level. These units are often referred to as states, provinces, länder, or canton, but I will refer to them generically as states throughout this codebook. The SEDS adopts a procedural and electoral definition of subnational democracy which emphasizes the important role of electoral competition in the establishment and identification of subnational regime variation. I captures this idea of subnational democracy across the subnational units of 12 federal democratic countries from 1980 (or the year a country became nationally democratic) until 2016. The SEDS is currently being expanded to more recent time periods and to additional countries and this codebook will be updated accordingly. The measure is designed to capture three conditions that distinguish more and less democratic states. These include: the degree of electoral contestation for executive office, executive party turnover, and legislative control by a single dominant party. This approach to measuring subnational democracy builds on previous work that has sought to measure subnational regime variation using electoral variables. However, the SEDS differs fundamentally in scope and construction. It covers more individual countries then any other publicly available subnational measure of subnational regime type.[1] Table 2 in the next section provides of list of many previous measurement strategies and how the SEDS compares.

The unit of analysis for this data set is the state-year. Data is coded on January 1st of each year, and election results are used to code data between elections. This means that election results are generally coded the year after these elections occur. The countries included in this data set are listed in Table 1 below along with some basic information about them.

[1] The Varieties of Democracy Project has a measure that covers more countries and time periods but is measured at the national rather than subnational level.

Table 1: **Countries included in this data set**

Country	**cntry**	**Starting Year**	**Ending Year**	**Number of States**
Argentina	1	1983	2015	23
Australia	2	1980	2016	6
Austria	3	1980	2016	9
Belgium	4	1980	2016	3
Brazil	5	1985	2015	27
Canada	6	1980	2016	10
Germany	8	1990	2016	16
India	9	1980	2015	28
Mexico	10	2000	2016	31
South Africa	12	1994	2015	9
Spain	13	1980	2016	19
United States	15	1980	2016	50

Starting year is either 1980, the first year a country is considered a democracy, or the year that a subnational unit was formed.

2 Previous Measurement Strategies

Below is a table that details a variety of different existing strategies that scholars have used to measure subnational democracy or authoritarianism in the past. This table also appears in Fidalgo (forthcoming).

Table 2: Previous strategies for measuring subnational regime variation

Study	**Countries**	**Subjective or objective**	**Variables**	**Aggregation Strategy**
Valdez (2000)	Mexico	Objective	Effective number of parties (ENP), opposition (non-PRI) party won governorship, effective number of legislative parties (ENP), number of human rights violations per 100,000 inhabitants, number of recommendations issued by National Human Rights Commission	factor Analysis
McMann and Petrov (2000)	Russia	Subjective	Expert ranking of regions based on Dahl's (1973) definition of democracy.	% of experts listing each region as one of the 10 most democratic minus the % who selected it as the 10 least democratic
Beer and Mitchell (2004)	Mexico	Objective	Turnout/population, 100-vote share of the largest party	Multiplication
Petrov (2005)	Russia	Subjective	Expert evaluations of: openness of political life, free and fair elections, stable parties, media freedom & independence, civil Society, balance of power, quality and turnover of political elites, corruption, Local self-government	Addition & moving average
Beer and Mitchell (2006)	India	Objective	Turnout/population, 100-vote share of the largest party	Multiplication

Montero (2007)	Brazil	Objective	1st & 2nd round gubernatorial margins of victory, standard deviations of the margins of victory, ENP running for governor, ENP in the legislature, incidence of run-offs and re-election of incumbents, % seats held by the winning and opposition coalitions	No Aggregation
Montero (2010)	Brazil	Objective	1st round incumbent vote share, succession control, % legislative seats won by the governor's party, % legislative seats won by the governor's coalition	Principal Component Analysis
Gervasoni (2010b)	Argentina	Objective	Vote share won by incumbent party in gubernatorial elections, vote share won by incumbent governor's party in legislative elections, extent to which governor controls who is elected to succeed them, legislative seat share won by the incumbent's party, number of consecutive gubernatorial reelections permitted	Factor Analysis
Gervasoni (2010a)	Argentina	Subjective	Expert survey measuring: contestation, inclusion, checks and balances, state repression, discrimination, & overall assessments of democracy	Averaging
Rebolledo (2011)	Mexico	Objective	Number of party alternatives for governor, % of state legislators in governor's party, margin of victory in gubernatorial elections, judicial independence, existence of "transparency and openness" legislation	Addition & Factor Analysis

Borges (2011)	Brazil	Objective	Vote share won by the governor's party, legislative seat share controlled by the governor's party, index of political continuity (governor's success in winning reelection or having a co-partisan reelected)	Factor Analysis
Lankina and Getachew (2012)	India	Objective	Turnout/population,100-vote share of the largest party	Multiplication
Giraudy (2013)	Argentina& Mexico	Objective & Subjective	Cumulative gubernatorial turnover rate, cumulative gubernatorial party turnover rate, effective number of parties (ENP), ENP in the legislature, governors seats in the legislature, clean elections index(Subjective)	Addition & Multiplication
Moraski and Reisinger (2014)	Russia	Objective	Votes received by the Kremlin's candidate or party as a % of eligible voters	None
Harbers, Bartman, and van Wingerden (2019)	India	Objective & Subjective	Turnover dummy, effective number of legislative parties, governor's seats in the legislature, dummy for instances of presidential rule, clean elections index(Subjective)	Addition & Multiplication
Grumbach (2021)	United States	Objective	67 indicators of electoral and liberal democracy	Bayesian Item Response Theory

