Legislature Size and Welfare: Evidence from Brazil

Response to Reviewers

May 16, 2022

Dear Editors and Reviewers,

We would like to thank you all for the opportunity to revise our manuscript, "Legislature Size and Welfare: Evidence from Brazil" (Ms. No. AJPS-44979). We have made several revisions to the paper along the lines suggested by the Editors and Reviewers and we believe the manuscript has improved significantly as a result.

Following Reviewers 1 and 2, we have incorporated additional literature into the manuscript, which has given the paper a clearer theoretical framework through which our results can be interpreted. We have also discussed the scope conditions of our findings in further detail and included a new paragraph explaining why newly-elected councilors tend to join pro-mayor coalitions, thus addressing two important concerns raised by Reviewer 3. We believe these changes have made the paper clearer and more comprehensive.

In response to comments from Reviewer 1, we have revised our Methods section to clarify our selection of independent variables, including the use of covariates to improve the efficiency and consistency of our estimates. Additionally, we have included a new section in the Supplemental Materials to explain how we conducted our survey and how it contributes to our results. We believe these additions also give the paper a better theoretical frame to help readers sort through the results we present.

Below we discuss in more detail these changes and the several others we have made to the manuscript in response to comments from the Editors and Reviewers. We thank the Editors again for the opportunity to revise the manuscript, and the Reviewers for their extremely helpful comments.

Sincerely,

The Authors

Reviewer 1 Comments and Responses

1) Reviewer 1 writes: "Overall the literature review is strong. I would recommend a couple of additions. Include among them is an important work the authors should cite on legislative size and spending and that is Gilligan and Matsusaka's 2001 article entitled 'Fiscal Policy, Legislature Size, and Political Parties: Evidence from the First Half of the Twentieth Century.' Their findings are relevant for this study and should be referenced. In addition, the recently published book *Population and Politics: The Impact of Scale* by Gerring and Veenendaal which has a comprehensive analysis of this topic should also be incorporated into the literature review."

Response:

> We thank Reviewer 1 for these two relevant suggestions. We now cite Gilligan and Matsusaka's 2001 article three times in our paper. We mention it twice in our Introduction,

first on page 2: "*On the one hand, enlarged legislatures may reduce political particularism and increase overall government spending, which can lead to more public goods (Gerring and Veenendaal 2020; Gilligan and Matsusaka 2001; Weingast et al. 1981)*", and then in the end of page 4: "*The corollary of the "law of 1/n" is that increasing legislature size promotes excessive public spending, regardless of the partisan makeup of the legislature (Gilligan and Matsusaka 2001)*". We also cite it in our Theory section (page 7): "*Yet, Gilligan and Matsusaka (2001) find that in the US legislature size is associated primarily with higher spending on geographically concentrated benefits, such as education and highways*".

We cite Gerring and Veenendaal's book four times. We mention it twice on page 2: "*Legislature size is known to have a significant effect on collective action strategies, the bargaining power between state branches, government spending, and representation (Crain 1979; Freire et al. 2021; Gerring and Veenendaal 2020; Primo and Snyder Jr. 2008; Rogers 2002; Weingast et al. 1981). However, how legislature size impacts social welfare remains less understood. On the one hand, enlarged legislatures may reduce political particularism and increase overall government spending, which can lead to more public goods (Gerring and Veenendaal 2020; Gilligan and Matsusaka 2001; Weingast et al. 1981)*". We mention the book again on page 4: "*Following the seminal contribution by Weingast et al. (1981), the "law of 1/n" posits that larger legislatures increase the legislative pressure for providing targeted public goods to local supporters at the expense of the entire polity (Freire et al. 2021). This question has become more relevant since legislature size has increased consistently over time (Gerring and Veenendaal 2020)*". Finally, we also cite it on page 6: "*Larger legislatures improve representation as both the election thresholds and the ratio of population-per-politician decrease, which facilitate the electoral success of ethnic and political minorities (Allen and Stoll 2014; Gerring and Veenendaal 2020).*"

2) Reviewer 1 writes: "In examining the relationship between legislative size and welfare why were education and health care selected as the independent variables? Was that decision based on data availability or were there another basis for the decision? It is not clear in the text of the manuscript."

