Studies in Comparative International Development (2019) 54:185–209
https://doi.org/10.1007/s12116-019-09281-6

Subnational Inequality in Latin America: Empirical and Theoretical Implications of Moving beyond Interpersonal Inequality

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Published online: 29 April 2019

Abstract

In many countries around the world, living in one subnational unit versus another can be just as important as race or class as a determinant of differential access to opportunities and wellbeing. Despite this fact, scholars still heavily emphasize interpersonal income inequality. This article develops and implements new tools to shift from interpersonal to subnational inequality and from economic to social inequality. It develops a novel concept and measurement of subnational social inequality that overcomes the inconsistencies between definitions and measurements found in existing research on the subject. Focusing on Latin America, the article applies the new measurement tools to reveal differences in the evolution and rankings of interpersonal and subnational forms of inequality. Such findings challenge our existing knowledge of both the levels and the sources of inequality in the region. To make sense of these discoveries, the article suggests that the usual drivers of interpersonal inequality—such as neoliberal reforms and authoritarianism—might drive down subnational inequality, while well-known inequality fighters—such as democratization and left party rule—might not be as effective at combating its subnational variety.

Keywords Inequality · Subnational politics · Political economy · Social development · Inequality measurements

In many countries around the world, the chances of being poor, illiterate, or sick depend to a large extent on one's place of residence within the country; however, in other countries, place of residence matters little in determining differential access to services.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s12116-019-09281-6) contains supplementary material, which is available to authorized users.

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There is, thus, a subnational side to inequality that is more acute in some countries than in others, and despite its importance, it is rarely studied. Economists and geographers have taken space much more seriously, but most analyses in these fields are descriptive.[1] Scholars of inequality in political science still heavily emphasize income inequality between individuals (Boix 2010; Stepan and Linz 2011), and there is little discussion as to whether existing concepts, measurements, and theories to analyze and explain income inequality travel well to analyze and explain subnational inequality.

The contradiction between the importance of subnational inequality in everyday life and the absence of concepts, measurements, and theories to analyze and explain it is particularly problematic in Latin America. For decades, we have known that this region is the most unequal in the world (Hoffman and Centeno 2003), a label that emanates from the high interpersonal income inequality in most of its countries. We have also learned from recent scholarship that, in a good number of countries, interpersonal income inequality rose in the 1990s mostly due to neoliberal reforms and declined in the 2000s as an outcome of democratization, left party rule, and increased human capital spending (De Ferranti et al. 2004; Kaufman 2009; Huber et al. 2006; López-Calva and Lustig 2010). Yet, we do not know whether these trends travel to the subnational type of inequality. We cannot affirm without empirical study whether subnational inequality behaves similarly to income inequality, and as a result, we cannot be confident that policies that work to reduce income inequality in Latin America also work to reduce subnational inequality.

Inequality is a complex, multifaceted phenomenon that cannot be completely reduced to its manifestation in interpersonal income. In this article, I join other scholars in arguing that a fixation on interpersonal income inequality obscures other sources of segregation and neglects the political dynamics that drive the production of differences in income and wellbeing (Stewart 2002; Tilly 1999). Concretely, I suggest two shifts in our understanding of inequality. First, I propose a shift from interpersonal to subnational or interregional inequality, as has been already stressed by Tarrow et al. (1978), Beramendi (2012), Østby et al. (2009), Rogers (2015), Berdegué et al. (2015), and Singh (2016). Second, I suggest a shift from an economic dimension of inequality to a social dimension, which relates to education, health, sanitation, and opportunity. In order to pursue both shifts and adequately study subnational social inequality, this article offers a novel measurement that combines the notions of dispersion and gap. This measurement allows us to better capture the idea of inequality at the subnational level and to compare it across dimensions and countries.

Pursuing both shifts with the correct measurement tools permits a novel perspective on the phenomenon of inequality in Latin America. I find that the evolution of subnational social inequality across the decades has been remarkably different than that of income inequality and that each type of inequality produces a different ranking of countries. To make sense of these divergences, I use a territorial lens to evaluate the findings of the recent literature on inequality in the region. I find that the theoretical expectations of the usual drivers of income inequality are not the same for subnational income inequality. It turns out that neoliberal reforms and authoritarian rule are not as adverse for subnational equalization as they are for the reduction of income inequality,

[1] See Zhang and Kanbur 2005; Banerjee and Somanathan 2007; Rodríguez-Pose and Ezcurra 2010; Royuela and García 2015; and Marchante and Ortega 2006.

and there are theoretical reasons to doubt that democratization and left party rule are as effective at reducing subnational inequality as interpersonal inequality. To sum up, this article provides the theoretical basis and the methodological tools necessary to adopt a territorial perspective in the study of inequality. In doing so, it suggests that scholars and practitioners have much to gain by complementing their study of inequality with a focus on subnational social inequality (Otero-Bahamon 2016).

In addition to contributing to the literature on inequality, this paper contributes to the growing field of subnational research in political science. It encourages scholars and practitioners to look inside countries, not to increase the number of observations or to solve methodological problems (Snyder 2001), but to discover important phenomena and develop novel theories that are hidden below the regular national categories we use (Giraudy et al. forthcoming). The article also offers a distinct way of approaching the subnational level: instead of focusing on variation between subnational units as most studies do, it assesses the differences between countries in the margin of variation. In other words, whereas most studies in subnational research seek to understand and explain the differences between subnational units in aspects such as income, public goods, state presence, or quality of democracy; this paper demonstrates that these differences between subnational units come in different sizes. By applying the measurement tools developed here, other scholars can observe the degree of subnational inequality in different attributes and study its causes and implications. This approach is what Harbers and Steele (2017) call "cross national variation of subnational variation," and has the potential of transforming the type of questions that we ask when scaling down to the subnational level.

This article is organized as follows: the first section discusses the importance of shifting to the subnational and social dimensions of inequality. The second section develops the concept and measurement of subnational social inequality, compares it with alternatives, and demonstrates its superiority with real-world examples. The third section uses the proposed new measurement to track the evolution of eight Latin American countries in terms of subnational social inequality, in comparison with income inequality. The fourth section interrogates our existing knowledge of inequality in Latin America through the lens of subnational inequality. The conclusion contains implications and future avenues for research.

From Interpersonal Economic Inequality to Subnational Social Inequality

When many scholars and practitioners think of inequality, they imagine interpersonal income inequality. The quasi-universal use of Gini coefficients and household surveys demonstrates this point. However, the practices of inequality-making often involve groups rather than individuals (Stewart 2002; De Ferranti et al. 2004), and subnational units represent one of the ways to define such groups. In order to better account for inequality beyond the standard approach, I suggest two shifts in emphasis: from interpersonal to subnational inequality and from economic to social inequality.

The first shift in emphasis has been compellingly undertaken by a handful of sociologists and political scientists (Lobao et al. 2007; Beramendi 2012; Østby et al. 2009; Cederman et al. 2011; Rogers 2015). In her pioneering work, Stewart and her

colleagues drew attention to Horizontal Inequalities, defined as inequality in which group membership is a marker for stratification[2] and segregation among culturally defined (or constructed) groups (Stewart 2002; Stewart and Langer 2008). Groups relevant for inequality are culturally constructed along racial, ethnic, class, gender, and territorial lines. Subnational inequality refers thus to a horizontal inequality that uses place of residence as a criterion to determine uneven access to opportunities for wellbeing.

Territorial or subnational divisions might act in conjunction with class, racial, or ethnic differentiations or by themselves, as markers of stratification. It is common for people from a particular class, race, religion, or ethnicity to be concentrated in well-defined territories. In Turkey, the Kurdish minority is territorially concentrated in 11 southeastern provinces, which are also among the poorest and least educated. In the former Sudan, a religious/territorial cleavage between the Islamic North and the Christian South fueled decades of conflict, as the North enjoyed economic and political power and the South launched armed resistance. In Peru, descendants of indigenous peoples have populated the highlands—*la Sierra*—which have been neglected for decades by the central state (Thorp and Paredes 2010).

