

# Supplementary Materials for Legislative Outcomes and Malapportionment: Evidence from Latin America

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## 1 Introduction

This appendix presents supplementary materials for the paper *Legislative Outcomes and Malapportionment: Evidence from Latin America*, which I am using as the main writing sample for my application to Political Science PhD programs. Here you will find illustrative content that helps get a clearer diagnosis of the scale of malapportionment in the cases I studies, as well as parts of the analysis that contributed to my main results, but were not included in the article, such as the ANOVAs for ideal point estimates.

The remainder of the replication materials are available for consultation in [this GitHub repository](#). The largest datasets, containing Brazilian and Colombian roll call votes, will be hosted at (other link), as they are too heavy for GitHub. If you have any questions, please do not hesitate to contact me at [catarinamroman@gmail.com](mailto:catarinamroman@gmail.com).

## 2 Abstract

This paper investigates the effects of malapportionment on lawmaking using the national congresses of Argentina, Brazil, and Colombia as case studies. I build counterfactual well-apportioned congresses through a naïve correction method. I simulate the outcomes of more proportional roll call votes and compare them against the results from 2007 to 2010. I find that malapportionment alters legislative outcomes, and that partisanship acts as a mediator. Depending on party system features, the effect can either favor or weaken the winning coalition. Argentina and Colombia have the largest malapportionment indexes, while Brazil is less disproportionate. In Argentina’s counterfactual assembly, the government party would be stronger, reducing the effective power of the opposition. Colombia presents surprisingly high malapportionment effects despite small changes in partisan seat distribution. Qualitative assessment indicates this is due to shifts in the composition of the winning coalition and to undisciplined incumbents. This paper has implications for the design and reform of legislative institutions and for the study of constitutional democratic distortions.

## 3 Diagnosing Malapportionment

To aid foreign readers get a visual depiction of the geographical patterns of malapportionment, I present self-produced heat maps representing the population/seat ratio. This means the provinces/states in a deeper tone of red are overrepresented, and those that have a lighter shade of yellow are underrepresented.

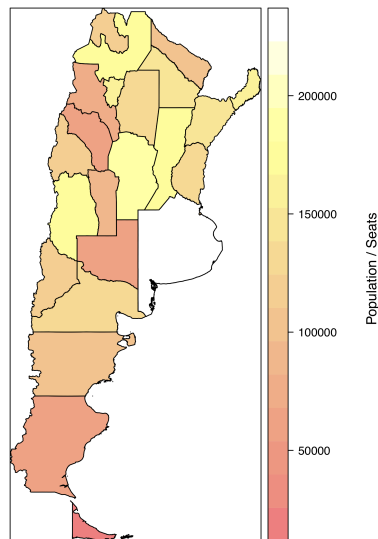


Figure 1: Argentinian Scale of Malapportionment per *Provincia*

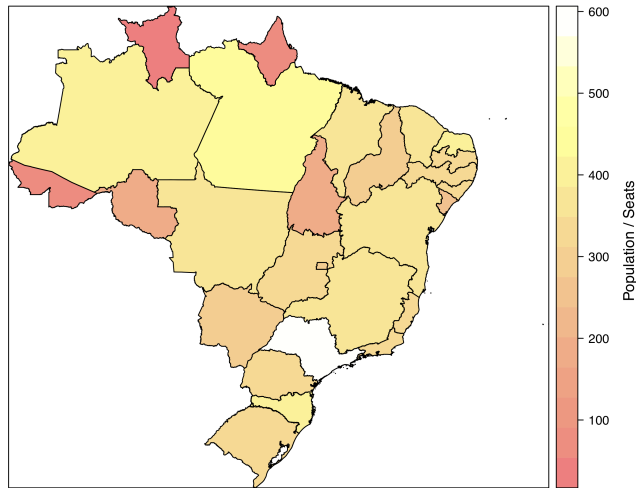


Figure 2: Brazilian Scale of Malapportionment per *Estado* (Population in thousands)