Response:

We thank Reviewer 1 for the opportunity to clarify the selection of these two sets of variables for our paper. We included an explanation for our choice on page 17: "*Our focus is on the impact of legislature size on education and health care, which are the two most important public services the municipal government should provide to citizens. According to the Brazilian Constitution, municipalities must spend 25% of their budget on education and 15% on health care. Consequently, the Ministry of Health and the Ministry of Education provide readily available, fine-grained data on health care and education at the municipal level, which we leverage in this study.*"

3) Reviewer 1 writes: "The details of the online survey conducted of Brazilian city councilors are lacking. What is the empirical contribution to the study? Beyond the online format what were the other administrative details involved with collecting that data?"

Response:

We agree with Reviewer 1 that we needed to provide more information on the online survey. Therefore, we have detailed our procedures in Section A.14 of the Supplementary Materials (pages 22-23), and we also reference the survey on pages 17 and 22 (footnote 13) in the main article. We rewrote paragraph 2 of Section 6.2 to clarify the importance of the survey results in our paper. It reads as follows: "*We assume that city councilors want to extract rents and to get reelected. The rents come from continuing in the repeated game,*

and the partisanship discounts that benefit. Figure 2 shows that 65.9 percent of councilors mentioned that mayors use job appointments to consolidate their coalition support. Moreover, 59.0 percent of the surveyed councilors affirmed that mayors use personal favors, such as shifting resources to places where the councilors have electoral support, to solidify their governing coalition. This provides further evidence that mayors do offer city councilors the benefits they demand. In this regard, granting favors works as rent transfers for councilors. Job appointments are also convenient for the mayors because patronage in Brazil has positive results in terms of welfare (Toral 2019)."

4) Reviewer 1 writes: "The models include a dummy variable for the northeast region. What specifically about this region would require adding it to the model. I am generally skeptical about including such a variable particularly since clustered standard errors are being estimated for municipal level. Is there logical reason to control for regional effects here? Very curious modeling decision by the authors."

Response:

We thank Reviewer 1 for the opportunity to clarify the selection of control variables in our empirical analysis. The inclusion of controls in our model has two purposes. The first one is to improve the consistency of the estimates. In Section A.5 of the Appendix, we use simulation to show that the inclusion of covariates enhances the consistency of our point estimates. The simulation indicates improved consistency for several distributions of the running variables and different treatment effects. Section 5 of the manuscript demonstrates that it improves consistency in both the main estimates and the placebo ones. Table 1 (page 20, reproduced below) shows that without controls, we would overestimate the treatment effects (finding an increase of 1.63 legislators instead of an increase of exactly one legislator), and underestimate the placebo treatment effects (finding a significant decrease of 0.31 legislators where there was supposed to be no effects in legislature size). This substantial improvement is because having control variables makes the subpopulations in each threshold more comparable across all the thresholds, avoiding comparing cases to the left (right) of one given threshold with points in the right (left) of a different threshold.

Table 1: Research Design Validity Check (reproduction from the main paper)

| | Panel A: Validity Check — Treatment Effect on City Council Size | | | |
| | (1) | (2) | (3) | (4) |
	Additional Num. Seats 2004 (Without Controls)	Placebo Add. Num. Seats 2004 (Without Controls)	Additional Num. Seats 2004 (With Controls)	Placebo Add. Num. Seats 2004 (With Controls)
LATE	1.63***	-0.31**	1.00***	-0.00
	(0.51)	(0.14)	(0.0004)	(0.0000)
N Left	5184	4621	5184	4621
N Right	343	906	343	906
Eff N Left	199	638	49	886
Eff N Right	145	385	51	477
BW Loc Poly	8.717	6.700	3.008	8.629
BW Bias	13.620	12.114	5.008	13.466