In these instances, horizontal inequalities built around racial/ethnic/religious lines have a territorial expression, making some subnational units more deprived than others. The fact that these cleavages are territorially bounded in subnational divisions provides the mechanism through which stratification is exercised. In most countries, whether democratic or authoritarian, politics are organized along territorial lines, and for this reason, subnational divisions are political institutions through which debates are fought and resources are allocated.

I pursue a second shift in attention from an economic dimension of inequality to a social dimension of inequality. Most scholars researching interpersonal and subnational inequality have focused on economic dimensions such as income or GDP. Less research is available on spatial disparities in other aspects of wellbeing, such as education, health, and sanitation. Focusing on income alone means emphasizing inputs and leaving aside outcomes, but the outcomes—such as life expectancy, infant mortality, educational attainment, and access to services—are most relevant for wellbeing and are the aspects real world people care about the most (Stewart and Langer 2008: 3; De Ferranti et al. 2004: 68).

I advocate giving the social dimension of inequality—the outcomes—a proper space in political approaches to inequality. A variety of reasons supports this claim. First, in subnational units with mediocre institutional and state capacity, high incomes are not enough to overcome the collective actions problems necessary to provide public goods. As a result, the correlation between social outcomes and local productivity is not necessarily strong.[3] Second, the experience of many countries shows that economic output can be extremely concentrated in a few provinces, but basic aspects of wellbeing can be quite homogenous across the territory. As income is correlated with but is

[2] Stratification refers to "how valued resources are allocated according to class, gender, race/ethnicity, and other statuses" (Lobao et al. 2007).

[3] For instance, the correlation between regional GDP per capita and regional literacy rates is 0.26 for Mexico, 0.22 for Ecuador, 0.32 for Colombia, 0.56 for Chile, 0.64 for Peru, 0.71 for Brazil, and 0.56 for Argentina, based on latest Census and official data.

neither necessary nor sufficient for other dimensions of wellbeing, social outputs should be part of the research agenda on inequality.

Defining and Measuring Subnational Social Inequality

Following Sen (1999) and Kanbur and Venables (2005), I define subnational social inequality as *the difference between subnational units of the same country on dimensions related to the capabilities needed to access the things that people have reason to value*. As Lobao et al. (2007) state, a concern for the spatial dimension of inequality changes the question of *who gets what* to *who gets what where*. In the case of subnational social inequality, the *what* refers to public goods necessary for accessing education, health, and sanitation, such as schools, teachers, teaching materials, roads, hospitals, doctors, medical equipment, water and sewage ducts, and infrastructure. An interest in subnational social inequality is translated into assessing which subnational units are getting public goods related to social development and why.[4]

Researchers use a variety of techniques and measurements to assess subnational inequality in different attributes. The measurements most commonly used are range, ratios, spatial Gini, Theil Index, Beta Convergence, standard deviation, and coefficient of variation. I argue that existing measurements face two problems. On the one hand, they are used without being explicit about which concept of inequality is connected to the selected measurement and whether there is coherence between how inequality is understood and the measurement used. On the other hand, they are not always a good fit to capture the subtleties of the subnational social variant of inequality.

I seek to address these problems by building on existing work on inequality theory. I propose a concept of subnational inequality that combines two notions of inequality—gap and dispersion—and suggest a measurement of subnational inequality that captures both notions. Next, I show with two examples the appropriateness of the suggested measurement. In the Appendix, I compare my measurement with others and with established rules for selecting inequality measurements, also known as axioms.

A Composite Index of Subnational Social Inequality

I operationalize subnational social inequality as the combination of two notions of inequality: gap and dispersion. Gap refers to the absolute difference or distance between the subnational unit(s) with the best and worst levels of an attribute. A lesser difference between the best and worst subnational unit signifies lower inequality. Dispersion refers to the distance from the mean in the distribution of an attribute among subnational units. If all subnational units have the same value of an attribute,

[4] Alternative labels are used to describe related phenomena: spatial inequality, territorial inequality, regional/interregional inequality, and regional disparities among others. I prefer *subnational inequality* for several reasons. First, the term *subnational* limits the attention to inequality between political and administrative entities, emphasizing the political mechanisms involved in its production. Second, in the context of decentralization where many social services are provided by municipalities, the term *subnational inequality* is more adequate when referring to inequality between these administrative units. Third, the term *regional* is often used to address political units comprising of several nation states.

dispersion becomes absent and full equity is observed. I contend that both notions are core components of subnational inequality.

Gap is a core component of subnational social inequality because it brings attention to what is happening at the tails of the distribution. A country with a very large distance between the best off and the worst off subnational units is substantially different than a country with a small distance. The concept of gap captures very well the existence of extremely privileged or extremely marginal subnational units. The first case might occur when an elite is concentrated in the territory of one subnational unit and denies public goods to the rest of the population. The second case might occur when there is systematic discrimination against the population concentrated in the territory of one subnational unit. Such territorial dynamics are political in nature and constitute subnational inequality and should thus be captured in an inequality measurement of this phenomenon.

Dispersion is a core component of subnational social inequality because it captures distance from the mean of the distribution. If all subnational units have the same illiteracy rate and infant mortality rate, subnational inequality is zero for these indicators. To the extent that the distribution of literacy, illness, water access, and other indicators of social development distance from the mean, dispersion and subnational inequality increase as well.

The following example illustrates the importance of both dimensions. Let us assume the existence of two countries, A and B, which have a total population of 100,000 people distributed equally in four subnational units of 25,000 people each. The dimension that interests us for the purpose of this example is illiteracy. In country A, the illiteracy rate in each subnational unit is 1%, 2%, 3%, and 4%. In country B, the illiteracy rate of each subnational unit is 20%, 40%, 60%, and 80%.

If we only measured inequality using a dispersion measurement such as the Gini coefficient or the coefficient of variation, both countries would be similarly unequal. The Gini coefficient of both countries is 0.25 and the coefficient of variation is 0.52. This similarity occurs because, in both countries, the relative position of each subnational unit is the same, resulting in the same relative dispersion of illiteracy around the mean. The worst off subnational unit has four times the illiteracy rate of the best off, and the second worse off three times the illiteracy rate of the best off. The dispersion around the mean is the same.

However, one must ask whether the two countries have the same degree of subnational inequality. An illiteracy rate of 4% is practically undistinguishable from an illiteracy rate of 1%, whereas an illiteracy rate of 80% is strikingly different from an illiteracy rate of 20%. In country A, virtually everybody is literate in all subnational units; in country B, there is one subnational unit in which a large majority is illiterate, and one subnational unit in which a large minority is illiterate. One can convincingly argue that country B is much more unequal than country A.

In the preceding example, it is clear that a measurement of dispersion alone such as the Gini or the coefficient of variation does not capture the difference in subnational inequality. This occurs because most dispersion measurements capture *relative inequality*, or the differences between individuals or groups with respect to each other. These *relative inequality* measurements work well when some individuals make *x times* the incomes of other individuals, disregarding whether such incomes are in dollars or yen, millions, or thousands. The relativity of inequality measurements makes a lot of sense

for distribution of income, but it does not fare well with non-cumulative and bounded attributes such as literacy or mortality.[5]

However, using a gap measurement such as the range would also produce misleading conclusions. Let us compare country B and country C. In both countries, there are four subnational units of 25,000 people each. The illiteracy rates of each subnational unit in country B are 20%, 40%, 60%, and 80%. The illiteracy rates of country C are 20%, 20%, 80%, and 80%. The gap between the best off subnational unit and the worst off subnational unit is the same in both countries: 60. However, country C is arguably more unequal because there is more dispersion in the illiteracy rates of its subnational units. In fact, the Gini coefficient of country B is 0.25 and of country C is 0.30, and the coefficient of variation of country B is 0.5 and of country C is 0.7. Focusing on gap alone is problematic because it only considers two subnational units when the issue of inequality involves the whole country.

