Ethnoracial Homogeneity and Public Outcomes: The (Non)effects of Diversity*

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Abstract

How does ethnoracial demography relate to public goods provision? Many studies find support for the hypothesis that diversity is related to inefficient outcomes by comparing diverse and homogeneous communities. We distinguish between homogeneity of dominant and disadvantaged groups and argue that it is often impossible to identify the effects of diversity due to its collinearity with the share of disadvantaged groups. To disentangle the effects of these variables, we study new data from Brazilian municipalities. While it is possible to interpret the *prima facie* negative correlation between diversity and public goods as supportive of the prominent "deficit" hypothesis, a closer analysis reveals that, in fact, more homogeneous Afro-descendant communities have lower provision. While we cannot rule out that diversity is consequential in other contexts, our results cast doubt on the reliability of previous findings related to the benefits of local ethnoracial homogeneity for public outcomes.

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Introduction

How does public goods provision[1] relate to ethnoracial demography? Political scientists and economists seemed to have reached a consensus regarding the existence of a robust association between diversity and a variety of negative social outcomes (i.e., "diversity deficit"). Despite the scarcity of support for a causal link, the sheer number of studies showing diversity to harm provision sufficed to convince the most skeptical of readers. More recently, however, these earlier findings have been challenged both empirically and theoretically.

This paper contributes to this ongoing debate by demonstrating that the previously uncovered effects of *diversity* can often be confounded with those of particular *group shares*. We thus argue that, to properly identify the relationship of ethnic diversity and public outcomes, one needs to compare diverse communities to homogeneous communities of *all* groups rather than of a single (usually dominant) group in society, which is nonetheless impossible in many previously studied contexts. To overcome this limitation, we focus on the empirically relevant–yet largely overlooked–case of Brazil, which allows us to distinguish between homogeneous local populations composed of either dominant or disadvantaged groups[2]. When the appropriate group share measures are taken into account, results show that diversity has no discernible effect on public goods provision.

In what follows, we first discuss the limitations of previous tests of the diversity hypothesis and emphasize the distinction between the use of group share and diversity measures (e.g., fractionalization). To tackle these issues, we make the case for the analysis of municipal outcomes in the racially diverse and highly decentralized case of Brazil. We then show that, when we use the model specifications adopted in previous studies, diversity seems to be

[1]We follow the literature and use "public goods provision" as a general term for government provided public services such as education, health care and infrastructure, even when they do not fit the strict economic description (i.e., non-excludable and non-rivalrous goods).

[2]We use the term "disadvantaged" merely to emphasize that ethnic groups which are relatively deprived along a given dimension (Horowitz, 1985)–and conventionally referred to as "minorities"–may constitute demographic majorities. Since social, economic, and political disparities between groups tend to be strongly correlated and hardly dissociable in many contexts (Stewart, 2005), including that of Brazil (Bailey, 2009), we are agnostic about which particular dimension of disadvantage is more consequential.

negatively correlated with public goods, even after controlling for a variety of confounding factors. While this result can be seen as supporting the standing hypothesis, a closer examination of the evidence reveals that diversity is not detrimental *per se*, but only insofar as it reflects an increase in the share of the disadvantaged group in the local population. Thus, after re-examining the data and including group share measures, we find that in fact more *homogeneous* Afro-descendant municipalities have worse public goods provision than more *diverse* communities and than *homogeneous* white majority municipalities.

Overall, this paper challenges the "diversity deficit" hypothesis by showing that previous subnational analyses have often relied on contexts with "truncated" population distributions where disadvantaged groups never reach a local demographic majority (i.e., where ethnic homogeneity is only defined for one group). In this sense, our results draw attention to the limited applicability of some of the mechanisms proposed in the literature which link diversity to negative social outcomes. In particular, we highlight that the failure to differentiate between diversity and relevant group shares may cast doubt on the reliability of previous findings related to the "benefits" of ethnoracial homogeneity.

Ethnoracial Demography and Public Goods

The "diversity deficit" hypothesis has been investigated and confirmed across a wide variety of regions and settings (for a review, see Stichnoth and Van der Straeten, 2013). However, some of the seminal studies in this literature have been criticized for neglecting the heterogeneous effects of diversity across various public goods and for failing to address omitted variable bias concerns (Gisselquist, 2014; Wimmer, 2016). The standard variable used to measure diversity, the fractionalization index[3], has also sparked considerable criticism (e.g., see Abascal and Baldassarri, 2015). Most important, as a summary statistic, it treats

[3]As a measure of diversity, the Herfindahl-Hirschman fractionalization index indicates the probability that two randomly chosen individuals in a community belong to different groups (Alesina et al., 1999): $F = 1 - \sum_{i=1}^{N} \pi_i^2$, where π_i is the proportion of group i in a locality.

groups as equivalent and fails to indicate which ones are represented in what proportions in the population (Vigdor, 2002; Rushton, 2008).