3 Constructing the Subnational Electoral Democracy Scale (SEDS)

The SEDS is the product of an extensive data collection and exploration process. I start with the basic assumption that subnational democracy is a latent concept that I cannot directly measure. Instead, I take a cue from a variety of other authors (See table 2 above) and focus on measuring the outcomes of subnational democracy, namely the reduction of electoral competition. Incumbents in subnational authoritarian enclaves (SAEs) shift the subnational electoral playing field using a variety of fairly undemocratic tactics that vary across states, countries, and time. These tactics include electoral fraud, corruption, clientelism, manipulation of the media, modification of electoral institutions (e.g. gerrymandering, voter ID laws etc.), and in some extreme cases repression (Gibson, 2005). These kinds of tactics have been challenging to measure across countries and time, let alone trying to measure their prevalence within countries.[2] Additionally, the sheer fact that a government engages in these types of behaviors does not guarantee that it is authoritarian. In many developing countries, clientelism may be a way that subnational governments interact with citizens. Politicians in even the most democratic states may engage in some clientelist behavior.[3] These tactics may be part of day-to-day democratic politics in a country, or they may be the result of an elite's efforts to manipulate subnational elections. Using a latent variable strategy helps to deal with this distinction by focusing on the outcome of these tactics rather than on the tactics themselves. In an enclave, undemocratic tactics should cause elections to appear fairly uncompetitive. In democratic states where clientelism is a component of normal politics, elections should be relatively unaffected by clientelism and thus should appear outwardly democratic. Electoral variables have been used in the past to capture regime variation at both the national and subnational level.[4] They are objective and easy to collect across almost all federal democracies. At the national level, they correlate with subjective indexes of political freedom (Coppedge, 2012).

In this section of the codebook I break down the process I use to construct the SEDS. I will start by describing the indicators that make up the SEDS. These are designed to account for three components of subnational regime variation; executive competition, executive party turnover, and legislative dominance. I will then move on to describe my standardization strategy. The twelve countries listed in Table 1 have very different political systems which makes them extremely difficult to compare. For example, in Brazil an average of six parties fielded candidates for governor since the 1980s with as many as fifteen in one state-year. Comparing that to the US system where an average of 3 (mode of 2) parties fielded candidates for governor is challenging. Without standardizing these measures in some way states in the US will always appear less democratic than those in Brazil, even when that is not necessarily the case. In order to account for this I standardize the indicators that made up the SEDS using national level values as a baseline for comparison. Finally, I describe the aggregation strategy that I used to combine these indicators. The codebook then moves on to describe the full data set which includes the SEDS, the components that make up the SEDS, and a variety of additional measures of subnational electoral competitiveness. If you would like additional information about the validity of the SEDS and how it is constructed please

[2] see De Vries and Solaz (2017) for a summary of this literature

[3] See Hicken (2011) for a summary of this literature

[4] Subnational: Beer and Mitchell (2004, 2006); Borges (2011); Gervasoni (2010b); Giraudy (2013) National: Alvarez, Cheibub, Limongi, and Przeworski (1996); Vanhanen (2000)

see Fidalgo (forthcoming) and its accompanying online appendix.

3.1 Components

I use five different electoral indicators to capture three procedural outcomes of subnational democracy; executive contestation, executive party turnover, and legislative control. To identify the variables I would use to construct the SEDS I began by measuring a wide range of electoral variables based on previous measurement strategies in the literature (see table 2 for the list). This wider range of variables is available in this data set along with the final SEDS. I then conducted a wide range of exploratory factor analyses to determine which measures did a good job of capturing the single concept of subnational democracy across countries and time. The final set of five indicators that I selected conform to a single factor both across and within all 12 countries. They are also relatively reliable and internally consistent with a Chrombach's alpha score of .77.

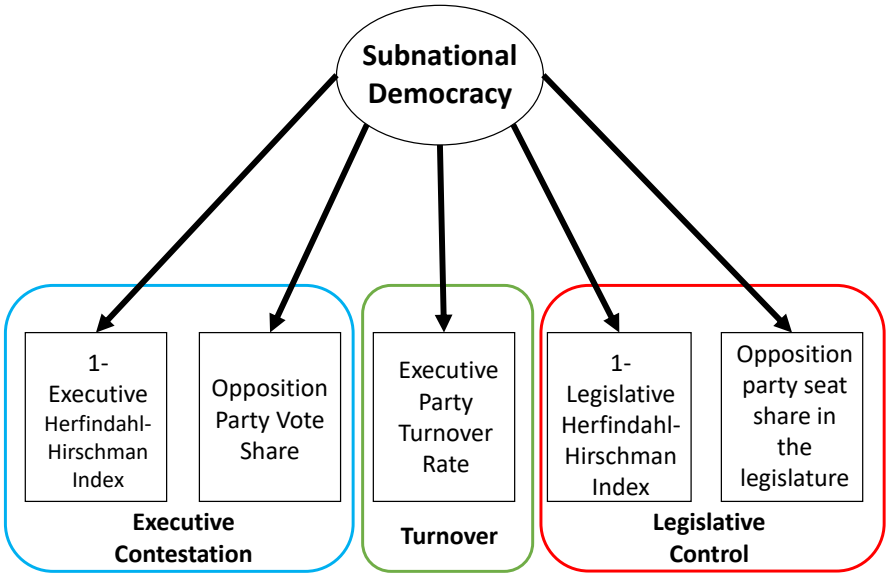

Figure 1: Structure of the subnational democracy index

Figure 1 displays a summary of my overall measurement strategy. Subnational democracy is the latent concept that is represented by the circle at the top of the figure. It affects the five variables in the rectangles at the bottom. These are the five observed electoral indicators, that represent the three outcomes of subnational democracy which are highlighted in different colors. Each variable is scaled so that higher values are associated with more competitive and democratic systems.