To capture the fact that country B is more unequal than country A and that country C is more unequal than countries B and A, I suggest a measurement of subnational inequality that combines a measurement of gap and a measurement of dispersion. In the Appendix, I demonstrate the advantages and disadvantages of different gap and dispersion measurements used in the literature and justify my selection of the range and the coefficient of variation (C.V.) as the most appropriate measurements to gauge subnational social inequality. The range captures the gap between the better off and the worse-off areas of a country, and the C.V. is one of the best measurements of dispersion. These two measurements are superior to other gap and dispersion measurements regularly used in the literature, such as Beta Convergence, Gini, and Theil Index. As I argue in more detail in the Appendix, Beta Convergence shows whether inequality in a country is increasing or decreasing, but gives no information on the extent of such inequality; Gini coefficients are not commonly used for categorical or bounded variables as illiteracy and infant mortality rates; and the Theil Index cannot be used in cross-country comparisons because it is sensitive to population size. In contrast, the range and the coefficient of variation do not suffer from these shortcomings. Because both gap and dispersion are core components of subnational inequality, the index multiplies the range by the C.V (Fig. 1).[6] The Composite Index of Subnational Inequality ranges between 0 and infinity. It takes a value of zero when all set values are equal (range = 0 and C.V = 0); it approaches infinity when the mean value is close to zero.

$$Composite\quad Index\quad of\quad Subnational\quad Inequality = \frac{\left(Max{-}Min^{*}\sigma\right)}{\mu}$$

Max	Maximum value
Min	Minimum value
σ	Standard deviation
μ	Mean

[5] Bounded refers to variables that have maximum and minimum levels. Illiteracy, for instance, is a bounded variable limited to a 0 to 100 range.

[6] Based on Goertz' (Goertz 2006) definitions of concepts, I suggest that both gap and dispersion are core components or dimensions of the concept of subnational inequality. Since both are "necessary" for the notion of subnational inequality, the aggregation rule should be multiplication (Munck and Verkuilen 2002; Goertz 2006)

In the examples above, the Composite Index of Subnational Social Inequality of country A is 1.54, of country B is 31, and of country C is 41.

This Composite Index has some desirable properties. First, it is an operationalization that captures well two notions of inequality that are particularly relevant to assess subnational social inequality: gap and dispersion. Second, it is comparable across countries when the same attribute is used. Third, it is intuitive and simple to compute.

To compute the Composite Index of Subnational Social Inequality, a researcher must choose the aspect of social inequality to be studied and the appropriate scale (region, state, province or municipality). To select a social indicator, the researcher must take into consideration which data sources compile data across the territory. Censuses provide reliable and frequent information on literacy, access to water, electricity, sanitation, and quality of housing, among others and cover the territory in such a way that the information can be aggregated at different scales. This might not be the case for other data sources such as household surveys, which might not cover significant portions of the territory or might have varying degrees of representativeness for different subnational units. However, since it has been established that the accuracy of Census data at the subnational level is dependent on state capacity (Lee and Zhang 2017), scholars must use Census data with caution when applied to years and countries where there is evidence of data inconsistencies. If a scholar wants to perform a temporal analysis, she must be careful of doing it at the same scale with the same units of analysis for the

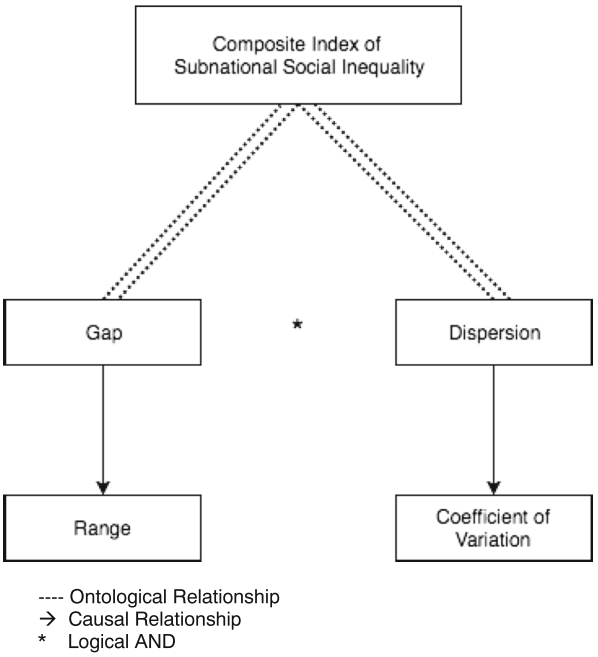

Fig. 1 Operationalization of the Composite Index of Subnational Social Inequality. * An ontological relationship means that gap and dispersion are fundamental constitutive elements of the concept of subnational inequality. They are linked with a logical AND, which expresses that each is a necessary condition. The relationship between the constitutive elements of the concept and the measurements is a causal one. Gap causes range and dispersion causes coefficient of variation (Goertz 2006)

different moments; otherwise, the observed changes might be due to the different treatment of the data, rather than to changes in the underlying subnational inequality.

Scholars have also warned that due to the modifiable areal unit problem, the selection of scale can profoundly affect the findings of the analysis (Wong 2008). The change over time of subnational inequality might look very different depending on whether the analysis is based on municipalities, provinces, or states. The selection of the scale must not be arbitrary, but respond to theoretical questions. What is the relevant scale for the provision of that service? Is the service decentralized to the municipal or the provincial level? Are state level politics more important than municipal level politics? These are the type of questions that should determine the scale to be used in the computation of the Composite Index of Subnational Social Inequality. The proposed index is amenable for computation with all subnational scales.

A Latin American Example

To assess the appropriateness of the Composite Index of Subnational Inequality for social indicators with real-world examples, I will compare dispersion and gap measurements to the Composite Index of Subnational Social Inequality in three Latin American countries: Argentina, Peru, and Brazil. Figure 2 shows the change over time of subnational inequality in illiteracy in Argentina and Peru. The top graph shows a measure of dispersion only, in this case the C.V. The bottom graph shows the composite measure that combines gap and dispersion

Judging from a dispersion measurement like the one portrayed on the top graph, both countries exhibit a similar trend in subnational inequality in illiteracy. Both countries started with high levels of inequality and saw a subsequent reduction in recent decades.

This description, however, is problematic. In 2010, the dispersion of subnational illiteracy values around the mean was similar in both countries, but in Argentina, no province had an illiteracy rate higher than 6%. The high dispersion is partially accounted for by the virtually universal literacy of two provinces: Buenos Aires and Tierra del Fuego. But even the most illiterate province (Chaco) is not very distant from the most literate province and the country's mean. We can observe a similar pattern in previous years.

In Peru, in contrast, subnational illiteracy rates show much more unevenness. Illiteracy rates in Huánuco and Huancavelica in 2010 remained around 20%, whereas in Lima and other coastal provinces the illiteracy rate ranges between 3 and 4%. This means that whereas in the *sierra* provinces one in every five people is illiterate, in the coastal provinces the ratio is one in every 33. Even though the illiteracy rates are similarly distributed around each country's mean values, one can convincingly argue that subnational inequality in Peru is much higher than in Argentina.

Similarly, a gap measurement alone does not gauge adequately subnational inequality. Figure 3 compares the change over time of subnational inequality in Brazil. The top figure measures inequality with the ratio, or the highest subnational illiteracy rate divided by the lowest subnational illiteracy rate. The bottom figure shows the evolution based on the composite measurement of subnational inequality proposed here.