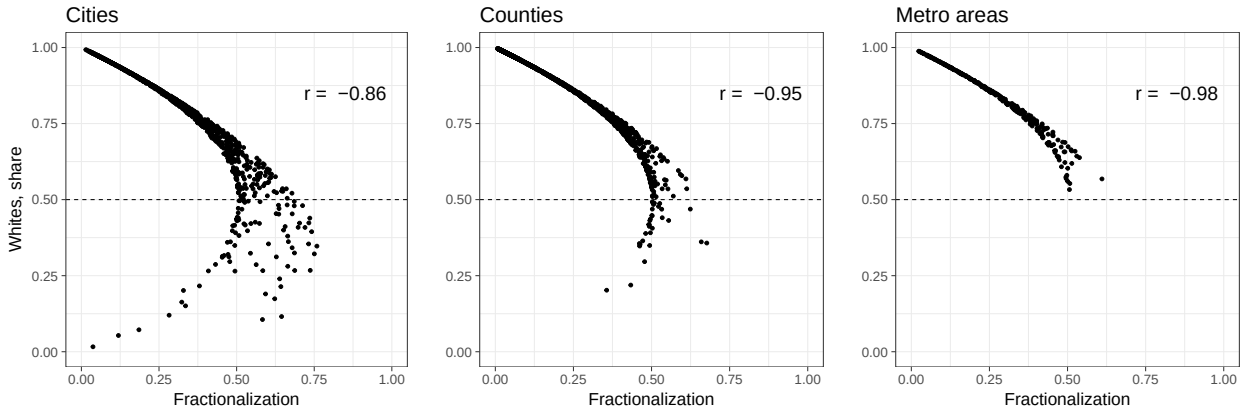
However, given divergent histories of conflict and migration, there are strong reasons to believe that ethnic groups are rarely interchangeable (e.g., see Horowitz, 1985; Sidanius and Pratto, 2001). In fact, between-group disparities tend to be rather ubiquitous, strikingly persistent and often multidimensional (Tilly, 1999; Stewart, 2005). This is important because the overlap of ethnicity and individual socioeconomic characteristics may produce an apparent negative association between diversity and social outcomes even if it is, in fact, a result of individual and contextual indicators of well-being (e.g., Abascal and Baldassarri, 2015). Due to such "compositional effects," for instance, "majority black and minority white" communities may systematically underperform "majority white and minority black" communities in terms of public outcomes, despite having the same level of diversity.

Nonetheless, the most commonly used mechanisms in the literature to elucidate how diversity affects social outcomes also assume that ethnic groups are analogous and behave in the same manner. According to the "in-group bias" mechanism, for instance, individuals benefit from the well-being of a fellow group member and attach lower (or even negative) utility to the welfare of the out-group (Alesina and Glaeser, 2004). Although this channel helps to explain why more diverse communities contribute less to the public welfare, it fails to clarify why homogeneous localities may achieve even poorer outcomes. Likewise, mechanisms such as preferences' homogeneity, expanded technical capabilities and facilitated social sanctions (e.g., see Habyarimana et al., 2007) elucidate the improved ability of more *homogeneous* localities to work collectively. Yet, if groups are not interchangeable and homogeneous communities diverge in a systematic way, it might be the case that these mechanisms do not operate in the same manner across groups.

The classic US study by Alesina et al. (1999) acknowledges the theoretically-relevant distinction between racial fractionalization and group shares. However, the US has only a small number of white-minority localities and, among them, few are racially homogeneous

(i.e., exhibit low fractionalization levels, see Figure 1). As a result, it may be empirically difficult, or even unfeasible, to distinguish between the effects of these two variables in this or similar contexts. Similarly, Schaeffer (2013) shows that in Europe most competing indices of ethnic diversity are indistinguishable from the mere percentage of immigrant shares. In fact, disadvantaged ethnic groups rarely constitute local demographic majorities in most democratic, developed countries. Since diversity and group share measures move together, in such contexts, their effects can be confounded.

Figure 1: The distribution of racial demography across US localities



Each dot represents local racial demography in terms of fractionalization or group shares (whites). The graph is based on the data from Alesina et al. (1999).

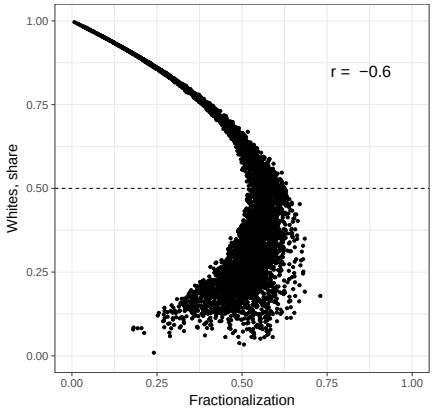
Empirical Strategy

Brazil is known for being one of the most racially diverse and economically unequal democracies in the world. Despite this fact, the influence of ethnic demography on public goods provision has not yet been investigated within the country's territory.[4] We contend that the study of Brazilian municipalities can greatly contribute to our understanding of the link between ethnoracial demography and social outcomes for several reasons.

[4]This is particularly surprising given the large amount of studies on the determinants of public expenditures and the vast literature on racial relations in the country (e.g., see Telles, 2006). A number of studies have, however, included Brazil as a case in their cross-national analyses on the effects of ethnic diversity (e.g., see La Porta et al., 1999; Alesina et al., 2003; Baldwin and Huber, 2010).

First, municipalities in Brazil provide a large number of comparable cases that reflect consistent political jurisdictions, share the same electoral rules, and exhibit wide variation in the dependent variables of interest. Second, and related, the country's high level of political decentralization implies that the responsibility for providing public goods is in the hands of municipal governments. This, in turn, guarantees that our outcomes are tightly linked to political decisions at the local level rather than at other levels of government.[5] Finally, and most important, Brazil offers enough variation in the local predominance of racial groups to allow for a clear empirical differentiation between this variable and diversity. The country has a near equal proportion of African and European descendants (50.74% *negros*[6] and 47.73% *brancos*), and almost as many majority white as majority black municipalities–which may display the same level of diversity despite having a rather different population composition (Figure 2).

Figure 2: The distribution of racial demography across Brazilian municipalities



Each dot represents local racial demography in terms of fractionalization or group shares (whites). The graph is based on Brazil's 2010 Census.