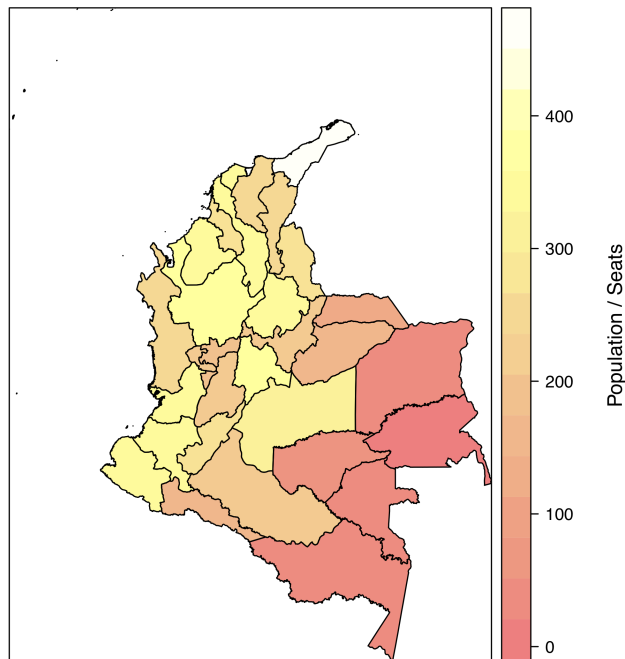


Figure 3: Colombian Scale of Malapportionment per *Departamento* (Population in thousands)

The maps are but an illustration of the analysis I propose in the main paper. The disparities are large in all three countries, with a slight difference in cause. In Argentina and Brazil, the problem seems to be one of underrepresentation of very populous urban centers, while in Colombia, the issue is of overrepresentation of a large number of sparsely populated *departamentos*.

#### 4 Determining Provincial vs. Partisan Behavior

This section will shed further light into the W-NOMINATE analysis and its procedures, its use in parliaments other than the US Congress, and its appropriate forms of interpretation.

## 4.1 Variance Analysis

While the W-NOMINATE figures are highly informative, I performed a variance analysis for Argentina, Brazil, and Colombia to infer which variable was more predictive of legislative behavior: province of origin or partisanship. First, for the sake of clarity, I will present the same figures that are in the article, but amplified. The plots are followed by the ANOVA regression results in each W-NOMINATE dimension.