Based on a gap measurement such as the ratio, which divides the top value on the bottom value, subnational inequality in illiteracy in Brazil has trended upward since 1980. However, one must ask whether subnational inequality has really grown. A closer look at subnational illiteracy data suggests that it has not. In 1980, the differences

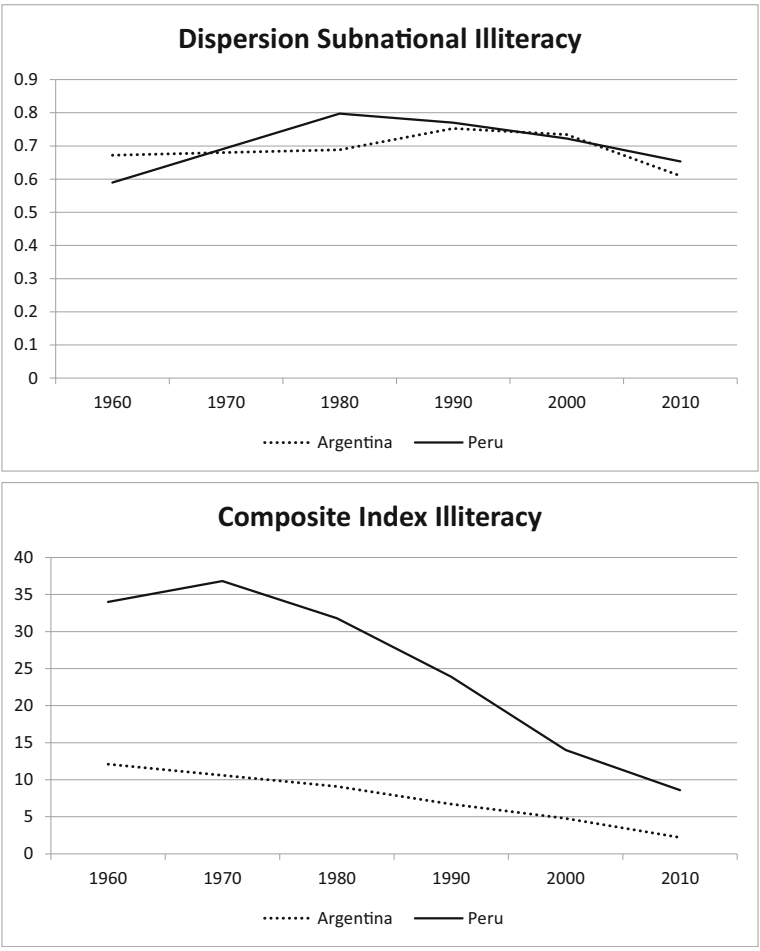

Fig. 2 Dispersion v. Composite Index. Sources: Author's elaboration on national census data. Census dates for Argentina: 1960, 1980, 1991, 2001, and 2010. Census dates for Peru: 1961, 1972, 1981, 1993, 2000, and 2010. Computed using illiteracy rates for Argentina's provinces and Peru's departments

between subnational units in illiteracy rates were enormous. A sizeable number of states from the northeastern and northern regions had illiteracy rates above 40% whereas in a considerable group of southern states illiteracy was below 10%, resulting in a ratio of 4.47. In 2010, the situation was considerably different. The worse-off states had illiteracy rates around 17%, and the better off states had illiteracy rates around 4%. The difference was still large but no longer staggering. However, the ratio went up to 6.48. Whereas a ratio measurement suggests that subnational inequality has increased, the reality is that it has not. Illiteracy became a rarer condition everywhere and the country has become more subnationally equal.

Both examples demonstrate that dispersion or gap measurements, taken separately, do not capture the concept of subnational social inequality. Combining gap and dispersion provides a better assessment of differences between subnational units in social attributes. The composite measure matches intuitive assessments that Peru has a higher subnational inequality than Argentina and that subnational inequality in Brazil

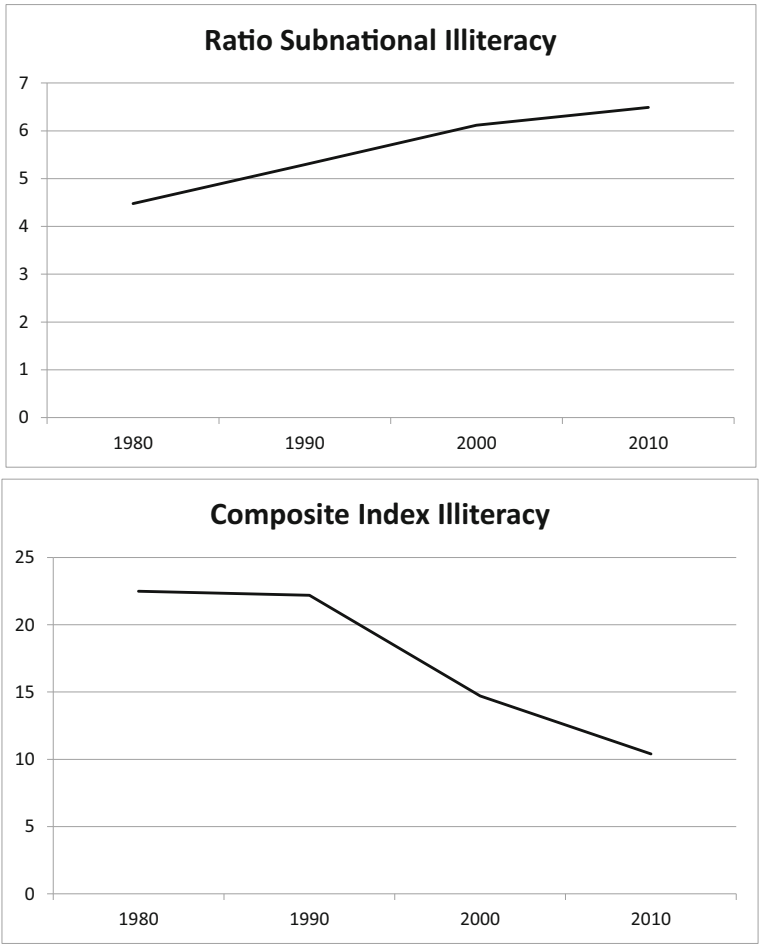

Fig. 3 Brazil Gap v. Composite Index. Sources: Author's elaboration on Brazil's national censuses of 1980, 1990, 2000, and 2010. Computed using illiteracy rates of federative units

has been falling and not increasing. The power of the composite measure, and its focus on social aspects, not income, suggest that applying this measure to study change through time will generate important new characterizations of inequality.

The Evolution of Subnational Social Inequality and Interpersonal Inequality in Latin America

In this section I, will first show the change over time of subnational social inequality and interpersonal income inequality for a sample of eight[7] Latin American countries. Next, I will develop rankings based on both types of inequality and explore whether there is a correspondence between the two.

[7] I restrict this exercise to eight countries since they are the only ones for which I found reliable data at the subnational level for both infant mortality and illiteracy.

Evolution and Rankings of Subnational Social Inequality[8]

Figures 4 and 5 illustrate the change over time of subnational inequality in illiteracy and infant mortality. For illiteracy, most countries in the sample experienced increases in subnational inequality at the beginning of the time series and reductions in subsequent decades. Subnational inequality increased in Chile from 1940 to 1960, in Brazil from 1920 to 1980, in Mexico from 1930 to 1960, and in Peru until 1970. Peru, Colombia, and Brazil were the three countries in which subnational inequality increased the most, exhibiting the highest levels of subnational inequality in illiteracy. Subnational inequality for illiteracy in Costa Rica started and continued at a lower level than in the other countries in the sample.