[5]To further minimize non-municipal influences, we focus on local-level outcomes that are under exclusive municipal responsibility in Brazil (municipal schools, hospitals, etc.). Additionally, to take potential state interventions into account, we include state fixed effects in our regression analyses. Finally, although federal interference in local affairs occasionally takes place, there is no evidence that it is systematically tied to the racial composition of municipalities and therefore should not affect our results.

[6]This commonly used classification encompasses both Brown (*pardos*, 43.13%) and Black (*pretos*, 7.61%) Census categories. Other categories include Asian (*amarelos*, 1.09%) and Indigenous (*indígenas*, 0.43%) populations.

Our model specification builds on the classic US study of Alesina et al. (1999) and its subsequent replication and extension by Gisselquist (2014). We regress a set of public outcomes related to local service provision on different racial demography[7] measures and control for the most relevant confounders identified in the literature. In particular, our analysis differentiates between the three most relevant "dimensions of disadvantage" recognized in the case of Brazil: race, class and geographic location. By controlling for the average income, proportion of poor population, regional location and geographic characteristics of municipalities, we thus distinguish between the effects of these different local features on provision, but also minimize the concern that group shares or diversity may be merely proxying for other types of group disadvantage.

Data

We use a new purpose-built dataset of 5,505 Brazilian municipalities (2010), including a variety of racial demography, public goods, and economic geography variables (for more details, see Appendix). Individual-level census data are used to construct the indices of racial fractionalization and group shares at the smallest politically relevant administrative unit (municipalities).[8] Additionally, we examine a range of dependent variables to identify the (potentially) diverging effects of racial divisions on different types and aspects of service provision. These variables include the total amount of public resources allocated to social spending, disaggregated spending indicators, and two different measures of public goods quality. Our covariates incorporate a set of other municipal characteristics that influence the capacity of local governments to provide public services, such as size of the locality, age, education, urbanization rate, local GDP, interpersonal inequality (GINI), poverty rate, as well as geography (Naritomi et al., 2012) (for summary statistics, see Table A1).

[7]Race has been shown to be the most salient ethnic cleavage in the country (for a detailed comparison, see Lieberman and Singh, 2012).

[8]Our diversity measure considers each one of the Census categories as a separate group, but our results are also robust to the use of an alternative fractionalization measure based on a unified Afro-descendant category composed of *pardos* and *pretos* (not shown).

Analysis & Results

Our analysis is divided into two steps. First, we replicate the model used in the seminal US study of Alesina et al. (1999) using municipal-level data from Brazil in 2010. Results from this estimation, shown in Table 1, suggest that the relationship between racial *fractionalization* and public goods provision in Brazil is very similar to the one observed in the US. More specifically, higher diversity seems to be related to higher overall government expenditure, but lower education spending.[9] Additionally, we find a strong negative association between fractionalization and the quality of healthcare and education across Brazilian municipalities. Overall, this is precisely the pattern we would expect to see where diversity is associated with the underprovision of public goods.

The same (and even stronger) relationship, however, can be observed using the white *group share* as a measure of ethnic demography (see Table A4). To better understand these findings, in the second portion of the analysis we divide our sample into *majority white* and *minority white* municipalities (Table 2) and re-examine the effects of fractionalization and group shares.[10] Results from these estimations show that the diversity coefficient remains negative only in the models using the first sample of municipalities–that is, those where the majority of the population is classified as white according to the Census. In the sample of minority white localities, however, the diversity variable has no effect. Conversely, the relationship between the 'white share'[11] variable and the various provision measures remains consistent across both samples, and mostly positive and significant with respect to the different dependent variables.[12]

[9]The positive relationship between diversity and healthcare spending, for which there is no compelling theoretical explanation, is also observed in the case of the US.

[10]For the summary statistics of each sample, see Table A2 and A3. As these tables indicate, majority white municipalities are on average better-off compared to minority white municipalities, illustrating the relevance of including socioeconomic controls in our analysis.

[11]To further understand the role played by different racial groups, Table A7 looks at each group's effect separately and confirms that more *homogeneous* Afro-descendant communities have poorer provision.

[12]Given the large number of outcomes tested and samples used, we apply the Bonferroni-Holm p-value adjustment for 15 different comparisons in the case of fractionalization (Table 1 and Table 2) and white shares (Table A4 and Table 2) to check whether some associations may be statistically significant by chance. Our results remain unchanged.

Table 1: Racial Diversity and Public Goods Provision

	Total spending	Educ. share	Heal. share	Educ. quality	Heal. quality
	(1)	(2)	(3)	(4)	(5)
Fractionalization	0.285***	−0.072***	0.082***	−1.080***	−0.761***
	(0.050)	(0.016)	(0.016)	(0.154)	(0.146)
Income PC, log	0.821***	−0.044***	0.033**	1.844***	0.147
	(0.045)	(0.014)	(0.014)	(0.141)	(0.133)
Population, log	−0.287***	0.030***	0.029***	−0.215***	−0.208***
	(0.005)	(0.002)	(0.002)	(0.016)	(0.015)
Pop. over 65, share	−3.147***	−0.393***	0.217**	−1.458*	−2.597***
	(0.284)	(0.090)	(0.089)	(0.885)	(0.837)
Pop. under 18, share	0.012	0.267***	−0.262***	−4.442***	−3.294***
	(0.174)	(0.055)	(0.055)	(0.541)	(0.512)
GINI	−1.123***	−0.022	−0.042	−3.643***	−0.433
	(0.134)	(0.043)	(0.042)	(0.421)	(0.398)
Years of schooling	0.013**	−0.007***	0.006***	0.207***	0.050***
	(0.005)	(0.002)	(0.002)	(0.015)	(0.015)
Area, log	0.011**	−0.0002	0.002	0.006	−0.057***
	(0.004)	(0.001)	(0.001)	(0.014)	(0.013)
Urban, share	−0.062**	−0.030***	0.014*	−0.226***	−1.030***
	(0.026)	(0.008)	(0.008)	(0.081)	(0.077)
Poor, share	1.461***	0.149***	0.084*	2.246***	−0.548
	(0.140)	(0.045)	(0.044)	(0.438)	(0.414)
Constant	4.873***	0.441***	−0.229***	−1.033	9.133***
	(0.283)	(0.090)	(0.089)	(0.885)	(0.837)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	5,150	5,146	5,149	5,503	5,503
Adjusted R^2	0.596	0.560	0.238	0.789	0.384