The first outcome is subnational executive contestation. As a state becomes more democratic, I expect executive elections to become more competitive because SAE incumbents actively seek to control the executive by limiting competition for executive office (Gibson, 2005, 2013). I

measure this component in two different ways. First, I measure the percentage of the vote won by the losing candidates for governor (1-winning vote share).[5] Higher opposition vote shares signal more competitive executive elections. Ths measure does not currently differentiate situations in which a single large opposition party exists from those where a number of small parties compete. To account for this I measure the weighted number of parties running in state executive elections using the inverse Herfidahl-Hirschman index (HHI). The HHI is a measure of firm size and competition in industry, but it has been adapted for use in measuring competition among political parties (Herfindahl, 1950; Hirschman, 1980). The popular Laakso and Taagepera (1979) effective number of parties indicator is the inverse of this index, which is calculated as the sum of the squared proportion of votes earned by each party ($\sum_{i=1}^{N} p_i^2$) in a gubernatorial election. The advantage of this measure is that it ranges from 0-1 such that larger values indicate fewer parties competing. To ensure that higher values signal more competitive executive elections I subtracted this value from 1. As a state becomes more democratic, I expect more viable parties to be able to compete in subnational executive elections. One issue with the HHI, however, is that it can be sensitive to the overall size of a country's party system. This is something that I partly handle by standardizing each electoral variable by country before creating the final SEDS. However, I also created another version of the SEDS (also available in the dataset as SEDS2) which replaces the HHI with Shannon's H, an entropy measure which is similar but may perform better at the extremes.

The second outcome I seek to measure as part of my electoral definition of subnational democracy is turnover. In an SAE, a primary goal of incumbent electoral manipulation is to keep an individual or political party in power over an extended period.[6] Thus, as a state becomes more democratic, I expect it to experience more instances of party turnover in executive office. I focus on party turnover rather than individual turnover to deal with the issue of term limits. A number of countries, have national term limit laws that limit the ability of an incumbent to run for office over time. Many of these laws are exogenously set by the national government and thus not related to a state's latent level of democracy. To capture this, I measure the cumulative party turnover rate. This rate captures the cumulative number of executive party turnovers that have occurred in each state divided by the number of years a state has been included in the data set. The party turnover rate ranges from 0-1 with higher values signifying more frequent turnovers.

The final component of my procedural definition of subnational democracy is legislative control. For an individual or party to fully dominate state politics over time, they not only have to win executive elections, they also need to maintain control over the subnational legislature (Gibson, 2005, 2013; Behrend and Whitehead, 2016). Thus, in SAEs I expect the incumbent executive's party to have a large presence in the legislature. However, as a state becomes more democratic, I expect a greater variety of voices to be represented. I measure this third component in two ways. The first is the seat share of opposition parties in the lower house of each state legislature and the second is the legislative HHI measuring the weighted number of parties represented in the legislature.[7] As a state becomes more democratic, I expect the governor's party to become less able to dominate the legislature and for more parties to have a voice. Just as with executive contestation,

[5] In parliamentary systems this is the opposition parties' vote share in parliamentary elections. In presidential systems this is the opposition candidates' vote share in the first round of a gubernatorial election.

[6] Gibson (2005, 2013)

[7] Where p_i now represents the percentage of seats held by each party.

I replace the legislative HHI with Shannon's H as part of an alternative SEDS indicator (SEDS2 in the dataset).

3.2 Standardization

In their raw form, these five variables are difficult to compare cross-nationally because the twelve countries used in this study have very different political systems. Electoral outcomes that are considered competitive in one country at one time may not be in other countries or other time periods. As I already noted, comparing the US two-party system and the Brazilian large multi-party system would result in US states always appearing less competitive than Brazilian states regardless of whether elections are manipulated or not. To account for these differences in the national political system, I have collected equivalent electoral data at the national level for each country and used that data to standardize the five subnational electoral variables described above. This puts states on a more even playing field, as it compares them to their national and more ideal counterpart. For example, I used the national opposition vote share from US and Brazilian presidential elections as a benchmark against which to compare state governments. Using national values as benchmarks is helpful because the twelve countries in this sample are all stable long-term democracies and state government institutions tend to be modeled after national institutions.[8] Additionally, state electoral trends often follow national trends (coattail effects) and it may be important to control for instances where a state appears more or less democratic because of national electoral trends. Thus, I expect states to have similar electoral institutions as their national government and for electoral outcomes to be relatively similar. As states become more democratic, their electoral outcomes should become more like national electoral outcomes or even more competitive. However, as states become less democratic, their outcomes should become less competitive compared to national electoral outcomes.

In order to remove some of the variability resulting from especially idiosyncratic national elections (e.g. political scandals, independent candidates, etc.), I predict the five national electoral variables (corresponding to the five subnational variables) based on their trend over time using a simple ordinary least squares regression model in which each national electoral variable is the dependent variable and the independent variable is a year trend. I estimate separate models for each variable and country and use these models to predict the value of the national electoral variable. I then subtract this predicted national level election variable from each of the five state indicators to create standardized subnational electoral indicators. This standardization strategy distributes states based on whether they are more or less competitive than the national government. States with values that are slightly below the national level are not necessarily undemocratic or authoritarian. I hope to account for this issue in two ways. First, I aggregate these five indicators such that a state's democracy score is related to all five variables, so having a lower value on one variable can be counteracted by being competitive in another domain. I also measure this concept continuously and make no assumptions about where along the SEDS a state becomes a democracy or an SAE.

[8] They are not always perfectly equivalent, but in most of these countries states use the same electoral system as the national government.