### 4.1.1 Argentina

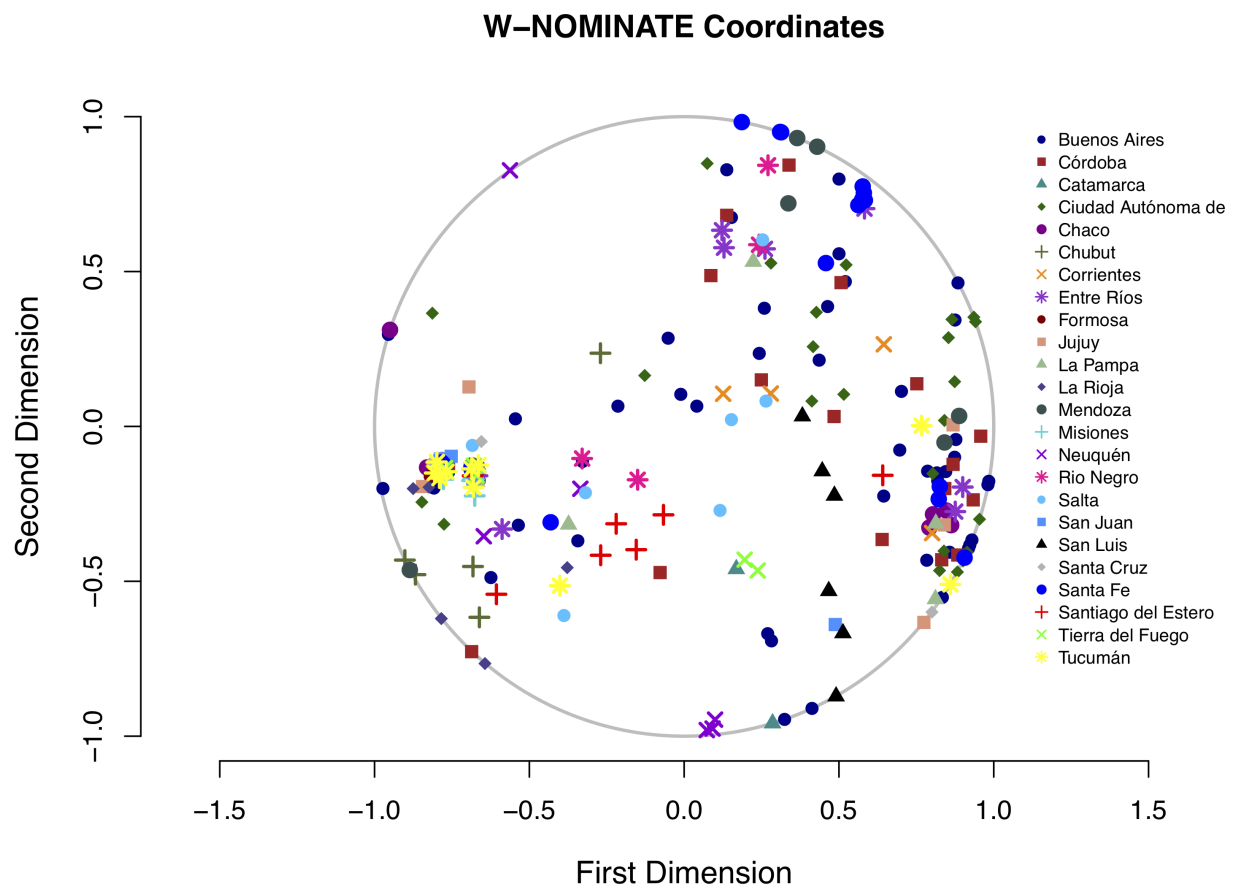


Figure 4: Argentinian Ideal Point Estimates per *Provincia*

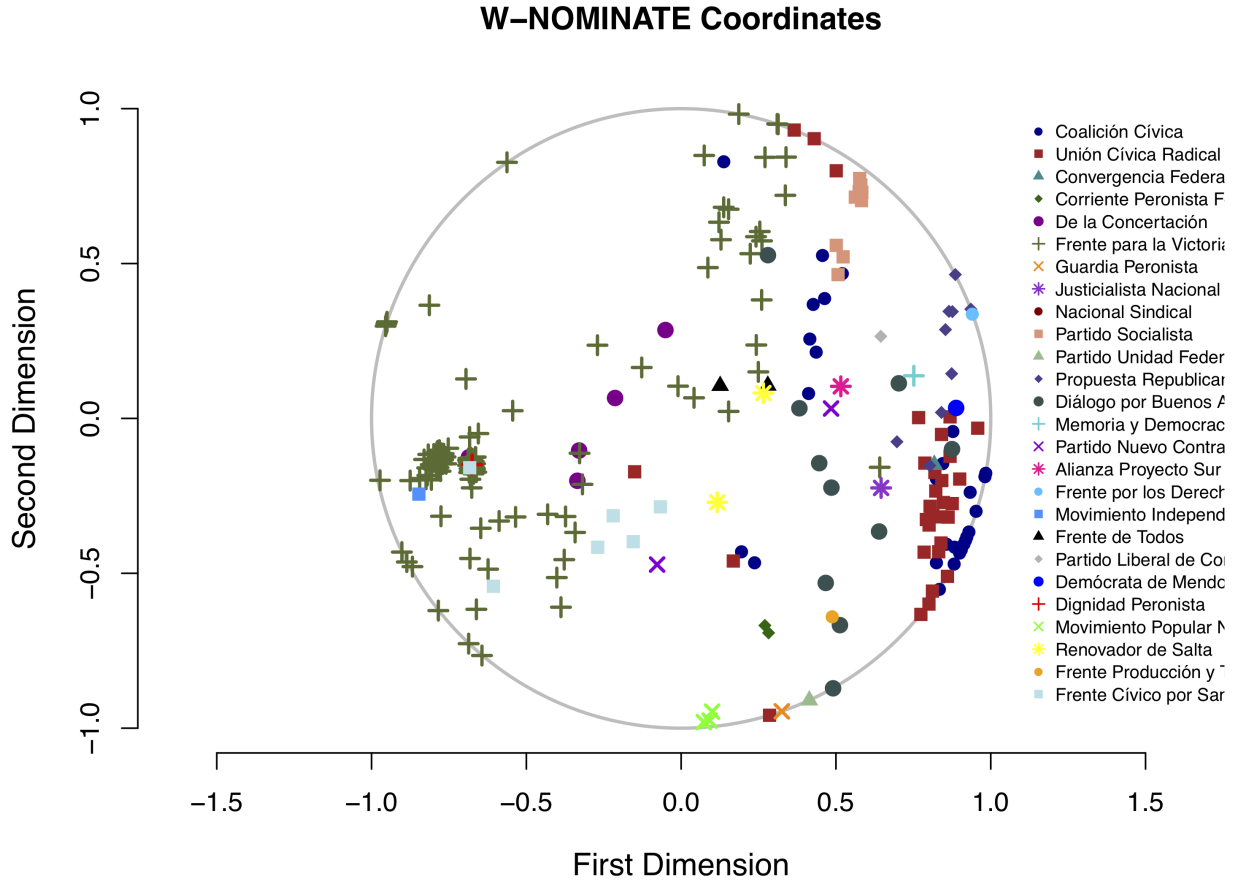


Figure 5: Argentinian Ideal Point Estimates per Party

Table 1: Contrib. Parties / States on legislative behavior (Argentina)

	First Dimension				
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Party contributions	24	89.18	3.72	44.71	0.000
Province contributions	23	6.30	0.27	3.30	0.000
Residuals	208	17.28	0.08		
	Second Dimension				
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Party contributions	24	13.01	0.54	5.04	0.000
Province contributions	23	5.11	0.22	2.07	0.004
Residuals	208	22.37	0.11		

Argentina has a clear province-level pattern of political behavior. Although the first dimension is mostly captured by parties (almost 90%), the second is one-third explained by province level behavior.