All specifications include "state fixed effects" based on 26 Brazilian states. For variable descriptions, see Appendix.
The standard errors are given in parentheses, $^{+}$p<0.1; *p<0.05; **p<0.01 ; ***p<0.001.

Table 2: Racial Demography and Public Goods Provision

Panel A: Majority White Municipalities Only

	Total spending		Educ. share		Heal. share		Educ. quality		Heal. quality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fractionalization	0.401***		−0.063***		0.101***		−1.201***		−1.049***	
	(0.069)		(0.019)		(0.020)		(0.207)		(0.214)	
Whites, share		−0.371***		0.061***		−0.100***		1.274***		1.177***
		(0.072)		(0.020)		(0.021)		(0.213)		(0.220)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Standard controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2,209	2,209	2,206	2,206	2,206	2,206	2,278	2,278	2,278	2,278
Adjusted R^2	0.593	0.592	0.381	0.380	0.312	0.312	0.501	0.502	0.252	0.254

Panel B: Minority White Municipalities Only

	Total spending		Educ. share		Heal. share		Educ. quality		Heal. quality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fractionalization	−0.053		−0.014		0.082***		−0.161		−0.285	
	(0.089)		(0.030)		(0.030)		(0.275)		(0.251)	
Whites, share		−0.169**		0.071***		0.042*		1.392***		1.023***
		(0.071)		(0.024)		(0.024)		(0.223)		(0.203)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Standard controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2,941	2,941	2,940	2,940	2,943	2,943	3,225	3,225	3,225	3,225
Adjusted R^2	0.529	0.530	0.519	0.520	0.213	0.211	0.705	0.708	0.332	0.337

All specifications include "state fixed effects" based on 26 Brazilian states. For variable descriptions, see Appendix.
The standard errors are given in parentheses, $^{+}$p<0.1; *p<0.05; **p<0.01 ; ***p<0.001.

Finally, explaining public outcomes may require taking into account the uneven distribution of groups across the country's territory (Naritomi et al., 2012). Some groups may be overrepresented in areas with unfavorable geographic characteristics, which may in turn hinder service provision. As a result, the relationship between racial demography and public goods provision may itself be confounded by economic geography. As Table A5 indicates, however, the significant relationship between group shares and public goods provision largely withstands the inclusion of geographic controls.[13]

Together these findings illustrate that our initial results on the negative effects of diversity are misleading. In fact, more diverse communities outperform *homogeneous nonwhite* localities in terms of service provision–and are thus found to have poorer outcomes only when compared to *homogeneous white* municipalities. In other words, racial fractionalization is detrimental to the provision of public goods only to the extent that it reflects an increase in the nonwhite population share. That is, when we restrict our analysis to the sample of *majority nonwhite* localities–where diversity's increase represents a higher proportion of white population–fractionalization ceases to be associated with worse outcomes.

These findings seem to suggest that diversity may have heterogeneous effects in different contexts. Before we can make this statement, however, we have to consider that the very reason why fractionalization is associated with public goods outcomes in 'majority white' but not in 'minority white' municipalities may be due to its higher correlation with white group shares in the former subsample (-0.98 versus 0.58). To examine the independent effect of diversity on provision, we thus restrict our analysis to the interval within which the correlation between fractionalization and the group share measure is minimized.[14] Within this artificially restricted sample, fractionalization does not robustly relate to any provision

[13]The inclusion of geographic covariates does reduce the magnitude of effects in some of the models, but changes are not systematic. The role of geography itself appears to be modest and, sometimes, ambiguous (for details on the coefficients of geographic covariates, see Table A6). This does not, however, imply that its effects should be ignored; rather, it suggests that a full understanding of geography's nuanced influences requires more detailed examination.

[14]This produces a selection of observations with fractionalization levels between 0.35 and 0.7, see Figure 1 and Table A8. We would like to thank an anonymous reviewer for suggesting this analysis.

measure after controlling for group shares. At the same time, as before, municipalities with a greater proportion of white population exhibit consistently better public goods regardless of fractionalization levels.