3.3 Aggregation

Finally, to create a single subnational electoral democracy scale I aggregate the five electoral variables. Choosing an aggregation technique requires making important assumptions. For example, the simplest aggregation strategies, such as addition, multiplication, or averaging, make strong assumptions that the indicators represent fundamental components of a concept like subnational democracy (Goertz, 2006). This strategy also assumes that each electoral variable has the same weight when it comes to determining a state's level of subnational democracy. Latent variable approaches, such as factor analysis, assume that the components are caused by an unobserved latent variable and they weigh variables based on their validity (Bollen and Lennox, 1991; Skrondal and Rave-Hesketh, 2007). Selecting the aggregation method that is most appropriate depends on how one defines the concept they are measuring. Many strategies used to measure subnational regime variation use a simple strategy such as addition or averaging without describing how their component indicators relate to their underlying definition of subnational democracy or authoritarianism.[9] I argue that, latent variable approaches have an advantage for measuring subnational regime variation using electoral data because they do not require the strong assumption that electoral indicators are fundamental components of subnational regime variation. Instead, they allow researcher to explicitly explore the relationship between latent regime type and various electoral indicators.

To create the SEDS, I aggregate the five standardized electoral variables described above using a structural equation model (SEM) which treats subnational democracy as an unobserved latent variable that causes the five electoral variables as shown in Figure 1. SEMs have several advantages over other potential modeling strategies. They are appropriate for modeling continuous variables and they are more flexible than regular confirmatory factor analysis (CFA). CFA requires the assumption that the latent variable accounts for all of the covariation between individual components. SEM allows for the estimation of covariances that I estimated among these electoral variables that are not fully accounted for by the latent subnational democracy index alone. This flexibility is helpful because electoral variables are likely correlated for reasons that go beyond a state's latent level of democracy. In fact, I estimate covariances among the observed variables accounting for correlations that are not simply due to a state's latent level of subnational democracy. These include one between the inverse executive HHI and the opposition executive vote share, one between the inverse executive and legislative HHIs, and one between the inverse legislative HHI and the opposition party seat share in the legislature. These variables covary even after subnational democracy has been accounted for because they are closely related in ways that are not dependent on a state's latent level of subnational democracy. For example, parties that run candidates in executive elections are also likely to run them in legislative elections, and their performance in one election is likely related to their performance in another. This is especially true in parliamentary systems where there are no independent executive elections. Thus, the inverse executive and legislative HHIs are likely to covary, even after subnational democracy has been accounted for.

[9] See Table 2 for more on this.

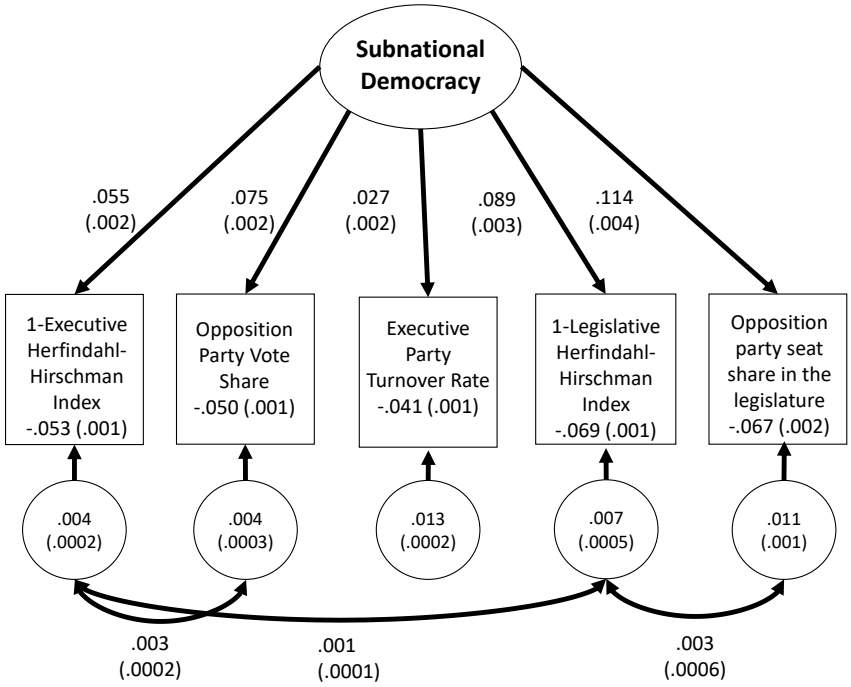

Figure 2: Results of the Structural Equation Model estimating latent subnational democracy. All coefficients are significant at the .05 level

Figure 2 presents the results of the SEM which essentially estimates a separate regression equation exploring the effect of the latent variable on each of the observed electoral outcomes. The coefficient along the path represents the effect of the latent variable on the observed electoral variable (this is the equivalent of a factor loading), while the coefficient in the box is the constant for that equation. The coefficients in the circles are the error variances for each observed variable. These represent the variance of the observed variable that is not accounted for by the latent variable. The arrows connecting the error variances represent the covariances among variables that are not accounted for by the latent variable. As expected, a state's latent level of democracy has a positive and significant effect on each of the five electoral indicators included. This suggests that as a state becomes more democratic, executive contestation, turnover, and opposition access to the legislature all increase. Basic model fit statistics indicate that this SEM is a relatively good fit to the data. The root mean squared error is 0.04, while the comparative fit index is 0.999 both indicate a relatively good fit. I estimated this model for the entire sample, as well as for each country individually, and the model behaved similarly across countries.[10] I then used the results of this model to estimate the SEDS using an analog of regression scoring. The predicted value is the mean of the latent variable conditional on the observed variables in the model.[11]

[10] A preliminary exploratory factor analysis indicates that these five variables conform to a single factor in each country as well.

[11] See Bollen (1989) for a more thorough discussion of this process.