Inequality began to decrease in 1950 for Costa Rica and Argentina, 1960 for Chile, Colombia, Mexico, and Ecuador, 1970 for Peru, and 1990 for Brazil. In all countries but Colombia, subnational inequality has continued to drop until today. In Colombia, in contrast, subnational inequality dropped between 1960 and 1980 before increasing slightly until 2005.

Subnational inequality in infant mortality was more successfully reduced in most countries in the sample. The trend towards reduction started first in 1970 in Chile (from a very high initial level) and Costa Rica, in 1980 for Mexico and Argentina, and 1990 for Ecuador, Brazil, and Peru. The only country in which subnational inequality in infant mortality did not drop is Colombia, based on data ranging from 1990 to 2005.

With this information, I created a ranking of countries with high, medium, and low levels of subnational social inequality.[9] The results are shown in Table 1, and the detailed table showing the process of building the ranking can be found in the online appendix.

Brazil, Peru, and Colombia are the countries with the highest levels of subnational social inequality; Mexico and Ecuador have medium subnational social inequalities; and Argentina, Costa Rica, and Chile are the countries with the lowest levels of subnational social inequality.

[8] For this section, I use an "adjusted range" and a weighted coefficient of variation rather than regular range and coefficient of variation. Regarding the "adjusted range," some of the countries taken into consideration here have a much smaller number of subnational units than others, going from 6 (Costa Rica) to 33 (Colombia). If we calculate the regular range, we would take into consideration 33% of Costa Rica's and 6% of Colombia's subnational units. To avoid this imbalance, I compute the range with the top 15% and the bottom 15% of subnational units. If, for example, a country has 20 provinces, I take the average of the top 3 provinces and subtract it from the average of the bottom 3 provinces. Likewise, I use a weighted coefficient of variation because most countries of my sample exhibit large differences in the population sizes of subnational units. The weighted C.V gives more weight to more populous subnational units than to less populous ones.

[9] I ranked from highest level of inequality to lowest level of inequality for 1970, 1990, and 2010 and added all values for each country. For instance, Peru in illiteracy ranked first in 1970 (1 point), first in 1990 (1 point), and third in 2010 (3 points). Similarly, Peru in infant mortality ranked first in 1990 (1 point) and fourth in 2010 (4 points). Adding all points results in a value of 10. Doing the same exercise for all the periods in which there is data available for all countries gives the following points: Peru, 10; Brazil, 11; Colombia, 12; Mexico, 21; Ecuador, 22; Argentina, 31; Chile, 35; Costa Rica, 38. These results give pretty clear break points between levels. High subnational social inequality covers countries with values ranging from 10 to 12; medium subnational social inequality covers countries ranging from 21 to 24, and low subnational social inequality ranges from values 31 to 38.

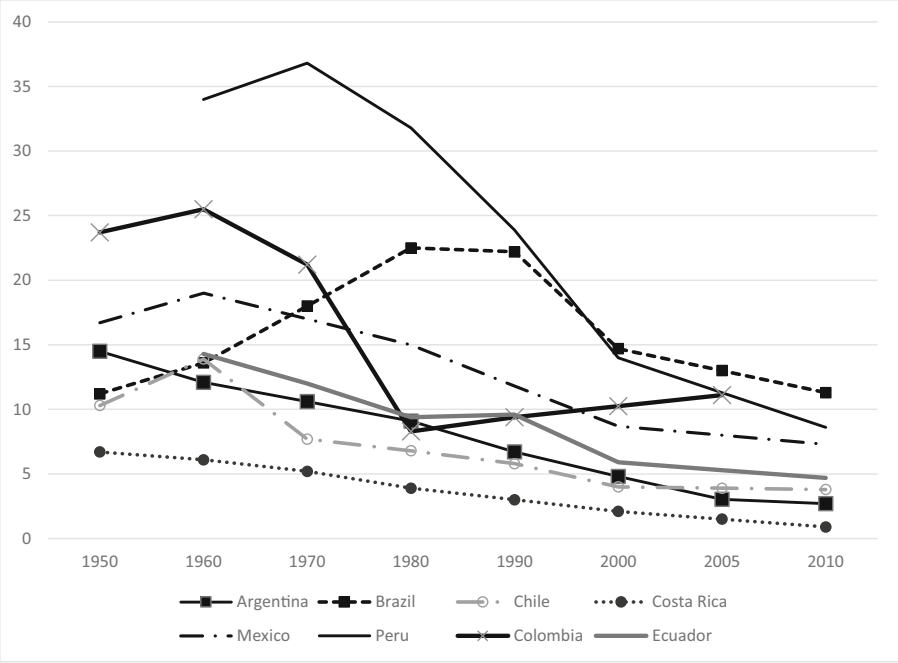

Fig. 4 Subnational Inequality—Illiteracy. Source: Author's elaboration, see Online Data Appendix for data and sources

Evolution and Rankings of Interpersonal Inequality

I have suggested a methodology for looking at subnational inequality in social outcomes, but if subnational social inequality tracks interpersonal income inequality, then this methodology can only reinforce existing, more common measures of inequality. Therefore, it is necessary to explore whether subnational social inequality is empirically distinct from interpersonal income inequality. In Fig. 6, I address this issue by presenting the change over time in interpersonal income inequality using Gini coefficients in the same eight countries between (circa) 1986 and 2011.

Income inequality in most countries in this sample exhibits a declining pattern, especially in the last few years. In Brazil and Chile, income inequality has been dropping since 1990; in Peru and Ecuador, since 1999; in Argentina and Costa Rica, since 2003; and in Colombia and Mexico, since 2008. The rate of reduction is different for every country. Income inequality reduction has been slow but steady in Brazil and Chile, steep in Ecuador, Peru, and Argentina, and fluctuating and slow in Costa Rica, Colombia, and Mexico.

Following the same process described above to produce country rankings on subnational social inequality, I sorted the countries into categories presented in Table 2. Table 3 summarizes the comparison of the two rankings.

Five countries have the same ranking for interpersonal and subnational inequality. Brazil and Colombia are among the most unequal in income inequality and subnational social inequality, Mexico and Ecuador exhibit medium values in both types, and

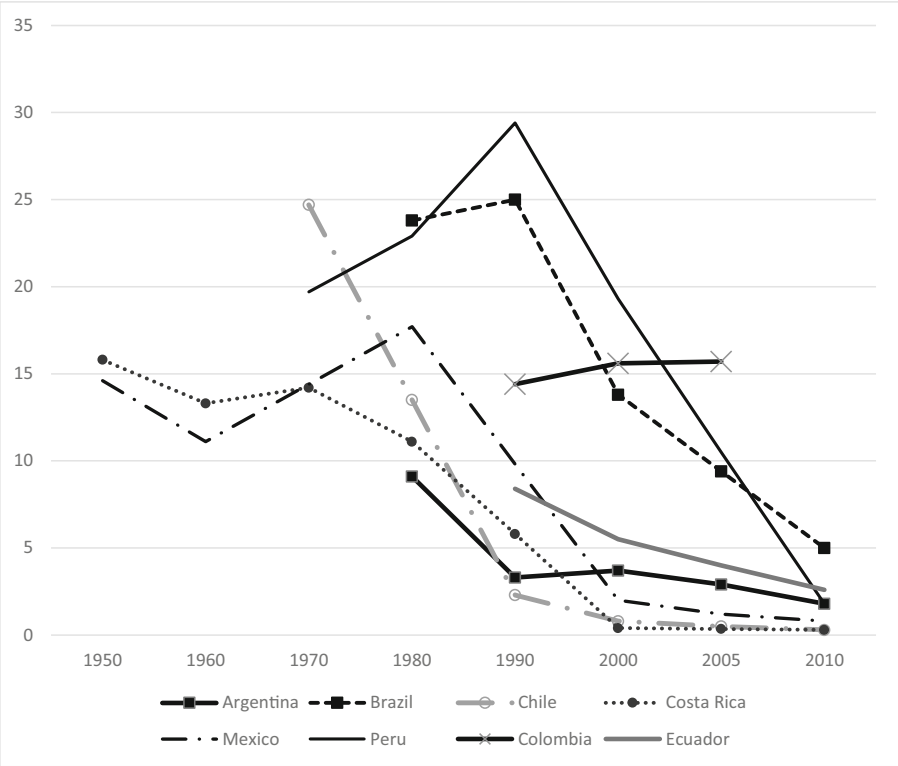

Fig. 5 Subnational Inequality—Infant mortality. Source: Author's elaboration, see Online Data Appendix for data and sources

Argentina remains low. The exceptional cases are worth our attention. Peru is one of the countries with lower income inequality and higher subnational social inequality. Chile is very interpersonally unequal and subnationally equal. Costa Rica has medium levels of interpersonal inequality and low levels of subnational inequality.