The second reason is that adding control variables improves the efficiency of our estimates (Calonico et al. 2019). We add five controls to the main specifications. We include the

2003 population because it conditions the multiple threshold assignments. We add GDP per capita to control for Brazil's economic expansion during the 2000s. We also add the number of seats in 2000 to ensure that our results come from the current legislature size and not from past seat allocations. Year was included in the models to control for seasonal effects. Finally, we add a dummy for Northeast states. The Northeast region received considerable attention from the Federal Government in the 2000s. According to de Macedo and Coelho (2015), in 2003 the Lula administration recreated the Superintendency for the Development of the Northeast (SUDENE), investing BRL 84 Billion from 2003 to 2010. This amounts to around 70regional investments. One example of these investments is that the Federal Government created about 100 new universities in the Northeast region. Moreover, infant mortality in the region decreased from 22.4 deaths per 1000 infants born in 2005 to 19.6 deaths per 1000 infants born in 2008 due to larger federal investments. In turn, education quality improved from 2.69 in 2005 to a 3.14 score in 2007 (0 to 10 quality of education score). For this reason, adding a dummy for Northeast states is essential for ensuring the consistency and the efficiency of our estimates.

To reflect these pieces of information, we rewrote paragraph five in Section 5 of the manuscript to (page 19):

"[...] *we add five controls to the estimates: population in 2003; GDP per capita; the number of seats in 2000; year; and a dummy for Northeast municipalities. The reason for the first variable is the multiple threshold assignments. We add GDP per capita because wealthier cities tend to have better public services. The number of seats in 2000 intends to control that some municipalities could experience a change provoked by the previous council size, confounding our estimates. The Northeast dummy was added to control for the fact that the Lula administration heavily invested in the region from 2003 until 2010, improving several development indicators (de Macedo and Coelho 2015). The years were added to improve efficiency and control for seasonal effects. Moreover, adding controls improves efficiency in RDD (Calonico et al. 2019) and also enhances the consistency in the multiple thresholds RDD.*"

And we added the discussions here to the Appendix at the end of Section A.5.

We want to highlight further that this decision to add controls in our case is also because of consistency. Even though clustered standard errors may provide the best standard errors for our model, this would not affect the consistency. And the consistency here relies on making the subpopulations comparable, i.e., the subpopulation of towns between 9 and 10 legislators as comparable as the subpopulation of towns between 10 and 11 legislators, and so on.

We would like to thank Reviewer 1 for their helpful comments and suggestions.

Reviewer 2 Comments and Responses

1) Reviewer 2 writes: "One minor issue for the author(s) to consider in future research: on p. 14 the paper states,"On average, municipal taxes account for only 5% of the local budgets, while mandatory transfers from state and federal governments correspond to the remaining 95%. This reduces the ability of municipal legislators to effectively increase local spending, which makes improvements in local services dependent only on the composition of their local investments." There is an alternative mechanism that the author(s) has not considered and that has been shown to work in resource allocations to municipalities in Japan under similar circumstances. A recent paper by Amy Catalinac, Bruce Bueno de Mesquita and Alastair Smith tests a formal model in which variance in centrally-provided local municipality resources is a function of a tournament among municipalities within

a larger legislative district. Perhaps future research might compare the impact of the tournament structure with the local city council effects in Brazil as studied here."

Response:

> We agree with Reviewer 2 that testing the proposed mechanism is an exciting project for a follow-up article. In the Discussion section (page 29), we write: "*Second, future research could evaluate whether additional legislators help mayors gain access to federal or state transfers in countries where resources are centrally provided, such as Japan. As suggested by Catalinac et al. (2020), in these situations the national government can create a tournament between municipalities and provide resources to those which offer more electoral support. Scholars might want to analyze whether this tournament structure interacts with the mechanisms we suggest in this paper.*"

> We would like to thank Reviewer 2 for their helpful comments and suggestions.