4.1.2 Brazil

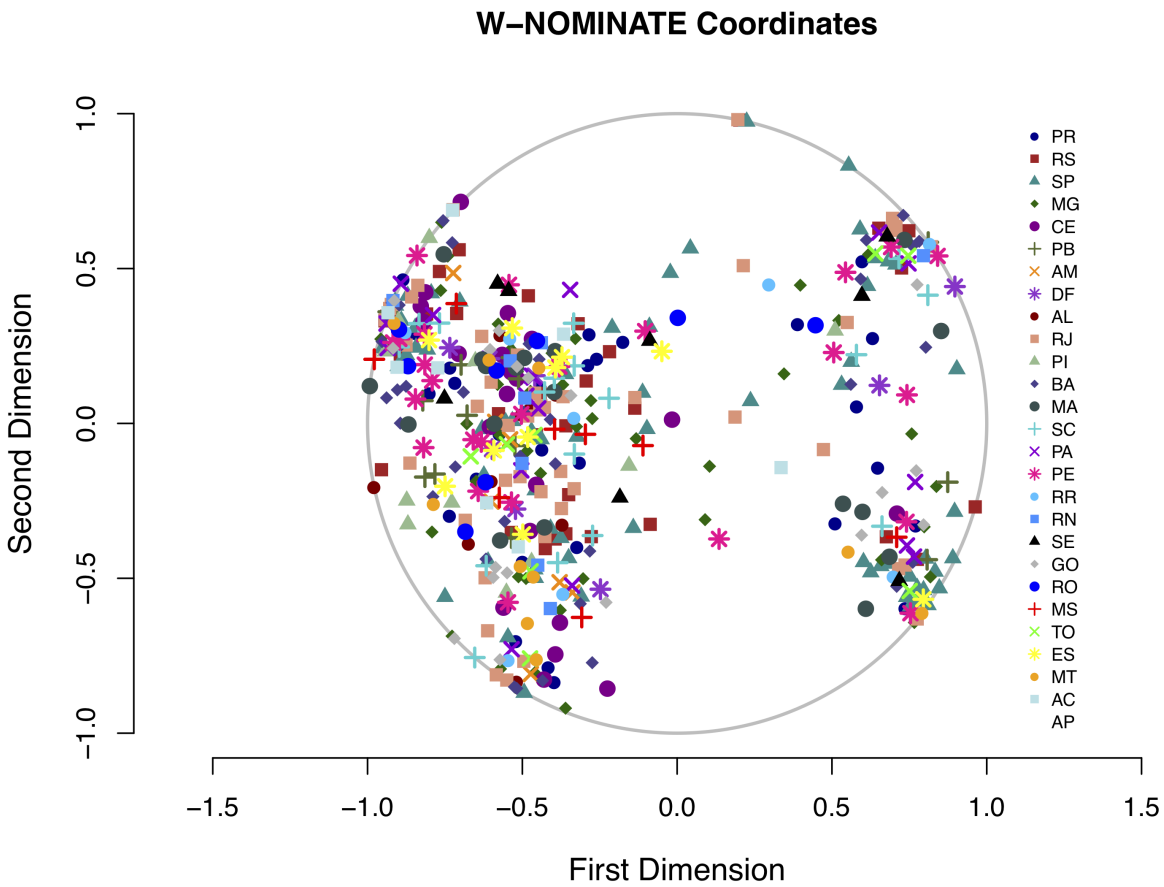


Figure 6: Brazilian Ideal Point Estimates per *Estado*

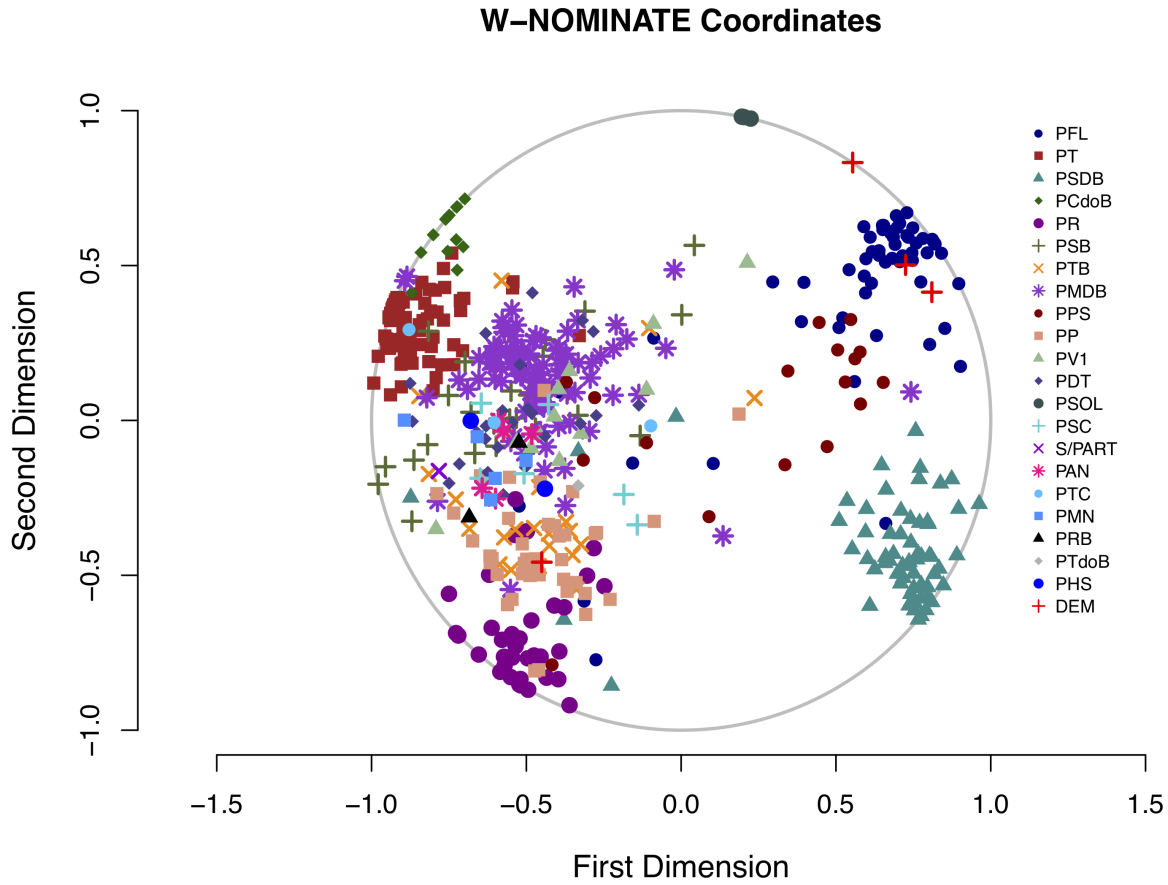


Figure 7: Brazilian Ideal Point Estimates per Party

Table 2: Contrib. Parties / States on legislative behavior (Brazil)

	First Dimension				
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Party contributions	21.00	142.02	6.76	112.45	0.00
Province contributions	26.00	3.68	0.14	2.35	0.00
Residuals	475.00	28.57	0.06		
	Second Dimension				
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Party contributions	21.00	63.08	3.00	75.32	0.00
Province contributions	26.00	1.48	0.06	1.43	0.08
Residuals	475.00	18.94	0.04		

As the results evidence, a small influence is significant. However, if we compare the sum of squares for each component, we see that the provinces have negligible explanatory power, and parties seem to better account for the voting patterns.