Discussion

In our analysis of Brazilian municipalities, we find that the *prima facie* negative relationship between diversity and public goods provision stems from the fact that higher levels of fractionalization reflect a larger proportion of disadvantaged ethnic groups in the local population. Our case and data allow us to measure the effect of diversity in localities where either dominant or disadvantaged groups constitute a demographic majority. Yet, this may not always be feasible in other settings. In fact, in cases where fractionalization is almost indistinguishable from group share measures, diversity's independent effect may be difficult (or even impossible) to identify.[15]

How common are the patterns described here? We recognize that the problem of confounding the effects of diversity with that of group shares at the subnational level may be more severe in some settings than in others. In particular, two main features set the Brazilian case apart from other scenarios and may limit the generalizability of our findings. First, the Brazilian society is characterized by entrenched racial or color stratification, an empirical reality that contradicts the country's myth of racial democracy (Bailey et al., 2013), and has led some scholars to refer to racial groups as castes (Telles, 1996; Guimarães, 2004). In other words, in Brazil, salient race and class cleavages overlap–a consequential fact[16] that is clearly reflected in the country's remarkably high between-group inequality level (Baldwin and Huber, 2010). Second, Brazil is a federal country where regional divisions are significant

[15] An important limitation of our study concerns the potential endogeneity of our findings. Despite the fact that we cannot dismiss the possibility that the relationships we observe are a result of some third factor, reverse causality issues are implausible in this case due to extremely limited cross-municipal migrations (Morten and Oliveira, 2016).

[16] Selway (2011) prominently highlights how the salience of an ethnic cleavage may be heightened when it overlaps with other ethnic dimensions, income or territory (for theoretical elaboration also see Kustov, 2017).

and deep-seated. As argued by Lieberman (2003), this feature of the Brazilian case created the conditions for the institutionalization of uneven state authority across the national territory. To the extent that underprivileged groups concentrate precisely in the geographical areas where the state is scarcely present, the patterns observed here are more likely to emerge. However, these particularities are far from making Brazil a unique case. In fact, a variety of historical legacies incite the emergence of rank-based societies. Aristocratic, colonial or caste-system pasts often produce hierarchical distinctions among ethnic groups that are multidimensional and highly persistent over time (Tilly, 1999). Similarly, cases of salient regionalism are not uncommon (Singh, 2015; Soifer, 2016).

This paper's findings thus draw attention to the fact that alternative theories are necessary to explain why more homogeneous Afro-descendant communities experience worse public outcomes than diverse ones, even after we take into account their more severe environmental conditions, disproportionate poverty, and general underdevelopment. In fact, our results point to the limited applicability of some of the micro-level mechanisms previously proposed in the literature. Hypotheses based on "unfavorable intergroup dynamics" do not elucidate how ethnic *homogeneity*, rather than *diversity*, is related to worse public outcomes.

Although it is beyond the scope of this paper to build a novel theoretical framework that fully elucidates the association of racial demography and public outcomes, we highlight two potential explanations for the patterns we observe. First, our results indicate that suboptimal outcomes are less a product of adverse intergroup relations than of path-dependent processes of state development. Insofar as the distribution of ethnic groups across the national territory overlaps with areas of historically low state presence, some groups are more likely to be systematically tied to worse provision (Soifer, 2016; Wimmer, 2016; Singh and vom Hau, 2016).[17] A second possibility is that part of the observed effect of racial demography stems from the compositional characteristics of local populations–such as those related to wealth

[17]In the case of Brazil, one potential driver behind these patterns can be found in the organization of slave exile communities (*mocambos* or *quilombos*), which were usually established in inaccessible areas precisely to avoid being "discovered and destroyed by Portuguese punitive expeditions." (Bethell, 1984)

or the level of interpersonal trust (Abascal and Baldassarri, 2015; Bertocchi, 2016)–which might themselves lead to suboptimal public outcomes.

In all, while our study does not rule out that ethnic heterogeneity may be consequential in certain contexts, it challenges the empirical findings of a vast body of work on the effects of diversity at the local level. Specifically, previous results show an association that may simply be an artifact of a close correlation between diversity and the share of disadvantaged groups across localities. Taking these findings into account can thus aid researchers in elaborating a novel theoretical framework that delineates the scope conditions of previous theories and identifies the specific mechanisms that might operate in different demographic contexts.

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Appendix

Explanatory and Outcome Variables

Demographic data

All demographic variables were constructed using the microdata from the 2010 Population Census, from the Instituto Brasileiro de Geografia e Estatística (IBGE).

Social Spending Per Capita and Share: Total and Disaggregated

These variables shows the amount of public resources destined to the provision of collective "productive goods" (Alesina et al., 1999), such as education, housing, health, basic urban infrastructure and transportation. All the data come from the Instituto de Pesquisa Econômica Aplicada (IPEA).

Provision quality

The quality measures concern education and healthcare provision. These indices come from a comprehensive study carried out by Arretche, Fusaro and Vaughan in the Centro de Estudos da Metrópole (CEM), which take into account a set of more than 10 indicators per sector in order to build two overall measures of quality (one for education and one for health) at the municipal level.[18]

Geographic controls

The data come from the National Institute of Geology (INGEO) and include *Latitude*, *Distance to Coast*, *Altitude*, *Rainfall*, and *Sunshine*. For details, see Naritomi et al. (2012).

[18]For instance, the health indicator is comprised, among other variables, of infant mortality rate, hospitalization rate and vaccine coverage. As for the education index, it consists of coverage below 6 years of age, failure and abandonment rates, proportion of municipal schools with below-average grades in the national standardized test, etc. For more detailed information, see: http://web.fflch.usp.br/centrodametropole.