Reviewer 3 Comments and Responses

1) Reviewer 3 writes: "The central story rests on some assumptions that I would like to see justified. Do mayor's generally want to spend more, and the city council holds them back? Why? I wonder about this assumption. Why does increasing the size of the city council usually result in pro-mayor additions? Under what conditions might increasing the size of the council bring in more diverse viewpoints or more polarized policy stances? What role is partisanship playing? It seems like it is mainly a proxy for agreement between councilors and the mayor, but do different parties have strongly different policy preferences? Does that matter for the results presented here?"

Response:

> We collapse two concerns from Reviewer 3 since they both speak to core topics in our paper. In Table 6 of the Supplementary Materials (page 21), we show that an additional legislator usually does not lead to significant increases in public expenditure. Therefore, our results speak more about the allocation of resources than about government spending. In our section titled "Background on the Brazilian Case" (page 14), we clarify why increasing the city council size often results in a pro-mayor legislator. We write (page 15): "*Brazil also adopts a unique formula to allocate seats, which combines the Hare quota and the D'Hondt method and strongly favors larger parties (Nicolau 2015). This poses a major obstacle for small parties to reach the electoral quorum, so they often join party coalitions to improve their chances of winning legislative seats (Ames 2001, 68). In Brazil, mayors are usually members of the largest coalitions (Poulsen and Varjao 2018), thus there is an incentive for candidates to side with the mayor before and after the election.*" We mention that information again on page 22, footnote 12: "*The effect of city council size on the number of mayor-aligned politicians stems from the rounding rule adopted by the proportional representation system in Brazil. The rounding rule favors the coalitions with more votes. Most of the time, the coalition of the elected mayor is the one that receives more votes.*".

> We did not find evidence that electing an additional legislator improves descriptive representation in the city council. For instance, we see no significant increase in the number of female or non-white legislators, as shown in Table 4 (page 27). Finally, we show in the table below that the mayors' parties are not driving our results. This result is also available on our GitHub repository. We ommitted it from the Supplementary Materials to conserve space.

Table 2: Councilors from Major Parties

	Councilors from PT	Councilors from PSDB	Councilors from PMDB	Councilors from PFL (DEM)
LATE	-0.01	-0.05	-0.01	-0.01
	(0.02)	(0.05)	(0.03)	(0.02)
N Left	5179	5179	5179	5179
N Right	343	343	343	343
Eff N Left	375	152	267	231
Eff N Right	212	121	172	159
BW Loc Poly	13.99	6.8	10.58	9.63
BW Bias	22.64	11.373	16.803	15.647

$^{***}p < .01$; $^{**}p < .05$; $^{*}p < .1$

2) Reviewer 3 writes: "Finally, I wonder about the scope conditions. The evidence for the patterns presented from Brazil are very convincing, but I'd like to see more discussion of why these patterns hold in Brazil and how they might be different/ similar elsewhere."

Response:

We entirely agree with Reviewer 3 that we need to discuss the scope conditions of our findings in more detail. We acknowledge that the external validity of our results might be conditional on the contextual characteristics of our study. We have rewritten two paragraphs in the Discussion (page 29) to highlight the implication of our results. We write: "*Our findings have implications that extend well beyond Brazil. A general form of our argument is that it is easy for a politician to negotiate with members of her in-group (Abbink and Harris 2019; Alt et al. 2018). Specifically, several countries have separate executive and legislative powers, such as the federal level of presidential systems, state governments, and local city councils. As these institutions are influenced by political allegiances, the dynamics we expose here may be generalizable. Depending on legislative support, changing the legislature size could increase the chance of electing politicians that are not aligned with the executive, hence decreasing welfare. Despite the particular effects on political support and welfare, the logic described in this paper would remain relevant for empirically accessing the effect of enlarged legislatures on welfare. Our findings may also help scholars understand why other countries in Latin America and Asia can generate effective governance despite having strong executives and large coalitions (Pereira and Melo 2012).*".