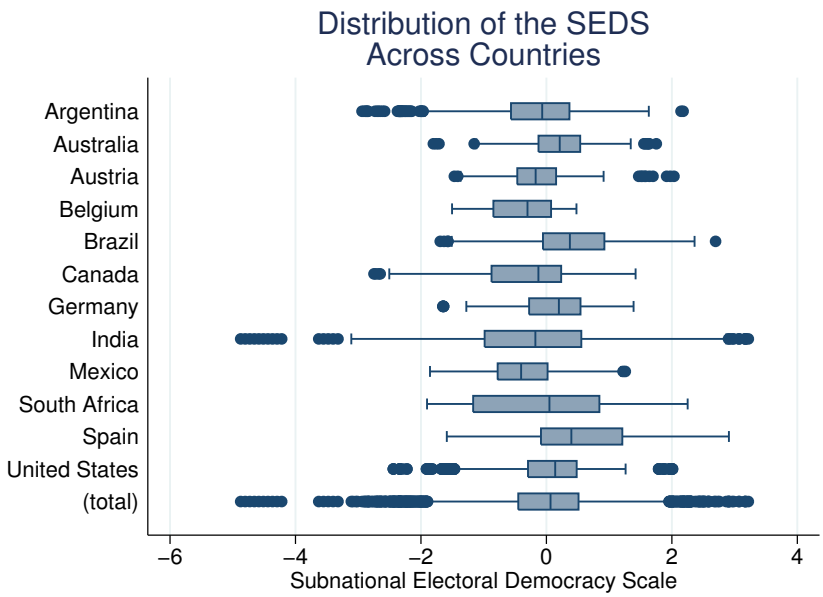

Figure 3: Distribution of the Subnational Democracy Scale across countries

Figure 3 presents some preliminary information about the distribution of the Subnational Democracy Scale both by country and pooled across all countries and time periods. The overall index has a mean of 0 and runs from about -5 to 3. Larger values indicate more democratic states while smaller values indicate less democratic, or more authoritarian, states. In addition to this version of the SEDS, the dataset also includes an alternative SEDS (SEDS2 in the dataset) that replaces the two HHI measures with Shannon's H entropy measures. Thus scale is calculated in the exact same way as the original SEDS, and the two scales are highly correlated (.97). For more on the validity of this measure please see Fidalgo (forthcoming) and its accompanying online appendix which talks more about convergent validity and specific examples and applications of the SEDS.

3.4 *Summary: Steps of the Measurement Process*

The steps below summarize the entire process of estimating the SEDS. For more, please see the accompanying Stata do file.

1. Collect the subnational data from primary (or reliable secondary) sources
2. Collect equivalent electoral national level variables
3. Use the national data to estimate a spline function
    - Linear regression with each electoral variable as the dependent variable and time as the independent variable

    - Estimate this model for each country and electoral indicator
    - Use the results to predict a national value for each indicator in each year
4. Subtract predicted national value from the actual subnational values
5. Use these values to estimate a structural equation model (SEM)
6. Predict the SEDS from the SEM using an analog of regression scoring

4 ID Variables

Below is a description of each of the identification variables that you can find in the Subnational Electoral Democracy Scale Dataset.

Country Name (country)

- Country name

World Values Survey country ID (WVSid)

- World Values Survey country ID number

Correlates of War country ID (COW)

- Correlates of War country ID number

Country ID (cntry)

- Numerical country ID labeled 1-12 based on a country's alphabetical order. See table 1 to see which value corresponds with which country.

State Name (state)

- State refers to the secondary subnational unit that fallws below the national government but above the municipal government
    - E.g. US states of Florida, Pennsylvania and Maryland
- Autonomous capital cities are not included in this data set
    - E.g. Washington DC, Brasília, and Buenos Aires (city)

World Value Survey State ID (WVSstateid)

- World Values Survey State ID number

Year (year)

- Numerical year
- All data is coded on January 1st of the recorded year

Year counter (yearcount)

- The number of years a state has been in the data set for each state-year observation
- Year count starts in 1980
- Ranges from 1 (first year) to 37

Year counter 2 (yearcount2)

- The number of years a state has been in the data set for each state-year observation
- Year count starts at the first year that a country becomes democratic, or the year that a subnational unit is formed
- Ranges from 1 (first year) to 37

5 Subnational Electoral Variables

Below is a list of of subnational electoral variables that are available in the SEDS dataset. These include the five variables used to create the SEDS, and additional variables that were part of the original data collection process.

Gubernatorial Election Year (execelec)

- Was there a gubernatorial election in a given state year?
  - No: 0
  - Yes: 1

Governor's Party (govparty)

- Acronym or name of the party of the current state executive (governor, chief minister etc.)

5.1 Turnover

Opportunities for Turnover (oppturnover)

- Was there an opportunity for a regularly scheduled executive turnover in a given year via election?
  - Yes an executive election took place: 1
  - No: 0

Cumulative opportunities for turnover (coppturnover)

- Total number of opportunities for turnover that have occurred at or before each given year. Count begins the year a state enters the data set

Turnover (turnover)

- was there a gubernatorial turnover in a given year?
  - No: 0
  - Yes: 1
- Turnovers may be the result of elections, resignation, impeachment, federal intervention, death of a predecessor
  - Exception: short term (less than a year) turnovers resulting from a governor running for higher office
    - This is common in Brazil but is not indicative of higher levels of democracy

Cumulative number of turnovers (cturnover)

- Number of turnovers a state executive has experienced at or before each state-year of the data set
  - Add up the value of the *turnover* variable for all the state-years preceding a given state-year in the data set
  - Potential range of 0 25

Turnover Rate (turnrate)

- Cumulative number of turnovers/total number of years
  - *cturnover/yearcount*
- Represents the number of turnover years that have occurred divided by the number of years a state has been in the data set
- Bounded between 0-1 where larger values indicate higher levels of turnover