Summary statistics

Table A1: Full Sample (n = 5505)

Statistic	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Spending Per capita, log	7.12	0.41	4.92	6.83	7.36	9.42
Spending on Education, share	0.42	0.12	0.00	0.33	0.50	0.93
Spending on Healthcare, share	0.32	0.09	0.00	0.27	0.36	1.00
Education quality	6.50	1.81	1.65	4.87	8.12	10.00
Healthcare quality	5.57	1.00	1.92	4.89	6.24	9.35
Fractionalization	0.47	0.12	0.01	0.42	0.55	0.73
Whites, share	0.47	0.24	0.01	0.26	0.67	1.00
Income per capita, log	6.08	0.50	4.57	5.63	6.48	7.62
Population, log	9.43	1.14	6.69	8.58	10.08	16.24
Population over 65, share	0.08	0.02	0.01	0.07	0.10	0.20
Population under 18, share	0.31	0.06	0.17	0.27	0.35	0.72
GINI	0.49	0.07	0.28	0.45	0.54	0.80
Years of schooling	9.46	1.10	4.34	8.74	10.21	12.83
Area, log	6.20	1.28	1.06	5.32	6.94	11.99
Urban, share	0.64	0.22	0.04	0.47	0.82	1.00
Poor, share	0.23	0.18	0.002	0.07	0.39	0.79
Latitude	−16.40	8.27	−33.69	−22.80	−8.43	4.60
Distance to Coast, log	5.37	1.33	0.003	4.76	6.24	7.91
Altitude	4.12	2.93	0.00	1.53	6.32	16.28
Rainfall	12.80	3.96	3	12	15	33
Sunshine	21.33	3.26	12	18	24	30

Table A2: Sample of Majority White Municipalities Only (n = 2280)

Statistic	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Spending Per capita, log	7.27	0.40	5.72	6.99	7.53	9.42
Spending on Education, share	0.35	0.09	0.00	0.29	0.41	0.81
Spending on Healthcare, share	0.32	0.09	0.00	0.26	0.36	0.92
Education quality	7.88	1.10	3.49	7.19	8.69	10.00
Healthcare quality	6.00	0.93	2.90	5.34	6.61	9.35
Fractionalization	0.40	0.14	0.01	0.29	0.51	0.63
Whites, share	0.72	0.13	0.50	0.61	0.83	1.00
Income per capita, log	6.48	0.30	4.95	6.31	6.67	7.62
Population, log	9.30	1.23	6.69	8.39	9.98	16.24
Population over 65, share	0.09	0.02	0.02	0.08	0.11	0.20
Population under 18, share	0.28	0.04	0.17	0.25	0.29	0.72
GINI	0.46	0.06	0.28	0.42	0.50	0.68
Years of schooling	10.11	0.94	7.00	9.50	10.76	12.83
Area, log	5.76	0.96	1.06	5.11	6.32	10.18
Urban, share	0.70	0.22	0.06	0.53	0.89	1.00
Poor, share	0.09	0.08	0.002	0.04	0.12	0.65
Latitude	−23.81	4.35	−33.69	−27.26	−21.37	−5.67
Distance to Coast, log	5.42	1.13	0.003	5.00	6.17	7.50
Altitude	5.39	2.85	0.00	3.85	7.50	16.28
Rainfall	13.95	2.36	6	12	15	21
Sunshine	19.97	2.99	12	18	21	27

Table A3: Sample of Minority White Municipalities Only (n = 3225)

Statistic	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Spending Per capita, log	7.00	0.37	4.92	6.76	7.22	8.92
Spending on Education, share	0.46	0.13	0.00	0.37	0.55	0.93
Spending on Healthcare, share	0.32	0.10	0.00	0.27	0.37	1.00
Education quality	5.52	1.57	1.65	4.31	6.68	9.81
Healthcare quality	5.27	0.95	1.92	4.62	5.91	8.32
Fractionalization	0.52	0.07	0.18	0.48	0.56	0.73
Whites, share	0.29	0.11	0.01	0.20	0.37	0.50
Income per capita, log	5.79	0.41	4.57	5.49	6.09	7.53
Population, log	9.52	1.07	6.70	8.74	10.11	14.80
Population over 65, share	0.08	0.02	0.01	0.06	0.09	0.15
Population under 18, share	0.34	0.05	0.20	0.31	0.37	0.58
GINI	0.52	0.06	0.33	0.48	0.55	0.80
Years of schooling	9.00	0.96	4.34	8.45	9.64	12.21
Area, log	6.52	1.39	2.41	5.54	7.35	11.99
Urban, share	0.60	0.21	0.04	0.44	0.76	1.00
Poor, share	0.34	0.16	0.01	0.21	0.46	0.79
Latitude	−11.16	6.08	−26.63	−16.08	−6.47	4.60
Distance to Coast, log	5.34	1.46	0.01	4.54	6.37	7.91
Altitude	3.23	2.64	0.00	0.98	5.05	12.68
Rainfall	11.93	4.64	3	9	15	33
Sunshine	22.36	3.06	12	21	24	30