In the next paragraph (page 29), we indicate some of the limitations of our findings and encourage scholars to conduct further research on the topic. We write: "*This paper opens several questions for future analysis. [...] Third, scholars might want to investigate whether our findings remain valid under different conditions. It is possible that the mechanisms we present here are non-linear, with additional legislators having a positive or negative impact on welfare depending on certain electoral characteristics. Finally, it remains unclear how other legislative features affect citizen well-being. For example, city councils may vary in size, monetary compensation for councilors, committee structure, and internal power structure. Understanding how legislature size interacts with other features would improve our knowledge about how local and national legislatures impact public services. These questions are crucial for institution design and welfare in developing democracies.*"

We would like to thank Reviewer 3 for their comments and suggestions.

References

Abbink, K. and Harris, D. (2019). In-group favouritism and out-group discrimination in naturally occurring groups. *PLOS ONE*, 14(9):1–13.

Allen, G. and Stoll, H. (2014). Representation as a numbers game: The link between legislative size and the representation of minorities and women. Retrieved from http://www.scpi.politicaldata.org/SCPIVIII/Stoll8.pdf.

Alt, M., Gallier, C., Schlüter, A., Nelson, K., and Anggraini, E. (2018). Giving to versus taking from in- and out-group members. *Games*, 9(3).

Ames, B. (2001). *The Deadlock of Democracy in Brazil*. University of Michigan Press, 1 edition.

Calonico, S., Cattaneo, M. D., Farrell, M. H., and Titiunik, R. (2019). Regression discontinuity designs using covariates. *Review of Economics and Statistics*, 101(3):442–451.

Catalinac, A., Bueno de Mesquita, B., and Smith, A. (2020). A tournament theory of pork barrel politics: The case of japan. *Comparative Political Studies*, 53(10-11):1619–1655.

Crain, W. M. (1979). Cost and output in the legislative firm. *The Journal of Legal Studies*, 8(3):607–621.

de Macedo, F. C. and Coelho, V. L. P. (2015). A política nacional de desenvolvimento regional–pndr e os fundos constitucionais de financiamento. *Redes. Revista do Desenvolvimento Regional*, 20(3):464–496.

Freire, D., Mignozzetti, U., Roman, C., and Alptekin, H. (2021). The Effect of Legislature Size on Public Spending: A Meta-Analysis. https://doi.org/10.31235/osf.io/xf7wp.

Gerring, J. and Veenendaal, W. (2020). *Population and politics: The impact of scale*. Cambridge University Press.

Gilligan, T. and Matsusaka, J. (2001). Fiscal policy, legislature size, and political parties: Evidence from the first half of the twentieth century. *National Tax Journal*, 54(1):57–82.

Nicolau, J. (2015). *Sistemas Eleitorais*. Editora FGV.

Pereira, C. and Melo, M. A. (2012). The surprising success of multiparty presidentialism. *Journal of Democracy*, 23(3):156–170.

Poulsen, A. and Varjao, C. (2018). Political opposition, legislative oversight, and politician performance: Evidence from brazil. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3304209.

Primo, D. and Snyder Jr., J. M. (2008). Distributive politics and the law of 1/n. *The Journal of Politics*, 70(2):477–486.

Rogers, J. R. (2002). Free riding in state legislatures. *Public Choice*, 113(1-2):59–76.

Toral, G. (2019). The benefits of patronage: How the political appointment of bureaucrats can enhance their accountability and effectiveness. https://translateyar.ir/wp-content/uploads/2019/12/The-benefits-of-patronage-How-the-political-appointment-of-bureaucrats-can-enhance-their-accountability.pdf.

Weingast, B., Shepsle, K., and Johnsen, C. (1981). The political economy of benefits and costs: A neoclassical approach to distributive politics. *Journal of Political Economy*, 89(4):642–664.