I also looked at the change over time in both measures. Income inequality increased in the 1990s and dropped in the 2000s. The alternative focus taken here shows that during the 1990s and 2000s, most countries reduced subnational social inequality.

These contrasts in the rankings and evolutions of both types of inequality challenge our existing understanding of inequality in the region. Countries can behave differently given alternative types of inequality. Conversely, for the entire region, the two types of inequality explored here can have dramatically different trends over long periods of time. Given that Latin America stands as the most unequal region of the world, scholars have drawn a few well-grounded conclusions on the causes of income inequality in this

Table 1 Ranking of Latin American countries in subnational social inequality

Level of subnational social inequality	Countries
High	Peru, Brazil, Colombia
Medium	Mexico, Ecuador
Low	Chile, Costa Rica, Argentina

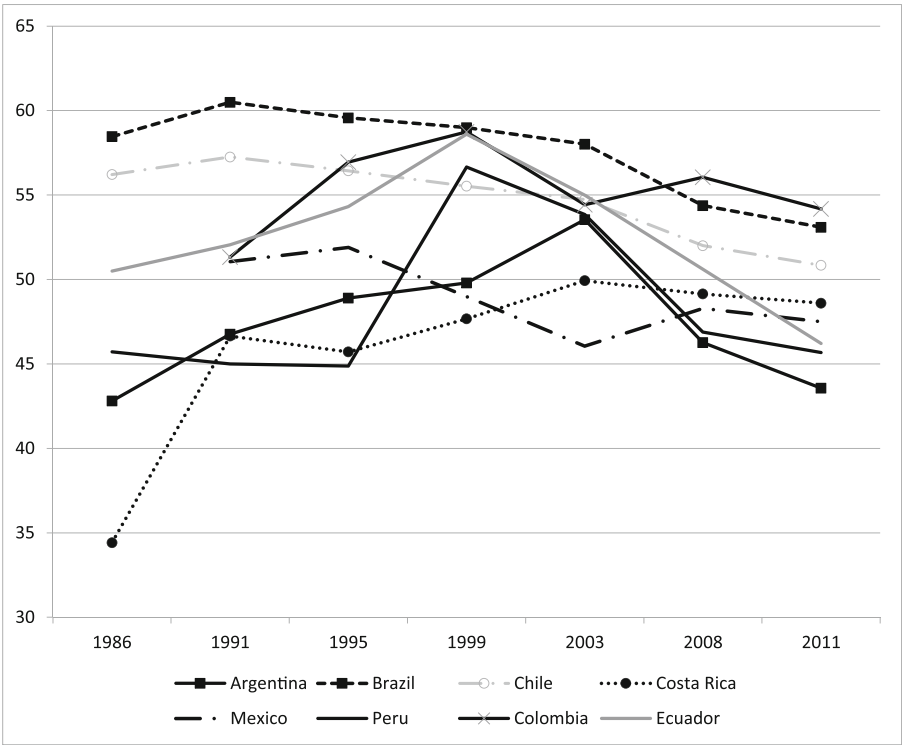

Fig. 6 Interpersonal Income Inequality—Gini. Source: World Development Indicators

region. In the next section, I consider the extent to which these conclusions travel to the subnational type of inequality.

Understanding Inequality through a Territorial Lens

There is generalized acceptance of the fact that for most countries in the region, income inequality rose during the 1980s and 1990s and started to subside by the late 1990s and early 2000s. Scholars converge on a handful explanations for this pattern. Increases in inequality during the 1990s are the result of the structural adjustment programs of the Washington Consensus that brought trade liberalization, privatization, and fiscal reforms across the region. These reforms led to deindustrialization, which lowered the incomes of low-skilled workers (Bogliaccini 2013); to technological change, which increased the demand for and incomes of high-skilled workers (López-Calva and

Table 2 Ranking of Latin American countries by interpersonal income inequality

Level of income inequality	Countries
High	Brazil, Chile, Colombia
Medium	Ecuador, Mexico, Costa Rica
Low	Argentina, Peru

Table 3 Subnational social inequality vs. income inequality

Interpersonal income inequality	Subnational social inequality		
	High	Medium	Low
High	Brazil Colombia	–	Chile
Medium	–	Mexico Ecuador	Costa Rica
Low	Peru	–	Argentina

Lustig 2010); and to the privatization of health, education, and pension sectors, which undermined the social security of important portions of society (Huber and Stephens 2012). All these outcomes of neoliberal reforms increased income inequality.

The 2000s brought changes in governance, economic models, and social conditions across the region. There is widespread acceptance of the role of democracy and left party strength on the reduction of inequality. Huber et al. find that countries with longer records of democracy have "lower degrees of inequality, because democracy, over the long term offers the possibility for the underprivileged to organize and make their voices heard" (2006, 944). One of the ways in which prolonged democracy fights inequality is through the participation of left parties in the political arena. Left parties tend to represent the poorest in a society, and favor transfers and benefits for low income earners, their core supporters (Huber et al. 2006: 950; Jana and Nathan 2013). Huber et al. (2006) and Jana and Nathan (2013) find that leftward shifts in the legislative partisan balance of power lead to lower pre-tax and post-tax income inequality, while Birdsall et al. (2013) and Cornia (2014) stress that inequality falls more sharply in regimes governed by the left.

Scholars have also identified inequality reducing policies that have been regularly, but not exclusively, carried out by left regimes. Two policies in particular have gathered support in the literature: higher human capital spending and conditional cash transfers. Higher spending in health and education are associated with lower income inequality (Jana and Nathan 2013): as more groups of people across Latin American countries managed to complete secondary and tertiary education, skilled jobs could pay lower wages, and the relative scarcity of unskilled labor drove wage increases. Various researchers discovered that a smaller difference between skilled and unskilled wages is found to have dropped inequality (Cornia 2014; López-Calva and Lustig 2010).

Similarly, an already large set of literature has highlighted the importance of conditional cash transfers in reducing income inequality. These lift the income of poor beneficiaries and expand access to basic education to the most underprivileged sectors of society (Soares et al. 2009; López-Calva and Lustig 2010). There is evidence that left-leaning governments have been more aggressive in the implementation of these policies (López-Calva and Lustig 2010: 17).

To sum up, scholars of inequality in Latin America have found that inequality rose during the 1980s and much of 1990s, mostly due to Washington Consensus policies that led to higher wage differentials between skilled and unskilled workers and to the demise of existing social protection schemes. This trend reversed in the late 1990s and 2000s when countries invested more heavily in expanding health, education, and

conditional cash transfer programs. Consolidation of democracy, strengthening of left parties, and left party rule contributed to the reduction of inequality. What happens with these findings when we adopt a territorial perspective? Does subnational inequality respond to similar dynamics? An empirical test of the possible causes of subnational social inequality is outside the scope of this article. Instead, I will discuss the theoretical implications of translating the findings of income inequality to subnational inequality.