Additional analyses

Table A4: White Shares and Public Goods Provision

	Total spending	Educ. share	Heal. share	Educ. quality	Heal. quality
	(1)	(2)	(3)	(4)	(5)
Whites, share	−0.300***	0.072***	−0.016	1.255***	0.855***
	(0.038)	(0.012)	(0.012)	(0.117)	(0.111)
Income PC, log	0.811***	−0.041***	0.015	1.848***	0.156
	(0.043)	(0.014)	(0.014)	(0.136)	(0.129)
Population, log	−0.289***	0.030***	0.029***	−0.209***	−0.203***
	(0.005)	(0.002)	(0.002)	(0.016)	(0.015)
Pop. over 65, share	−3.230***	−0.371***	0.183**	−1.216	−2.421***
	(0.283)	(0.090)	(0.089)	(0.877)	(0.833)
Pop. under 18, share	−0.215	0.322***	−0.271***	−3.496***	−2.651***
	(0.176)	(0.056)	(0.056)	(0.546)	(0.518)
GINI	−1.023***	−0.049	0.016	−3.963***	−0.671*
	(0.129)	(0.041)	(0.041)	(0.404)	(0.383)
Years of schooling	0.010**	−0.006***	0.006***	0.219***	0.058***
	(0.005)	(0.002)	(0.002)	(0.015)	(0.015)
Area, log	0.012***	−0.001	0.002*	−0.001	−0.062***
	(0.004)	(0.001)	(0.001)	(0.014)	(0.013)
Urban, share	−0.085***	−0.025***	0.018**	−0.127	−0.964***
	(0.026)	(0.008)	(0.008)	(0.081)	(0.077)
Poor, share	1.271***	0.198***	0.022	2.932***	−0.061
	(0.134)	(0.043)	(0.043)	(0.419)	(0.398)
Constant	5.285***	0.335***	−0.088	−2.536***	8.065***
	(0.268)	(0.085)	(0.085)	(0.837)	(0.795)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	5,150	5,146	5,149	5,503	5,503
Adjusted R^2	0.598	0.561	0.234	0.791	0.388

The outcome variables are the log of total spending per capita, education and healthcare share and quality in a municipality, respectively. All specifications include "state fixed effects" based on 26 Brazilian states. For variable descriptions, see Appendix. The standard errors are given in parentheses, $^{+}$p<0.1; *p<0.05; **p<0.01 ; ***p<0.001.

Table A5: Racial Demography and Public Goods Provision: Robustness to geographic controls

Panel A: Majority White Municipalities Only

	Total spending		Educ. share		Heal. share		Educ. quality		Heal. quality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fractionalization	0.509***		−0.025		0.062**		−2.108***		−1.001***	
	(0.077)		(0.022)		(0.023)		(0.226)		(0.230)	
Whites, share		−0.444***		0.022		−0.064**		2.045***		0.976***
		(0.078)		(0.022)		(0.023)		(0.229)		(0.233)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Standard controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Geographic controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2,074	2,074	2,071	2,071	2,071	2,071	2,139	2,139	2,139	2,139
Adjusted R^2	0.585	0.582	0.391	0.391	0.317	0.318	0.518	0.516	0.283	0.282

Panel B: Minority White Municipalities Only

	Total spending		Educ. share		Heal. share		Educ. quality		Heal. quality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fractionalization	−0.006		−0.017		0.096**		−0.242		−0.347	
	(0.100)		(0.034)		(0.034)		(0.308)		(0.276)	
Whites, share		−0.103		0.063*		0.015		1.202***		0.830***
		(0.079)		(0.027)		(0.027)		(0.249)		(0.223)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Standard controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Geographic controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	2,587	2,587	2,586	2,586	2,589	2,589	2,831	2,831	2,831	2,831
Adjusted R^2	0.527	0.527	0.533	0.534	0.232	0.230	0.714	0.717	0.347	0.349

All specifications include "state fixed effects" based on 26 Brazilian states; "standard control" variables as in Table 1, as well "geographic control" variables. For variable descriptions, see Appendix. The standard errors are given in parentheses, $^{+}$p<0.1; *p<0.05; **p<0.01 ; ***p<0.001.

Table A6: Racial Demography and Public Goods Provision: Robustness Checks

	Total spending		Educ. share		Heal. share		Educ. quality		Heal. quality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Fractionalization	0.043***		−0.008***		0.009***		−0.169***		−0.103***	
	(0.006)		(0.002)		(0.002)		(0.020)		(0.019)	
White, shares		−0.081***		0.016***		−0.003		0.364***		0.154***
		(0.010)		(0.003)		(0.003)		(0.032)		(0.030)
Income per capita, log	0.450***	0.440***	−0.018*	−0.017*	0.013+	0.004	0.870***	0.886***	0.030	0.073
	(0.024)	(0.023)	(0.008)	(0.007)	(0.008)	(0.007)	(0.074)	(0.072)	(0.069)	(0.067)
Population, log	−0.328***	−0.328***	0.031***	0.031***	0.035***	0.036***	−0.216***	−0.215***	−0.226***	−0.227***
	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)	(0.020)	(0.020)	(0.018)	(0.018)
Pop. over 65, share	−0.069***	−0.070***	−0.007**	−0.007**	0.004	0.003	−0.053*	−0.053*	−0.040+	−0.036+
	(0.007)	(0.007)	(0.002)	(0.002)	(0.002)	(0.002)	(0.023)	(0.023)	(0.021)	(0.021)
Pop. under 18, share	0.008	−0.005	0.016***	0.019***	−0.017***	−0.017***	−0.249***	−0.190***	−0.174***	−0.150***
	(0.011)	(0.011)	(0.003)	(0.003)	(0.003)	(0.003)	(0.033)	(0.034)	(0.031)	(0.031)
GINI	−0.087***	−0.080***	−0.003	−0.004	−0.001	0.003	−0.228***	−0.247***	−0.031	−0.053*
	(0.009)	(0.009)	(0.003)	(0.003)	(0.003)	(0.003)	(0.029)	(0.028)	(0.027)	(0.026)
Years of schooling	0.018**	0.017**	−0.006**	−0.006**	0.006**	0.006**	0.226***	0.235***	0.064***	0.067***
	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)	(0.018)	(0.018)	(0.017)	(0.017)
Area, log	0.028***	0.030***	0.002	0.002	−0.001	−0.001	−0.033	−0.040*	−0.056**	−0.058**
	(0.007)	(0.007)	(0.002)	(0.002)	(0.002)	(0.002)	(0.020)	(0.020)	(0.019)	(0.019)
Urban, share	−0.013*	−0.015*	−0.005*	−0.005*	0.005*	0.006**	−0.029	−0.017	−0.200***	−0.200***
	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)	(0.019)	(0.019)	(0.018)	(0.018)
Poor, share	0.298***	0.265***	0.032***	0.038***	0.010	−0.0005	0.322***	0.446***	−0.095	−0.006
	(0.027)	(0.026)	(0.008)	(0.008)	(0.009)	(0.008)	(0.083)	(0.080)	(0.078)	(0.075)
Latitude	−0.012	−0.064*	−0.007	0.003	0.013+	0.011	0.204**	0.427***	−0.001	0.095
	(0.024)	(0.025)	(0.008)	(0.008)	(0.008)	(0.008)	(0.074)	(0.076)	(0.069)	(0.071)
Dist. to Coast, log	−0.033***	−0.031***	−0.006**	−0.006**	0.007***	0.009***	0.084***	0.075***	0.009	0.001
	(0.007)	(0.007)	(0.002)	(0.002)	(0.002)	(0.002)	(0.021)	(0.021)	(0.020)	(0.020)
Altitude	−0.017**	−0.007	0.009***	0.007***	0.002	0.002	0.064***	0.020	0.148***	0.131***
	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)	(0.017)	(0.018)	(0.016)	(0.017)
Rainfall	0.011	0.013+	−0.006*	−0.006*	−0.007**	−0.007**	−0.049*	−0.058*	0.050*	0.047*
	(0.008)	(0.008)	(0.002)	(0.002)	(0.002)	(0.002)	(0.023)	(0.023)	(0.021)	(0.022)
Sunshine	0.006	0.008	−0.005**	−0.006**	−0.005**	−0.005*	0.021	0.012	−0.047**	−0.051**
	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)	(0.002)	(0.019)	(0.019)	(0.018)	(0.018)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	4,661	4,661	4,657	4,657	4,660	4,660	4,970	4,970	4,970	4,970
Adjusted R^2	0.591	0.592	0.563	0.564	0.250	0.247	0.794	0.796	0.404	0.403