### 4.1.3 Colombia

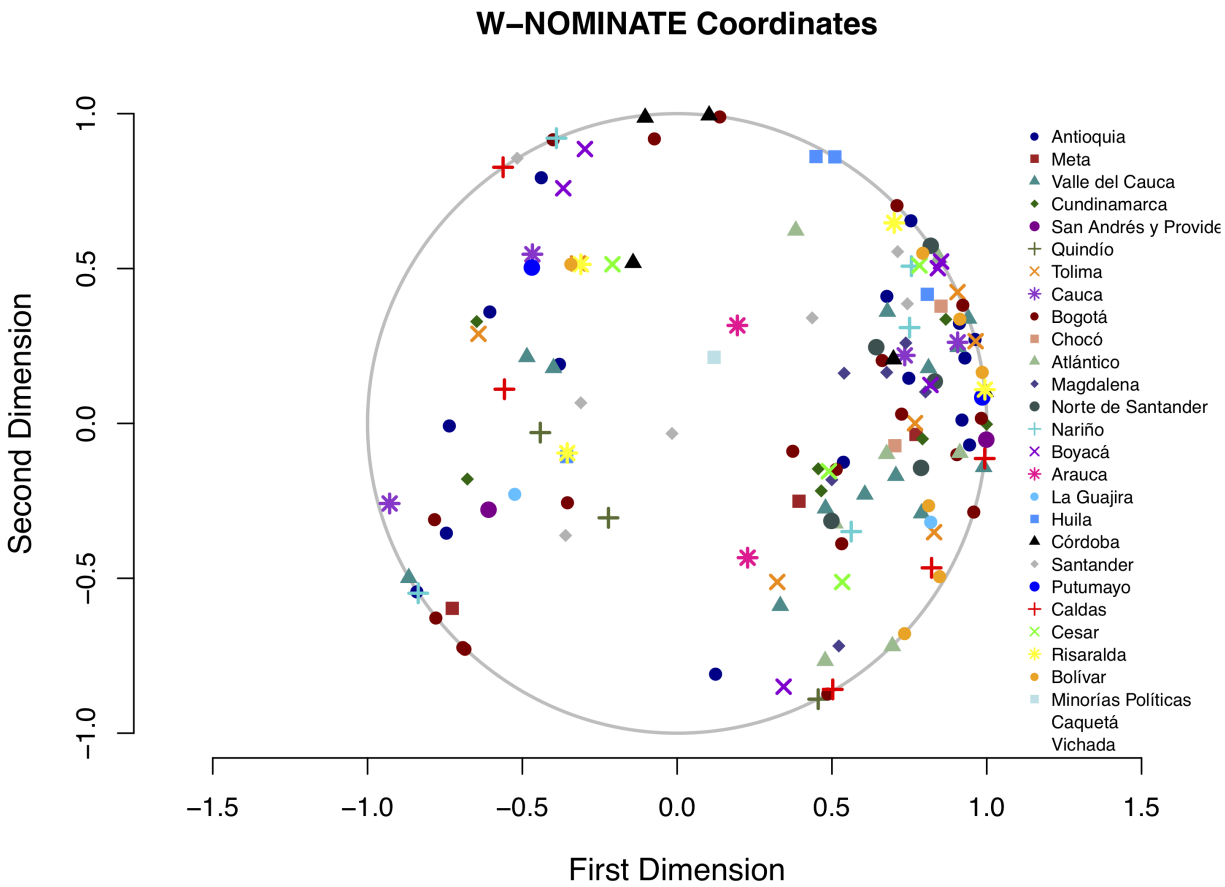


Figure 8: Colombian Ideal Point Estimates per *Departamento*



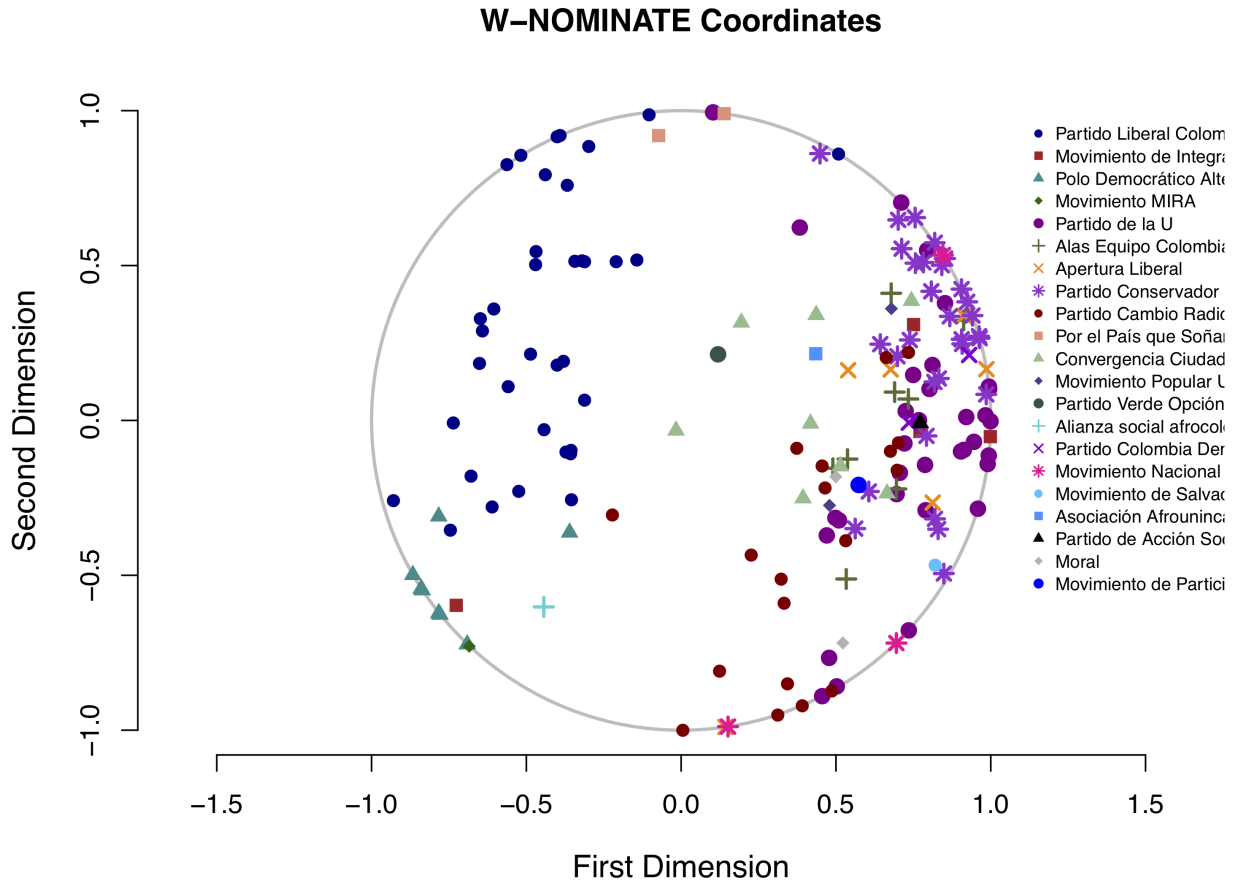


Figure 9: Colombian Ideal Point Estimates per Party

Table 3: Contrib. Parties / States on legislative behavior (Colombia)

	First Dimension				
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Party contributions	20.00	47.60	2.38	40.66	0.00
Province contributions	34.00	1.77	0.05	0.89	0.64
Residuals	115.00	6.73	0.06		
	Second Dimension				
	Df	Sum Sq	Mean Sq	F value	Pr(>F)
Party contributions	20.00	15.26	0.76	5.34	0.00
Province contributions	34.00	5.69	0.17	1.17	0.27
Residuals	115.00	16.42	0.14		

Statistically speaking, the provincial contribution on legislative behavior is zero. This is remarkable since the Colombian electoral system and legislation are very similar to the Argentinian.