As opposed to income inequality, subnational social inequality dropped in the 1990s in most countries of the sample studied in the previous section, suggesting that neoliberal reforms were not so adverse for inequality reduction. The decrease might have to do with the fact that countries with more aggressive neoliberal reforms experienced a process of deindustrialization that affected living standards in the urban metropolis, since industrialization in the region was extremely concentrated in urban centers (United Nations-HABITAT 2012). In large industrial cities, social indicators might have worsened or improved at a lowered rate as a result of increased unemployment and fiscal contractions, leading to smaller gaps between these urban areas and rural, more impoverished areas of the country. On the other hand, market reforms reduced funding and political support for universal social policies and switched attention to targeted social policies. Universalism has been found to be a key policy in driving down interpersonal inequality, but targeted social policy often includes a territorial criterion, making worse-off areas likely targeted beneficiaries of social protection schemes. Reformist incumbents in the 1990s often targeted benefits and subsidies to stagnant areas that were key in maintaining governance coalitions. Gibson and Calvo (2000), Schady (2000), and Etchemendy (2016) provide evidence of this in Argentina, Peru, and Chile.

While the demise of universalism in the 1990s contributed to rising income inequality, the implementation of targeted social policies might have had a positive impact in reducing subnational social inequality.

In the 2000s, both types of inequality dropped. Did democracy, left party strength, and increased social spending lead to lower subnational social inequality just as they led to less income inequality? The answer is unclear. Theoretically, democratization and democracy might increase rather than lower subnational inequality. First, some of the region's authoritarian rulers catered to constituencies in impoverished or less developed regions, reducing subnational social inequality during their terms by directing public goods there. This is the case of Peru with Fujimori (Schady 2000; Roberts and Arce 1998) and Chile with Pinochet (Etchemendy 2016). Democratization might mean that these areas lost their authoritarian privilege. Second, democracies entail an urban bias due to the demographic weight of cities. As Latin American countries urbanized, programmatic and clientelistic politicians devoted more attention to urban areas, which might have worsened the livelihoods of rural and sparsely populated subnational units. Democratization might increase subnational inequality through changes in the territorial distribution of resources, via urban bias, or via demise of authoritarian coalitions.

What about left party rule? As Garay has recently demonstrated, left parties "have generally prioritized the interests of labor union allies over those of outsiders" (Garay 2017: 12). Outsiders, or the poor working in the informal sector, make up the majority of the poor outside the main urban, industrial centers of a country. We can deduce from Garay's work that the poor in peripheral cities or in the rural portions of the country are not the core constituency of left parties in the region. For this reason, territorial

equalization cannot be assumed to be a priority of more progressive welfare policies pursued by left regimes, because these policies tend to target insiders concentrated in the main cities and linked to the formal sector.

Similar questions can be raised regarding the proposition that increased human capital spending and conditional cash transfers result in inequality reduction. The effect

Table 4 Summary of arguments and findings

Type of inequality	Subnational social inequality	Income inequality
Description		
Vertical or horizontal	Horizontal	Vertical
Measurements	Composite Index of Subnational Inequality.	Gini Index, Palma Index, among others.
Time trends	For most countries in Latin America, it dropped in the 1990s and 2000s.	For most countries in Latin America, it increased in the 1980s and 1990s, and dropped in the 2000s.
Causal inferences		
Neoliberal reforms	Unclear impact. Deindustrialization might have disproportionately affected urban metropolises, closing the gap between urban and rural areas. Replacement of universalism for targeted social policies with a territorial component might have improved social conditions of stagnant regions.	Causes increases in interpersonal inequality due to deindustrialization (lowered salaries of low-skilled workers), technological change (increased wages of high-skilled workers), and reduction of universalism.
Democracy and left party rule	Unclear impact. Democracy entails an urban bias. The poor outside formal sectors and industrial centers are not the main constituencies of left parties.	Causes reduction in interpersonal inequality by amplifying the preferences of the poor.
Human capital spending and cash transfers	Unclear impact. Effect on subnational social inequality depends on territorial distribution of programs and benefits.	Causes reduction in interpersonal inequality by increasing the incomes of the poorest.
Analytic tradeoffs		
Benefits of focusing on each type of inequality	A more comprehensive assessment of the state of inequality.	Causal parsimony. Clearer conclusions on what affects a key type of inequality.
	Acknowledgement of causal complexity: not all forms of inequality respond equally to the same stimulus.	Causal parsimony facilitates policy recommendations.
	Novel connections with political dynamics that produce this type of inequality.	

of these policies on subnational social inequality largely depends on their territorial distribution. Such investments might be first directed to areas where there are larger concentrations of the poor and least educated, which tend to be the main cities. Or such investments might go first to smaller areas with low educational attainment and high poverty, but that are smaller in size. The first pattern of territorial distribution might lead to lower interpersonal inequality but higher subnational inequality. The second pattern might lead to lower interpersonal and subnational inequality. In the 2000s, it is possible that the educational attainment and income level in the most important cities had risen, forcing governments to channel investments and conditional cash transfers to more rural or peripheral areas. In any case, without looking at territorial distribution, the expansion of social policies does not necessarily imply lower subnational inequality.

In conclusion, when we employ a territorial lens to read the main findings of the inequality literature in Latin America, we can see that subnational inequality does not necessarily respond to the same dynamics. Whereas neoliberal reforms increased inequality between individuals, their effects on inequality between subnational units might have been the opposite. Despite the fact that both forms of inequality dropped in the 2000s, there are theoretical reasons to raise doubts on the positive effects of democratization, left party rule, and increased human capital spending on subnational inequality. Without in-depth analyses of the territorial effects of these factors, we should not let the findings on interpersonal income inequality form the basis for our understanding of inequality in general. The study of subnational inequality requires serious consideration of the territorial distribution of resources, the location of constituencies across the territory, the territorial interests of various political, social, and economic actors, and the nature of subnational governments (Falleti 2010, Gibson 2013). Although an empirical testing of factors that affect the evolution of subnational inequality is outside the scope of this paper, this section has shown a few theoretical reasons that justify the treatment of subnational inequality as a separate empirical phenomenon. Table 4 summarizes the key findings and arguments of this paper. The next section continues this discussion by proposing avenues of future research.

Conclusions

Subnational social inequality is a type of inequality that has received scant attention from scholars. Researchers have devoted attention to interpersonal income inequality or to other dimensions such as race, gender, class, or ethnicity. Additionally, when political scientists study subnational units as markers of inequality, they almost exclusively observe economic attributes. This article proposed two shifts, one from interpersonal to interregional or subnational inequality and a second from economic to social inequality. To do so, the article developed a novel concept and measurement of subnational social inequality. By exploring the evolution of inequality using this measurement in the Latin American region, the article achieved three main contributions.

First, employing the lens of territory when studying inequality leads us to see a completely different reality. As the example of the Latin American region shows, it challenges the idea that inequality rose during the 1990s because most countries managed to equalize access to health and education across territory. Neoliberal reforms might not be so adverse to equality after all. Along the same lines, the fact that a set of countries has low

interpersonal inequality and high subnational inequality (Peru), or high/medium interpersonal inequality but low subnational inequality (Chile and Costa Rica), should prompt political scientists to study the dynamics of the formation of inequality and the interrelations between different dimensions and markers of inequality. The last section showed how theoretical explanations for increases or decreases in inequality, such as neoliberal reforms, democratization, left party rule, or increased human capital spending, might work differently for subnational inequality. Studying the diverse manifestations of inequality is particularly pertinent in Latin America, a region with the highest levels of inequality in the world. Political scientists must produce descriptions and explanations that account for the subtleties and complexities of the different varieties of inequality.