All predictor variables are standardized. All specifications include "state fixed effects" based on 26 Brazilian states. For variable descriptions, see Appendix. The standard errors are given in parentheses, $^{+}$p<0.1; *p<0.05; **p<0.01 ; ***p<0.001.

Table A7: Racial Group Shares and Public Goods Provision: Robustness Checks

	Total spending		Educ. share		Heal. share		Educ. quality		Heal. quality	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
White, shares	-0.331^{***}		0.066^{***}		-0.013		1.492^{***}		0.630^{***}	
	(0.043)		(0.014)		(0.014)		(0.133)		(0.124)	
Blacks, shares		0.448^{***}		-0.020		0.034		-2.676^{***}		-1.458^{***}
		(0.102)		(0.032)		(0.033)		(0.309)		(0.289)
Brown, shares		0.284^{***}		-0.066^{***}		0.008		-1.263^{***}		-0.479^{***}
		(0.047)		(0.015)		(0.015)		(0.146)		(0.137)
Asian, shares		1.247^{***}		-0.433^{***}		-0.058		-0.851		0.993
		(0.475)		(0.150)		(0.152)		(1.426)		(1.333)
Indigenous, shares		0.384^{***}		-0.268^{***}		0.231^{***}		-0.121		-1.807^{***}
		(0.133)		(0.042)		(0.043)		(0.414)		(0.387)
State FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Standard controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Geographic controls	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	4,661	4,661	4,657	4,657	4,660	4,660	4,970	4,970	4,970	4,970
Adjusted R^2	0.592	0.593	0.564	0.567	0.247	0.252	0.796	0.798	0.403	0.405

The outcome variables are the log of total spending per capita, education and healthcare share and quality in a municipality, respectively. All specifications include "state fixed effects" based on 26 Brazilian states; "standard control" variables as in Table 1, as well "geographic control" variables. For variable descriptions, see Appendix.
The standard errors are given in parentheses, $^{+}$p<0.1; *p<0.05; **p<0.01 ; ***p<0.001.

Table A8: Racial demography and Public Goods Provision (Fractionalization and Shares)

	Total spending	Educ. share	Heal. share	Educ. quality	Heal. quality
	(1)	(2)	(3)	(4)	(5)
Fractionalization	0.005	-0.007^{*}	0.012^{***}	-0.052^{+}	-0.062^{*}
	(0.013)	(0.003)	(0.003)	(0.030)	(0.027)
Whites, share	-0.068^{***}	0.014^{***}	0.002	0.311^{***}	0.118^{***}
	(0.017)	(0.004)	(0.004)	(0.038)	(0.035)
State FE	Yes	Yes	Yes	Yes	Yes
Standard controls	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes
Observations	3,916	3,908	3,911	4,195	4,195
Adjusted R^2	0.405	0.553	0.235	0.787	0.352

Note that none of the associations in the case of fractionalization are robust to the Bonferroni-Holm adjustment. All predictor variables are standardized. All specifications include "state fixed effects" based on 26 Brazilian states. For variable descriptions, see Appendix. The standard errors are given in parentheses, $^{+}$p<0.1; *p<0.05; **p<0.01 ; ***p<0.001. The sample is restricted to municipalities where group shares and fractionalization measures are not collinear (i.e., with white shares between 0.2 and 0.6, see Figure 1). The F-test further indicates that, with an exception of healthcare spending, group share coefficients are significantly stronger than those of fractionalization.