Turnover rate as a function of opportunity (oppturnrate)

- Cumulative number of turnovers/number of turnover opportunities
  - *cturnover/ coppturnover*
- Represents the number of turnover years that have occurred divided by the total number of opportunities for turnover
- Bounded between 0-1 where larger values indicate higher levels of turnover

Gubernatorial party turnover (partyturnover)

- Was there a turnover in the governor's party in a given year?
  - N0: 0
  - Yes: 1
- For each turnover identified by the turnover variable, was there a shift in the governor's party?
  - This does not code instances where a governor shifted his party affiliation while still in office, just instances in which a new governor from a new party took over executive office

Cumulative Gubernatorial party turnovers (cpartyturnover)

- Number of party turnovers a state executive has experienced up to each year of observation
  - Add up the value of the *partyturnove*r variable for all the state-years preceding a given state-year in the data set

Gubernatorial Party Turnover Rate (partyturnrate)

- Cumulative number of party turnovers/total number of years
  - *cpartyturnover/yearcount*
- Represents the number of party turnover years that have occurred divided by the number of years a state has been in the data set
- Bounded between 0-1 where larger values indicate higher levels of turnover

Party turnover rate as a function of opportunity (opppartyturnrate)

- Cumulative number of party turnovers/number of turnover opportunities
  - *cpartyturnover/ coppturnover*
- Represents the number of party turnover years that have occurred divided by the total number of opportunities for turnover
- Bounded between 0-1 where larger values indicate higher levels of turnover

5.2 Executive Contestation

Winning Gubernatorial vote share (govvote)

- Proportion of the vote that went to the winning gubernatorial candidate (presidential system) or governor's party (parliamentary system)
  - Governors vote/total votes

Opposition vote share (oppvote)

- 1-proportion of the vote won by the governor (presidential system) or the governor's party (parliamentary system)
- 1-*govvote*

Second largest party vote share (secvote)

- Proportion of the votes won by the second largest party or the largest party in the opposition
  - In the case of parliamentary systems, this may be the largest party if a smaller party formed a coalition to form the government

Gubernatorial margin of victory (govmov)

- Margin of victory for the winning gubernatorial candidate or party
- *govvote-secvote*

1-Gubernatorial margin of victory (ogovmov)

- One minus the margin of victory for the winning gubernatorial candidate or party
  - larger values indicate more competitive elections
- 1-(*govvote-secvote*)

Average Disproportionality (disprop)

- $\frac{\sum_1^n (p_1 - s_i)}{n}$
  - p_i represents the proportion of the vote won by each political party
  - s_i represents the proportion of legislative seats won by each party in the lower house of the subnational legislature
  - n represents the total number of parties running for a seat in the lower house of the state legislature

1-Average Disproportionality (odisprop)

- $1 - (\frac{\sum_1^n (p_1 - s_i)}{n})$
  - p_i represents the proportion of the vote won by each political party
  - s_i represents the proportion of legislative seats won by each party
  - n represents the total number of parties running for a seat in the state legislature

Number of parties running for governor (ngovparty)

- Count of the number of parties that fielded a candidate for governor
  - If the state has a parliamentary system, this variable counts the number of parties that fielded a candidate for the state legislature?
  - Other and independent are not counted as a parties for this or any of the other party variables

Gubernatorial Herfindahl-Hirschman Index (ghhi)

- $\sum_1^n p_i^2$
  - p_i represents the proportion of votes won by each political party's candidate in the gubernatorial election
- If there are two rounds I only focus on the first round
- If the state does not have direct gubernatorial elections, this is the proportion of votes won by each political party running for the legislature
- Ranges from 0-1 with large values representing fewer parties

1-Gubernatorial Herfindahl-Hirschman Index (oghhi)

- $1 - (\sum_1^n p_i^2)$
  - p_i represents the proportion of votes won by each political party's candidate in the gubernatorial election
- If there are two rounds I only focus on the first round
- If the state does not have direct gubernatorial elections, this is the proportion of votes won by each political party running for the legislature
- By subtracting this value from 1 the variable is scaled so that larger values indicate more parties running in gubernatorial elections.

Effective number of parties running for governor (enpg)

- $\frac{1}{\sum_1^n p_i^2}$
  - p_i represents the proportion of votes won by each political party's candidate in the gubernatorial election

- If there are two rounds I only focus on the first round
- If the state does not have direct gubernatorial elections, this is the proportion of votes won by each political party running for the legislature

Golosov Effective number of parties running for governor (genpg)

- $\sum_1^n \frac{p_i}{p_i+p_1^2-p_i^2}$
  - p_i represents the proportion of votes won by each political party's candidate in the gubernatorial election
  - p_1 represents the proportion of the votes won by the largest political party
- If there are two rounds I only focus on the first round
- If the state does not have direct gubernatorial elections, this is the proportion of votes won by each political party running for the legislature

Shannon's H measure of parties running in gubernatorial elections (Hgov)

- $-\sum_{i=1}^n (p_i * ln(p_i))$
  - p_i represents the proportion of votes won by each political party's candidate in the gubernatorial election
- If there are two rounds I only focus on the first round
- If the state does not have direct gubernatorial elections, this is the proportion of votes won by each political party running for the legislature

5.3 Legislative Control

Total number of seats in the state legislature (totalseats)

- Count of the number of seats in a state's legislature
- When a state has a bicameral legislature this measures the total number of seats in the lower house

Governor's legislative seats (rgovseats)

- Count of the number of seats held by the governor's party

Governor's legislative seat proportion (pgovseats)

- Number of seats held by the governor's party/total number of seats
- *rgovseats/totalseats*

Seats held by the largest party that is not the governor's party (rlseats)

- Count of the number of seats held by the largest party that is not the governor's party
- May be the second largest or largest party