The second contribution relates to the development of a novel measurement more attuned with the subjective notions of what inequality looks like. This article proposes that two dimensions of inequality, gap and dispersion, provide a more nuanced and complex understanding of subnational inequality. Both the absolute differences in the wellbeing of better-off and worse-off subnational units, and the distance of subnational units from the average, should be taken into account. In this sense, this article stresses the importance of coherence between concepts and measurements.

Lastly, this article sets the conceptual grounds for a political understanding of subnational social inequality. Political scientists should inquire about the power dynamics that determine a territorially uneven allocation of public goods, elucidate the origins and the role of political institutions in solidifying such distributional asymmetries among subnational units, and assess the opportunities, obstacles, and results of policies designed to address such disparities (Otero-Bahamon 2016). In the context of decentralization reforms enhancing the importance of subnational arenas, the study of subnational inequality can be a great avenue for understanding the preferences of actors involved in territorial politics (Falleti 2010, 32; Beramendi 2012; Rogers 2015). Political scientists should embrace the study of different types of inequality, in alignment with the political processes in which inequality is produced. This article sets the foundation for such a theoretical and empirical undertaking.

Acknowledgements I would like to thank Isabel Castillo, Rodrigo Barrenechea, Mariana Borges, Laura Garcia, Ana Arjona, James Mahoney, Alisha Holland, Edward Gibson, Tulia Falleti, Diana Rodriguez, Sandra Botero, Santiago Alles, Juan Diego Prieto, participants and discussants at Repal 2014, Lasa 2014, and IQMR 2015, and anonymous reviewers and editors for their excellent comments and suggestions. I also thank EDGS and the Buffet Center at Northwestern University for the financial support.

Appendix

Inequality Measurements of Gap and Dispersion

Gap Measurements

a) Range

Definition: The range provides the difference between the highest and the lowest value on a variable. When used in subnational analysis, it provides the full extent of variation

of an attribute across spatial units. If subnational illiteracy rates go from 5 to 25, the range would be 20.

Advantages: It captures the idea of the *gap* between the better-off and the worse-off areas, it is easy to compute and simple to understand.

Disadvantages: The range is not commonly used as an inequality measurement because it does not comply with the inequality axioms, or a group of desirable properties that inequality measurements should respect. There are four axioms: the transfers principle, the scale invariance principle, the translation invariance principle, and decomposability.[10] As the range only takes into account two units and it depends on the scale, it does not fulfill any of the axioms. However, the axioms for inequality measurements were mainly developed for the study of individual income inequality, and they are not necessarily suited for subnational inequality in social development indicators. In fact, and as was shown in the text with the examples of countries A and B, complying with the scale invariance axiom obscures the existence of subnational inequality.

b) Ratios

Definition: The ratio is computed by dividing the highest value by the lowest value, or values set at different percentiles.

Advantages: Ratios can be used in cross-country and cross-attribute comparisons.

Disadvantages: As the ratio complies with the scale invariance principle, it does not allow us to tap the gap dimension of subnational inequality that makes a difference between country A and country B, in the text's example. For this reason, the range is better suited than the ratio for our concept of subnational inequality.

c) Beta Convergence (B.C)

Definition: Economists study subnational inequality by using sigma and beta convergence. Sigma convergence is the coefficient of variation, while beta convergence refers to the relationship between the initial level of an attribute and its growth rate over a time period. B.C takes place when the worse-off regions improve faster than the better-off regions, lessening the range. Theoretically, B.C refers to the idea that when the worse-off catch up there is reduction in inequality. B.C is measured by running a lineal regression in which the growth rate of an indicator in each subnational unit in a previously established period of time is the dependent variable, and the initial level acts as the independent variable. If the coefficient (b) is negative, there is beta convergence (Barro and Sala-i-Martin 1992).

Disadvantages: It is possible that the worse-off grows so fast that it overcomes the better off, producing more inequality instead of reducing it. The measurement of B.C

[10] Very briefly, the transfers principle states that any transfer of the attribute under consideration between a worse off unit or individual to a better off must be reflected in a reduction or increment in the measurement of inequality (Dalton 1920; Allison 1978) The scale invariance principle requires that multiplying every value by a constant leaves the degree of inequality unchanged. The translation invariance principle requires the inequality measurement to remain unchanged when a uniform addition or subtraction is applied to all values of the distribution. Lastly, the decomposability axiom is achieved when a measurement is able to distinguish between group inequality and individual inequality (Bellù and Liberati 2006)

would suggest a reduction in inequality when an increment in inequality is taking place (Gyuris 2014: 213). Additionally, beta convergence describes whether inequality is increasing or decreasing, but gives no information on the extent of such inequality. Lastly, the fact that the time frame for which B.C is calculated must be predetermined raises suspicions, since the criteria for selecting the time period are not clear and often different time frames give different results. To sum up, B.C, although commonly used by economists, does not fulfill a few desirable attributes of a subnational inequality measurement.

Dispersion Measurements

a) Standard Deviation and Coefficient of Variation.

Definition: The standard deviation provides an idea of the dispersion of an attribute around the mean. If the values of a given variable are very spread out, the standard deviation is high. When applied to spatial analysis it would tell, on average, how distant from the mean are the values of the different spatial units. The standard deviation can be weighted by population size. The weighted standard deviation acknowledges that each spatial unit has a different population size, reducing the impact of depopulated and outlier provinces in the distribution.

Disadvantages: The standard deviation, however, says little if not placed in the context of the mean. For example, the dispersion of a variable in a dataset with standard deviation of 3 looks very different if the mean is 5 or 500. If the mean is 5, the data is very dispersed. If the mean is 500, the data is not dispersed at all.

The coefficient of variation—our selected measurement for dispersion—is the solution to this problem because it is computed by dividing the standard deviation by the mean. It can also be weighted by the population size of each subnational unit. Additionally, it is independent of the unit in which the variable is measured. In every case, the higher the C.V, the greater the dispersion of a given attribute. The (weighted) C.V is as apt for inequality measurement as the Gini coefficient.

b) Spatial Gini

Definition: The Gini Coefficient is a measure of dispersion because it measures the extent to which the distribution of an attribute among individuals or groups deviates from a perfectly equal distribution. It is defined in two main ways: as the average difference in an attribute between all pairs of individuals or groups or as the area between the Lorenz curve and the egalitarian line by the area of the egalitarian triangle. The Gini can be used for groups and individuals. When applied to spatial analysis, each spatial unit is considered to be a group with a population weight. The Gini captures whether the amount of an attribute possessed by each group is proportional to its size. It ranges from 0 where all subnational units have the same access, to 1 where there is absolute concentration of an attribute in one subnational unit.

Advantages: The Gini is probably the most commonly used measurement of inequality. It is scale invariant and sensitive to transfers.

Disadvantages: However, the Gini is used for continuous variables that are cumulative in nature, such as income or years of schooling. It is not commonly used for

categorical (e.g., race), discrete (e.g., educational attainment), or bounded variables (e.g. illiteracy or infant mortality rates (Thomas et al. 2001). This is reflected in the fact that a Gini of a rate—for instance, illiteracy—is completely different from the Gini of its opposite—literacy.

c) Theil Index

Definition: The Theil Index is a measure of dispersion that allows decomposition in *between group* and *within group* inequality. If disaggregate data is available, the Theil index would tell how much inequality corresponds to the differences between groups and the differences between individuals.

Disadvantages: Despite being very appropriate for spatial analysis due to its decomposable nature, the Theil Index suffers from a major shortcoming: it is sensitive to population size, which means that it is not comparable across countries with different numbers of subnational units (Elbers et al. 2008). In addition, the Theil Index is difficult to understand and compute and is not intuitive.

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