Proportion of seats held by the largest party that is not the governor's party (plseats)

- Number of seats held by the largest party that is not the governor's party/total number of seats
- *rlseats/totalseats*

Number of seats not held by the governor's party (roppseats)

- Total number of seats held by any party that is not the governor's party
- Total number of seats in the state legislature - the number of seats held by the governor's party
- *totalseats-rgovseats*

Proportion of seats not held by the governor's party (poppseats)

- 1- the proportion of seats held by the governor's party
- 1-*pgovseats*

Legislative "margin of victory" (legmov)

- The proportion of seats held by the governors party minus that held by the second largest party.
- *pgovseats-plseats*

1-Legislative "margin of victory" (olegmov)

- One minus the proportion of seats held by the governors party minus that held by the second largest party.
  - larger values indicate more competitive elections
- 1-(*pgovseats-plseats*)

Number of parties represented in the lower legislative house (legparty)

- Count of the number of parties represented in the legislature

Legislative Herfindahl-Hirschman Index (llhi)

- $\sum_1^n s_i^2$
  - s_i represents the proportion of seats held by each political party

1-Legislative Herfindahl-Hirschman Index (ollhi)

- $\sum_1^n s_i^2$
  - s_i represents the proportion of seats held by each political party
- By subtracting this value from 1 the variable is scaled so that larger values indicate more parties running in the legislature

Effective number of parties in the legislature (enpl)

- $\frac{1}{\sum_1^n s_i^2}$
  - s_i represents the proportion of seats held by each political party's candidate in the legislature

Golosov Effective number of parties in the legislature (genpl)

- $\sum_1^n \frac{s_i}{s_i+s_1^2-s_i^2}$
  - s_i represents the proportion of seats held by each political party's candidate in the legislature
  - s_1 represents the seats held by the largest political party

Shannon's H measure of parties represented in the legislature (Hleg)

- $-\sum_{i=1}^n (s_i * ln(s_i))$
  - s_i represents the proportion of seats held by each political party in the legislature

6 National Electoral variables

Below is a list of of national electoral variables that are available in the SEDS dataset. These include the five variables used to create the SEDS, and additional variables that were part of the original data collection process.

National executive election year (Nexecelec)

- Was there a national executive election in a given state year?
  - No: 0
  - Yes: 1

National executive party (Nexecparty)

- Acronym or name of the party of the current national executive (President, prime minister, Chancellor etc.)

6.1 Turnover

National opportunities for Turnover (Noppturnover)

- Was there an opportunity for a regularly scheduled national executive turnover in a given year?
  - Yes a national executive election took place: 1
  - No: 0

Cumulative national opportunities for turnover (Ncoppturnover)

- Total number of national opportunities for turnover that have occurred at or before each given year. Count begins the year a state enters the data set

National Turnover (Nturnover)

- Was there a national executive turnover in a given year?
  - Yes: 1
  - No: 0
- Turnovers may be the result of elections, resignation, impeachment, death of a predecessor

Cumulative number of national turnovers (Ncturnover)

- Number of turnovers a national executive has experienced at or before each year in the data set
  - Add up the value of the *Nturnover* variable for all the country-years preceding a given country-year in the data set

National turnover Rate (Nturnrate)

- Cumulative number of national turnovers/total number of years
  - *Ncturnover/yearcount*
- Represents the number of turnover years that have occurred divided by the number of years a country has been in the data set
- Bounded between 0-1 where larger values indicate higher levels of turnover

National turnover rate as a function of opportunity (Noppturnrate)

- Represents the number of national turnover years that have occurred divided by the total number of opportunities for turnover
- *Ncturnover/ Ncoppturnover*
- Bounded between 0-1 where larger values indicate higher levels of turnover

National executive party turnover (Npartyturnover)

- Was there a turnover in the national executive's party in a given year?
  - N0: 0
  - Yes: 1
- For each turnover identified by the turnover variable, was there a shift in the national executive's party?
  - This does not code instances where a national executive shifted his party affiliation while still in office

National cumulative executive party turnovers (Ncpartyturnover)

- Number of party turnovers a national executive has experienced up to each year of observation
  - Add up the value of the *Npartyturnover* variable for all the state-years preceding a given state-year in the data set

National party turnover rate (Npartyturnrate)

- Cumulative number of party turnovers/total number of years
  - *Ncpartyturnover/yearcount*
- Represents the number of party turnover years that have occurred divided by the number of years a country has been in the data set
- Bounded between 0-1 where larger values indicate higher levels of turnover

Party national turnover rate as a function of opportunity (Nopppartyturnrate)

- Represents the number of national party turnover years that have occurred divided by the total number of opportunities for turnover
  - *Ncpartyturnover/ Ncoppturnover*
- Bounded between 0-1 where larger values indicate higher levels of turnover

6.2 Executive Contestation

Winning national executive vote share (Nexecvote)

- Proportion of the vote that went to the winning national executive candidate (presidential system) or their party (parliamentary system)
  - National executive vote/total votes

Opposition national executive vote share (Nexecoppvote)

- 1-proportion of the vote won by the national executive (presidential system) or their party (parliamentary system)
- 1-*Nexecvote*

National second largest party vote share (Nexecsecvote)

- Proportion of the votes won by the second largest party that is not the national executive's party in national executive elections
  - In the case of parliamentary systems, this may be the largest party if a smaller party managed to form a coalition and form the government

National executive margin of victory (Nexecmov)

- Margin of victory for the winning national executive candidate
- Nexecvote-Nexecsecvote

1-National executive margin of victory (oNexecmov)

- One minus the margin of victory for the winning national executive candidate
  - larger values indicate more competitive elections
- 1-(Nexecvote-Nexecsecote)

National executive Herfindahl-Hirschman Index (Nhhi)

- $\sum_1^n p_i^2$
  - p_i represents the proportion of votes won by each political party's candidate in the national executive election
- If there are two rounds I only focus on the first round
- In parliamentary systems I count this as the proportion of votes won by each political party running for the legislature

1-National executive Herfindahl-Hirschman Index (INhhi)

- $1 - (\sum_1^n p_i^2)$
  - p_i represents the proportion of votes won by each political party's candidate in the national executive election
- If there are two rounds I only focus on the first round
- In parliamentary systems I count this as the proportion of votes won by each political party running for the legislature.

Effective number of executive parties (enep)

- $\frac{1}{\sum_1^n p_i^2}$
  - p_i represents the proportion of votes won by each political party's candidate in national executive elections
- If there are two rounds I only focus on the first round
- In parliamentary systems I count this as the proportion of votes won by each political party running for the legislature.

Golosov Effective number of executive parties (genep)

- $\sum_1^n \frac{p_i}{p_i+p_1^2-p_i^2}$
  - p_i represents the proportion of votes won by each political party's candidate in national executive elections
  - p_1 represents the proportion of the votes won by the largest political party
- If there are two rounds I only focus on the first round
- In parliamentary systems I count this as the proportion of votes won by each political party running for the legislature.

Shannon's H measure of parties running in national executive elections (NHexec)

- $-\sum_{i=1}^n (p_i * ln(p_i))$
  - p_i represents the proportion of votes won by each political party's candidate in national executive elections
- If there are two rounds I only focus on the first round
- In parliamentary systems I count this as the proportion of votes won by each political party running for the legislature.

6.3 Legislative Control

Total number of seats in the national legislature (Ntotalseats)

- Count of the number of seats in a country's legislature
- When a country has a bicameral legislature this measures the total number of seats in the lower house

National executive's legislative seats (Nrgovseats)

- Count of the number of seats held by the national executive's party

National executive's legislative seat proportion (Npgovseats)

- Number of seats held by the National executive's party/total number of seats
- *Nrgovseats/Ntotalseats*

Seats held by the largest party that is not the National executive's party (Nrlseats)

- Count of the number of seats held by the largest party that is not the National executive's party
- May be the second largest or largest party

Proportion of seats held by the largest party that is not the National executive's party (Nplseats)

- Number of seats held by the largest party that is not the National executive's party/total number of seats
- *Nrleats/Ntotalseats*

Number of seats not held by the National executive's party (Nroppseats)

- Total number of seats in the state legislature - the number of seats held by the National executive's party
- *Ntotalseats-Nrgovseats*

Proportion of seats not held by the National executive's party (Npoppseats)

- 1- the proportion of seats held by the governor's party
- 1-*npgovseats*

National legislative "margin of victory" (Nlegmov)

- The proportion of seats held by the National executive's party minus that held by the second largest party.
- *Npgovseats-Nplseats*

1-national legislative "margin of victory" (oNlegmov)

- One minus the proportion of seats held by the National executive's party minus that held by the second largest party.
  - larger values indicate more competitive elections
- 1-(*Npgovseats-Nplseats*)

National legislative Herfindahl-Hirschman Index (Nllhi)

- $\sum_1^n s_i^2$
  - s_i represents the proportion of seats held by each political party in the national legislature

1-National legislative Herfindahl-Hirschman Index (INllhi)

- $\sum_1^n s_i^2$
  - s_i represents the proportion of seats held by each political party in the national legislature
- By subtracting this value from 1 the variable is scaled so that larger values indicate more parties represented in the national legislature

National effective number of parties in the legislature (Nenpl)

- $\frac{1}{\sum_1^n s_i^2}$
  - s_i represents the proportion of seats held by each political party in the national legislature

Golosov national effective number of parties in the legislature (Ngenpl)

- $\sum_1^n \frac{s_i}{s_i + s_1^2 - s_i^2}$
  - s_i represents the proportion of seats held by each political party in the national legislature
  - s_1 represents the seats held by the largest political party

Shannon's H measure of parties represented in the national legislature (NHleg)

- $-\sum_{i=1}^n (s_i * ln(s_i))$
  - s_1 represents the seats held by the largest political party

7 Data sources

Table 3: **Sources of Subnational election data**

Country	Source	Link
Argentina	Atlas Electoral de Andy Tow	http://andytow.com/atlas/totalpais/larioja/index.html
Australia	Electoral Commission website for each state	See https://www.ecanz.gov.au/enrol for a full list
Austria	Websites for each individual state	See https://www.austria.org/the-state-governments for a full list
Belgium	Federal Interior Public Service Elections Directorate	https://elections.fgov.be/resultats
Brazil	Tribunal Superior Eleitoral (Superior Electoral Court)	http://www.tse.jus.br/eleitor/estatisticas-de-eleitorado/eleitorado
Canada	Provincial Elections Websites	See https://www.elections.ca/content.aspx?section=lin&document=index&lang=e for a full list
Germany	Government website for each Länder parliament	See https://www.bundeswahlleiter.de/en/service/landtagswahlen.html for a full list
India	Election Commission of India India Votes	https://eci.gov.in/statistical-report/statistical-reports/ http://www.indiavotes.com/
Mexico	The electoral Institute of each state government	See https://portalanterior.ine.mx/archivos2/portal/EncuestasElectorales/EleccionesLocales/2015-2016/Ordinaria/ for a full list
South Africa	The Electoral Commission of South Africa	https://www.elections.org.za/NPEDashboard/app/dashboard.html
Spain	Government website for each Autonomous Community	See http://www.infoelectoral.mir.es/es/enlaces-de-interes for a full list
United States	Ballotpedia	https://ballotpedia.org/Main_Page

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